Knowledge Demanded for Action
- Studies on Knowledge Mediation in Organisations

by

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For this, indeed, is the true source of our ignorance – the fact that our knowledge can only be finite, while our ignorance must necessarily be infinite.

Karl Popper (1902-94)
Abstract

Knowledge enables action and is used in action, but organisations per se do not possess knowledge or perform actions. Organisations act through their members – human actors – who demand actionable knowledge to enable knowledgeable actions. Actors create knowledge in interaction with each other in the social world, and this dissertation aims to contribute to the understanding of knowledge mediation between actors in organisations. Knowledge mediation can be performed both with and without the use of information technology (IT), and this work is interested in both kinds.

Three basic types of knowledge mediation have been identified: specific knowledge mediation (SKM), typical knowledge mediation (TKM) and random knowledge mediation (RKM). These types and their variants have been conceptualised and characterised based on, among other things, what triggers the mediation, who initiates the mediation and what instruments are used to accomplish the mediation. One significant characteristic of SKM and TKM is that they are triggered by problems that actors experience, while RKM is about serendipity.

This work has also identified a number of circumstances that might facilitate or hinder knowledge mediation. These influencing circumstances are explained on the basis of the characteristics of the problem situation, the knowledge, the initiator, the knowledge receiver, the knowledge provider, the mediating instrument and the working environment.

Concerning the instruments used to accomplish knowledge mediation, SKM, TKM as well as RKM exhibit variants of both IT-based and none IT-based mediation, which partly can be related to whether a personalisation strategy or a publication strategy is used to approach knowledge mediation.

IT-based information systems (IS) have shown to represent crucial instruments to institutionalise and organise knowledge mediation. In comparison with oral communication, the use of IS offers high preservation and accessibility of signs used to mediate knowledge. On the other hand, the use of IS limits the possibilities of reasoning about interpretations and putting additional questions, which are some of the benefits of oral communication.

The contributions of this work have been developed through a qualitative, interpretative case study approach. Three organisations – an energy firm, a publishing firm and an architect firm – have been used to empirically ground this work, and interviews and observations were the two main methods used to collect the empirical data.

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Foreword

Information systems development is a discipline within the faculty of arts and sciences at Linköping University. Information systems development is a discipline studying human work with developing and changing computer-based information systems in organisational settings. It includes theories, strategies, models, methods, co-working principles and tools concerning information systems development. Different development/change situations can be studied as planning, analysis, specification, design, implementation, deployment, evaluation, maintenance and redesign of information systems and its interplay with other forms of business development. The discipline also includes the study of prerequisites for and results from information systems development, as e.g. studies of usage and consequences of information systems.

This work, *Knowledge Demanded for Action - Studies of Knowledge Mediation in Organisations*, is written by Ewa Braf at Jönköping International Business School. She is also a member of the research group VITS. She presents this work as her Ph D dissertation in information systems development, Department of Computer and Information Science, Linköping University.

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23. Stefan Holgersson (2001) IT-system och filtrering av verksamhetskunskap – kvalitetsproblem vid analyser och beslutsfattande som bygger på uppgifter hämtade från polisens IT-system

24. Per Oscarsson (2001) Informationssäkerhet i verksamheter – begrepp och modeller som stöd för förståelse av informationssäkerhet och dess hantering i verksamheter


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This introductory chapter describes the research area of interest. The chapter opens with some reflections concerning the theoretical domain of knowledge management that this work sets out from. This is followed by a discussion and presentation of the research agenda, the aim and research questions, the target audience and the demarcations of this work. The chapter closes with an outline of the disposition and some reading instructions for this dissertation.

1.1 Knowledge Management: the Point of Departure

There is a widespread consensus that the modern society is increasingly governed by knowledge and expertise (see Knorr Cetina 2001; Kalling & Styhre 2003). It is even claimed that we live in a so-called ‘knowledge society’ in which ‘knowledge’ represents the most critical competitive means for organisations (see Drucker 1993; Nonaka & Takeuchi 1995; Quintas et al. 1997; Davenport & Prusak 1998). Organisational practices are not only dependent on individual knowledge but also on shared skills and understanding (Dreyfus 1991; Turner 1994; Schatzki 2001). This implies that knowledge continuously needs to be developed and communicated in order to be utilised as a strategic asset in organisations; knowledge is needed to maintain clients’ demand, efficiency, market shares and profitability (see Drucker 1993; Quintas et al. 1997; Davenport & Prusak 1998; Blackler 1995).

Those ideas have, in turn, contributed to the rise of the concept of ‘knowledge management’ (KM), which has become a common topic in both research and practice (see also section 3.1). However, despite the huge amount of literature on KM, some scholars argue that KM is still a rather illusive concept and that rather little analytical work has been undertaken to clarify what KM concerns (see Harrison 2002; Quintas 2002; Styhre 2003). To Harrison (2002) and Quintas (2002),

[t]here is much rhetoric and conceptualisation, but scant progress in theory building or in practice. […] there is also a worrying failure to identify or deal effectively with
human issues involved in developing, sharing and using knowledge that flows from workplace learning. (Harrison 2002:xii)

The phrase ‘knowledge management’ describes an aspiration rather than a reality for the majority of organisations. [. . .] there is currently only partial agreement on what the knowledge management project consists of and what its agenda may look like. There are still many interpretations of the boundaries, scope and content of this new area, as well as conflicting views on the dominant disciplinary bases. (Quintas 2002:1)

This dissertation intends to contribute to the understanding of the concept of KM. Before presenting my research agenda, I will discuss KM from the perspective of informatics, which is the discipline that this work is primarily based on, and also present some meanings of ‘knowledge’ to clarify some basic assumptions of this work.

1.1.1 Knowledge Management – A Foundation in Informatics

It is said that knowledge management “is a newly emerging, interdisciplinary business model that has knowledge within the framework of an organization as its focus” (Awad & Ghaziri 2004:2). However, the ideas underlying KM are not new. As early as in 1920 the economist Alfred Marshall (1920:115) stated the importance of knowledge as a source of economic wealth, “[k]nowledge is our most powerful engine of production [. . .] Organization aids knowledge [. . .]”

Later on Penrose (1959) asserted that economists have always recognised the critical and increasing role of knowledge in economic processes, and Touraine (1971) emphasised knowledge as an important production factor. Still, even if the function of knowledge has been recognised since several decades, Penrose (1959) also asserted that less concrete actions have been performed to develop and maintain knowledge in organisations.

How come we recognise the role of knowledge but lack the capability to handle this issue? What is the underlying problem? Perhaps one cause lies in the characteristics of knowledge that in comparison with material assets is more difficult to handle. This is suggested by Penrose (1959:77), who writes,

[e]conomists have, of course, always recognized the dominant role that increasing knowledge plays in economic processes but have, for the most part, found the whole subject of knowledge too slippery to handle.

It might also be due to our view of the relation between organisational actors¹, knowledge and production. Perhaps we focus too much on the individual knowledgeability without giving enough attention to the context in which individuals interact. Perhaps we should pay more regard to communication between actors as a foundation of KM. This reasoning is in line with Touraine (1971), who contends that work comes to be less defined as a personal contribution and more as a role within a system of communications and social relations (see also Kalling & Styhre 2003).

¹ In this work the term ‘organisational actor’ (or just ‘actor’) refers to the individual members who work within and behalf of an organisation (see further discussion in section 2.2.1).
Talking about communication and social relations are not new issues either. Those phenomena have been discussed within several theoretical areas, including sociology (see Berger & Luckmann 1966), semiotics (Halliday 1978), philosophy of language (Austin 1962; Searle 1969) and organisational learning (Argyris & Schön 1978; Senge 1990).

This work approaches KM as a part of informatics, which also is a theoretical area in which communication represents a core. Informatics is a theory and design-oriented study of information technology (IT\(^1\)) use (see Dahlbom 1996). It deals with issues such as design, use and management of information systems (IS) as tools to collect, store, process and distribute data to the IS users (Dahlbom 1996; Magoulas & Pessi 1999).

What nowadays is called ‘informatics’ has – at least from a Scandinavian perspective – its origin in ‘administrative data processing’ that evolved as a new discipline in the sixties, and Börje Langefors is often referred to as its founder (Dahlbom 1996; Magoulas & Pessi 1999). Following Langefors’ (1966) terminology, the function of information systems is to support an object system with information (see further section 2.5). An organisational practice can be seen as an object system in which the actors need information to make decisions and accomplish different kinds of actions.

Even if the word ‘information system’ implies that an IS contains information, Langefors (1966) refers to IS as *instruments to communicate information and knowledge*. He talks about the content of IS in terms of data representing and communicating information and knowledge. Langefors (1993:111ff.) writes,

\[
\text{[i]n Information Systems Theory, information is what we obtain when we get informed. Thus information is something we get to know, is knowledge of some sort. [. . .] “data” refers to signs used to represent information. [. . .] but data are not information.}
\]

Langefors (1993:119) also discusses the importance of “interpretation” and the notion of “informed action”. Actors need to interpret the data provided by an IS in order to become informed and to get to know more, and the intention of gaining new knowledge is to enable improved and modified actions, so-called informed actions. The distinction between data versus information and knowledge, the need for interpretation and the effects of communication in terms of informed actions are all important KM-related issues. Another useful contribution of Langefors is the view of IS as instruments to communicate knowledge. As such IS has also become closely associated with KM (see further section 1.2).

In sum, the underlying ideas of KM are not new but have now been disguised by a new name: ‘knowledge management’ (see Gray & Meister 2003). We might continue to talk about KM – which is an important aspect of all organisational practices – but need to be clearer about what KM concerns (ibid.). In this regard, informatics and its theories can contribute to an enhanced understanding of the concept of KM, and by turning back to Langefors several useful ideas have been identified. However, we also need to acknowledge that KM is an interdisciplinary

\(^1\) Nowadays ‘information and communication technology’ (ICT) is often used as a synonym of IT, in particular in the KM literature.
area of research (see Quintas 2002; Gray & Meister 2003). As such, this work will also make use of theories within other disciplines such as organisation theory, philosophy of communication and language and philosophy of knowledge.

1.1.2 Basic Meanings of ‘Knowledge’ Applied in this Work

Even if we put a great value on knowledge, we have obvious difficulties in defining what we mean by the word ‘knowledge’ and also its prospects of being ‘managed’. Several KM scholars tend to use the word ‘knowledge’ in a rather simplistic manner without any well-reasoned consideration of its ontological and epistemological assumptions (see criticism in Stamper 2001; Styhre 2003; Walsham 2004). Knowledge is not a commodity that easily can be collected and stored by the use of IT, as some KM scholars seem to imply (see Cohen 1998; Kock & McQueen 1998; see further section 3.1.3). As Garvey & Williamson (2002:3; see also Quintas 2002) argue, there are also reasons to be suspicious of organisational claims concerning, among other things, knowledge, creativity and organisational learning,

[the ability to use this language fluently – if not always intelligently – has become one of the defining characteristics of modern managerial identity.]

Following Styhre (2003), neither practitioners, nor theorists will be able to offer a coherent definition of knowledge. Still, to be able to improve organisations’ capabilities to continuously develop and share the knowledgeability of actors, there needs to be a pretty good idea of what knowledge is needed in the practice (see also the concept of ‘knowledge vision’, Nonaka & Takeuchi 1995; Davenport & Prusak 1998; von Krogh et al. 2000). Jenkins (2004) even argues that the way we view knowledge affects the design specifications of information systems as instruments for KM.

To be clear about what knowledge is needed in practices is a critical issue of informatics. Since about forty years back Langefors (1966) has argued for the need to determine what information and knowledge to provide via an IS. But instead of investigating why information is needed in a system, Langefors (1966:149) suggests that we turn the question around and ask “how we could make use of information?”.

Hereby, Langefors gives prominence to the usefulness of information and knowledge in relation to the practice (object system) that the information system is supposed to serve.

However, the content of an information system is not information or knowledge (Langefors 1966, 1993; see also the previous section). It is data (signs) used to communicate information and knowledge. Langefors (1993:113f, *italics* in original) maintains,

[. . .] we obtain knowledge by communication from other people [. . .] We get informed by the communication and the knowledge we thus get is usually called information. But it is the same knowledge in both cases, the knowing of some fact. [. . .] Like “information” the term “data” is used with different meanings in different contexts, but in connection with data processing by computers or by hand, “data” refers to signs used to represent information. As an illustration, we can look at the sign “information”, composed of eleven letters, and observe that it is data used to
represent some concept or component of information, to somebody who knows that concept.

Building on Langefors, this work approaches knowledge as what human actors need to know to accomplish their organisational tasks. It will presume that by acquiring task- and practice relevant knowledge, actors will be able (or at least be better prepared) to accomplish knowledgeable (‘informed’) actions. This is a practical-oriented view focused on how actors acquire and share knowledge to perform organisational actions (see further section 2.2). This work also presumes that human actors obtain knowledge in interaction and communication with each other. Hence, knowledge is a property of humans, but a significant part of actors’ knowledge can be expressed and communicated by the use of signs (see further section 2.4). In this work, the words ‘information’ and ‘informed’ refer to the knowledge contribution of actors gaining information and getting informed. This view follows Langefors (1966, 1993) and also the view of ‘knowledge as practical information’ as described by Jenkins (2004).

We could, of course, argue about what is right, good and rational knowledge. However, “what is seen as relevant knowledge in terms of practices is always based upon the assumptions and beliefs in a certain culture and society” (Styhre 2003:146; see also Douglas & Wildavsky 1982). What is right for us is what we can make practical use of. As such knowledge is situational (Haraway 1991); it qualifies as knowledge from the perspective of its usefulness. This is in line with James (1975:100), who contends “truth live, in fact, for the most part on a credit system. Our thoughts and beliefs ‘pass’ so long as nothing challenges them, just as banknotes pass so long as nobody refuses them”.

We can also reason about different degrees of knowledge. For example, an expert has more and deeper knowledge than a novice in the same area. I am also well-aware of the ongoing discussions about the distinction between information and knowledge in which I have also participated (see Braf 2002). But perhaps we are ingrained in the belief that we have to reach and define the essence of words and concepts. However, as Langefors says, terms like data, information and knowledge are used with different meanings in different contexts (see also Wittgenstein 1958a; see further section 2.1). At the core, the information we have gained and the experiences we have learned are all part of our knowledge about the world.

1.2 Launching the Research Agenda

It is widely recognised that the practice of KM has been closely associated with IT (see also section 1.1.1). It is also a widespread understanding that many knowledge management initiatives (KMI) have focused on technology and less on the use of IT in relation to its social and organisational context (see Scarbrough et al. 1999; Harrison 2002; Walshaw 2001; Garvey & Williamson 2002). This has involved a tendency to treat knowledge as a ‘tradable commodity’ that can be exchanged via IT (see the “content perspective” and the “codification strategy”, section 3.1.3 and 3.2.2). Not surprisingly, Mc Dermott (1999:104) notes that, “most companies soon find that leveraging knowledge [through IT] is hard to achieve”. This does not, however, mean we should neglect technology as part of KMI. As Walshaw
(2001:607) proposes, “computer-based systems can be of benefit to human activity if we are careful about assessing their benefits and limitations in supporting the development and communication of human meaning” (see also McDermott 1999).

1.2.1 Focus of Investigation

Talking about communicating knowledge presumes at least two parties: a knower (‘speaker’) and a new knower (‘receiver’). For example, when using IT to communicate knowledge 1) a knower (speaker) expresses his knowledge by the use of signs and 2) stores and makes the signs available in an IS for 3) a potential new knower (receiver) to access and interpret the signs and thereby hopefully gain useful knowledge.

In the KM literature the communication of knowledge is commonly discussed in terms of ‘knowledge transfer’. It is argued that knowledge transfer is both a critical part of KM and a key to a learning organisation (see Goh 1998; Garvin 1993). Furthermore, Szulanski (1996) argues that during the 1990s the transfer of knowledge – in particular concerned with ‘best practices’ – became an important a widespread practical management issue (see also Szulanski & Cappetta 2003), and Spender (2003) argues that even if research has been performed on knowledge transfer it tends to be treated as unproblematic phenomenon and needs to be further investigated.

Following Walsham (2004), there is, however, a risk of using words such as ‘knowledge transfer’ since it might imply a view of knowledge as objectified. To avoid such interpretation, knowledge mediation is the key term used in this work when talking about communication of human experiences, meaning and understanding. The term ‘mediation’ is borrowed from Vygotsky (1986), who talks about ‘mediated action’ in which he interrelates the phenomenon of artefacts, communication and knowledge (see further section 2.4.2 and 2.5.2).

Knowledge mediation is not about moving an object from one actor to another; it is about a flow or process that indirectly or directly connects the knower (speaker, knowledge provider) and the new knower (receiver, knowledge seeker, knowledge needer?), and one important issue is how to make this flow function effectively (see Holtshouse 1998).

There is a need to better understand the benefits and limitations of IT as a tool for communicating knowledge (Walsham 2001). To improve this kind of understanding it is not enough to only study IT-based knowledge mediation or just focus on the benefits and limitations of such mediation. We need to understand knowledge mediation as phenomenon in order to understand when IT can be a usable instrument. We need to understand how knowledge mediation is accomplished both with and without IT. This includes an understanding of when IT-based and none IT-based knowledge mediation work and when they do not work.

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1 Still, the KM literature on ‘knowledge transfer’, and partly also ‘knowledge sharing’, will be used as a theoretical source of inspiration (see section 3.2).

2 I am aware that notions such as ‘speaker’, ‘knowledge provider’ and ‘receiver’ might sound as simplistic and reified expressions – like if it was a ‘piece of a cake’ to just ask someone to ‘hand over’ certain knowledge. Still, I will sometimes use these kinds of simplistic notions due to a lack of better words that capture and involve the complex reality we are dealing with.
Understanding when knowledge mediation works and when it does not work can be related to issues such as ‘benefits’, ‘facilitators’, ‘limitations’ and ‘hindrances’ of KMI, which are common themes in the KM literature (see further section 3.2). Even if there is extensive research on circumstances influencing knowledge mediation, it is argued that there is a need to further investigate both facilitators and hindrances, including their underlying reasons (see Alavi & Leidner 2001; Walsham 2001; Nonaka & Toyama 2003).

Furthermore, the KM literature says rather little about how different knowledge mediation processes are accomplished, what they look like, their similarities and differences. As Nonaka & Toyama (2003:2) argue, “it seems that we are still far from understanding the process in which an organization creates and utilizes knowledge” (see also Holtshouse 1998). There are several studies concerned with knowledge transfer in organisational contexts. One limitation is that many of those discuss knowledge transfer on a quite abstract level; not infrequently based on a general process model including four stages: initiation, implementation, ramp-up and integration (Szulanski 1996; see further section 3.2.1). Goh (2002) also claims that most studies focus on knowledge transfer between organisations and that there is a lack of understanding of an intraorganisational perspective (see also Pfeffer & Sutton 2000).

One interesting study of knowledge transfer is presented by Dixon (2000; see further section 3.2.1). By analysing a number of diverse transfer processes, Dixon points out three criteria – who the intended receiver is, the nature of the task and the type of knowledge to be transferred – that she believes determine how and why knowledge transfer works. Those three criteria are used “to develop five categories of knowledge transfer, each of which requires different design elements to make the transfer successful” (Dixon 2000:28). Dixon also argues that the “business drivers” of knowledge transfer are business goals or requirements established by the management. For example, to reduce time and cost to resolve routine or non-routine tasks, or to improve teams’ outcome measures.

Dixon’s study focuses on knowledge transfer between teams. In this regard, it would be interesting to investigate whether Dixon’s ‘business drivers’ also trigger individual actors to initiate knowledge mediation, or if there might be other circumstances that give rise to the need for knowledge mediation. In other words, what circumstances trigger (give rise to) the need for knowledge mediation and who initiates knowledge mediation in the first place? In comparison with Dixon’s study, using the trigger together with the initiator as initial criteria to understand knowledge mediation might result in the identification of other and additional types of knowledge mediation (see further discussion in section 3.2.1).

1.2.2 Level of Inquiry
Following Styhre (2003; see also Chauvel & Despres 2002), there are at least three levels of knowledge management research: firm-to-firm, organisation unit-to-organisation unit and individual-to-individual level. The firm-to-firm level concerns the creation, exploitation and dissemination of knowledge in networks of organisations or within industries. These kinds of studies often aim to understand how organisations can create competitive advantage on the basis of their knowledge
recourses and capabilities. The organisation unit-to-organisation unit level involves the creation and exploitation of knowledge in groups of experts or in a division of an organisation, while the third level individual-to-individual relates to how knowledge is created and communicated between individuals.

This work will investigate how knowledge is mediated between actors within an organisation, which is an intraorganisational perspective. Hereby, the firm-to-firm level would not be an appropriate choice as it focuses on an interorganisational perspective. The unit-to-unit level could be suitable if this work aimed to look into certain communities of practices, but such a focus has not been defined. Thus, the research agenda so far presented applies best with the individual-to-individual level of research.

However, this deserves some additional comments: I find the distinction between the three levels problematic since there seems to be an inherent conflict in the way those three levels are presented.

On the one hand, how can research on a firm-to-firm and a unit-to-unit level be accomplished without an understanding of the individual-to-individual level? How can we study the communication of knowledge without a focus on individuals? We might talk about organisations and groups as actors, but those do not act on their own; organisations and groups act through their members (see further section 2.2.1). In the same line, organisations per se do not have and use knowledge; knowledge is always related to someone who knows—a human being. Hereby, when investigating phenomena such as knowledge creation, knowledge mediation and knowledge utilisation, we need to start out from inquiring the individual-to-individual level. On the other hand, talking about an individual-to-individual level might be interpreted as we leave the organisational context. But investigating knowledge mediation between actors in an organisation does not primarily mean an interest in individuals as such. The interest is in individual actors in their organisational roles.

This reasoning does not mean that it is irrelevant to talk about a firm-to-firm or unit-to-unit level. We might investigate how knowledge is created and shared in networks of firms or in expert groups, but such knowledge mediation involves mediation at the individual level. We need to understand the individual-to-individual level to be able to understand how groups and firms exploit knowledge. In the spirit of Wittgenstein (1958a, 1958b), we need to understand the simple before we can understand the complex, and as Pfeffer (1994) argues, it is critical to get close to the originators and users of knowledge, that is, the human beings. This is also in line with Chauvel & Despres (2002), who maintain that individuals are the fundamental reality of organisations.

1.3 Aim of Research

This dissertation aims to contribute to the understanding of knowledge mediation between actors in organisations. Such mediation can be performed with or without the use of IT, and I am interested in both kinds. The dissertation will identify common types of knowledge mediation, their characteristics and influencing circumstances.
1.3.1 Research Questions

To further specify and direct this work, some research questions will be formulated. These are questions to which some answers will be given. Hereby, I do not claim that this work will contribute with any definite or conclusive answers but provide evidence good enough to achieve the formulated aim of this dissertation.

- What are common types of knowledge mediation between actors in organisations? Here I am interested in the characteristics of common types of knowledge mediation, no matter whether they are IT-based or not, like,
  - What triggers knowledge mediation?
  - Who initiates knowledge mediation?
  - What instruments are used to accomplish knowledge mediation?

- What circumstances might influence knowledge mediation? Here I am interested in under which circumstances knowledge mediation works and when knowledge mediation has less potentiality to work; I am interested in,
  - What circumstances might facilitate knowledge mediation?
  - What circumstances might hinder knowledge mediation?

The above questions include both IT-based and none IT-based knowledge mediation. An additional question focusing on IT-based knowledge mediation has also been formulated:

- When can information systems be seen as suitable instruments for knowledge mediation?

1.3.2 Demarcations

The aim and research questions formulated above embrace different theoretical fields that could be useful for this work. However, it would be futile to try to incorporate all relevant theoretical sources. Thus, some clarifications and demarcations need to be done.

This work approach KM as part of informatics, thus information system theory and also prior research on KM are fundamental. Organisational learning theory is another field relevant to this work. I will make some brief comments towards this area (see section 3.1.5), but I do not intend to build this work on organisational learning theory.

I am interested in the whole process of knowledge mediation, that is, from the situation that triggers the need of knowledge mediation, along the mediation process and until the knowledge can be utilised in action. However, the focal point of my research is oriented towards what knowledge is mediated by what instruments and for what actions (see ‘informed actions’, Langefors 1993), and less on the interaction between actors in knowledge mediation and the actually use of mediated knowledge (see further section 2.4.2 and 2.6.4).
I am primarily interested in knowledge mediation within organisations, that is, an intraorganisational perspective. However, if knowledge needs to be acquired from external actors, I will not disregard such examples. Hence, the focus is on what knowledge actors in an organisation need to do their work.

Knowledge mediation is about communication, and I am interested in knowledge mediation as one aspect or portion of communication. Thus, I view knowledge mediation as communication but do not claim I will look into all kinds or aspects of communications. For example, a new order intake involves communication between a customer and a supplier, and also knowledge mediation in the sense that the supplier gets to know what the customer wants. However, this kind of communication will not be in focus of my investigation; I am rather interested in the knowledge mediation required for the supplier to handle the order, which also follows the intraorganisational focus applied in this work.

Furthermore, knowledge can be communicated in different way, including the use of body language or the meditation of a feeling. However, those kinds of knowledge mediation are not in focus of this work. The main interest is in knowledge mediation by the use of instruments such as language and IT-based information systems.

### 1.3.3 Target Audience

This work has two main target groups: One target group is people with a general interest in knowledge management, in particular the phenomenon of communication and mediation of knowledge. Those people might be researchers working in the field or approaching it as a new field. They might be practitioners, such as human resource managers or other managers or operative workers, who aim to improve actors’ (including their own) capability to share, reuse and utilise knowledge. They might be students who are exploring different areas to understand organisations in contemporary ‘knowledge society’. Or they might be other ordinary people who want to explore the interesting but elusive phenomenon of knowledge that affects our daily life.

The other target group concerns researchers and practitioners who have a specific interest in IT-based knowledge mediation. It is about understanding when information systems can be useful, or less useful, as instruments for communication. Such understanding is needed when deciding on whether to use IS as mediating instruments and what to think about when designing and implementing IS.

### 1.4 Disposition and Reading Instructions

The following is a brief outline of the disposition and some reading instructions of the remaining chapters presented in this dissertation.

Chapter 2 explores the phenomenon of knowledge in organisations by discussing what knowledge is for and how it is created and mediated between actors. Read this chapter to further understand the theoretical foundations that this work builds on.

Chapter 3 presents a critical review of the concept of KM. One part focuses on general issues common in the KM literature, and one part focuses on the concept of
knowledge transfer as part of KM. This chapter is not a complete survey of KM theories but comprehensive enough to position my standpoints in relation to common KM ideas. Read this to understand the position of this work in relation to KM theory and to get a picture of the use of KM theory in this work.

Chapter 4 describes the research approach and presents the main choices concerning the research focus, the analytical entity of inquiry, the research design, the methods for data collection and the principles of the data analysis. Read this to understand the research process and how this work has been accomplished.

Chapter 5 presents the organisations (cases) used to empirically ground the investigation and the contributions of this dissertation. Read this to get a picture of the practice of each organisation and their respective knowledge management initiatives that were the initial reasons for choosing those organisations as cases.

Chapter 6 introduces an initial categorisation of the three basic types of knowledge mediation identified in the empirical data: knowledge mediation triggered by specific problems, knowledge mediation triggered by typical problems and non-problem driven knowledge mediation. Read this to get an introduction to the more detailed descriptions in the three subsequent chapters.

Chapter 7, 8 and 9 contain a number of empirical vignettes to illustrate examples of each of the three identified types of knowledge mediation introduced in Chapter 6. Chapter 7 describes knowledge mediation triggered by specific problems, called Specific Knowledge Mediation (SKM), Chapter 8 describes knowledge mediation triggered by typical problems, called Typical Knowledge Mediation (TKM) and Chapter 9 describes non-problem driven knowledge mediation, called Random Knowledge Mediation (RKM). Empirical data are also used to illustrate circumstances that might influence the different types of knowledge mediation. Read these chapters to understand the connection between empirical data and the theory of knowledge mediation evolving as a result of this work. Each of these chapters is also concluded by a summary of significant findings (see section 7.4, 8.5 and 9.3). Read these sections to get a summary of the main categories and characteristics identified for each of the three types of knowledge mediation.

Chapter 10 and 11 abstract and theorise empirical findings, which are structured along an action-oriented model including the prerequisites for knowledge mediation (initiation stage), the process of mediation (implementation stage) and the consequences of knowledge mediation (utilisation stage). Chapter 10 further develops the categorisation introduced in Chapter 6 by comparing the three identified types of knowledge mediation and their characteristics on the basis of the empirical examples discussed in Chapter 7 to 9. The categorisation is refined and developed partly by the identification of a number of variants of each of the three basic types of knowledge mediation. Chapter 11 focuses on theorising circumstances that might influence each of the three basic types of knowledge mediation and when information systems are suitable instruments for knowledge mediation. Read these two chapters to get a detailed understanding of the theory of knowledge mediation suggested by this work.

In the final Chapter 12 the findings and the research contributions of this dissertation are summarised. This includes a discussion about implications of the findings in relation to the problem area, reflections concerning the research
approach and its results and some suggestions for future research. Read this chapter to get a clarification and summary of the theoretical and practical implications of this work, to take part of some of my reflections concerning the research process, and to get some ideas of future research.
Chapter 2

Theoretical Foundations

This chapter aims to delineate the theoretical foundations of this work. It will discuss the concept of knowledge, the primary function of knowledge in organisations, how knowledge is created and communicated and the role of information systems as specific instruments to mediate knowledge. As a result of these discussions, a reference model will be presented that illustrates the core and primary focus of this work, that is, the mediation of knowledge between actors to enable knowledgeable actions.

2.1 Inquiring the Concept of Knowledge

One of the fundamental words in this dissertation is ‘knowledge’. The meanings of ‘knowledge’ could be investigated on the basis of its synchronic axis by analysing how the word is used at a certain time (de Saussure 1959; Styhre 2003). Performing such an investigation at present time would result in the identification of a number of typologies of knowledge (see Boisot 1995; Nonaka & Takeuchi 1995; Spender 1996; Zack 1999), and one would also find that the distinction between data, information and knowledge is a commonly used basis for explaining knowledge (see Castells 1998; Nyhed 1998; Davenport & Prusak 1998; Hurme 1998; Knapp 1998).

The meanings of the word knowledge could also be investigated along its diachronic axis, retrospectively investigating how it has been used and developed over time (Styhre 2003). For example, according to English Etymology, ‘knowledge’ originates from the verbs ‘acknowledge’ and ‘recognise’, which imply a flow rather than a noun as a static object (Hoad 1996). The verb has also given rise to the adjective ‘knowledgeable’, which can never stand as itself but is a characteristic of something else (see further discussion in Braf 2002).

Both those approaches of inquiry are of value, and taking advantage of what previously has been said is a way to avoid “reinventing the wheel”. However, one drawback of both approaches is the risk that such discussions will be held on a too abstract level and do perhaps not support the clarification of what we mean by the
word ‘knowledge’. Such lack of substance is unfortunately also common in the KM literature, where discussions on ‘knowledge’ tend to be rather woolly, partly because scholars try to define knowledge but are less successful in formulating clear definitions. For example, as Davenport & Prusak (1998:5) maintain,

[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.

These authors also state that “what this definition immediately makes clear is that knowledge is not neat or simple” (ibid.). This kind of definition is, however, not really useful if it mainly illustrates the difficulties in pinpointing the meaning of what aims to be defined.

One underlying problem seems to derive from the way ‘knowledge’ is discussed. Much of the KM literature tends to approach knowledge as an isolated phenomenon without any concrete context. The meanings of knowledge per se are discussed rather than its relation to actors and their actions. Even if a lexical definition of knowledge might be desirable, knowledge is an elusive word that has been given a number of explanations. Following Webster’s Dictionary (1993:303), knowledge is explained as “what one knows; the body of facts, etc accumulated over time; fact of knowing; range of information or understanding; the act of knowledge”. Knowledge is a word that can be used in different settings and, thereby, be given different meanings (see the concept of ‘language game’, Wittgenstein 1958a; see also Vygotsky 19861; and discussion in Braf 2002). Hence, the meanings of words are situational, and we need to pay regard to the context in which words are used in order to clarify what they signify.

Thus, instead of striving to define ‘knowledge’, its meanings will be discussed on the basis of the use of the word in different contexts (language games). The overall context of this work is ‘knowledge in organisations’ (see section 2.2), and some specific language games that will be discussed are ‘knowledge creation’ and ‘knowledge communication’ (see section 2.3 to 2.5).

2.2 Knowledge in Organisations

There is no doubt that organisations play a prominent role in contemporary society, and via the development of organisations, it is possible to get things done and to achieve goals beyond the reach of the individual (see Parsons 1960; Scott 1998). Organisations are important not least as the bulk of the adult population spends more than a third of its waking hours as employees in organisations; as such, organisations represent a major part of our social environment (March & Simon 1958). The following subsections delineate some basic standpoints of this work concerning the view of organisations, the function of knowledge and actions performed in organisational contexts.

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1 Vygotsky (1986) also talks about how the meaning of words is changed due to different contexts. He argues that the ‘sense’ of linguistic utterances is dependent on the communicative practice in which they are used.
2.2.1 The Organisational Context

Organisations are not only interesting because they occupy a significant part of individuals’ lifetime. They are above all interesting in terms of social institutions established, maintained, re-produced and developed by human actors (see Zucker 1977; Giddens 1984; Knutagård 2003). Individuals and their actions are core constituents of organisational practices1. However, organisations are not only arrangements in which individuals accomplish actions to produce certain goods and services. Organisations are actors in their own right (Scott 1998). The fact that individuals can prosecute organisations is an obvious example of organisations as juristic or collective actors (see Coleman 1974). Still, organisations as such do not think or perform on their own. Organisations act through their members, that is, human actors who act on behalf of the organisation in which they work (see Argyris & Schön 1996; Ahrne 1994; Ahrne & Hedström 1999; Goldkuhl & Nilsson 2000). Hereby, we might talk about both organisations and humans as actors. However, in this work the terms ‘actor’ and ‘organisational actor’ will be used when referring to human actors (not to organisations as actors).

Organisations are durable, goal-oriented institutions that involve establishments of routines and common ways to perform. Organisations as institutions design and prescribe the way things are and should be done, including what to do, how to do it and sometimes also why to do it (Berger & Luckmann 1966; Giddens 1984; Goldkuhl 2003). Scott (2001:48) writes,

[j]nstitutions are composed of cultured-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life. Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines, and artefacts.

Following Berger & Luckmann (1966), institutions arise through processes of habitualisation and typification (see further section 2.3.1). This also means that institutions are composed of intersubjective knowledge of the actors (see Goldkuhl & Braf 2002a, 2002b). Actors develop common knowledge about the ‘situated contexts’ in which they interact (Goffman 1959; Giddens 1984). Norms, goals and values aim to be followed by the actors working in the organisation. This knowledge is a basis for establishing collective habits and routines whereby actors’ performance becomes institutionalised.

Different actors might have varying responsibilities and privileges. Those are defined through the actors’ organisational roles (see Giddens 1984; see also ‘role assignments’, Goldkuhl & Röstlinger 1999, 2002). Following Giddens (1984:84), an organisational role can be viewed as,

[. . .] a social identity that carries with it a certain range (however diffusely specified) of prerogatives and obligations than an actor who is accorded that identity (or is an “incumbent” of that position) may activate or carry out: these prerogatives and obligations constitute the role-prescriptions associated with that position.

1 The notion of ‘practice’ refers to the actions performed in organisations (that is, organisations seen as practice systems, Goldkuhl et al. 2001). Following Schatzki (2001), there is no unified theory of practice, but there are a number of issues that most practice theorists take into account, including knowledge, meaning, human activity, language and social institutions.
Even if organisational actors are accorded certain roles and positions, they are also incumbents of other identities (see March & Simon 1958). They are individuals whose behaviour, feelings and needs also arise within other social institutions – such as families and sport associations – in which they are involved. As actors do not only represent organisational roles but also individual and more personal identities and loyalties, conflicts might arise. Actors might have individual goals that are not in line with their organisational roles and the organisation’s goals. Conflicts might derive within individuals due to their different identities as well as between individuals due to different goals and perceptions of reality (see further March & Simon 1958; Goffman 1959).

Still, in organisations the primary role of actors is their organisational role (not their more personal identity). Actors act on the basis of their organisational roles, which are related to certain expectations. The expectations might be explicit as well as unexpressed (Giddens 1984). Either way, they influence the conduct of individuals as part of organisational practices. Hereby, given the organisational context, actors have their professional roles within which they carry out certain activities.

Organisations are complex systems that aim to produce goods and services for their clients within the frame of given assets and capabilities (see Goldkuhl & Röstlinger 2002). Organisations have a number of constituents – such as actors, their knowledgeability and activities, artefacts, goals and norms – that need to be coordinated\(^1\). Then, how can organisational practices be coordinated?

Mintzberg (1983, 1998) suggests six fundamental ways of coordination: Mutual adjustment by informal communication. Direct supervision, where one person takes responsibility for the work of others, instructs and monitors their actions, and four indirect ways to coordinate via standardisation of skills, work processes, outputs and norms. Looking into these coordination mechanisms they are all concerned with communication. Hence, communication can be seen as the most fundamental way to coordinate organisational practices. Actors communicate and use language to make sense of different situations, to organise activities and above all to develop common knowledge needed in practices (see Taylor & van Every 2000; Taylor et al. 2001).

2.2.2 Knowledge for Action

The view of knowledge as a critical constituent of organisational practices is not an issue of dispute (see Drucker 1993; Wikström & Normann 1994; Nonaka & Takeuchi 1995; Davenport & Prusak 1998; Nonaka & Toyama 2003). Knowledge makes organisations work (see also section 1.1). Knowledge is actually manifested in all kinds of human products, which, in turn, represent instruments to gain knowledge (see Davenport & Prusak 1998; Scott 2001). Still, even if we talk about knowledge as manifested in products and embedded in descriptions and routines, individuals are the carriers of knowledge (see Dewey 1931). Then, why do individuals learn and acquire knowledge? What is the function of knowledge?

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\(^1\) See Leavitt (1965), who talks about organisations involving social structures in terms of relationships among actors, norms and roles and also technology, which all need to be coordinated.
Imagine an infant who has no preferences or bias that governs her way of thinking and behaving. How come the infant develops knowledge about the world? The most obvious motive is to cope with the world as a human being. The baby will learn how to sit, walk and eat, and after some years she will manage those quite basic human behaviours and continue to learn other things such as talking, reading and writing. The baby will learn to eat to appease her hunger, sit to look around, walk to move, talk to communicate and so forth. She learns to accomplish different actions; she acquires knowledge to enable actions. She learns to improve her moral and social life (Dewey 1931).

This reasoning is also valid for actors in organisations. Actors have certain roles and functions within which they accomplish certain tasks. For example, in a bakery the baker’s task is to bake cakes and pastries. To do that the baker needs to know about what to bake, what ingredients to use, how to mix them and how long time they should be in the oven. The baker does not lean back and stop learning when he has learned how to bake a certain cake. He will continue to learn either by becoming more knowledgeable and perform tasks in a more efficient way, or by learning new things when dealing with new situations. Organisations and their actors are continuously challenged by different changes.

The core is that actors need knowledge to conduct, to accomplish tasks related to their roles and functions in organisations. In fact, already the definition of roles, functions and tasks is a matter of knowledge provision. This kind of pragmatic aspect of knowledge is highly critical – individuals do not primarily learn for its own sake, they learn in order to conduct. As can be read in Eppelheimer (1934), the aim of the enlightened man is not to collect a large personal stock of knowledge but to develop an advanced know-how. This is also emphasised by Berger & Luckmann (1966:56), who maintain, 

[s]ince everyday life is dominated by the pragmatic motive, recipe knowledge, that is, knowledge limited to pragmatic competence in routine performances, occupies a prominent place in the social stock of knowledge.

In a pragmatic vein, the interest of this work is oriented towards the practical consequences of actors’ knowledge in the sense that knowledge should be useful for actors’ actions. As Goldkuhl (2004:13) argues, “[. . .] action must be guided by purpose and knowledge. [. . .] and there is an inseparable link between human knowing and human action”. Consequently, we need to understand what actions actors perform in order to understand what knowledge they need and use (see also Langefors 1966; section 1.1.2).

Knowledge apart from the one needed in action is of secondary value. If knowledge is not needed for organisational actions, it is of no use for the actors in their organisational roles. From this also follows that if knowledge is not pragmatically necessary, there is less reason to learn it (Berger & Luckmann 1966). Hereby, there is a relation between the usefulness of knowledge and the motives to acquire it. Accordingly, actors have more knowledge about their own specific tasks than about tasks that they have not directly experienced (see Giddens 1984).

Actors might, of course, know about issues not directly concerned with their own specific tasks, and this knowledge might still be of value. For example, the baker
does not have to know about the clients in order to bake the cakes, but if he knows about the clients’ desires, he might be able to identify new product ideas and give the clients better service.

In sum, what actors need to know depends on their present and future pragmatic purposes as organisational members, and this work is interested in actors gaining knowledge to improve their capability to act as representatives of the organisation and within the frame of their organisational roles. Consequently, this work presumes that actors need actionable knowledge in order to perform knowledgeable actions (see Peirce 1931-35; James 2003).

2.2.3 Acting to Solve Problems

Actors need knowledge to deal with different practical tasks. It is about handling unproblematic or problematic situations. As long as the baker knows what cake to bake and how, he might not regard it as a problematic task. But if he is not sure about what to do or how, the situations will be regarded as problematic and a need for additional knowledge will occur.

In this regard, Dewey’s (1938) concept of ‘productive inquiry’ can be used as an inspiring source (see also Argyris & Schön 1996; Cook & Brown 1999). Productive inquiry is based on an experienced problematic situation. It is about actively pursuing a problem or a puzzle in order to seek an answer, solution or resolution. It is inquiring because it is the problem as such that motivates the action of knowledge acquisition, and it is productive because it aims to produce some kind of solution (Dewey 1938; see also Cook & Brown 1999). Dewey does not regard productive inquiry to be a random or ad-hoc based search. It is rather a deliberate activity in which an actor seeks what he needs to know in order to do what he wants to do.

On the one hand, productive inquiry is governed by knowledge about theories, rules of thumb and concepts. As such, knowledge is regarded as a tool of productive inquiry (Dewey 1938; see also Säljö 2000). On the other hand, knowledge is also recognised as a product of productive inquiry (Dewey 1938). Consequently, actors need certain knowledge to enable productive inquiry, and by doing that, they will also gain new knowledge. Hereby, productive inquiry includes problem-solving and knowledge utilisation and knowledge creation. In addition, facing problematic situations is a motive for seeking knowledge (see Dewey 1938; Schön 1983; Molander 1996).

However, as mentioned above, all situations are not problematic just because there is a task to solve. Normally, if we face a task that we know how to deal with, we do not regard that task as problematic – it is just a task to be handled, for example a routine as an institutionalised pattern of conduct (see Berger & Luckmann 1966; Scott 2001). However, if we face a new kind of situation, we consider it problematic because we do not know for sure what to do, how and what the result will be.

Hence, we can distinguish between what is apprehended as problematic and what is not apprehended as problematic. This is in line with Dewey (1938), who distinguishes between indeterminate and determinate situations. It is the indeterminate character of a situation that makes actors inquire with the aim to make the situation determinate. The indeterminate situation is characterised by
vague and unclear elements\footnote{See also Mead (1938:6) who describes a problematic situation as “[t]he situation out of which the difficulty, the problem, springs is a lack of adjustment between the individual and his world”}, while the determinate situation is characterised by clear distinctions and relations of the constituents. As Dewey (1938:105f, \textit{italics} in original) explains,

\begin{quote}
[a] variety of names serves to characterize indeterminate situations. They are disturbed, troubled, ambiguous, confused, full of conflicting tendencies, obscure, etc. It is the \textit{situation} that has these traits. \textit{We} are doubtful because the situation is inherently doubtful.
\end{quote}

Whether a situation is considered problematic or not depends on the earlier experiences and pre-understanding of the certain actor. Hence, there is a relation between the situation and the knowledgeability of the actor. From this also follows that a situation might be considered problematic to one actor but unproblematic to another.

Berger & Luckmann (1966:38) give an illustrative example of how everyday life is divided into, on the one hand, situations that are \textit{apprehended routinely} and, on the other hand, situation that are \textit{apprehended as problematic},

\begin{quote}
[s]uppose that I am an automobile mechanic who is highly knowledgeable about all American-made cars. Everything that pertains to the latter is a routine, unproblematic facet of my everyday life. But one day someone appears in the garage and asks me to repair his Volkswagen. I am now compelled to enter the problematic world of foreign-made cars. I may do so reluctantly or with professional curiosity, but in either case I am now faced with problems that I have not yet routinized. At the same time, of course, I do not leave the reality of everyday life. Indeed, the latter becomes enriched as I begin to incorporate into it the knowledge and skills required for the repair of foreign-made cars. The reality of everyday life encompasses both kinds of sectors, as long as what appears as a problem does not pertain to a different reality altogether […]. As long as the routines of everyday life continue without interruption they are apprehended as unproblematic. But even the unproblematic sector of everyday reality is so only until further notice, that is, until its continuity is interrupted by the appearance of a problem. When this happens, the reality of everyday life seeks to integrate the problematic sector into what is already unproblematic.
\end{quote}

Then, how about the \textit{identification of problematic situations}? There are certainly situations when actors neglect or are not capable of identifying the problematic character of a situation and overlook the need for inquiry. However, even if they are aware of a problematic feature of a situation, do they automatically know what to inquire? Let us consider the situation of the automobile mechanic described above. He might not know at all what is wrong with the Volkswagen as he is not used to those kinds of cars. Consequently, he might not know where to start searching to identify the problem or how to solve it. This implies that the ability to define the problem is critical to be able to solve it. As Dewey (1938:108, \textit{italics} in original) so succinctly puts it,

\begin{quote}
[i]t is familiar and significant saying that a problem well put is half-solved. To find out \textit{what} the problem and problems are which a problematic situation presents to be
\end{quote}
inquired into, is to be well along in inquiry. To mistake the problem involved is to cause subsequent inquiry to be irrelevant or to go astray. Without a problem, there is blind groping in the dark.

Hereby, one challenge is to know what to inquire, that is to define the problem that needs to be solved. Just imagine a doctor who is incapable of identifying the underlying illness of a patient’s symptoms. That might cause a wrong treatment and the patient’s health might even deteriorate if the patient does not get the proper treatment and medication. This reasoning is also in line with Molander (1996), who argues that the way we formulate our questions is a determinant for what answers we get.

In this way, the problem identification is as critical professional activity as the problem-solving. This is strongly emphasised by Schön (1983:40), who talks about “problem setting” as “the process by which we define the decision to be made, the ends to be achieved, the means which may be chosen”. The problems are not always given. They must rather be constructed on the basis of the constituents of the experienced problematic situation (ibid.). Hence, actors need the ability to identify both the problematic situation and the problematic feature(s) of the situation. Consequently, it is not enough to only focus on the known, the typical and repetitive. Actors need to pay attention to the untypical, unexpected and so far unknown (Molander 1996). Such awareness is one important means for continuous enhancement of actors’ knowledgeability.

2.3 Creation of Knowledge

In ordinary life we often talk about creation and acquisition of knowledge in terms of learning via personal experience – learning-by-doing as a kind of trial-and-error. For example, the infant, mentioned above, might learn that crying will make the mother pick her up and feed her, or the father will take her in his arms to rock her to sleep. In the end, this is about learning from others. The baby will not learn the prevailing norms of the parent-child relationship if she is all by herself – she learns by interacting with her parents. As she grows older, she will continue to observe the world and listen to others: She will learn that different objects have different characteristics and different names. She will learn the difference between a cow and a cat and how they sound. Without interacting with others, she will likely not call a cow a cow or a cat a cat. There are just so many things that already are defined and categorised. We can say that our knowledge is developed in interaction with fellow-beings – as such it is socially constructed (Berger & Luckmann 1966).

2.3.1 Knowledge as Socially Constructed

Following the vignette of the newborn, the creation of knowledge is not a private phenomenon. The creation of individual – intrasubjective – knowledge depends on the interactions with others in the social world (see Berger & Luckmann 1966; Schütz & Luckmann 1973). Human knowledge has a social origin. Actors learn by interacting, observing and communicating with others.

All our knowledge embraces constructions including a set of abstractions, generalisations and idealisations that are organised in our thoughts (Schütz 1962).
In this way, human knowledge is highly categorical as we define phenomena and render them different labels and meanings transmitted from one generation to another, from parents to children, from teacher to students. We learn typical constructions that are in compliance with the relevance system accepted by the social communities in which we interact (Schütz 1962; see also the concept of ‘typificatory schemes’, Berger & Luckmann 1966). If we do not apply with prevailing typical constructions, we should expect opposition from the rest of the community. In the worst case, no one will understand what we mean.

The ‘reality’ represents an intersubjective world – a world we share with each other (Berger & Luckmann 1966). Still, this does not mean that everyone gains and possesses exactly the same knowledge. The understanding of society is created and maintained in humans’ thoughts and actions. As such, knowledge is always representational in that it refers to something – an object or phenomenon (see Ogden’s triangle, Ogden & Richards 1956; Berger & Luckmann 1966; Linell 1998).

Actors apprehend everyday life – ‘the here and now’ – in different ways (Berger & Luckmann 1966). There are differences due to background knowledge and preferences that influence how individuals will understand and interpret the world in which they act. Hereby, even if we talk about intersubjective (common) knowledge as knowledge shared by a number of individuals, this does not mean that the knowledge of different individuals has exactly the same meaning. Individuals differ as well as their knowing and doing.

It is not only what we know that differs between individuals but also how we get to know it. As Schütz (1962:14) explains,

> any individual's stock of knowledge at hand is at any moment of his life structured as having zones of various degrees of clarity, distinctness and precision.

Some knowledge might be a pure acquaintance, while other parts of actors’ knowledge might be more of an expertise (see the distinction between ‘knowledge by acquaintance’ and ‘knowledge-about’, James 1890). As mentioned earlier, there is a greater need for detailed knowledge concerning situations of everyday life that actors frequently deal with in comparison with remote situations such as situations of other actors’ daily life (Berger & Luckmann 1966).

Then, how do we know whether an actor is knowledgeable? One way to evaluate actors’ knowledgability is to investigate their capability to skilful actions. For example, if the baker makes tasty and beautiful pastries, we will consider him as knowledgeable in his profession. But if he burns the cakes or if they taste bad, we would likely consider the baker to be ignorant and unskilled.

This reasoning is in line with Argyris & Schön (1996) and Daft & Weick (1984), who contend that the most obvious test of whether learning has occurred or not is to investigate whether the behaviour and action repertoire of the learner has changed. This is similar to Ryle (1949:28f.) who means,

> a person's performance is described as careful or skilful, if in his operations he is ready to detect and correct lapses, to repeat, and improve upon successes, to profit from the examples of others and so forth. He applies criteria in performing critically, that is, in trying to get things right.
Ryle (1949) also stresses that in ordinary life we are much more concerned with people’s competences than with their cognitive repertoires, but he criticises theorists for being too occupied with the latter issue. Hereby, we have come back to the function of knowledge (see section 2.2.2) and this work is interested in actors’ practical knowledgeability, rather than their cognitive repertoires.

2.3.2 The Complexity of Communicating Knowledge

The communication of knowledge from one actor to another requires some degree of interaction. A junior baker (an apprentice) might observe a senior baker (a master) in action and thereby learn certain patterns of conduct, or he might learn by investigating the action result (product) of the master. While the former requires the presence of both actors, the latter only requires the presence of the apprentice and the product.

The master’s knowledgeability can also be mediated by the use of communication via linguistic significations. For example, the apprentice can ask the master how to make a certain cake and by answering the master expresses his knowledge about the procedure. If the apprentice still feels unsure, he can put further questions. Hereby, the communication between the apprentice and the master is characterised by an ongoing production of utterances that aim to express their respective knowledge (in the case of the apprentice, his utterances might above all signify a lack of knowledge).

Language represents a significant means for mediating knowledge and derives from the capability of humans to put experiences and ideas into words. Following Berger & Luckmann (1966:51), language is “the most important sign system of human society” (see also Säljö 2000). Berger & Luckmann (1966) argue that the face-to-face situation is the prototypical case in which humans share experiences and knowledge by the use of language. This is also argued by Clark & Brennan (1991), who list ten features specific to face-to-face communication (see table 2-1; see also Clark 1996). In table 2-1, some comparisons are also made in relation to other situations such as written communication (see the right column).

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>The feature reflects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-presence</td>
<td>The participants share the same physical environment</td>
<td>The immediacy of face-to-face conversation.</td>
</tr>
<tr>
<td>Visibility</td>
<td>The participants can see each other</td>
<td>In a lecture the speaker has restricted access to the addressees, and written settings lack all those features.</td>
</tr>
<tr>
<td>Audibility</td>
<td>The participants can hear each other</td>
<td></td>
</tr>
<tr>
<td>Instantaneity</td>
<td>The participants perceive each other’s actions at no perceptible delay</td>
<td></td>
</tr>
<tr>
<td>Evanescence</td>
<td>The medium is evanescent – it fades quickly</td>
<td>The medium, including speech, gestures and eye gaze are evanescent. While, for example, writing has</td>
</tr>
<tr>
<td>Recordlessness</td>
<td>The participants’ actions leave no record or artefact</td>
<td></td>
</tr>
</tbody>
</table>

1 There are, however, scholars who argue that learning does not require a change of behaviour. They argue that new ways of thinking – a cognitive change – is sufficient in order to talk about learning (see Pfeffer & Salanick 1978; Hedberg 1981; Hellgren & Löwstedt 1997). Such a view implies that thinking is not doing and that we learn for learning’s own sake, which is not in line with the pragmatic position of this work.
**THEORETICAL FOUNDATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>The feature reflects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simultaneity</td>
<td>The participants can produce and receive at one and simultaneously</td>
<td>far-reaching effects on the course of language use.</td>
</tr>
<tr>
<td>Extemporaneity</td>
<td>The participants formulate and execute their actions extemporaneously, in real time</td>
<td><strong>Control</strong>, that is, who controls what gets done and how. In face-to-face conversation the participants speak for themselves, jointly determine who says what when and formulate their utterances as they go.</td>
</tr>
<tr>
<td>Self-determination</td>
<td>The participants determine for themselves what actions to take when</td>
<td></td>
</tr>
<tr>
<td>Self-expression</td>
<td>The participants take actions as themselves</td>
<td></td>
</tr>
</tbody>
</table>

Although language has its origin in the face-to-face situation, it can be detached from it (Berger & Luckmann 1996; Clark 1996). The junior baker can make a phone call to the senior baker and ask how to bake a certain cake, or try to find the answer by looking in a recipe. As such, language is a kind of objectivation. As Berger & Luckmann (1966:52, my italics) assert,

> [t]he detachment of language lies much more basically in its capacity to communicate meanings that are not direct expressions of subjectivity ‘here and now’. It shares this capacity with other sign systems, but its immense variety and complexity make it much more readily detachable from the face-to-face situation than any other (for example, a system of gesticulations). I can speak about innumerable matters that are not present at all in the face-to-face situation, including matters I never have and never will experience directly. In this way, **language is capable of becoming the objective repository of vast accumulations of meaning and experience, which it can then preserve in time and transmit to following generations.**

The function of language as a means to express meanings together with its detachable feature makes it a momentous instrument for knowledge mediation between actors. However, the mediation of knowledge should not be confused with the transportation of objects from one place to another. Still, as Säljö (2000) points out, we often talk about knowledge as a kind of object that comes from the outside into individuals, and when stored in the mind, it can be taken out whenever the holder wants to use it (see also ‘the conduit metaphor’ as discussed by Reddy 1993). This view is also reflected in the traditional way of organising education, where the teacher ‘transfers’ information and knowledge to the students who ‘receive’ it. Then, how should we understand the communication of knowledge by the use of language?

Following Dewey (1966:9), “communication is a process of sharing experience till it becomes a common possession”. Individuals re-present the world to themselves and others using language. As such, language has a double representational function in the sense that it has an outside towards others and an inside directed towards our own thinking (Vygotsky 1981; see further discussions about the functions of language in section 2.4.2). To Vygotsky (1986:225), “inner speech is speech for oneself; external speech is for others”. External speech is about turning thoughts into words, while inner speech is the reverse in which overt speech sublimates into thoughts (ibid.).

Those ideas have similarities with Polanyi’s (1969) notion of **sense-giving** and **sense-reading**. Sense-giving refers to the act when actors endow their own
utterances with meaning, while sense-reading (or what more commonly is talked about in terms of sense-making) is the act of attributing meaning to events or the utterances of others (ibid.).

The dualistic function of language as well as the concepts of sense-giving and sense-reading pay regard to at least some of the complex feature of communicating knowledge. Even if an actor tries to communicate his knowledge with another actor, this does not necessarily mean that he will manage to express his knowledge in an understandable way to the intended new knower (receiver). And even if the receiver is capable of understanding the meaning of what is communicated he might lack the capability to use it in action. Thus, the mediation of knowledge between actors to enable knowledgeable actions is a far more intricate process than transporting an object from one place to another. In the next section the complexity of communicating knowledge will be further discussed with a focus on the limitations of language.

2.3.3 Limitations of Language as a Mediator of Knowledge

What individual actors know differ depending on their different prerequisites, experiences, background knowledge and interpretations. Even if we have certain typifications and common sign systems, individuals’ knowledge and capability to express and acquire knowledge will vary. Lacking capability to verbalise one’s knowledge relates to a problem of ‘external speech’ and ‘sense-giving’ (see section 2.3.2). In other words, even if an actor has certain knowledge this does not mean that he can easily express it to another actor.

Following Polanyi (1966, 1969), the difficulty of expressing one’s knowledge can also be explained by the notion of explicit versus tacit knowledge as two interrelated dimensions of knowledge. We can know more than we can tell, as Polanyi puts it. We might know how to ride a bicycle but be unable to fully express how we do it. This means that parts of our knowledge about how to ride a bike are hard to put into words and might be referred to as the tacit dimension of the knowledge. Even if we intellectually can understand the existence of this so-called ‘tacit knowledge’, it does not mean that we can define the tacit content of knowledge. Polanyi (1969:194) again, “[t]he clues of tacit knowing and the elements of tacit performing are usually difficult to identify and sometimes they are quite unspecifiable”.

When knowledge is verbalised, we might say that it takes the form of ‘explicit knowledge’. However, parts of its meaning will still be tacit in the sense that even if we try to put our knowledge into words, some parts will remain unarticulated. This is a core of Polanyi’s (1969:195, italics in original) view and he argues,

> [a]ll knowledge falls into one of these two classes: it is either tacit or rooted in tacit knowledge. The ideal of a strictly explicit knowledge is indeed self-contradictory;

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1 See also Giddens’ (1984) concepts of ‘practical consciousnesses’ versus ‘discursive consciousness’. The distinction between these two concepts should not be understood as rigid or impermeable, and there is no bar between them. As Giddens (1984:7) states, “there are only the differences between what can be said and what is characteristically simply done”.
deprived of their tacit coefficients, all spoken words, all formulae, all maps and graphs, are strictly meaningless.

This quotation does not mean that the use of language is useless. Polanyi recognises speech as a fundamental structure of all meaningful uses of consciousness. He regards communication as an important function for knowledge creation and knowledge sharing but stresses that we should be aware of the fact that the significance of any kind of utterances is dependent on the tacit knowing of the knower.

It seems reasonable that knowledge has a tacit dimension that makes parts of our knowledge difficult to express, and without certain pre-understanding, a lot of so-called explicit knowledge might be hard to understand and put into action. From this also follows that an utterance expressing someone’s knowledge about something is never identical with the described (see further section 2.4.2). Knowledge is inexhaustible in the sense that we are not capable of expressing all our knowledge (see Molander 1996). Some knowledge is hard to formulate so that others can understand it fully. This limitation of language helps us to further understand the complexity of communicating knowledge.

Yet, even if the tacit dimension of knowledge is significant, we should not over-mystify this dimension and believe that knowledge is unable to be expressed, as argued by the early Wittgenstein (1922; see further discussions in Rolf et al. 1993). We should nuance the picture and talk about tacit knowledge as so far unarticulated, rather than knowledge as impossible to verbalise (see also Goldkuhl & Nilsson 2000). Furthermore, as noted by Hansson (1998), even if it might be hard to articulate our knowledge, this does not mean that knowledge cannot be mediated from one actor to another. In addition, despite the limitation of language as an instrument to verbalise actors’ knowledge, language has a critical function in organisations as an instrument to communicate and create meanings (see Molander 1996; Ljungberg 1999; Taylor & van Every 2000).

### 2.4 Knowledge and Signs

As said above, by social interaction we gain and create knowledge, but the knowledge is not there to be picked up as an external object. To acquire knowledge, we need to learn. Hence, to know is a result of learning (see Argyris & Schön 1996). It has also been argued that the primary aim of knowledge is to facilitate and be used in action. Thus, besides knowledge of the world, actors need the capability to apply knowledge in action. In the following three subsections, we will look further into the meanings of knowledge in relation to actions and the functions of language.

#### 2.4.1 Actionable Knowledge

What is known is a ‘property’ of individuals. Thus, knowledge relies on a subjective holder. Individuals ‘possess’ knowledge that they have gained by interacting in the social world (see Cook & Brown 1999). Knowledge is also what actors can make use of with the intention of achieving social effects (Dewey 1938). Actors need knowledge to accomplish tasks and to solve problems (see section 2.2.2
and 2.2.3). Concerning knowledge as a possession or something used in action, some scholars make a distinction between ‘knowledge’ and ‘knowing’.

Cook & Brown (1999) illustrate this distinction in their discussion of knowledge as something possessed in terms of concepts, rules and procedures. They argue that actors’ knowledge “is abstract since it is something that is about but not in the tangible world. And it is static in that possessing it does not require that it be always in use” (Cook & Brown 1999:387). This seems reasonable in the sense that even if an actor is on a vacation and does not use his knowledge related to his organisational role, he still possesses that knowledge. However, rather than regarding ‘knowledge’ as something needed for or used in action, Cook & Brown prefer to talk about ‘knowing’ as part of action (see also Schön 1983). As such, ‘knowing’ is regarded as dynamic and concrete in comparison with the static feature of ‘knowledge’ (Cook & Brown 1999).

I agree with the view of ‘knowing’ as part of action. Still, talking about knowledge for action, knowledge to enable action or knowledge used in action is also meaningful. To again use the example of the baker, if he was to bake a new kind of cake, he would need new knowledge, and when he is baking the new cake, that knowledge would be applied as part of his actions. In other words, the baker uses his professional knowledge when baking the cake. Following this reasoning, ‘the knowing’ – in terms of acting knowledgeable – would not be possible without ‘the knowledge’ about what to do and how.

Another distinction is between ‘intellectual knowledge’ versus ‘practical knowledge’. This division is reflected in ordinary speech by words such as ‘to know’ versus ‘skills’, ‘competence’ and ‘capability’ (see also the German words ‘wissen’ and ‘können’, the French words ‘savoir’ and ‘pouvoir’ and the Swedish words ‘veta’ and ‘kunna’). We can also find this distinction if we go back to the ancient Greeks, in particular Aristotle. Building on Plato’s definition of knowledge – episteme – as true, justified beliefs, Aristotle (1947) also acknowledged other forms of knowledge. He meant that while the philosopher needs episteme to understand the nature of life, the craftsman needs knowledge – techne – related to the production of products, that is, the skills and ability to do something. Hereby, techne emanates from what we do and is related to the pragmatic aspect of knowledge as discussed in section 2.2.2. A third form of knowledge presented by Aristotle (1947) is phronesis, which also is a form of practical knowledge that has its starting-point in knowledge-in-action, just as techne. However, while techne focuses on production, phronesis concerns practical sense making and aims to enhance humans’ well-being. As such, phronesis includes both political and ethical dimensions.

Polanyi (1966) is a more contemporary scholar who emphasises intellectual knowing versus practical knowing¹. He argues that intellectual and practical knowing have similar structure and none of them are present without the other. Hereby, Polanyi recognises the dependence between intellectual and practical knowing.

¹ Compare also with Ryle (1949), who talks about ‘knowing that’ as (theoretical) knowledge about how reality constituted and ‘knowing how’ as a capability to action.
knowing. Following Polanyi, it seems difficult to clearly categorise what would count as intellectual knowing versus practical knowing.

Still, the literature seems to have a predilection for such typologies. As Rolf (1995) argues, when discussing ‘tacit knowledge’, scholars almost automatically start to think about what knowledge that is tacit and what is verbal or possible to verbalise. However, Rolf’s point is that language does not always classify. Thus, even if we use different prefixes to the word knowledge – such as tacit, intellectual or practical – they are not always classifying.

Rolf (1995) gives an example of how Wittgenstein (1958a) has been used as a basis for categorising knowledge: Nordenstam (1983) refers to a passage where Wittgenstein aims to show that ‘to know’ is not always the same as ‘to say’\(^1\). As argued by Rolf (1995), Wittgenstein did not, however, mean that we can categorise knowledge as the one or the other type. Wittgenstein just wanted to show that sometimes we can express what we know, sometimes we lack that capability. Still, building on Wittgenstein, Nordenstam (1983:21, my translation) distinguishes between three types of knowledge: theoretical knowledge (in Swedish: “påståendekunskap”), practical knowledge (in Swedish: “färdighetskunskap”) and praxis (well-established practice) knowledge (in Swedish: “förtrogenhetskunskap”).

Another scholar who follows Nordenstam’s typology is Göranzon (1998), who holds that theoretical knowledge is about facts, methods and models; practical knowledge contains experiences as a result of being active in a specific practice; and praxis knowledge concerns the familiarity of the practice and is gained by learning from others in the practice. Göranzon (1998:19f, my translation) continues,

[i]f we empty a practice of practical knowledge and praxis knowledge it will at the same time be drained of its theoretical knowledge. […] An effect of disregarding the skills and familiarity with a practice when talking about knowledge is that one tends to presume that people who lack theoretical knowledge within an area do not have any knowledge at all within that area.

Göranzon argues that theoretical knowledge is often stressed at the expense of the other two types of knowledge (see also Ryle 1949; section 2.3.2). At the same time in the quotation he implies interdependence between the three types of knowledge – otherwise how could theoretical knowledge disappear if we drain a practice of its practical and praxis knowledge? My main point here is that we should be careful and question how different kinds of typologies are developed and how they can be used (see also Rolf 1995; Molander 1996; Braf 2000). Are they practical useable and meaningful? Is it possible to categorise what is the one or the other type of knowledge? Following Göranzon (1998), practical knowledge is a result of being active in a practice and praxis knowledge is developed when actors take part of the traditions in a practice. Hence, those types of knowledge seem overlapping, that is, part of actors’ practical knowledge can likely also be seen as praxis knowledge, and vice versa.

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1 Wittgenstein (1958a) talks about that we might know and say how high Mont Blanc is, but we might know but not be able to say how a clarinet sounds.
In this work, when talking about knowledge, it is human knowledge needed for and used in action that is of interest, that is, *actionable knowledge*, which might involve both intellectual and practical features (see Rolf 1995).

### 2.4.2 Functions of Language

Following Vygotsky (1986; see also Wertsch 1998), individuals do not communicate with each other directly; they always communicate via *mediating instruments* in so-called *mediated actions*. A mediated action includes a subject (human), an object (knowledge referent) and a mediating instrument (see illustration in figure 2-1 below). Vygotsky (1986) also argues that language is our most important mediational instrument (see also Berger & Luckmann 1966).

When using language to communicate, we engage in a process of producing utterances consisting of signs. Hereby, the ideas of mediated action have similarities with the view of signs suggested by the semiotics tradition. A classical definition of ‘sign’ reads as “something which stands to somebody for something in some respect or capacity” (Peirce 1985:5). The ‘something’ represents the *object* in the world, for example, an experience or a physical object. The ‘somebody’ represents the *subject* in terms of the interpreter of the object or the signs. The subject can be both the creator and the receiver of the sign (see Sjöström & Goldkuhl 2003). The ‘sign’ represents the *mediating instrument* used to communicate what the subject knows about the object. Hereby, the object is related to meaning by the aid of signs that are created and interpreted by some actors.

Those ideas are also used as some of the basic assumptions of FRISCO’s framework of information system concepts (Verrijn-Stuart 2001). The fact that those ideas are manifested in the FRISCO report is quite natural since Ronald Stamper, a semiotics scholar, is one of the originators to the ideas presented in this report. As noted by Sjöström & Goldkuhl (2003), they also correspond with the three functions of language described by Bühler (1934): 1) the symptom as an expressive relation, 2) the signal as the influence relation and 3) the symbol as the referential function. The left box in figure 2-1 below illustrates a conceptualisation of Vygotsky’s mediated action, while the right box illustrates Bühler’s three functions of language.

![Diagram](image-url)

*Figure 2-1: Mediated action versus three functions of signs*

The representational (referential) function of language, to signify and communicate meanings, is one important function of language (Vygotsky 1981; see also the ‘semantic function’ of language, Säljö 2000). Säljö (2000) presents two
additional functions of language: the indicative and the rhetorical function. Concerning the indicative function, Säljö means that we use language to get individuals to pay attention to certain objects (a dog, a tree or water) in the world (see also Vygotsky 1986). Hereby, words and expressions can be seen as a substitute to the forefinger (Säljö 2000). A feature of the indicative function of language – that the forefinger lacks – is that it can be used without the communicating actors having to meet face-to-face (ibid.). We can also talk about objects that are not present here and now, as well as abstract phenomena such as feelings, loyalty and time (ibid.). Concerning the rhetorical function, Säljö holds that we also use language to influence the understanding of others and to move other people into action (see also Shotter 1993).

Another classification of the functions of language is discussed within speech act theory (Austin 1962; Searle 1969). Searle argues that when saying something, the speaker performs at least three distinct acts: 1) the uttering of words, that is, performing utterance acts, 2) referring and predicating, that is, performing propositional acts (see also the indicative and the representational function above) and 3) stating, questioning, commanding and so forth, that is, performing illocutionary acts. A fourth act presented by Searle (1969) is the perlocutionary act that concerns the consequences or effects that the illocutionary act has on the actions, thoughts or beliefs of the listeners (see the rhetorical function, Säljö 2000). An additional function of language that Halliday (1978) talks about is the interpersonal function, which refers to how actors (speakers and listeners) interact in communication.

All those functions are interesting. However, the ones of primary interest in this work is the propositional content (the indicative and semantic function) in relation to intended perlocutionary effects of mediated actions (see further section 2.6.4). I am interested in the propositional content in relation to the effects of getting to know something. In terms of knowledge mediation, the propositional as well as the perlocutionary function of language are critical since the communication of knowledge has a pragmatic purpose aiming at enhancing the knowledgeability of actors to act. I am also interested in how actors interact when mediating knowledge – the interpersonal function – but my interest does not concern details of the interaction; the aim is rather to understand general patterns of knowledge mediation and with a particular focus on what mediating instruments are used.

Furthermore, language can be used both in oral and written speech. Vygotsky (1986:238) claims that “communication in writing relies on the formal meanings of words and requires a much greater number of words than oral speech”. Written speech is more of a monologue, while oral speech often aims to dialogue (ibid.). In the dialogue there is a ‘free’ exchange of turns among the participants (see Sacks 1992; see further section 10.2.1), while the monologue leaves little or no opportunity for interruption by the listener or reader. Oral speech might be easier to accomplish as the dialogue partners have a closer interaction (see Clark 1996; section 2.3.2). Written speech tends to be more decontextualised, and the reader has

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1 Halliday (1978) also talks about ‘ideational function’, which is similar to the re-presentational function, and ‘textual function’ that concerns how we structure a message in communication processes.
a limited possibility of comparing his pre-knowledge with the producer’s and to ask follow-up questions to clarify that he makes correct interpretations.

However, written speech is an integrated constituent of most practices (see Ljungberg 1999; Taylor & van Every 2000). Organisations define models, policies and norms by the use of writing, and actors get informed via written documents. Written reports and accounts show financial position to the owners, and operative workers get to know what to do via written manuals and working procedures. Above all, in comparison with oral speech, written language has a higher degree of materiality. Wertsch (1998:31) notes that,

[i]t is often easier to recognize the materiality of written language objects that continue to exist even when they are not being employed as mediational means [. . .] than it is to recognize the materiality of spoken language. Unlike written language, the materiality of spoken language seems to evaporate after a moment’s existence except for those rare instances when the speech is recorded.

Even if written speech has a more permanent record, the meanings of texts are not there “in the texts themselves” (Linell 1998:268). The meanings are assigned and accomplished by human beings.

2.5 Information Systems

By introducing new mediating instruments, the characteristics of mediated actions are transformed (see Vygotsky 1986; Wertsch 1998). In this regard, let us consider information technology (IT): Before its inception, we had quite limited possibilities to get in touch with people in geographically dispersed areas. We could send a post-mail, but it could take days or weeks before it reached the addressee. Nowadays, we can easily and fast communicate by the use of e-mail and telephone, and IT does also offer functionalities such as processing and distributing texts and pictorial illustrations (Säljö 2000).

Hereby, the way actors communicate has partly become dependent on their capability to master the functionalities of technology. This is in line with Nurminen (1996) who argues that many actors need a double competence, including their professional skills related to their organisational roles and the knowledgeability to utilise technology (see also Zuboff 1988; Säljö 2000). IT enables humans to communicate in new ways; as such, IT-artefacts extend humans’ capability to action (Goldkuhl & Ågerfalk 2000; Goldkuhl & Braf 2002a, 2002b).

IT-based information systems (IS) represent one kind of IT-artefacts commonly used in organisations. An information system does not necessary involve technology. An information system can be any kind of organised communication system. However, in this work, when talking about ‘information system’ this refers to IT-based IS (see further below; see also Langefors 1966; Checkland & Holwell 1998). The use of IS to communicate knowledge means that the IS are parts of actors’ communication processes. In the following, section 2.5.1 presents some different views of IS and section 2.5.2 discusses IS as mediating instruments.
2.5.1 Views of Information Systems

Nurminen (1988) discusses three views of IS that are based on the relationship between the computer and human beings. One extreme is the *systems-theoretical perspective*, which puts a great emphasis on the computer more or less at the expense of humans. This perspective pays little consideration to how systems are intended to be used and by whom. The other extreme is the *humanistic perspective*, which is concerned with the human subject almost to the degree that information systems are regarded as personal. Neither of these two perspectives pays proper regard to the relation between computers and humans. However, we need to acknowledge that IS are both produced and used by humans; they are used as instruments in mediated actions (see Vygotsky 1986).

Between the system-theoretical perspective and the humanistic perspective we can find the *socio-technical perspective*. This third perspective aims to balance the technical and the social system (Nurminen 1988). The socio-technical perspective pays regard to the computers as well as the actors using computers in organisational contexts to communicate and coordinate actions.

The view of information systems applied in this work corresponds best to the socio-technical perspective. Information systems are seen as computer-based IS, including computers and actors using those to communicate. In this work, however, when using the word ‘information system’ this primarily refers to the computer systems as instruments for communication between actors in organisations. Still, we need to discuss IS in relation to the actors using them. Furthermore, information systems are not just there; they are designed and implemented in organisations to fulfil certain purposes. Thus, the functionality of an IS must be congruent with the organisational objectives and actions performed by the actors in their organisational roles. In other words, an information system is used in a specific context that it is supposed to support. To Langefors (1977),

> information systems (IS) have the purpose of serving another system, its object system (OS). The object system is often an organization, a system in which people act. Accordingly, the main task of the typical IS is to provide people with information service which includes providing information to people.

One issue that is not fully transparent in Langefors’ description is the communicative perspective of IS. This can be explained by the circumstance that Langefors’ theory of IS evolved within the systems-theoretical frame of reference. It can also be explained by the circumstance that there has been a shift in focus of IS design from information to communicative action. In Ljungberg’s (1999:140) words, “[. . .] people do not mainly process information and make decisions, but act through language”.

The main point here is that IS are designed instruments that aim to support communication between actors in organisations. Accordingly, the design of IS needs to be grounded in an understanding of the use situation of such systems (see

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1 As Nurminen (1995) concludes, at least two of his perspectives can be associated with two of Lyytinen’s (1987) three contexts of information systems development: Lyytinen’s technology context and organisational context have similarities with Nurminen’s system-theoretical perspective and socio-technical perspective, respectively.
Langefors 1993; Nurminen 1996). Furthermore, actions performed by human actors using IS are social actions since they are – explicitly or implicitly – directed to human beings. In this regard, Sjöström & Goldkuhl (2002) talk about the communication level of IS, which is the level where actors actually receive and interpret messages mediated via the IS.

However, the use of information systems is not only about receiving and interpreting messages delivered by the system. An IS can be used for different kinds of actions. Goldkuhl & Ågerfalk (2000) present three kinds of actions related to IS: interactive, automatic and consequential actions (see figure 2-2).

![Figure 2-2: Actions related to an information system (Goldkuhl & Ågerfalk 2000:10)](image)

An interactive action is a communicative action performed in interaction between a user and a computer; it is performed with support by and through the use of an IS. Automatic actions are based on pre-defined functionality (rules) that the IS developers assign the IS. Pre-defined functionalities enable an IS to perform certain actions on its own, without direct involvement of the users. Finally, the consequential actions that concern the subsequent actions IS users perform on the basis of receiving and taking part of the content of an IS (output messages), that is, the perlocutionary effects of obtaining written signs via an IS.

### 2.5.2 Information Systems as Mediating Instruments

Based on the view of IS outlined in the previous section 2.5.1, IS as well as language are important mediating instruments. IS enable other and new ways to communicate, and we should take advantage of the benefits and opportunities offered by IS (see Säljö 2000; Walsham 2001; see section 1.2). IS enable new forms of interactivity between actors and also new possibilities to visualise and make signs more accessible. Taking these ideas one step further, IS can be seen as designed instruments that aim to institutionalise IT-based knowledge mediation. This relates to a general need of organisations to institutionalise their practices (see also section 2.2.1). The need for institutionalisation drives the development of organised systems of communication, and IT-based information systems represent one way to institutionalise organised and formalised ways to mediate knowledge.

Then, how does an IS provide actors with knowledge, and what is the relation between knowledge and information? Following Langefors (1993:111; see also section 1.1.2), “information is what we obtain when we get informed”. Accordingly, information is something we get to know; it is an additional contribution of knowledge as we get to know something more by getting informed (ibid.).

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1 IS can be regarded as a meta-instrument in relation to language since the use of IS presumes the use of language.
However, following Langefors, information systems do not contain information; information systems contain signs (data) that aim to represent and communicate information and knowledge (see also section 1.1.1). Thus, to get informed and gain additional knowledge, the contents (signs) of IS need to be interpreted and understood by the IS users. Langefors (1993:144; see also 1966:197) explains this by his so-called “infological equation”:

\[ I = i(D, S, t), \]

where \( I \) is the information (or knowledge) produced from the data \( D \) and the pre-knowledge \( S \), by the interpretation process \( i \), during the time \( t \).

Langefors’ equation could also be reformulated, not with the intention to disregard his ideas but to bring the equation in accordance with the terminology used in this work. Such reformulation could read as follows: \( K = sr(s, pk, t) \), where \( K \) is the knowledge acquired from the mediating signs (s) when integrated with the individual’s pre-knowledge (pk), by the sense-reading act (sr), during the time (t).

Even if IS are regarded as important mediating instruments, several initiatives to implement IT-based knowledge mediation have shown to fail (McDermott 1999; see section 1.2). Those failures might be due to a too strong focus on technology and too little understanding of how humans acquire and use knowledge (as the systems-theoretical perspective of IS, see section 2.5.1). However, we need to further understand what facilitators and hindrances can be seen in IS as mediating instruments. To do this, we need to understand knowledge mediation in more general terms, including IT-based as well as none IT-based knowledge mediation (see further section 1.3.1). Perhaps IT-based information systems are useful for certain kinds of knowledge mediation and less useful in other kinds.

The understanding of IT-based and none IT-based knowledge mediation is also interesting as some scholars have argued that computerisation impoverishes actors’ knowledgeability. For example, Göranzon (1983, 1990; see also Arbetslivscentrum 1979) presents two reasons for impoverishment of knowledge when computerising work: First, computerisation results in expertise and knowledge not being used, and those actors who have had the knowledge will forget about it, while new actors will never completely learn the profession (ibid.). Second, computerisation reduces the opportunities to talk with colleagues, which also is said to contribute to a loss of expertise and knowledge (ibid.). Concerning the latter, this is interesting as it seems to contradict the view of IS, as mediating instruments, applied in this work. Following Göranzon, IS seem to be regarded as hindrances rather than enablers of knowledge mediation. Göranzon (1983, 1990) and Josefson (1991) also maintain that the tacit dimension of knowledge hinders computerisation. To them, it is not possible to articulate tacit knowledge and there is no reason trying (see further discussion in Goldkuhl & Nilsson 2000). This is a point as knowledge might be hard to express in language and the use of IS presumes that actors can verbalise their knowledge. However, this is not a problem only related to the use of IS but to the communication of knowledge in general (see further section 2.3.2). Most important, however, even if it might be difficult to express knowledge this is not a reason for not trying.
2.6 Towards a Reference Model

Throughout this chapter, I have discussed different issues related to knowledge and the communication of knowledge in order to outline the theoretical foundations of this work. Doing so, I have identified three significant language games of knowledge: knowledge utilisation, knowledge mediation and knowledge representation. Those are briefly discussed and recapitulated in section 2.6.1 to 2.6.3, and conceptualised in a reference model to be used in the further work (see section 2.6.4).

2.6.1 Knowledge Utilisation

A primary aim of organisations is to produce and offer goods and services to their clients (see Goldkuhl & Röstlinger 1999). This requires human actors who act on behalf of the organisations. These actors need knowledge of, for example, what to do and how to do it; they need knowledge to perform knowledgeable actions. The possession of knowledge as such is not of value to organisations. It is the practical consequential effect of knowledge that is of value, that is, actors’ use of knowledge in action (Dewey 1931; Goldkuhl 2004). Accordingly, we need to acknowledge “the full dialectics between knowledge and action: Proper action is knowledgeable action. Proper knowledge is actable knowledge” (Goldkuhl 2004:24).

Hence, when talking about knowledge in organisations we need to pay attention to the phenomenon of knowledge utilisation as one central language game. It is when actors utilise their knowledge in action the benefits of having the knowledge will be shown. Acknowledging the importance of knowledge utilisation, we need to ask ourselves: What is knowledge for? What will be better if an actor knows something more? Such questions are important to understand what knowledge actors need for what actions. Knowledge needs to be actionable. If we disregard the usefulness of knowledge, initiatives to communicate knowledge might require more efforts than potential returns. That is, the cost of knowledge mediation will be higher than the generated value (see Langedfors 1966).

2.6.2 Knowledge Mediation

Knowledge is socially constructed, and actors learn by interacting in the world (Berger & Luckmann 1966). One significant means of learning via social interaction is communication. Actors use language, as well as other instruments, to communicate knowledge (see Dewey 1966; Vygotsky 1981). The communication of knowledge via the use of instruments is referred to as knowledge mediation. The mediation of knowledge is not a simple process (see section 2.3.2). It demands, for example, a capability of actors to express their knowledge (sense-giving) and to interpret expressions of other actors’ knowledge (sense-reading). Furthermore, knowledge mediation involves two basic roles: an original knower (speaker, knowledge provider) and a potentially new knower (receiver, knowledge seeker, knowledge needer; see also section 1.2.1). These two roles are not static; the roles might, for example, shift between actors during a conversation.

The mediation of knowledge does not mean that actors always meet face-to-face or even know about each other. Actors might mediate knowledge via oral as well as
written communication and via other human products. Thus, the way knowledge is mediated varies depending on the instrument used to accomplish the mediation. In this regard, we should ask: How can knowledge be mediated? What instruments can be used?

2.6.3 Knowledge Representation

Knowledge is not an object that is there just by itself or that easily can be ‘transferred’ from one actor to another. Knowledge is always human knowledge, that is, someone has knowledge of something. Still, actors’ knowledge can be communicated via mediating instruments such as language. However, utterances as such are not knowledge; utterances and other signs only represent someone’s knowledge about something. This leads to the third language game significant to this work: knowledge representation, which actually is part of knowledge mediation as described in the previous section.

Talking about knowledge representation as part of knowledge mediation, there are actually two representational dimensions: An actor’s knowledge of something (the object) involves one representational dimension, and the instruments used to mediate the actor’s knowledge involves the other. There is a direct relation between the actor’s knowledge and the object and between the actor’s knowledge and the mediating instrument, but there is no direct relation between the object and the instrument. As Ogden & Richards (1956) argue, there is no relevant relation between the phenomenon (object) and the words used to describe it; there is only an indirect relationship.

2.6.4 Communication as Mediated Actions

The three language games described above are conceptualised in figure 2-3, which will be used as a reference model for the continuing work.

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*Figure 2-3: Mediated Actions for Knowledgeable Actions*
As shown in figure 2-3, there is a dashed line between actor A’s knowledge referent and actor B and also between actor B’s knowledge referent and actor A. These dashed lines aim to illustrate that actor B might not be able to observe actor A’s knowledge referent and actor A might not be able to observe actor B’s knowledge referent. In such cases, actor B is fully dependent on actor A’s capability to sense-giving, and actor A is fully dependent on actor B’s capability to sense-giving.

The investigation of this work will focus on the instruments used to accomplish knowledge mediation and the propositional content of what is mediated in relation to (intended) knowledge utilisation (see also section 2.4.2). The intention is not to outline the details of actors’ interactions in the mediation process or to investigate the details of the actual and realised perlocutionary effects.

The model in figure 2-3 illustrates some significant aspects of knowledge mediation between actors, but it is also a simplistic description and perhaps also an idealistic one. It is a simplification of reality as it does not show possible variations and possible challenges of the knowledge mediation process. The model does not tell anything about what triggers knowledge mediation initiatives. Apart from aiming at knowledge utilisation, the model does not say anything about specific motives of the actors to share their knowledge or to learn from each others. Furthermore, it does not say anything about the specific instruments used to mediate the knowledge.

Consequently, there are a number of issues that remain to be discussed. Still, the model is regarded as a tool directing the focus on certain aspects that need to be further investigated. The model can be seen as a model of knowledge mediation or, in more general terms, a basic model of communication.
This chapter presents some reflections on the literature dealing with the concept of ‘knowledge management’. The chapter builds on the theoretical foundations presented in Chapter 2 and it is intended as a further discussion on the research problems presented in Chapter 1. The first section 3.1 positions this work in relation to some general issues of knowledge management. The second section 3.2 focuses on ‘knowledge transfer’, as one part of knowledge management, which is of particular interest in this work.

3.1 The Concept of Knowledge Management

Knowledge and its ‘management’ has become a topical issue on the business as well as the research agenda. Considerable attention has been paid to issues such as the need to create and disseminate knowledge (Nonaka 1994; Nonaka & Takeuchi 1995), the establishment of knowledge communities (Lave & Wenger 1991), the expanding role of knowledge workers (Hayman & Elliman 2000) and the establishment of learning organisations and knowledge-intensive firms (Senge 1990; Allee 1997). It is frequently put forward that organisations can no longer compete with ‘tangible assets’ as they are considered easy for competitors to copy and imitate. The unique and valuable in organisations are said to be ‘intangibles’ including knowledge, customer relations and internal structures (Sveiby 1990; Edvinsson & Malone 1997; Freedman 1997; Knapp 1998; Ruggles 1998). Knowledge is often regarded as the most critical one and knowledge management (KM) has evolved as a concept focusing on the management of knowledge in organisations (see Drucker 1993; Wikström & Normann 1994; Nonaka & Takeuchi 1995; Davenport & Prusak 1998; Nonaka & Toyama 2003).

Looking further into what caused the evolvement of KM, two main explanations can be found: the technical development and a changed view of organisations (see
section 3.1.1 and 3.1.2). In the KM literature one can also find different views of knowledge, which will be discussed in section 3.1.3. This chapter will, further, reflect on the ‘management’ of knowledge (see section 3.1.4) and organisational learning theory as a related area of research (see section 3.1.5). Based on the theoretical foundations outlined in Chapter 2, the aim of the following subsections is to clarify the position of this work in relation to common and general KM ideas.

### 3.1.1 Technology as one Driving Force

Knowledge makes people able to act. Or as Davenport & Prusak (1998:12) put it, “knowledge is what makes organizations go”. This is and has always been the case, but the current interest in knowledge has been reinforced as a response to the changing organising processes permeating many practices (see Awad & Ghaziri 2004). To deal with changes – such as increased globalisation, geographic dispersion and downsizing – information technology (IT) has become commonly recognised as a way to share and maintain critical business knowledge (Awad & Ghaziri 2004). Thus, the upsurge of interest in knowledge and its management noticed during the last decade can partly be explained by the technical development. IT has become a significant constituent of contemporary organisations – not only as a way to automate production, but to ‘informate’ practices and the workers (Zuboff 1988; see also Beard 2002). As such IT has also become closely associated with knowledge management initiatives (Walsham 2001; Hayes & Walsham 2003).

However, due to a lack of consideration of how knowledge is communicated and created among actors, many organisations have found it hard to leverage knowledge through IT (McDermott 1999; Scarbrough et al. 1999; Hendriks 2001; Walsham 2001; Garvey & Williamson 2002). According to Whiting (1999), 80 per cent of all technology-centred KMI have failed due to a lack of consideration of the actors. It is also claimed that KMI have failed because they have been handled by information system (IS) experts who focus on the supply side – that is, to get ‘knowledge’ into IS – and disregarding the output of IS (Scarbrough et al. 1999). Scarbrough et al. (1999:2) even claim, “KM in particular seems to be in danger of being hijacked by the IT community and turned into a vehicle for the marketing of new IT systems”.

We might also approach the problem of IT-focused KMI from another angle. First, it seems like some KM scholars try to make a specific phenomenon of IT-based ‘knowledge management systems’ (KMS; see further section 3.2.4), but what is the purpose of IT-based information systems if they do not aim to communicate knowledge? Going back to Langefors (1966), IS aim to provide the artefact users with information and knowledge. Hence, all kinds of IS can be seen as instruments for knowledge mediation (see also section 2.5). Second, IT-focused KMI seem to presume that technology is the solution of KM. However, if we understand IS as instruments for knowledge mediation (see section 2.5), we should also realise that communicating knowledge is a far more complicated process than just implementing an IS and expecting the mediation process to be solved automatically. Thus, no matter if KM scholars are experts in IS or other areas, there seems to be a need for better understanding both the functions of IS and the phenomenon of knowledge creation and mediation. IS are important instruments for knowledge
mediation, but they are only instruments. We need to better understand the inherent opportunities and limitations that can be seen in IT-based knowledge mediation. Such understanding needs to be based on actors’ knowledge and actions in organisations. This is an issue that several KM scholars so far have failed to cover.

3.1.2 Knowledge-Based View of Organisations

An additional explanation for the interest of KM concerns the enhanced view of organisations as consisting of a bundle of internal resources representing the key to competitiveness. This so-called resource-based view (RBV) has primarily evolved within the area of economics, in particular the area of strategic management (see Penrose 1959; Chandler 1977, 1990). RBV has been developed as an attempt to expose internal conditions as an intrinsic part of organisations’ ability to outperform competitors (Grant 1991; Dosi et al. 2000; Tell 2000). Thus, instead of deriving the sources of competitive advantage from market structures (see Bain 1968; Porter 1980, 1985, 1990), RBV focuses on internal assets as a main source of competitive advantage (Barney 1991; Dosi et al. 2000). Following Andrews (1971), this does not mean that external conditions should be neglected. Both internal assets and external conditions are critical to understand the competitiveness of organisations.

One concept deriving from the RBV is the knowledge-based view (KBV). This approach places the analysis of organisational capabilities centre-stage in understanding organisations. The concept of routine (Nelson & Winter 1982), capability (Grant 1996b; Teece et al. 1992) and core competence (Prahalad & Hamel 1990) all fall within this approach. Many of its proponents argue that if there is one single resource that makes a difference that is ‘knowledge’ (see Spender 1996; Grant 1996a). Following Foss et al. (1995:3),

[i]t is the firm’s path-dependent, hence ‘sticky’, knowledge endowment that differentiates it from other firms, allowing it to articulate unique profit-seeking strategies.

Both RBV and KBV take an efficiency approach to organisational performance (Foss et al. 1995). However, while KBV is oriented towards knowledge, RBV applies a broader perspective by encompassing intangible as well as tangible assets. KBV is also the theoretical basis of the KM, and many KM scholars regard ‘knowledge’ as the most valuable asset for organisational success. I agree on the view of knowledge as the primary constituent of organisations’ capability of becoming and staying competitive if we with knowledge mean the ‘use of actionable knowledge’ (see the concept of ‘action relatedness’, Hendriks 2001; see also Goldkuhl & Braf 2002a, 2002b). As Penrose (1959) points out, the main productive opportunity of organisational resources does not lie in the resources themselves but in the productive services they render. This implies that the key to organisational competitiveness is the knowledge needed to utilise intangible and tangible assets (see Chandler 1990: von Tunzelmann 1995; Tell 2000).

3.1.3 Content versus Relational Approach

There is no unified view of how to understand and approach knowledge. ‘Knowledge’ is an elusive word, and almost every discipline has its own
interpretation of it (Scarbrough & Burrell 1996; Quintas 2002). In general, problems of interpretations haunt our attempts to use words effectively. That even counts for, what might be regarded as, basic typologies like tacit versus explicit knowledge, knowledge versus information and knowledge versus norms (see further discussions in Braf 2002, 2003). As observed by Scarbrough & Burrell (1996:178),

[studies of knowledge in management demonstrate these problems to the full, with heterogeneity and incommensurability being probably the only things they have in common.

One can, however, roughly split the KM literature’s view on knowledge into the content approach and the relational approach (Scarbrough & Burrell 1996; see also the structuralist versus the process-oriented approach, Swan et al. 1999).

The content approach views knowledge as an object and underpins many KM theories (Scarbrough & Burrell 1996; Walsham 2004). Knowledge is viewed as being able to be codified and stored in so-called knowledge management systems (KMS) and knowledge repositories. This allows for knowledge to be shared and retained regardless of employee turnover (Wasko & Faraj 2000). The content approach also emphasises certain processes to operationalise KM. Such processes often include 1) capturing data and information, 2) organising and refine information to become useful knowledge, 3) storage of the knowledge in KMS and 4) disseminating the ‘stored’ knowledge by the use of KMS (see Ruggles 1998; Davenport & Prusak 1998; Zack 1999; Awad & Ghaziri 2004). The focus is to collect, distribute, reuse and measure codified knowledge (Cohen 1998; Kock & McQueen 1998; Zack 1999). The content approach also focuses on making tacit knowledge explicit in order to facilitate the conversion of individual to organisational or even inter-organisational knowledge (see Nonaka 1991, 1994; Nonaka & Takeuchi 1995). Another characteristic of this approach is the accentuation of ‘knowledge markets’ including sellers, buyers and brokers of knowledge transactions (see Prusak 1997; Davenport & Prusak 1998).

Against the content approach, we can find the relational approach (Scarbrough & Burrell 1996). Its advocates argue that instead of treating knowledge as a free-floating entity, knowledge should be understood as relative, provisional and primarily context-bound (Orr 1990; Blackler et al. 1993; Barley 1996). Within this perspective, knowledge is primarily treated in terms of the production and reproduction of social relations. The focus is not on knowledge per se but rather on the process of knowing and the capability to act (Blackler 1995; Brown & Duguid 1998; Schultze 2000). Furthermore, relational theorists stress the importance of viewing knowledge as a reflection of individuals’ viewpoints of the world, and those viewpoints may be misunderstood, disputed and controversial outside its own specific locality (Galliers & Newell 2001).

One problem with the content perspective is that it treats knowledge as a tradable commodity that can be managed independently of individuals; a view of knowledge as objectified1. “To treat knowledge as a mere asset, a static entity like any other of the firm’s constituting elements or factors of production, is to miss the opportunity

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1 The view of knowledge as objectified is probably inspired by the work of Nonaka & Takeuchi (1995; see also Nonaka 1991; 1994; see further discussion in section 3.2.1)
to shift our theorizing into a genuine framework” (Spender 1998:234f.). Thus, as Scarbrough et al. (1999:vii) maintain, we “will have to turn it [read: KM] away from knowledge as a commodity and towards the benefits of people acting knowledgeably” (see also Quintas et al. 1997; Walshaw 2001, 2004; Wyssusek & Schwartz 2001; Goldkuhl et al. 2001; Goldkuhl & Braf 2002a, 2002b).

A criticism that has been raised against the relational perspective is that by “[a]sking not what is knowledge, but what counts as knowledge, relational theorists may deny it any substantive content whatsoever: it is all to do with the manipulation of social relations” (Scarbrough & Burrell 1996:179, *italics* in original).

Based on the theoretical foundations of this work, including knowledge as socially constructed (see section 2.3.1), social relations play a significant role in the creation and mediation of knowledge. However, we should not limit our view of knowledge as pure tacit and subtle and as restricted to manipulation of social relations (see further Goldkuhl & Braf 2002a, 2002b). We should acknowledge the fact that actors express and communicate knowledge by the use of signs. Actors use language and other signs to mediate what they know and to get other individuals to think and perform in certain ways (see section 2.4.2). However, signs, including oral and written utterances, should not be confused with knowledge *per se*. Signs are expressions of and refer to actors’ knowledge of the world (see further section 2.3.2 and 2.3.3). In sum, we should recognise knowledge as human knowledge, but which humans can communicate by the use of language and other sign systems.

### 3.1.4 The Incongruity of ‘Knowledge’ and ‘Management’

Talking about ‘management’ implies that someone manages something, and we make use of the concept of management “to capture all sorts of processes that are aimed at controlling, governing, and steering a certain practice or activity in society” (Styhre 2003:66; see also Braf 2000). Accordingly, the concept of ‘knowledge management’ implies that knowledge can be managed. However, knowledge is not a ‘thing’ that is amenable to being managed (Quintas et al. 1997; see also the above section). Hence, the concept of ‘management’ might easily be misunderstood when used in relation to knowledge. Styhre (2003:25) argues that,

> [t]he management of knowledge is something different from, say, the management of a manufacturing company primarily relying on machinery and technology. While other organizational resources and capabilities may be tangible, knowledge remains elusive, concealed by language barriers and the cognitive and perceptual limitations of the human body. Management, on the other hand, is all the practices aimed at structuring, ordering, arranging, monitoring, evaluating, controlling and leading complicated social processes in organisations. [. . .] Knowledge management is thus an oxymoron: Knowledge is processual and fluid, management is aimed at control and order.

I agree with Styhre with the exception that the management of a manufacturing company does, of course, also involve the need for development, mediation and use of knowledge. Hence, even if there are organisations that might be regarded as more knowledge-intensive than others, knowledge is needed, developed and used in all organisations. As Zuboff (1988) maintains, organisations in general have become
more informative and require a higher degree of intellectual skills rather than manual work.

We might talk about different ‘sub-practices’ of organisations. Each organisation has its ‘core work practice’, that is the sub-practice aiming at producing the goods and services to the clients (see Goldkuhl & Röstlinger 1999). Then, there are a number of supporting sub-practices – for example marketing, financial and human resource functions – aiming at taking care of issues related to the practice of doing business and leading organisations. Each sub-practice requires knowledge of what to do, how to do it, for whom and why. In this way, each of the sub-practices also involves a kind of ‘knowledge practice’ aiming at facilitating development, communication and utilisation of knowledge needed in the specific sub-practices. The knowledge practices are an integrated aspect of all sub-practices, but might be more or less distinguished. In some cases the knowledge practices are intertwined in the other sub-practices. In other cases the knowledge practices are separated from the other sub-practices, for example when some actors take a course to develop certain knowledge needed in the other sub-practices.

The main difference between the knowledge practices and the other sub-practices concerns their focus. The knowledge practices focus on development and communication of knowledge needed in the other sub-practices, while the focus of, for example, the core work practice is to produce the end-product offered to the business clients. Hereby, we need to acknowledge the knowledge practices as part of all organisations and all sub-practices (see Braf 2000, 2001).

In sum, ‘knowledge management’ can be seen as an inappropriate term since ‘management’ is highly associated with traditional conceptualisations of management as control (see Garvey & Williamson 2002; Styhre 2003). Based on the view of knowledge applied in this work, ‘knowledge management’ might be interpreted as the manipulation and control of human minds. Thus, if we use the concept of ‘management’ it would be more proper to talk about management of knowledge-oriented activities, in which the ‘management’ represent the design of activities and prerequisite to facilitate creation, mediation and utilisation of actors’ knowledgeability. We might also talk about ‘knowledge practices’. Not as a box of tools, but as a way of thinking of and approaching organisations as knowledge intense systems (see Tsoukas 1996; Styhre 2003).

3.1.5 Knowledge in Relation to Learning

Learning is the process through which knowledge is created, and actors’ current knowledge affects their capability to future learning (Kolb 1984; Vera & Crossan 2003; see also section 2.2.2 and 2.2.3). Hence, there is a close relationship between knowledge and learning and also between KM and organisational learning (OL) theory (see Gray & Meister 2003). Even if this work does not build on organisational learning (OL) theory, some reflections will be made on OL as a related theoretical domain.

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1 The word ‘knowledge practice’ is here used as an alternative to the concept of KM (see Braf 2000).
2 See Vera & Crossan (2003) for a further discussion about similarities and differences between OL and KM.
Basically, there are two kinds of learning discussed in the OL literature: single-loop learning and double-loop learning (Argyris & Schön 1978). Single-loop learning involves change of understanding concerning strategies or prerequisites for a practice, but leaves the basic values of the practice unaltered (see also ‘learning I’, Bateson 1973; ‘adaptability focused learning’, Ellström 1992, 2000). There is a change within a system; a transition of one state to another without any alteration of the system itself (see also Watzlawick et al. 1974). Double-loop learning focuses on establishment of new premises (like new mental models, perspectives, values or schemata) as means to override existing ones (see also ‘learning II’, Bateson 1973; ‘developing focused learning’ Ellström 1992, 2000; ‘innovative learning’, Engeström 1999). The organisational thinking and behaviour will be changed, which results in a change of the frame of the system (Watzlawick et al. 1974).

Both kinds of learning are relevant. Relating to the discussion in section 2.2.3, an experienced problem might sometimes be handled by single-loop learning, while another problem might require double-loop learning. This work recognises the existence of these to kinds of learning, but does not aim to make any distinction between knowledge as a result of single-loop learning versus double-loop learning.

Another proponent for OL theory is Senge (1990), who maintains that many organisations suffer from so-called ‘learning disabilities’. To overcome this problem and to enhance the capability to learn Senge suggests five so-called disciplines – to adopt ‘system thinking’, encourage ‘personal mastery’, make prevailing ‘mental models’ explicit and challenge them, build a ‘shared vision’ and facilitate ‘team learning’ – as means to create a learning organisation. Those kinds of prerequisites and facilitators for learning and knowledge creation have similarities with the KM literature (see further section 3.2.2 and 3.2.3).

However, the literature on OL has been criticised by KM scholars. Nonaka & Takeuchi (1995:45) argue that, for example, Senge (1990) “does not present any ideas on how knowledge can be created” and that many OL theories “basically lack ‘the view that knowledge development constitutes learning’” (see also Weick 1991). Nonaka & Takeuchi (1995:45) also argue that many OL theories “are trapped in a behavioural concept of ‘stimulus-response’” and views learning as a kind of reactive and adapted change activity.

Kolb’s (1984) four-stage process of experiential learning – including concrete experience, reflective observation, abstract conceptualisation and active experimentation – can be seen as one example of a reactive change process. Still, Kolb identifies important issues such as the needs for reflection and conceptualisation together with the connection between knowledge and action as well as between knowledge and learning.

In sum, even if some scholars concur that organisational learning and knowledge management research differ (see Nonaka & Takeuchi 1995; Scarbrough et al. 1999), they have “more in common than many are willing to admit” (Gray & Meister 2003:263). Learning is about change: Actors acquire knowledge and alter their way of thinking and acting through learning, and a primary aim of learning is to create knowledge to enhance the knowledgeability of actors to conduct within their organisational roles (see section 2.2).
3.2 Prior Research on Knowledge Transfer

Studies of knowledge transfer and knowledge sharing in organisations have evolved as a specific domain within KM research (see Argote et al. 2000; Goh 2002). Following Kalling & Styhre (2003), such studies can be categorised in three main lines. One line focuses on what organisational parts that are involved in knowledge sharing. Communities of practice (Wenger et al. 2002), teams (Dixon 2000; Postrel 2002) and networks (Spencer 2003) are examples of entities that engage in knowledge sharing activities. A second line focuses on guidelines concerning tools and mechanisms – such as intranets (Newell et al. 2000) and specific physical places (Nonaka et al. 2002) – that could be used to encourage actors to participate in knowledge sharing activities. A third line focuses on what facilitates and hinders knowledge sharing and transfer (see Szulanski 1993, 1996, 2000; Davenport & Prusak 1998; Björkegren 1999; de Long & Fahey 2000; Sverlinger 2000; Lindkvist 2001; Malhotra 2002; Roth 2002).

The first line of research mentioned by Kalling & Styhre (2003) is not in focus of this work. However, facilitators and hindrances are closely related to the research questions of this work and will be discussed in section 3.2.2 and 3.2.3. Section 3.2.4 discusses knowledge management systems as technology-based tools for knowledge mediation, which is an issue also related to the research questions of this work. Another issue is how knowledge transfer is viewed, and this is the focus of section 3.2.1 that presents some conceptualisations of knowledge transfer found in prior research.

The overall aim of this section 3.2 is to review knowledge transfer related literature in order to investigate how prior research can be used in this work. Hence, this section is closed with a summary of how the literature on knowledge transfer will be used in this work (see section 3.2.5).

3.2.1 Conceptualisations of Knowledge Transfer

Many studies of knowledge transfer are based on models of knowledge transfer processes including activities such as creation, identifying, capturing, collecting, adapting, organising, applying and sharing of knowledge (see Szulanski 1993; Nevis et al. 1995; Allee 1997; Wiig 1997; von Krogh 1998; O'Dell & Grayson 1998; Ruggles 1998; Argote 1999; McElroy 2000). One conceptualisation of knowledge transfer is presented by Szulanski (1996, 2000) who includes four process stages: initiation, implementation, ramp-up and integration (see figure 3-1 below; see also Szulanski & Cappetta 2003).

As figure 3-1 shows each of the stages is initiated by an event – a kind of milestone. Concerning the initiation of knowledge transfer, “[a]n opportunity to transfer exists as soon as the seed for the transfer is formed, i.e. as soon as a gap and knowledge to address the gap is found within the organization” (Szulanski 2000:13;
see also Szulanski & Cappetta 2003). The *initiation stage* comprises the events that lead to a decision to transfer knowledge. Accordingly, the *implementation* begins with the decision to proceed with the actual knowledge transfer. Hence, the implementation is the stage in which knowledge is communicated between actors, or what Szulanski refers to as ‘the source’ and ‘the recipient’ of knowledge. The *ramp-up* begins when the knowledge transferred is being used. As Szulanski (1996:29) holds, “[t]he recipient is likely to use the new knowledge ineffectively at first [. . .], but gradually improves performance, ramping up toward a satisfactory level”. This third stage is followed by the *integration stage* which begins after the recipient has achieved satisfactory results with the transferred knowledge. In other words, the knowledge gradually becomes routinised\(^1\) (ibid.).

<table>
<thead>
<tr>
<th>Formation of the transfer seed</th>
<th>Decision to transfer</th>
<th>First day of use</th>
<th>Achievement of satisfactory performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation</td>
<td>Implementation</td>
<td>Ramp-up</td>
<td>Integration</td>
</tr>
</tbody>
</table>

*Figure 3-1: The process of knowledge transfer (Szulanski 2000:13)*

An important contribution of Szulanski’s model is that it pays attention to the utilisation of knowledge (see further section 2.2.2 and 2.6.1). It also assumes that the final goal is routinisation\(^2\) of knowledge. However, there might likely be knowledge that is not inclined to be routinised\(^3\). Thus, rather than only striving for knowledge routinisation, the focus should be on mediating actionable knowledge that is needed for and utilised in action – no matter of the utilisation occurs once or several times. Hence, the process model could perhaps be modified by talking about *knowledge utilisation* as an alternative to Szulanski’s two latter stages. Another limitation of Szulanski (1996, 2000) is that he does not discuss *what* forms the need for knowledge transfer. This seems important to understand how mediation processes are initiated and constituted.

It would also be desirable to conceptualise knowledge mediation in a way that more clearly encompasses the complexity of communication discussed in section 2.3.2. One such model is presented by Walsham (2004). Building on Polanyi’s concept of sense-reading and sense-giving, Walsham presents a model of basic communication (see figure 3-2 below; see also figure 2-3) that pays regard to some issues Szulanski’s model lacks. While Szulanski’s process view can be regarded as an analytical framework that pays attention to different stages of the mediation process, Walsham’s model emphasises the need for re-presentation and interpretation, which can be seen as critical activities within Szulanski’s

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1 This is in line with Kostova (1999:311, *italics* in original), who defines “the success of transfer as the degree of institutionalization of the practice at the recipient unit. Institutionalization is the process by which a practice achieves a taken-for-granted status at the recipient unit – a status of ‘this is how we do things here’”.

2 Routinisation has similarities with ‘institutionalisation’ and ‘typification’ as discussed by Berger & Luckmann (1966; see also section 2.3.1)

3 Knowledge might be needed for a task which is infrequent and non-routine, as in Dixon’s (2000) strategic transfer (see further section 10.3.3).
implementation stage. Hereby, a combination of those two views might offer a fruitful analytical instrument.

**Figure 3-2: A model of basic communication (Walsham 2004:3)**

Based on Szulanski’s and Walsham’s general models, it would also be interesting to investigate whether there are different types or variants of knowledge mediation. One such study is presented by Dixon (2000; see also section 1.2.1), who identifies five knowledge transfer types: serial transfer, near transfer, far transfer, strategic transfer and expert transfer (see table 3-1).

<table>
<thead>
<tr>
<th>Transfer types</th>
<th>Definition</th>
<th>Similarity of task and context</th>
<th>Nature of the task</th>
<th>Type of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial</td>
<td>The knowledge a team has gained from doing its task in one setting is transferred to the next time that team does the task in a different setting.</td>
<td>The receiving team (which is also the source team) does a similar task in a new context.</td>
<td>Frequent and nonroutine</td>
<td>Tacit and explicit</td>
</tr>
<tr>
<td>Near</td>
<td>Explicit knowledge a team has gained from doing a frequent and repeated task is reused by other teams doing very similar work.</td>
<td>The receiving team does a task similar to that of the source team and in a similar context.</td>
<td>Frequent and routine</td>
<td>Explicit</td>
</tr>
<tr>
<td>Far</td>
<td>Tacit knowledge a team has gained from doing a nonroutine task is made available to other teams doing similar work in another part of the organization.</td>
<td>The receiving team does a task similar to that of the source team but in a different context.</td>
<td>Frequent and nonroutine</td>
<td>Tacit</td>
</tr>
<tr>
<td>Strategic</td>
<td>The collective knowledge of the organization is needed to accomplish a strategic task that occurs infrequently but is critical to the whole organization.</td>
<td>The receiving team does a task that impacts the whole organization in a context different from that of the source team.</td>
<td>Infrequent and nonroutine</td>
<td>Tacit and explicit</td>
</tr>
<tr>
<td>Expert</td>
<td>A team facing a technical question beyond the scope of its own knowledge seeks the expertise of others in the organization.</td>
<td>The receiving team does a different task from that of the source team, but in a similar context.</td>
<td>Infrequent and routine</td>
<td>Explicit</td>
</tr>
</tbody>
</table>

Dixon is not primarily concerned with knowledge transfer between individual actors but the transfer of knowledge gained in one task and context to another tasks

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1 See Goh (2002) and Chauvel & Despres (2002), who hold that studies involving empirical investigations of how knowledge transfer is accomplished are less common.
CRITICAL REFLECTIONS ON KNOWLEDGE MANAGEMENT

and contexts. This becomes clear when looking at the serial transfer in which the knowers (source team) and users (receiving team) of the knowledge are the same. However, focusing on ‘task’ and ‘context’, Dixon pays attention to the utilisation of knowledge, which, as mentioned earlier, is an important aspect. Furthermore, even if Dixon discusses knowledge transfer between teams – that is, an organisation unit-to-organisation unit level (see section 1.2.2) – her findings seem interesting also at an individual level as the primary focus of this work.

Based on the identified transfer types, Dixon gives a number of guidelines concerning how the different transfer situations should be designed. For example, to be successful with serial knowledge transfer, meetings should be locally, brief and regularly and involve all team members. The near transfer is accomplished by disseminating knowledge electronically with a supplement of personal interaction, knowledge is pushed and the usage and business goals are monitored. The far transfer is accomplished by translating source team knowledge, and it is mainly the individuals who are the carrier of knowledge. In the strategic transfer, the knowledge in question is identified by senior managers and then collected and interpreted by knowledge specialists. Finally, concerning expert transfer, electronic forums should be segmented by topic from which knowledge is pulled.

Dixon’s study involves an in-depth investigation of both how and why knowledge transfer works. However, based on the theoretical foundations of this work, one issue that is doubtful is whether there are transfer types – near, far and expert transfer – that involve either tacit or explicit knowledge (see further comments concerning Nonaka & Takeuchi’s model below; see also section 2.3.3 and 2.4.1). Furthermore, two issues that are not of focus in Dixon’s study concern the trigger and the initiator of knowledge transfer (see section 1.2.1). Dixon talks about business drivers, but those mainly concern requirements and measurements established by the management and one question is if they also motivate individual actors to mediate knowledge.

Another conceptualisation is presented by Nonaka & Takeuchi (1995) who describe a model of knowledge conversion including four modes – socialisation, externalisation, combination and internalisation – by which knowledge is translated into different kinds of tacit and explicit knowledge (see figure 3-3).

![Figure 3-3: Four modes of knowledge conversion (Nonaka & Takeuchi 1995:62)](image)

Following Nonaka & Takeuchi (1995), socialisation is about transferring tacit knowledge from one actor to another without the use of language, for example via observation and the traditional master-apprentice relationship. Externalisation is about the conversion of tacit knowledge to explicit knowledge which is facilitated
via reflective and mutual dialogues by the use of metaphors and analogies (ibid.).
The third mode concerns combination of different packages of explicit knowledge, which is facilitated through meetings, documents and courses (ibid.). Finally, internalisation that is about the conversion of explicit knowledge to tacit knowledge of the knower, and this is to a high degree facilitated though learning-by-doing (ibid.).

Examples of criticism that have been raised towards Nonaka & Takeuchi’s theory is that the relationship between individual and organisational knowledge is unclear (Tsoukas 2001) and that their theory lacks profound explanation of how new knowledge is created (Stacey 2001). Roth (2002:16) also points out a lack of testing the model in real settings as means to explain “how the knowledge conversion modes add to the value added activities of the firm”.

Furthermore, Nonaka & Takeuchi draw heavily on the work of Polanyi (1969; see section 2.3.3) arguing that knowledge can be transformed from tacit to explicit and visa versa almost as “some kind of monetary entity that can be exchanged into different currencies” (Styhre 2003:8; see also criticism in Walsham 2001, 2004). However, tacit and explicit knowledge are not separate forms of knowledge, but inseparable and necessary components of all knowledge (Polanyi 1969; see also Tsoukas 1996, 1997). Still, many KM scholars seem to use Nonaka & Takeuchi’s work to justify the distinction between tacit and explicit knowledge in a way not in line with Polanyi’s thinking (see also ‘the content approach’, section 3.1.3).

### 3.2.2 Prerequisites and Facilitators for Knowledge Transfer

Looking at the vast volume of KM literature, one can find several suggestions concerning critical prerequisites and facilitators for knowledge transfer as part of KM. The importance of a knowledge vision, knowledge staff, the ‘right’ culture, management commitment, common language and different channels for knowledge dissemination are frequently put forward as prerequisites for KM (see Nonaka & Takeuchi 1995; Marquardt 1996; Allee 1997; Davenport et al. 1998; Davenport & Prusak 1998; Klein 1998; O’Dell & Grayson 1998; McDermott 1999; von Krogh et al. 2000). On the one hand, these kinds of suggestions are valuable to better understand how to approach KM. On the other hand, they tend to be discussed without conscious consideration of how knowledge is created, communicated and utilised.

It is, for example, claimed that one of the most important prerequisite for successful KM is the presence of a knowledge sharing culture (Davenport & Prusak 1998; McDermott 1999; Nonaka & Takeuchi 1995). However, as Dixon (2000) critically points out, do we first ‘create’ a knowledge culture and then get people to share their knowledge? Should it not be the other way around? If actors become used to communicate their knowledge, is it not the communication itself that creates

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1. McDermott (1999) talks about four challenges: The management challenge is about creating an environment that truly values knowledge sharing. The social challenge is about getting actors to share their knowledge but still encourage thinking rather than sophisticated copying. The personal challenge is to be open to others’ ideas and maintain a thirst for new knowledge, and finally the technical challenge, which is about designing human and information systems that not only make things available but also help actors thinking together.
a knowledge-oriented atmosphere? Furthermore, according to O’Dell & Grayson (1998), there are certain capabilities that mould such a culture: a process improvement orientation, a common methodology for improvement and change, the ability to work effectively in teams, the ability to capture learning and the technology to support cataloguing and collaboration. Still, it is not fully clear how those capabilities are developed or how they contribute to a knowledge sharing culture.

The issue of a ‘knowledge sharing culture’ relates to another prerequisite concerning the willingness to communicate knowledge. Davenport & Prusak (1998:154) maintain that “[e]mployees who sought and applied knowledge in school and in early jobs will probably continue to do so”. Then, is that a fact that people in general are either willing or unwilling to share their knowledge? Do some actors seek and apply knowledge, while some do not? Do we not all – consciously or unconsciously – seek and apply knowledge? Does not willingness depend on other underlying reasons rather than a pure personal characteristic? Davenport & Prusak (1998:28f.) also state,

[s]ome potential knowledge sellers keep themselves out of the market because they believe they benefit more from hoarding their knowledge than they would from sharing it. [. . .] This is a reality of knowledge politics that managers need to deal with in designing knowledge initiatives. One of the challenges of knowledge management is to ensure that knowledge sharing is rewarded more than knowledge hoarding.

As Davenport & Prusak state, perhaps sometimes incentives might be required. However, first we need to understand what the underlying reasons for ‘hoarding’ versus ‘sharing’ knowledge might be. We need to investigate what is beneath those kinds of behaviours. For example, Davenport & Prusak (1998:154) themselves mention that “employees may feel that their knowledge is critical to their unique value as an employee, and thus their continued tenure in the organisation. Under these circumstances they may be reluctant to share that knowledge”.

Furthermore, O’Dell & Grayson (1998) argue that relationships are critical prerequisites for successful knowledge transfer (see also Wagner 2003). It is also argued that knowledge transfer is more likely between individuals who have similar attitudes and experiences (see Burkhardt & Brass 1990; Cohen & Levinthal 1990; Darr & Kurtzberg 2000:30). Hence, relationships seem to be important to facilitate the communication of knowledge.

To continue, an example of a doubtful theoretical stance concerns the idea that knowledge grows with use, and that knowledge sharing is always a good thing. As Davenport & Prusak (1998:17; see also Quinn et al. 2002) argue,

[k]nowledge, by contrast, can provide a sustainable advantage. [. . .] The knowledge advantage is sustainable because it generates increasing returns and continuing advantages. Unlike material assets, which decrease as they are used, knowledge assets increase with use: Ideas breed new ideas, and shared knowledge stays with the giver while it enriches the receiver. The potential for new ideas arising from the stock of knowledge in any firm is practically limitless [. . .].
This idea seems to imply that knowledge grows by itself and without any additional costs or efforts. Even if humans would have an unlimited capability to acquire and maintain new knowledge, we need to ask ourselves what is knowledge for? The idea implies that the mere existence of knowledge will generate a competitive advantage, and it is seldom connected to solid discussions of the utilisation of knowledge. Should we really take for granted that all knowledge is usable when shared? Depending on the working role of different actors, some knowledge might be useful for some actors but less useful for other actors. Some knowledge might perhaps even be useless when shared. Knowledge might also become obsolete, and thereby lose its usefulness.

Another prerequisite is that organisations need to choose how knowledge should be transferred between their actors, and both overall and specific types of strategies are offered by the literature. For example, Nevis et al. (1995) discuss ‘learning orientations’ – which concern what and where learning takes place – and facilitating factors and suggest three overall (and a bit woolly) strategies to improve organisational learning capabilities: 1) to improve on learning orientations, 2) to improve on facilitating factors or 3) to change both learning orientations and facilitating factors.

Hansen et al. (1999) present more specific KM strategies, and suggest that organisations should choose either a codification strategy or a personalisation strategy. Hansen et al. argue that the codification strategy is applied in organisations that have a technology-oriented approach, while the personalisation strategy primarily is concerned with direct contacts between actors. Following Hansen et al., the criterion for choosing strategy concerns organisations’ competitive strategy, and three questions are suggested to facilitate the decision: Are the products standardised or customised? Are the products mature or innovative? Do the actors rely on explicit or tacit knowledge to solve problems? If the products are standardised and mature and dependent on explicit knowledge, a codification strategy is preferable (ibid.). If the products are customised and innovative and dependent on highly tacit knowledge, a personalisation strategy should be selected (ibid.).

One question that can be raised is whether the questions are a proper basis for making such a strategic decision. Just because products are standardised and mature might not automatically mean that actors can gain needed knowledge primarily without talking to colleagues. Furthermore, the theoretical foundations of Hansen et al. concerning their distinction between explicit (codified) knowledge and tacit knowledge can be questioned (see Hendriks 2001; see also discussions in section 3.1.3 and 3.2.1). How is knowledge mediated between individuals if it is not ‘codified’ in some sense? When communicating, actors continuously ‘codify’ their ideas and thoughts by the use of language or other signs. No matter if actors use an IS or oral language to mediated knowledge, the signs they use are not knowledge; signs are only used to express actors’ knowledge. Thus, the distinction and meanings of those two strategies need to be further clarified.

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1 These strategies can be related to the content versus the relational approach as discussed in section 3.1.3.
3.2.3 Hindrances to Knowledge Transfer

Prior research suggests four sets of factors that influence the difficulties to transfer knowledge: the characteristics of the knowledge, the source, the recipient and the context in which the transfer takes place (see Teece 1977; Rogers 1983; Leonard-Barton 1990; Szulanski 1996, 2000). Some scholars place the main emphasis on the characteristics of the knowledge (Winter 1987; Zander & Kogut 1995), while others stress the characteristics of the situation in which the transfer occurs (Arrow 1969). However, many times it is probably the mixture of the four factors that together affect the transfer process (Szulanski 1996). In comparison, there are many similar findings in prior research on hindrances to knowledge transfer, and the following is a presentation of some of the hindrances commonly emphasised in the KM literature.

Sverlinger (2000) argues that the major hindrance to knowledge transfer is a lack of time in the sense that actors want to share knowledge but have no time1 (see also Chase 1997; Davenport & Prusak 1998). The second largest hindrance suggested by Sverlinger is a lack of reward for knowledge sharing (see also Davenport & Prusak 1998), which is followed by too high costs and a lack of funding. Other hindering circumstances presented by Sverlinger (2000; see also Nonaka & Takeuchi 1995; Davenport & Prusak 1998) are the following:

- Difficulties to know where to store knowledge
- Knowledge is difficult to locate
- Knowledge from one project is difficult to generalise and use in other projects (see also ‘causal ambiguity’, Szulanski 1996)
- Individuals do not share best practice (concern unwillingness)
- Lack of skills in knowledge management techniques
- Lack of understanding of knowledge management and its benefits
- Current culture does not encourage knowledge sharing (see also Davenport & Prusak 1998; Moffett et al. 2003)
- Lack of management support and commitment
- The organisation does not have offices that support knowledge sharing
- The organisation does not have the right information technology for sharing knowledge

Additional hindrances presented by Szulanski (1993; 1996), who has investigated the notion of stickiness, are lack of 1) motivation to share and adopt a new practice due to the ‘not invented here syndrome’ (NHI-syndrome, Katz & Allen 1982), 2) perceived reliability of the source, 3) absorptive capacity of receiver (see also

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1 Sverlinger’s study is to a large degree based on quantitative data collection and analysis. Hereby, data were primarily collected via questionnaires, including statements that should be answered using a ten-grade scale. For example, the statement concerning time was “people want to share knowledge but have no time” (Sverlinger 2000:274). It might be easy for a person to agree that he wants to share, but blames ‘lack of time’ as the reason for him not sharing. Thus, when formulating these kinds of questions, we need to be aware of their limitations and the risk of incorrect conclusions.
Cohen & Levinthal 1990; Mowery et al. 1996) and 4) retentive capacity of the receiver.

One hindrance not often mentioned in the literature concerns conflicting norms. Organisations often have certain norms governing what is done and how (see section 2.2.1). As shown in Braf (2000), the consulting firm (used as empirical case) initiated activities to facilitate knowledge sharing, but several respondents (consultants) referred to the reward and budget system and questioned why they should give away their knowledge for free. De Long & Fahey (2000) have identified a similar conflict. They describe a team that was supposed to capture ‘lessons learned’ from the product development process. However, the team members were so concerned with being able to account for their working time that they refused to reflect on their experiences. The team’s well-established norm of being billable was only removed when an administrative accounting code, to which time for extracting lessons learned could be charged, was introduced.

Both Braf (2000) and de Long & Fahey (2000) show that prevailing norms might be a potential hindrance, and it seemed unlikely that other additional incentives would make any difference as long as the reward and budget systems were unchanged1. Accordingly, organisations should perhaps not expect knowledge mediation initiatives to be successful if they contradict existing working norms.

The other way around, Hayes & Walsham (2001) observe that actors might participate in knowledge mediation when this is regarded as a way to show off their knowledgeability and thereby promote their careers. This behaviour probably builds on an apprehension that knowledge sharing is an evaluation criterion (perhaps even a norm) for career advancement.

Another issue identified by de Long & Fahey (2000) concerns the disinclination of individuals to share knowledge, and the authors hold that people tend to experience a loss of control if their knowledge if it is shared. Dixon (2000) emphasises the opposite and contends that people are very willing to share what they know and that they feel flattered when someone asks for knowledge support. Perhaps the ‘truth’ is something in between. As Constant et al. (1994) hold, people tend to distinguish between what they have learnt via own experience and what have been learnt via documents and other descriptions; even if it was said that they were willing to share both, their motivation for sharing their personal experiences was lower. One explanation is that forwarding a document does not really require anything back, but sharing personal experiences was only done if the actors got something back (ibid.). Still, the personal benefit was often trivial, for example a smile in return could many time be enough. The findings in Constant et al.’s (1994) study might also explain why many technology-oriented KMI have failed (see section 3.1.1). As Dixon (2000:8) notes,

[I]ittle personal benefit comes from contributing to a database that is accessed by others with whom I have no connection and moreover from whom I am unlikely to hear. A database is like a black hole. It gives nothing back – no thank you, no smile, no sigh of relief, no enthusiasm on the other end of the line.

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1 Kostova (1999) also acknowledges the importance of norms via an investigation of transnational knowledge transfer.
Another hinder to knowledge transfer is a lack of care (von Krogh 1998; see also Lave & Wenger 1991; Goh 2002; Roth 2002). Following Mayeroff (1971), care gives rise to certain behaviours in relationships. Behaviours can, in turn, be illustrated in terms of different dimensions, and the most important are mutual trust, active empathy, access to help, lenience in judgement and courage (von Krogh 1998). One might distinguish between high-care and low-care relationships, and it is argued that when care is low, individual actors will try to hoard knowledge rather than communicate it (von Krogh et al. 2000; see also Goh 2002).

On the other hand, based on the relation between weak versus strong relationships and complex versus non-complex knowledge, Hansen (1999) argues that weak relationships are sometimes also beneficial. Hansen (1999:105) argues that weak ties “have the strongest positive effect on completion time when the knowledge is not complex”. A similar conclusion is made by Kotabe et al. (2003), who found that an increased duration of relationships between a supplier organisation and a buyer organisation did not moderate the effects of exchange of ‘technical knowledge’, but the effect of transferring ‘technological knowledge’ increased remarkably with link duration1.

### 3.2.4 Knowledge Management Systems

Technology has played a significant role in the KM literature, and many KMI have focused on implementing IT-based systems to deal with KM (Hendriks 2001; see also section 3.1.1). Those kinds of systems are often referred to as ‘knowledge management systems’ (KMS), ‘knowledge repositories’ or simply ‘knowledge systems’ (see Walsham 2001; Lau et al. 2003; Carlsson 2003). The role of those systems is to support the creation, storage and retrieval, transfer and application of knowledge (Alavi & Leidner 2001). These systems are not only concerned with ‘storing’ knowledge (O’Dell & Grayson 1998; Teece 2001); they are also used as a kind of ‘yellow pages’ in order for individual actors to find certain experts (Ruggles 1998). Consequently, there are a number of different applications referred to as KMS: e-mail and virtual discussion forum (Nonaka 1994), intranet and different kinds of groupware (Hendriks 2001; Stenmark 2003), databases and data warehouse (Zack 1999; Lau et al. 2003) and knowledge portals (Mack et al. 2001; Carlsson 2003; Tsui 2003; see also Davenport & Prusak 1998; Liebowitz 1999; Carlsson 2001; Awad & Ghaziri 2004).

I agree on the view that these IT-based systems are important instruments for KM. However, as questioned in section 3.1.1, what is the purpose of other kinds of information systems if they do not aim to inform and contribute to the knowledgeability of the IS users? All information systems are designed as instruments for communication and knowledge mediation (see Langefors 1966; see also section 2.5). Thus, the distinction between KMS and other IS does not seem fully relevant. There might, however, be characteristics of KM that are useful when designing IS. For example, the fact that KM is concerned with the creation,

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1 Kotabe et al. (2003) describe ‘technical knowledge’ as narrow and independent pieces of information, and ‘technological knowledge’ as a broader body of knowledge encompassing a set of related techniques, methods and designs applicable to an entire class of problem.
communication and reuse of knowledge also prompts the need for IS designed and utilised for those kinds of activities.

Furthermore, several scholars suggest that knowledge can be viewed as an object that can be stored and manipulated via IS (see Carlsson et al. 1996; McQueen 1998; Zack 1999; Wijnhoven 1999). Such a view often builds on the distinction between tacit and explicit knowledge. Even if the value of this distinction is beyond dispute as a way to explain that knowledge might be difficult to express, Polanyi’s idea was never to separate knowledge into two distinct types (see section 2.3.3 and 3.2.1).

Instead of talking about tacit versus explicit knowledge, Hendriks (2001) suggests that we talk about generic versus situated knowledge. Generic knowledge is explained as a set of rules, while situated knowledge includes an understanding of the context in question. Hendriks (2001:65) also writes,

> [t]his distinction refers to the fact that knowledge involves the application of generic rules within an individual situation. The situatedness of knowledge indicates the fact that, without knowledge of the context, a generic rule is limited in meaning or even, as some maintain, void of meaning.

Hendriks (2001) maintains that most IT applications involve a focus on generic knowledge at the expense of situated knowledge (see also Butler 2003). Hence, he implies that we should pay more attention to situated knowledge in order to understand and be able to use generic knowledge.

Moreover, we should not expect knowledge mediation to work just because an IS has been implemented. Neither should technology be regarded as a substitute for face-to-face meetings (Dixon 2000). One of the challenges is to get actors to use technology to communicate knowledge (see Braf 2000). Following Stenmark (2003), when concerns about under-utilised systems are raised, this commonly results in centralisation and more stringent control. However, Stenmark (2003:215) claims the opposite,

> [c]orporate intranets are likely to become useful knowledge creation environments only in organizations where the management dares to let go of its control desire and empower the organizational members to take a more active role in the design of the information landscape.

One benefit of using IS to mediate knowledge is that actors can communicate independent of geographical and time distances (Stenmark 2003; see also Langefors 1966). The content of IS has a higher degree of durability and availability than, for example, oral language (see Clark & Brennan 1991; section 2.3.2). However, the content of IS might be rather extensive. Thus, one challenge is to deal with the issue of information overload (Stenmark 2003).

The use of technology also enhances the chance of serendipity. To Stenmark (2003:212),

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1 Some of those authors also suggest alternative views of knowledge, for example as a capability, resource or as a process of simultaneously knowing and acting (Carlsson et al. 1996; McQueen 1998; Zack 1999, see also Carlsson 2001; 2003).

2 Walsham (2004:7) even argues that “[w]e should stop using phrases such as ‘knowledge repositories’, ‘knowledge transfer’ [. . .]” as they imply a view of knowledge as objectified.
The chance that an unexpected piece of information should cross your path increases on an intranet since web technology enables anyone to publish anything, and the flexibility of the web further enables a cross-fertilization.

Concerning hindrances, Bansler & Havn (2003) suggest five explanations for failures of communicating knowledge about best practice via IS. Two major hindrances are lack of time and lack of incentives (see also Sverlinger 2000; section 3.2.3). Bansler & Havn (2003:161) argue that activities of expressing and communicating knowledge via IS are not prioritised because IS are “not perceived as a vital mode of problem solving”. Bansler & Havn also found that if an actor requests help in person, other actors are highly willing to help. A third hindrance concerned bragging. Contributing to the content of systems is a way to let colleagues know what a gifted person one is, and that kind of behaviour is not regarded as proper behaviour (ibid.). A fourth hindrance concerns the importance of personal networks and Bansler & Havn (2003:162) write,

all respondents emphasised that better-practice sharing happens in personal networks, while documents and databases are of minor importance. [As one respondents explained] People like to talk about things they have done. But if they for some reason have to sit down to write about what they have done, it all turns into something strained and confined, and very likely not useful for others.

The fifth hindrance is poor quality of the contributions, and almost all respondents in Bansler & Havn’s (2003) study had dropped the system after having looked into the system a few times without finding anything of interest.

Furthermore, Sörensen & Lundh-Snis (2001) argue that the process of ‘codifying’ knowledge might be stifled if the knowledge is highly tacit and complex and if the knowledge elicitation process is performed by other actors than the knowers. In one of Sörensen & Lundh-Snis’ cases, the aim was to elicit complex and tacit process knowledge situated throughout several professional groups and codify it into a new expert system. A so-called ‘knowledge engineer’ began to interview the experts individually and discussed possible codifications of rules governing a certain business process. However, following Sörensen & Lundh-Snis (2001), more questions were raised than answered when the actors realised the extremely complex nature of the knowledge in question. Hence, the whole idea was abandoned (ibid.).

On the other hand, even if actors have the capability to verbalise their knowledge, they might be reluctant to share it due to the ‘knowledge-is-power syndrome’ (Butler 2003). They might be unwilling because of a fear of loosing status, power or influence in their organisation (ibid.). However, this is not a problem specific to the use of technology, but a general hindrance when trying to communicate knowledge.

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1 Such requests were often related to specific problems that the questioner had to deal with (Bansler & Havn 2003; see further Chapter 7).
2 The problem described by Sörensen & Lundh-Snis (2001) has similarities with the reasoning about the complexity of communicating knowledge as described in section 2.3.2 (see also section 2.3.3).
3.2.5 The Range of Uses of Prior Research

Even if I have applied a rather critical stance when discussing theories on knowledge management and knowledge transfer, they offer a lot of interesting ideas and contribute to the theoretical grounding of this work (see also section 4.5.3). One drawback is that several theories tend to suffer from an unclear theoretical position, and many assumptions are taken for granted without further investigations. Several theories do not consider the relation between actors, their knowledge, signs representing their knowledge and their actions.

However, like the KM ideas discussed in section 3.1, the theories discussed in this section 3.2 are used to position this work in relation to prior research. For example, as a complement to Dixon (2000) and Szulanski (1996, 2000), this study focuses on characterising common types of knowledge mediation, with a particular interest in what triggers mediation, who initiates mediation and what instrument are used to accomplish knowledge mediation. This focus might result in new findings – for example, other types of knowledge mediation – that can complement Dixon’s and Szulanski’s theories. Walsham’s (2004) model of communication has similarities with the reference model presented in section 2.6.4 (see figure 2-3) and verifies several of the ideas presented in Chapter 2. As maintained in section 3.2.1, those ideas might also be enriched by a process view. Thus, with some modifications – Szulanski’s two latter stages are replaced with one stage referred to as ‘knowledge utilisation’ – Szulanski’s (1996) process model will be used as a framework to analyse knowledge mediation and circumstances influencing knowledge mediation (see further Chapter 10 and Chapter 11).

I have also discussed what prior research says about circumstances, including facilitators and hindrances, influencing the communication of knowledge. This line of prior research will be compared with the findings of this work, which might verify earlier theory, falsify earlier theory or enrich prior research by new findings (see Chapter 11). This work will particularly highlight the unwillingness to communicate knowledge and the idea that knowledge sharing is always desirable. These two issues are interesting as the KM literature tends to treat them as axioms, without proper reflections and investigation of underlying reasons and effects. Another issue of interest is the influence of prevailing norms. This is interesting as norms seem to be pivotal when it comes to influencing circumstances but they are seldom discussed in the mainstream KM literature.

Finally, KM-related theories on IT-based communication of knowledge have been used to clarify the view of IS applied in this work (see also section 3.1.1 and 2.5). Based on the criticism raised towards these KM-related theories, there is also a need for further investigating the use of IS as instruments for knowledge mediation. Such an investigation needs to go beyond the view of knowledge as objectified. It also needs to analyse circumstances that might hinder or facilitate IT-based knowledge mediation and clarify when IS might be useful and when IS are less useful as instruments for knowledge mediation (see the third research question, section 1.3.1). Such clarification might, in turn, provide suggestions for the design of IT-based knowledge mediation.
Chapter 4
Research Approach

This chapter describes the research approach through which the aim and research questions of this dissertation have been fulfilled and answered. The chapter includes an overall outline of the research process, a presentation of how the focus and research questions of this work have evolved and been developed, the research design, the methods for data collection and the principles of analysing collected data.

4.1 The Research Process

The process by which this dissertation has been produced has not been a straightforward route. One of the challenges was that I initially intended to investigate ‘knowledge management initiatives’ (KMI) and thereby contribute to the understanding of the concept of knowledge management (KM). However, during the research process I realised that there was a need for modifying and developing the research focus\(^1\) as a way to more fully capture what KM is about. This resulted in a shift of focus towards ‘knowledge mediation’ as the core phenomenon of investigation.

To give an overall view of the research process, figure 4-1 below illustrates the main stages starting with the concept of KM as the point of departure and closing with a theory of knowledge mediation as the research product. These steps will be further described in section 4.2 to 4.5.

The single-way arrows in figure 4-1 illustrate the structure and relations between the different steps and double arrows illustrate iterations and mutual interdependence between different steps. For example, the two-way arrow between the ‘New research focus: Knowledge Mediation’ and ‘A theory on Knowledge Mediation’ means that the theory should correspond with the research focus and research question defined for the study.

\(^1\) The term ‘research focus’ refers to what phenomenon to study, that is, the analytical entity of this work.
4.2 Initial Research Focus

In this section, the main stages relating to the initial research focus ‘knowledge management initiatives’ (KMI) will be described. Section 4.2.1 summaries the main KM-related issues that triggered this work to focus on KMI. Based on the formulated research focus, the research design and the choice of empirical sources will be described in section 4.2.2 and 4.2.3. This will be followed by a presentation of the analysis and reflections that caused a change in research focus (see section 4.2.4).

4.2.1 Investigating Knowledge Management Initiatives

The first stage was to establish a basic understanding of the concept of KM, which was done by investigating KM theories. This stage was facilitated as I had studied KM in an earlier work (see Braf 2000). Two main reasons were identified that caused the choice of KM as the starting point of this work. First, KM is an interesting area of research as it focuses on a highly critical aspect of organisations. However, even if there are a lot written on KM, it is also a woolly concept that needs clarification (see further section 1.1 and Chapter 3). As Gray & Meister (2003:259) argue, “[k]nowledge management research lacks a common conceptual core”. Second, it is argued that many KMI in organisations have failed due to a too strong orientation on technology (Scarborough et al. 1999; Harrison 2000; Walsham 2001; Garvey & Williamson 2002). The empirical data used in a preparatory study reported in Braf (2000) did also show that IT-based KMI tended to fail because too few actors used the technology. In this regard, it was in particular interesting to investigate how technology is used in KM.

Hence, the initial research focus was to investigate KMI in practice. Accordingly, KMI was chosen as the analytical entity (unit of analysis) of the research. KMI was understood as conscious activities that organisations undertake to develop, share

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1 The data collection of this initial focus will be discussed in section 4.4.
2 Existing theories are often referred to ‘secondary sources’ while empirical data are often referred to as ‘primary sources’ (see Booth et al. 1995).
and reuse knowledge. Hereby, the study of KMI focused on what was done in organisations to operationalise KM in practice. The aim was to contribute with a clarification of the concept of KM and also give suggestions about how to design and work with KM in practice. I wanted the study to be transparent concerning the relation between knowledge and action – knowledge aims to enable, improve and be used in action. This relation was considered important in order to work with proper KMI and to gain useful effects of KMI. The connection between knowledge and action is also an issue that several KM theories lack.

4.2.2 Research Design

Having decided on the research focus, the second main choice concerned what kinds of data were needed and how to acquire these data to realise the intended study.

Investigating KMI in practice required access to empirical data. One option was to collect quantitative data (also referred to as ‘hard data’, Bryman 2001) via a broad study. Such a study would require some kind of hypothesis from which questions could be specified. The questions needed to be clearly formulated and perhaps also have some given and alternative answers such as yes or no or a graded scale, so-called ‘closed questions’ (see Bryman 2001). This would involve a deductive approach to the data collection. This means that based on existing theories a hypothesis and research questions would be grounded, formulated and tested.

However, the initial research focus formulated did not include a defined hypothesis or specific and clear questions, and that was not considered relevant as KM as such is a vague and unclear concept. Furthermore, the characteristic of the needed data was regarded as rich (qualitative) rather than hard (quantitative) data (see Bryman 2001). These rich data did not seem likely to be acquired via a broad study involving a single or a few data collection attempts at certain points of time. They needed to be acquired over a longer period of time. Thus, based on the characteristic of needed data, the lack of conceptual stringency in existing KM theories and the lack of a formulated hypothesis and clear research questions, a broad study to collect quantitative data was not a proper choice.

To understand KMI in practice required an in-depth analysis of underlying reasons, solutions and purposes of these kinds of activities. It was about investigating the content and features of KMI in order to say something about how to design and work with KM. Hence, to acquire the rich data needed a deep and qualitative study, involving ‘open’ (rather than closed, see Bryman 2001) questions and an explorative orientation, was chosen. In line with my view of knowledge and

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1 See Nurminen (1996:122, italics in original) who talks about ‘context-sensitive’ in the sense that “[e]ven if information systems and work organisations may be regarded as generalisable phenomena, they always have unique situational factors which must be taken account in the use and design of them”. The same reason is valid for the concept of KM in the sense that even if KM can be regarded as a generalisable phenomenon, its operationalisation is always specific in relation to the prerequisites, needs and circumstances of the particular organisation.

2 A focus on features and significant characteristics of the phenomenon of study is often related to qualitative studies (see Denzin & Lincoln 2000).
its construction, I also chose an interpretive study\(^1\). As Orlikowski & Baroudi (2002:55, bold type in original; see also Walsham 1994) maintain,

[i]interpretive studies assume that people create and associate their own subjective and inter-subjective meanings as they interact with the world around them. Interpretive researchers thus attempt to understand phenomena through accessing the meanings that participants assign to them.

Case studies are one way to collect empirical data and can be regarded as an overall research method (Easterby-Smith et al. 2002). Case studies are also common in qualitative research as a way to perform an intense study to understand, describe and explain phenomenon that are examined in natural settings (see Benbasat et al. 1987; Bryman 2001). This applied well to this work; thus, case studies were chosen as the overall method (concerning criteria for selecting cases in section 4.2.3).

As reasoned above, I had not formulated any hypothesis from which questions were specified. Neither had I formulated any ‘initial guide’ (see Eisenhardt 1989) to govern the data collection. I wanted to avoid the risk of focusing too much on pre-defined issues whereby other potential avenues of exploration might be disregarded (see also Walsham 1995). I wanted the study to be open towards empirical data, as in inductive approaches\(^2\). However, even if I chose not to apply a deductive approach, the choice was not a strict inductive approach – such as the original form of grounded theory (see Glaser & Strauss 1967) – either. To develop an understanding of KM theories by reviewing KM literature and thereby also formulating the research focus is not in line with a strict inductive approach. The overall approach was more of a combination of induction and deduction (see ‘abduction’, Alvesson & Sköldberg 1994).

Another choice concerned the role of empirical data and existing theories in the data analysis, which relates to the choice of analytical principles. As reasoned above, it was important to be open-minded towards empirical data and not too focused on pre-defined hypothesis whereby important data might be neglected. However, it was also important to take advantage of and build on existing theories in order to avoid re-inventing the wheel and to secure a cumulative theory development (see Goldkuhl & Cronholm 2003). During the analysis the intention was to use KM theories as analytical instruments by comparing them with collected empirical data (see Eisenhardt 1989; Walsham 1995). Hence, the analytical principles chosen were a combination of empirically and theoretically driven analysis (see ‘multi-grounded theory’, Goldkuhl & Cronholm 2003; see further section 4.5).

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1 The interpretive approach is in line with the view of knowledge outlined in Chapter 2. There are, however, also other epistemological views such as the positivistic and the critical stance (see further Orlikowski & Baroudi 2002).

2 Inductive approaches are often related to qualitative research, while deductive approaches are commonly related to quantitative research. However, this categorisation is not as straightforward as it might seem; both qualitative and quantitative research can be inductive as well as deductive (see Alvesson & Sköldberg 1994; Bryman 2001).
4.2.3 Selection Criteria and Choice of Cases

Based on the choice of case studies as the overall method, I needed to define criteria for choosing relevant cases and also the number of cases. One criterion for choosing organisations was that they should either have implemented conscious KMI or started the implementation or have a serious intention to develop such initiatives. The organisations should have a serious and conscious intention with their KM-related work; otherwise there was a risk that there were no KMI to study.

Another criterion concerned the size of the organisation. A medium-sized or large organisation¹ was preferred rather than organisations with few employees. This should not be understood as KMI is of less importance to small organisations. However, it is likely that small organisations have greater possibilities to handle a lot of ‘knowledge management’ informally and in a more ad hoc based manner, while larger organisations likely require a more structured and formalised knowledge practice. Furthermore, in medium-sized and large organisations more actors are likely working with similar tasks, which, in turn, call for a greater need for sharing and reusing knowledge between actors.

Concerning the number of organisations, the case study method is commonly used to perform an intensive study of a single organisation (see Bryman 2001; Easterby-Smith et al. 2002). However, to fulfil the aim of this research focus, one case did not seem enough. To clarify of the concept of KM and to give suggestions about how to design and work with KM in practice required an understanding including depth as well as width about what organisations do to accomplish KMI. I needed width to be able to identify more common features and patterns and to give prescriptive advices and also to enhance the possibilities of variation and thereby enrich the view of KMI generated via this work. The aim was to get access to two or three cases and thereby be able to compare initiatives of different organisations².

The first organisation chosen was an energy firm – referred to as Energy. Energy was one of three pilot organisations within Energy Group (a group of companies) that had implemented a so-called Personnel Process (see further section 5.1). The Personnel Process was an effort initiated by the parent company to enhance learning and knowledge development, and this initiative corresponded well to the first criterion for choosing cases. Energy was selected as this was the pilot organisation that had got farthest in the implementation process. Energy involved about 130 employees which corresponded to the second criterion.

The second organisation chosen was a publishing firm – Publish – that aimed to develop a so-called Human Capital Process (see further section 5.2). The aim of the Human Capital Process was to secure and improve development and sharing of business knowledge, which corresponded to the first criterion for choosing cases. Publish involved about 120 employees. Hence, both criteria for selecting cases were fulfilled.

¹ A medium-sized organisation is here regarded as an organisation that employs between 50 and 250, and a large organisation that employs over 250 employees.

² Following Bryman (2001), qualitative research on two or more cases is referred to as a comparative design (see also ‘cross analysis between cases’, Merriam 1994).
One main difference between Energy and Publish was that Energy was supposed to have implemented its KMI, while Publish was about to design its KMI. Hence, they were in different stages of their KM work, which could offer interesting variations of collected data. Furthermore, Energy worked with operative energy net management, while Publish worked with product development and production. Thus, their products as well as the logic of their respective practice differed. This was interesting as it might show variation of their way of approaching KMI.

Having those two cases could have been enough as empirical sources. However, along the data collection I saw a need for a third case and that was mainly due to that neither Energy, nor Publish seemed to be very progressive in their KMI (see further section 4.2.4). The third organisation chosen was an architect firm – Architect – that had initiated an internal work to develop its knowledge practice. The idea of Architect was to develop and implement an action plan with clear visions and goals aiming at improving its knowledge practice. Architect included over 300 hundred employees. Thus, both selection criteria were fulfilled.

Architect was not only chosen because it had expressed a serious attempt to develop its knowledge practice. Architect was also interesting as the organisation was geographically dispersed and the architects at the different offices were in great need for each other’s knowledge and expertise. This differed from Energy and Publish, where the actors were located in the same place. Thus, Architect could offer some additional aspects in particular concerning how to bridge physical distances. It also seemed reasonable to believe that information systems play a more significant role in KMI that have to deal with physical distances. As Publish, Architect also worked with product development but its products concerned designs of buildings that aimed to be produced, as a kind of preparatory product design. Accordingly, the three cases differed concerning their products and practices which could offer varying findings as well as similar patterns as they worked with KMI as a kind of common feature.

One circumstance that facilitated the access to the three organisations’ KMI was that they all wanted certain assistance in their work. Energy wanted help to evaluate the implementation of the Personnel Process and its effects. Publish wanted help with planning and designing its Human Capital Process. Architect wanted support and feedback during the planning process and help to make a follow-up of the initiatives after their implementation. Hence, I had an interventionist role – almost as in action research – in which the researcher is seen as part of the change process itself rather than a pure and outside observer (see Walsham 1995; Kemmis & McTaggart 2000; Easterby-Smith et al. 2002).

The methods chosen to collect the empirical data were interviews, observations and document studies (see further section 4.4).

### 4.2.4 Initial Data Analysis and Reflections

When analysing the empirical data I realised that in Energy several of the intended initiatives had not been implemented or had failed on the way and Publish had difficulties in deciding what to do and how (see further section 5.1.3, 5.2.2 and 8.3.2). Thus, these two organisations showed limited progress and, consequently,
few observable effects of their KMI\(^1\). Architect seemed to be more prosperous and had carefully planned and implemented a number of KMI\(^2\) (see further section 5.3.2).

The data from Energy and Publish were useful to describe underlying reasons and overall goals together with design and implementation hindrances to KMI. The data from Architect were useful to describe the planning, including specified goals and activities, and the implementation of KMI.

However, I realised that fulfilling the aim of the work – that is, to clarify the concept of KM and to give suggestions about how to design and work with KM in practice – based on these data would result in a too ‘meagre’ dissertation. The empirical grounding and potential contribution did not feel satisfactory. This was not due to a choice of cases – they all worked or had an intention to work with KMI. Still, the purpose of Energy’s as well as Publish’s KMI – in terms of how their respective knowledge practices should look like and function – was highly unclear. As it was not clear what they aimed to achieve, their KMI did also become unfocused and ad hoc based. In fact, these two cases verified the criticism of KM as an illusive and unclear concept (see Gray & Meister 2003; Spender 2003; Styhre 2003).

In this work, KMI are viewed as activities aiming at establishing situational knowledge practices (see also section 4.2.1). Thus, the object of KMI is the intended situational knowledge practices (or ‘situational KM’ if preferable). Working with KMI, organisations need to clarify how their knowledge practices should look like and what they should strive to achieve in relation to the other sub-practices. Without a clear idea of what KMI concern and strive to attain, it is difficult to work with (and also study) KMI.

Another reason for not feeling content with the empirical data and potential contribution was that I seemed to have become stuck in the same trap as a lot of the existing KM literature. Even if my intention was to maintain and show the connection between knowledge and action I had failed to do so. By focusing on investigating KMI – in particular in the case of Energy and Publish – the knowledge needed in the practices to accomplish knowledgeable actions did not gain proper attention\(^3\). The view of ‘knowledge for action’ got in the background rather than in the foreground. Consequently, as a lot of the existing KM literature, I also discussed KMI in a rather abstract manner without clear consideration of the knowledge actors need to perform knowledgeable actions.

I also realised that a lot of prior KM research, as well as of my initial focus, suffered from insufficient clarifications of basic assumption concerning knowledge, its creation and utilisation. Too many assumptions are taken for granted and are not fully clarified – perhaps not even to the researcher. Thus, I recognised a need to be more explicit and careful concerning the phenomenon of inquiry (the analytical entity to study). To talk about and investigate KMI did not seem clear enough. I

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1 The limited progress was also brought up by several respondents at Energy and Publish.
2 Several respondents in Architect meant that their initiatives were highly important and thought they would be successful.
3 This was also one of the problems in Energy and Publish that explained their difficulties of progressing in their KMI.
needed to get closer to the core of KM and also the relation between knowledge and action. In this regard, I experienced difficulties of finding existing KM theories helpful. Thus, instead of using existing KM theories as the main theoretical base, I recognised a need for other theoretical inputs, in particular to position my view of the phenomenon of inquiry\(^1\). In sum, I needed to revalue and modify the focus of the inquiry and develop my research questions.

### 4.3 A New Research Focus

Based on the reflections and conclusions described above, one of my first tasks was to come up with a new research focus and new research questions (see section 4.3.1). The next step was to define what types of data were needed to fulfil the aim of the new focus (see section 4.3.2). Then, the initial research design needed to be assessed to evaluate if it was still applicable within the new focus and if the earlier collected data still could be used (see section 4.3.3).

#### 4.3.1 Investigating Knowledge Mediation

To identify a new research focus, I started to reflect on typical features of KMI related to the development of actors’ knowledgeability to conduct. Doing this, I gained a lot of inspiration from Architect’s KMI, which to a large degree focused on communicating knowledge between actors in order to enhance their capability to knowledgeable actions. Hereby, the communication of knowledge was identified as a core of KMI and considered critical to understand in order to know what KMI to design and implement and how.

A quick return to the KM literature also verified that the communication of knowledge is one common and important theme, but it is referred to in terms of ‘knowledge transfer’ or ‘knowledge sharing’ (see Szulanski 1996; Goh 1998; Garvin 1993; and also section 1.2.1). This also implied that I needed to look further into prior research on knowledge transfer (and knowledge sharing), which is one specific strand within the KM literature (see section 3.2).

Having verified the practical and theoretical relevance (see further Chapter 1) of investigating the communication of knowledge – which later also was referred to as knowledge mediation – this was chosen as the new research focus. It was also decided that this should be investigated on an ‘individual-to-individual level’ (see my discussion in section 1.2.2).

One of the questions formulated concerned how common knowledge mediation functions between actors in organisations. I was interested in knowledge mediation in a broad sense, including pre-designed knowledge mediation activities (such as KMI) and knowledge mediation evolving in the daily work of actors. I was also interested in what triggered the need for and who initiated knowledge mediation. This was two aspects that were not in focus in prior research on knowledge transfer (see further section 1.2.1 and 3.2.1).

\(^{1}\) One result of this was that I put KM theories partly in brackets in order to gain inspiration from other theories. This has also been manifested in this dissertation in terms of Chapter 2 in which I present and ground the theoretical foundations of this work.
Approaching knowledge mediation as a part of informatics, I had a particular interest in identifying situations when information systems (IS) could be regarded as usable mediating instruments. Still, to identify that, I needed to understand both IT-based and none IT-based knowledge mediation. I also needed to understand what circumstances might hinder respectively facilitate different types of knowledge mediation. This was important to be able to understand when knowledge mediation works and when it does not work.

In sum, knowledge mediation was chosen as the new research focus and three new research questions were developed (see section 1.3.1). These questions were also grounded in the KM literature, and one aim was to contribute to areas where prior KM research is considered insufficient (see Chapter 1 and section 3.2). Furthermore, to clarify the assumptions and pre-understanding of the work, I also decided to make more explicit use of other theories than KM theory that, so far, had been used as the main source of inspiration. I started to view KM as part of informatics rather than informatics as part of KM, which I so far had done. Thereby, the view of IS applied in this work was made explicit and used as a basis for the investigation. I also used theories within other disciplines such as organisation theory, philosophy of communication and language and philosophy of knowledge to outline the theoretical foundations of the work (see Chapter 2).

4.3.2 The Type of Data Needed

The aim of the new research focus included an identification of common types of knowledge mediation, their characteristics and circumstances that might influence knowledge mediation (see further section 1.3).

To fulfil this aim, I needed data to develop descriptive and categorising knowledge of what are common types of knowledge mediation and their characteristics. I also needed data to develop explanatory knowledge of what circumstances might influence knowledge mediation and descriptive and explanatory knowledge of when information systems might be useful instruments for knowledge mediation.

The aim was to acquire enough details of knowledge mediation to elucidate not only how knowledge mediation works but also why it works and why it does not work. This new research focus also concerned rich, qualitative data, just as the initial research focus (see section 4.2.2).

To acquire data to fulfil the new focus required an understanding of actions performed in the organisations used as cases. It was vital to understand what knowledge actors need to perform their tasks in order to understand the needs for and motives of actors to initiate knowledge mediation. I also needed to understand how actors got to know what they needed to know in order to conduct. I was in particular interested in what triggered the need for knowledge mediation, who initiated the mediation process and what instruments were used to mediate knowledge between actors. This was important in order to investigate whether any patterns could be identified concerning common types of knowledge mediation. Another main area of data needed concerned circumstances that might influence knowledge mediation.
In sum, to understand how knowledge mediation is accomplished and what circumstances might influence knowledge mediation required data concerned with concrete examples of knowledge mediation in practice.

4.3.3 Evaluating and Modifying Initial Research Design

Having changed the research focus and clarified what types of data were needed, I needed to evaluate the initial research design to assess if it was still relevant and whether the already collected data were still useful.

Based on the types of data needed to fulfil the aim of the work, an in-depth, interpretative and qualitative study and the use of case studies were still considered as proper choices. However, the new research focus was clearer, which might raise the question: why not a broad study? Even if the focus was clearer and included more specified research questions these were still too open and explorative in nature to be suitable for a broad study.

Concerning the choice of cases, the three organisations were still relevant. In fact, the new research focus did not put the same requirements on the first formulated selection criterion (about serious and conscious intention to work with KMI); it did not require any new selection criterion either. I realised, however, that even if a lot of the data already collected were still useful, I also needed additional data (see further section 4.4). I needed to investigate not only conscious KMI concerned with knowledge mediation but also the communication of knowledge in the daily work of actors.

One change concerned my role as a researcher. During the initial research focus, I had an interventionist role and was requested to be part of the three organisations’ KMI. However, during the new research focus, I was more of an “outside observer” than an “involved researcher” (see Walsham 1995:77). This changed role did not involve any major changes for my research aim or research questions, but I had some difficulties in getting access to collect more data. This was not a problem in Energy or Architect, where I had more or less free access. However, I had some difficulties in getting access to Publish. This was not regarded as a crucial problem as the first data collection (with the initial research focus) at Publish had focused quite a lot on establishing a basic understanding of its practice, what the actors did, what they needed to know and how they got to know that. However, perhaps some more interesting data could have been gained if I would have been allowed to access Publish at more occasions than I did during the second data collection.

The choice of a combined inductive and deductive approach was also suitably. I had, for example, generated the new research focus and research questions partly via empirical data, partly via grounding in KM and IS theories. I also made use of other theoretical domains – including organisation theory, philosophy of communication and language and philosophy of knowledge – to clarify the theoretical foundations of this work, which resulted in a reference model (see section 2.6.4) that helped to focus the data collection as well as the data analysis (concerning the latter see further section 4.5).

Finally, I would like to briefly recapitulate and summarise some basic ontological and epistemological considerations. This work is based on the idea that the meanings of words and phenomena are constructed by humans via social
interaction (see further Chapter 2; see also the concept of ‘internal realism’, Walsham 1995). This ontological stance is followed by an epistemological stance oriented towards an interpretive understanding of human behaviour and social action (see Orlikowski & Baroudi 2002; and also ‘non-positivism’ as described by Walsham 1995). This position is similar to Weber’s (1947:88) description of ‘sociology’ as a “science which attempts the interpretive understanding of social action in order to arrive at a causal explanation of its course and effects”. However, talking about knowledge as socially constructed might be interpreted as if such a view disregards the existence of any objective reality. In this regard I follow Berger & Luckmann (1966:30, italics in original) who clearly state that,

[society does indeed possess objective facticity. And society is indeed built up by activity that expresses subjective meaning. [. . .] It is precisely the dual character of society in terms of objective facticity and subjective meaning the makes its ‘reality sui generis’ [. . .]

4.4 Data Collection

In this section, I will describe the methods chosen to collect the empirical data needed to accomplish this work. This includes descriptions of what methods have been used, during which time periods data collection has been accomplished, how many respondents have been involved in the data collection and what organisational positions the respondents had when the data collection was accomplished.

4.4.1 Methods for Collecting Empirical Data

Based on the choice of case studies, I needed to decide what specific methods to use in order to collect the data. I needed methods that could be used to collect the types of rich data required for the study. The methods also needed to offer flexibility in the sense that I could easily follow-up on collected data and have the opportunity to put additional questions if needed, for example, to be clear that the data were properly understood. On the basis of those requirements, the primary data collection method chosen was the interview, which is a frequently used qualitative technique (Easterby-Smith et al. 2002). Following Yin (2003), interviews are also one of the six most common sources of evidence used in case studies. The other five sources are documentation, archival records, direct observations, participant-observation and physical artefacts (ibid.). Walsham (1995:78; see also Bell 1987) even argues that interviews are the primary source,

[. . .] with respect to interpretive case studies as an outside observer, it can be argued that interviews are the primary data source, since it is through this method that the researcher can best access the interpretations that participants have regarding the actions and events which have or are taking place, and the views and aspirations of themselves and other participants.

One of the strengths of interviews is that they are targeted in the sense that they can be focused directly on the case study topic (Yin 2003). As argued by Walsham (1995), interviews also offer the best access to the interpretations of the respondents. However, interviews do also have certain weaknesses. For example,
the respondents might give answers that he believes the interviewer wants to hear, so-called ‘reflexivity’ (Yin 2003). Interviews might also be affected by bias of the interviewer or the respondent (ibid.). To limit those weaknesses, I followed up answers with ‘how’ and ‘why’ questions, and asked the respondents to exemplify and illustrate their views and what they were talking about. Exemplifications are also a useful basis for formulating additional and follow-up questions (see Yin 2003). When considered relevant and possible, I also followed up respondents’ answers by talking with other actors suggested by the respondent or mentioned in interviews.

There are a number of different types of interviews, including structured, semi-structured, unstructured and individual and group interviews (see Bryman 2001). The type most appropriate for this work was open-ended, semi-structured interviews, also called qualitative interviews (ibid.). Semi-structured interviews build on some pre-defined questions but offer a possibility to follow-up and put additional questions when needed. This type of interview does best offer a balance between directing the interview and allowing the respondent to express his views. As Walsham (1995) argues, it is about avoiding over-direction as well as excessive passivity.

The interviewees were initially selected by the aid from the contact person at each of the organisations involved in the study. After having familiarised myself with the organisations, the selections were made by me, but with the approval of the contact persons. In this way, I started with a number of interviews and along the research process additional interviews were performed when required, for example to follow statements with other respondents or to put additional questions to specific respondents. The change of research focus — from KMI to knowledge mediation — did also require additional interviews. After having changed the focus of my dissertation, I needed more data about the communication of knowledge in general sense and not only as part of pre-designed KMI. As a consequence, some of the respondents were interviewed on more than one occasion, which also is a typical feature of qualitative interviews (see Bryman 2001).

To get a broad picture of the view of knowledge mediation, respondents on different organisational levels were interviewed: top management, managers and operational workers (see summary in table 4-1 below). However, the type of knowledge mediation of interest concerned the knowledge needed in the operative business to deal with the on-going core business. Thus, the focus was on the knowledgeability and actions of the operators at Energy, the editors at Publish and the architects at Architect.

Before the interviews were initiated, the personnel in all three organisations were informed of the overall purpose of the investigation — to investigate knowledge sharing and knowledge development in the organisation — via their respective intranets and at Energy and Publish also during a staff meeting.

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1 The contact person at Energy and Publish was the personnel manager (director) and at Architect a senior architect. Those persons were also responsible for the KMI of each practice and were part of the management board.

2 Another focus could have been to investigate knowledge mediation on a strategic level, but that is likely more limited as the representatives of the top management tend to be fewer in number.
Most of the interviews lasted about two hours, except for the second or third interview with the same respondent, which seldom lasted more than one hour. With exception from some of the shorter interviews and more informal talks, the interviews were tape recorded and transcribed. The transcriptions were sent to the respondents to check if there were any misunderstandings, but no significant corrections were made. The transcriptions were useful as they offered a possibility to go back to the exact quotations of respondents and reduced the risk of forgetting or neglecting important issues. This is also emphasised by Bryman (2001) as a benefit of using transcriptions (see also Walsham 1995).

In addition to semi-structured interviews, a number of informal talks were performed with actors in the organisations. Some were individual and some were in group. Two or three oral presentations and one written report were also presented to each of the organisations in order to give the respondents feedback from the investigations and the feedback were followed by joint discussions.

The interviews were a good way to put questions and ask the respondents to tell about their work, the knowledge needed and how it was mediated between actors. However, sometimes the respondents had difficulties in answering questions, such as what knowledge they needed in order to conduct and how that knowledge was communicated. Using interviews, there was also a risk that important issues were overlooked because I (as the interviewer) and the interviewees did not think about them. Such issues could, for example, concern the logic of the practices that likely are taken for granted by many actors, and specific knowledge mediation processes that have become routine in the sense that they are performed by actors but without any conscious reflection.

Hence, to enrich the data, I decided to complement interviews with observations. Observations were accomplished by participation in meetings and the daily work of actors (the editors, the operators and the architects). The observations did not involve any actual participation in the work. However, I continuously asked question when it was required to get clarifications of what they did, what they needed to know and how they acquired and communicated knowledge.

Table 4-1 below summarises the total amount of semi-structured interviews and the number of half day observations performed. The table also shows how many interviews and observations were performed during the first data collection with the initial research focus and during the second data collection with the modified research focus. The first figure in brackets shows how many respondents were interviewed two or three times and the second figure in the brackets tells how many of the respondent during the second data collection had been interviewed during the first data collection. The total numbers respondents are also summarised.

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1 In Energy one presentation was given to the whole staff and two to the management board. In Publish two presentations were given to the contact person and one to the management board. In Architect two presentations were given to the contact person and one to a group consisting of the managing director and twelve architects responsible for different parts of Architect’s knowledge work.

2 See Chauvel & Despres (2002), who argue that people tend to have difficulties in talking about knowledge and declaring what is regarded as relevant knowledge.

3 The kind of observation performed has similarities with ‘interrupted involvement’, which is a role of an observer who is sporadically present for observation and does not involve in the actual work of the observed actors (Easterby-Smith et al. 2002, see also ‘direct observation’, Yin 2003).
Table 4-1: Number of interviews and half day observations

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Energy</th>
<th>Publish</th>
<th>Architect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview – first data collection with initial research focus (KMI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers</td>
<td>6 (3)</td>
<td>15 (4)</td>
<td>4 (1)</td>
</tr>
<tr>
<td>Operational workers</td>
<td>7 (0)</td>
<td>7 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Interview – second data collection with modified research focus (knowledge mediation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers</td>
<td>2 (1,1)</td>
<td>4 (1,3)</td>
<td>8 (1,2)</td>
</tr>
<tr>
<td>Operational workers</td>
<td>6 (5,0)</td>
<td>5 (0,0)</td>
<td>18 (3,0)</td>
</tr>
<tr>
<td>Number of respondents in total</td>
<td>7 + 13 = 20 (8)</td>
<td>16 + 12 = 26 (6)</td>
<td>10 + 18 = 28 (4)</td>
</tr>
<tr>
<td>Observation – first data collection with initial research focus (KMI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half days</td>
<td>3</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Observation – second data collection with modified research focus (knowledge mediation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half days</td>
<td>12</td>
<td>-</td>
<td>5</td>
</tr>
</tbody>
</table>

The reason why there are so few interviews at Architect during the first data collection is that at that stage I foremost acted as a sounding-board by giving feedback on documents describing intended KMI and having informal discussions about their plans and goals. The difference between the numbers of observations in Architect in comparison with the other two organisations was that it was easier for me to understand the practice of the architects via interviews, especially in comparison with the operators’ work at Energy.

In Publish all observations were performed during the first data collection focusing on KMI. This was rather natural as Publish was at the beginning of planning the KM work, and I needed to understand the practice of Publish in order to understand what kinds of KMI were needed. This was different in comparison with Energy, where the initial data collection focused on the already planned KMI. Hence, when having changed research focus, I needed to enhance my understanding of the practice of the operators and this required more observations.

The reason why more managers than operational workers were interviewed in Publish was partly because the initial data collection focused on outlining what ideas the managers had concerning the intended Human Capital Process, partly because of difficulties in getting access to respondents during the second data collection.

I also used documents, including archival records, to collect empirical data. The kinds of documents used concerned 1) descriptions and illustrations of the working processes and working methods of the three practices, 2) reports of evaluations of the practices related to knowledge development and knowledge sharing and 3) document describing routines, goals and KMI of the three organisations. An additional source was physical artefacts in terms of information systems (IS). One limitation of artefacts concerns availability (Yin 2003). I had the opportunity to look into the content and functionality of information systems used in the practices when I visited the organisations, but could not access them when I was not there. It was most interesting, however, to see how the systems were used by the actors in action, which was accomplished via observations.

The main time periods for data collection are summarised in table 4-2 below. The time between the first and second data collection and after the second data collection has been dedicated to structuring, analysing and interpreting the data.
### Table 4-2: Main time periods for data collection

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Energy</th>
<th>Publish</th>
<th>Architect</th>
</tr>
</thead>
</table>

In sum, four methods (sources) have been used to collect data for this work: semi-structured interviews, direct observations, documents and IS-artefacts. Using more than one method is commonly referred to as ‘triangulation’, which was to advantage as what was written in documents, expressed during interviews or observed could be checked out by the use of one of the other sources (see Bryman 2001). Hence, using multiple methods was a way to secure the quality of data collected (see the concept of ‘construct validity’, Yin 2003).

### 4.5 Data Analysis

One challenge with analysis in qualitative research is to condense complex data into a format which tells a story in a way that is understandable and convincing to the reader (Easterby-Smith et al. 2002). This requires explanations of how the data analysis has been performed including how the collected empirical data were transformed into meaningful conclusions (ibid.). The analysis procedure of this work can be described in terms of three main analysis stages and the overall principles of these stages will be explained in the following three subsections.

#### 4.5.1 Identification of Categories and Characteristics

The first task of the analysis was to identify issues related to knowledge mediation together with concrete examples of knowledge mediation in the three cases. When analysing the data collected based on the initial research focus (KMI), I had to search for these types of data as the data from the initial data collection concerned not only knowledge mediation but also other phenomena related to the development of KMI. When analysing the data collected based on the modified research focus (knowledge mediation), it was easier to identify examples as those data focused on knowledge mediation.

About eighty empirical examples of knowledge mediation were identified in the data from the three cases. The examples showed both variation and similarities and were used as the empirical basis for investigating the phenomenon of knowledge mediation. In this dissertation, I will not present all these data and far from all of the eighty concrete examples of knowledge mediation. For the presentation of this dissertation, I chose data including significant examples that show variations of how knowledge mediation might work and under which circumstances knowledge mediation works and when it does not work. Thus, the empirical data presented in this dissertation are illustrative for what I want to show and say.

When presenting the empirical data (see foremost Chapter 7, 8 and 9), these will be structured based on categories that have been primarily inductively generated (some are also theoretically grounded or related to existing theories along the
empirical descriptions and discussions). That is also the case for the categories presented in Chapter 6, but the examples in that chapter are fictitious.

The aim of this analysis stage was to identify categories and characteristics that could be used to describe knowledge mediation. I wanted to describe both the phenomenon of knowledge mediation as well as when it worked and when it did not work. The examples were closely examined one by one and then compared in order to identify similarities and differences. To illustrate how the needed data were identified and analysed, the following example is offered, which concerns knowledge mediation and includes two short quotations that are extracts from two of the transcribed interviews. The notes in the brackets represent comments – such as ‘positive connotation’ – and initial conceptualised labels – such as ‘communication of knowledge’.

We are very good [positive connotation] at sharing knowledge with each other [communication of knowledge/creation of intersubjective knowledge], I believe we are unusually generous [positive connotation] to each other here within Architect.

We are typical team-players [collaboration] and share knowledge with each other [communication of knowledge/creation of intersubjective knowledge]. We collaborate [collaboration] a great deal in projects and competitions, thus there are a lot [high frequency and positive connotation] of knowledge sharing between individuals and across office boundaries [communication of knowledge/creation of intersubjective knowledge].

As shown in the brackets, there are some similar labels. Both those quotations concerned the communication of knowledge and the creation of intersubjective knowledge, and both respondents used positive connotations when talking about knowledge sharing. In the second quotation the respondent also mentions that they collaborate a great deal in projects and competitions, which are examples of situations facilitating knowledge mediation.

Having labelled the data, I started to compare and group similar issues and examples under common labels. For example, based on the example above, one similarity of the quotations was that both respondents expressed a positive attitude [positive connotation] towards knowledge sharing. During the analysis, these kinds of positive attitudes were grouped under a more abstract label called ‘circumstances facilitating knowledge mediation’ as one overall category. Later on during the analysis, this overall category was specified into subcategories. One such subcategory was ‘willingness to share knowledge’, and the positive attitudes expressed in the quotations above were grouped under this label (subcategory).

This way of analysing data aims to tease out categories from empirical data that can be used as a basis for interpretation (see ‘grounded analysis’, Easterby-Smith et al. 2002). As such it has similarities with ‘inductive coding’ respective ‘open coding’ as the initial coding stages in ‘multi-grounded theory’ (MGT, Goldkuhl & Cronholm 2003) respectively ‘grounded theory’ (GT, Strauss & Corbin 1998). Both MGT and GT advocate that this coding stage should be open-minded and as free as possible from pre-categorisations. As Goldkuhl & Cronholm (2003:6) argue, “[t]here is risk that one destroys the freshness of the data if theories and categories
are used too early in the process”. I agree with this and have tried to “[l]et the data ‘speak’” (Goldkuhl & Cronholm (2003:6).

Still, I had a certain pre-understanding of the area and this probably influenced the analysis. For example, based on the example above, ‘willingness’ is a common issue in the KM-literature, which I was well-aware of when I started the analysis. Thus, even if I did not consciously look for issues related to ‘willingness’, knowing about this category might have directed my attention to issues related to willingness. In a more general sense, during the analysis I had my aim and research questions in mind. Hereby, I could not say that I have been strictly inductive, but I have tried to be as open-minded as possible.

One part of the analysis emphasised by MGT is ‘conceptual refinement’, including critical reflection on empirical statements, ontological determination and linguistic determination (Goldkuhl & Cronholm 2003). I have not followed up every utterance and statement or made an ontological and linguistic determination of each word and sentence. However, I have had those ideas in mind and applied them when considered relevant. Concerning critical reflection, the two respondents quoted above showed a positive attitude towards knowledge sharing. However, instead of feeling satisfied with the utterances expressed, I continued to ask questions and asked for examples related to willingness. Thereby, it was possible to identify other attitudes and views, and the following are utterances from two other respondents.

We do not have that kind of tradition at all, and people do not want to [negative connotation] share their knowledge [communication of knowledge/creation of intersubjective knowledge]

At times [sometimes, not always] there is some abstinence [negative connotation]. One wants to gain knowledge from others [positive connotation: willingness to take part of other actors’ knowledge], but are more restricted to share of one’s own [negative connotation: unwillingness to share own knowledge]

In comparison with the two previous quotations (see above), the first of the two latter quotations was contradictory and showed an attitude involving unwillingness to communicate knowledge. While the second quotation was more nuanced expressing that sometimes actors are unwilling to share knowledge. The second quotation was also more specified as the respondent talked about unwillingness to share one’s own knowledge but willingness to take part of other actors’ knowledge. Hereby, complementary views offered additional characteristics of the subcategories ‘willingness’ and ‘unwillingness’. Furthermore, few respondents did actually say that they were unwilling to share their knowledge; they usually talked about the unwillingness of others. This was also something that one needed to be suspicious of. Perhaps the respondents sometimes were unwilling but did not want to tell about it, and perhaps they sometimes had a bias concerning other actors’ behaviours. Hence, asking for concrete examples was important to further identify situations that could tell about unwillingness and willingness (see further section 8.2.2, 8.3.1 and 8.4.4).
4.5.2 Building Categorical Structures

Having identified a number of categories (and subcategories) and some of their characteristics, the next main step in the analysis procedure was to relate identified categories to each other. As proposed by Strauss & Corbin (1998:127), “[. . .] by answering the questions of who, when, where, why, how, and with what consequences, analysts are able to relate structure with process”.

Aligning categories (structure) to each other (process) was important as I did not only aim to describe why but also how knowledge mediation works. Strauss & Corbin (1998) and Goldkuhl & Cronholm (2003) also argue in favour of the use of an action-oriented paradigm model. Following Strauss & Corbin (1998:128), there are three basic components of a paradigm: conditions, actions/interactions and consequences. The paradigm model used in this work follows the reference model presented in section 2.6.4 (see figure 2-3). The model does not show any prerequisites (conditions) for knowledge mediation, but the prerequisites have been investigated partly by inquiring what triggers knowledge mediation (see further section 10.1). The mediation between the actors in the figure 2-3, via the mediating instruments, can be compared with the component ‘actions/interactions’ and knowledge utilisation corresponds with the component ‘consequences’.

Based on this reference model, I asked a number of questions (see examples below), which, in turn, were related to different categories. Doing this, additional categories and subcategories were identified. Consequently, the coding stage described in the previous section was not closed when I entered this analysis stage. Categories were developed, refined and characterised until I found that no significant contribution could be gained by further conceptualisation, labelling and analysis. Strauss & Corbin (1998:136) talk about this in terms of “saturation” of categories, but also add that,

[i]n reality, if one looked long and hard enough, one always would find additional properties or dimensions. There always is that potential for the “new” to emerge. Saturation is more a matter of reaching the point in the research where collecting additional data seems counterproductive; the “new” that is uncovered does not add that much more to the explanation at this time.

Examples of questions that were asked and some of their related categories [in brackets] are as follows: When and how was the need for knowledge mediation identified [trigger]? What was the knowledge in question about [the referent and the propositional content]? What were the characteristics of the knowledge intended to be mediated [knowledge characteristics]? What was the knowledge for [intended consequential effects of knowledge mediation]? Who initiated knowledge mediation [initiator]? Why was knowledge mediation initiated [motive]? How was knowledge mediation initiated [strategy and approach]? How was knowledge mediation accomplished [mediational instruments]? When did knowledge mediation work [facilitating circumstances]? When did knowledge mediation not work [hindering circumstances]?

Some comments should be made concerning ‘knowledge utilisation’ as the consequential effect of knowledge mediation (see figure 2-3 section 2.6.4). Whether the knowledge intended to be mediated facilitated and was utilised in action by the
actors is a matter of whether the mediation process could be regarded as successful or not. Knowledge utilisation has not been of primary focus in this work – the focus has rather been oriented towards the trigger, the initiator and instruments used in mediation processes. Still, attention needed to be paid towards knowledge utilisation in particular to better understand what might influence mediated knowledge to be used in action.

It might, however, be difficult to evaluate the effects of knowledge mediation initiatives. The effect of knowledge mediation might not be directly observable as the real effect might be manifested in future rather than in immediate actions. This was one issue that made it difficult to evaluate whether knowledge mediation initiatives could be regarded as successful or not. Sometimes it was easy to investigate, for example, when the actors had used the mediated knowledge in action and could say something about this experience. But sometimes the actors had not had the opportunity to apply mediated knowledge in concrete actions. In those cases, I had to rely on their apprehension concerning if they believed the knowledge mediation had been successful and if they thought the mediated knowledge would be useful in the future.

As a result of this analysis stage, three basic types of knowledge mediation could be identified including three overall categories of knowledge mediation (see initial categorisation and description in Chapter 6). Those three basic types were later on specified in a number of variants (subcategories) of each of the three basic types (see empirical illustrations in Chapter 7 to 9 and abstractions and conceptualisations in Chapter 10). In addition, those basic types and variants had a number of characteristics that were based on categories used to distinguish the types and variants from each other.

To continue, Strauss & Corbin (1998) talk about discovering one central explanatory concept. However, even if I have condensed the evolving theory during the analysis, I have not strived to identify just one overall concept or category. Thus, in this regard, I have followed MGT as described by Goldkuhl & Cronholm (2003), who do not put the same claim on one core category. The central explanatory concepts of this work are the three basic types of knowledge mediation.

So far, the analysis performed has mainly been described as ‘inductive’. However, as mentioned in the previous section, my pre-understanding was likely to influence the analysis. As Strauss & Corbin (1998:136f.) acknowledge,

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[. . .] whenever we conceptualize data [. . .] we are interpreting to some degree. [. . .]
We are deducing what is going on based on data but also based on our reading of that
data along with our assumptions about the nature of life, the literature that we carry
in our heads, and the discussions that we have with colleagues.
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Following Strauss & Corbin (1998), a kind of deduction is actually performed when interpreting and conceptualising data. Still, this deduction has so far been implicit and unconscious, rather than explicit and conscious. Thus, the final stage in the analysis procedure was to explicitly ground the validity of evolving theory.

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1 As Miles et al. (1998) point out, researchers and practitioners have traditionally been most comfortable with things – such as money and physical assets – that are easily measured and accountable.
4.5.3 Explicit Grounding and Theory Validation

Goldkuhl & Cronholm (2003:8f.) talk about three types of explicit grounding processes – theoretical matching, explicit empirical validation and evaluation of theoretical cohesion – that, in turn, are related to certain validity claims. *Theoretical validity* means that the theory is in accordance with other theoretical abstractions, *empirical validity* means that the theory is in accordance with empirical observations and *internal validity* means that the theory is considered to be a coherent way of talking about the world (ibid.).

Concerning ‘explicit empirical validation’ and ‘evaluation of theoretical cohesion’, those grounding processes have to a large degree been part of the analytical process stages previously described, especially the one focusing on building categorical structures (see section 4.5.2). However, some more comment concerning those two grounding processes should be made.

The work of identifying categories and building structures resulted in the development of three basic types of knowledge mediation including certain variants. I used these basic types and variants (structures) as a basis for looking into the empirical data again. In this way, I tested the empirical validity of the theory by checking that the empirical data were in accordance with the evolving theory on knowledge mediation. It was an iterative process that shifted focus back and forth between concrete examples, comparisons between examples and cases, and between empirical data and the abstracted categories and characteristics.

Partly related to this kind of explicit empirical validation, I also inquired the cohesion of the evolving theory by asking questions such as the following: Is there a consistency between the categories related to different types and variants of knowledge mediation? Are the different types and variants possible to distinguish? To further secure the theoretical cohesion of the evolving theory, I also used graphical illustrations of different types and variants of knowledge mediation. Besides textual presentations, those illustrations are also used in this dissertation to conceptualise parts of the evolving theory (see Chapter 6 and Chapter 10).

Concerning the ‘theoretical matching’, this was about grounding evolving theory in existing theories. The evolving theory, its categories and characteristics were compared with theories related to knowledge mediation. Existing theories on, for example, information systems, knowledge management including knowledge transfer, sociology, communication and pragmatism were used to verify and interpret empirical data (see Walsham 1995).

For example, the category ‘circumstances facilitating knowledge mediation’ could be compared with facilitators or enablers that are categories commonly used in the KM literature. My category ‘trigger’ was compared with pragmatism – in particular Dewey (1938), who talks about productive inquiry – and the notion of serendipity (see Myrdal 2002; Stenmark 2003). The idea concerning IT-artefacts as instruments for knowledge mediation could be found in the KM-literature in terms of knowledge management systems (KMS), but IS theory and the concept of mediated actions (Vygotsky 1986) were found more fruitful to understand this category. When doing the analysis of different kinds of knowledge mediation, I also asked myself when information systems could be regarded as useable instruments
and when they seemed to be less useful. In this regard, IS theory was very helpful to clarify the basic function of IS in organisations – IS as instruments for communication.

The theoretical grounding of identified categories did also result in modifications of the evolving theory. One category that I initially had worked with was labelled ‘driving force’. However, I had difficulties in pinpointing what I meant with it, and when I found the concept of ‘motive’ in the literature, this was regarded as a better concept as it was easier to understand its meaning (it is a more common word) and it was also theoretically grounded (see Berger & Luckmann 1966). In this way, some of the categories and characteristics that are part of the final theory presented in this dissertation are borrowed from existing theories.

Furthermore, Szulanski (1993, 1996; see section 3.2.1) presents a process model of knowledge transfer. With some changes this was used to verify and clarify the action-oriented paradigm model (see section 4.5.2) used to structure and analyse the empirical data concerning types and variants of knowledge mediation (see Chapter 10) and to elucidate how different circumstances influenced different process stages of knowledge mediation (see Chapter 11).

The theoretical grounding was not only about verifying my findings or revise my evolving theory. Based on empirical evidence, I could also show that some categories and ideas of prior research need to be revised or at least be reconsidered. For example, I worked with a category labelled ‘strategy’ that was similar to Hansen et al. (1999), who talk about ‘codification strategy’ versus ‘personalisation strategy’ for KM. However, based on the analysis of the strategies in the empirical examples, Hansen et al.’s suggested strategies were modified and re-interpreted (see section 10.1.2). I could also identify some circumstances that influence knowledge mediation and that are seldom emphasised in the KM literature.

In sum, existing theories have had three distinct roles during the data analysis: 1) to help to structure and interpret empirical data, 2) to theoretically ground identified categories and characteristics and 3) to help to refine and modify identified categories and characteristics of the evolving theory.

The analysis procedure has not been as sequential as might seem judging from the three main analytical stages described above. The data analysis has been highly iterative, jumping back and forth between empirical data, categorisations and existing theories. I have analysed empirical data and identified certain categories and compared my findings with prior research which sometimes has resulted in changes of labels. I have also identified categories, but then acknowledged a need to collect additional empirical data to validate and critically investigate if there were additional interpretations that could further explain the empirical data and identified categories and characteristics.

The analysis proceeded until identified categories and characteristics had reached a stable and congruent meaning and when additional analysis did not seem to contribute to a further enhanced understanding (see the concept of ‘saturation’, Strauss & Corbin 1998; section 4.5.2). This stage was considered reached when I had categorised and structured the empirical data, performed the explicit grounding processes and could describe and explain knowledge mediation based on the three basic types and their variants.
The grounding processes as well as the building of categorical structures are partly reflected along the presentations in this dissertation. Chapter 6 gives an introduction to the three identified basic types of knowledge mediation including initial categories and characteristics used to describe these three types. Chapter 7, 8 and 9 do all present empirical examples illustrating the three basic types of knowledge mediation, including their respective variants and influencing circumstances. These four chapters do primarily reflect the analysis stages described in section 5.4.1 and 5.4.2, while the last analysis stage described in this section 5.4.3 is mainly reflected in Chapter 10 and Chapter 11.
Chapter 5

Case Descriptions

This chapter describes the three organisations – Energy, Publish and Architect – used as empirical cases in this work. The descriptions include a brief presentation of each of the practices together with a presentation their respective knowledge management initiative\(^1\) (KMI). The presentations of the practices aim to give an overall understanding of what the actors worked with and the KMI descriptions aim to clarify what kind of work I initially got involved with in the organisations and also how the three organisations’ KMI were planned and performed.

5.1 Energy

This section describes Energy as one of the cases in this study. The first section presents a brief description of the practice of Energy with the focus on the operators working with the energy nets (see section 5.1.1). This is followed by a description of the aim and content of the Personnel Process as the main part of Energy’s knowledge management initiative (see section 5.1.2) and a discussion about the implementation of the Personnel Process (see section 5.1.3).

5.1.1 The Practice of Energy

The practice of Energy is about owning and managing energy nets – operational net management – to supply the clients with electricity. Energy has over 120,000 clients (customers) of which the major part is private households and only about 30 clients represent large organisations. The practice includes handling of disturbances in the nets, maintaining and planning for reparations of the nets, purchasing entrepreneurs who do the repairs and taking care of clients’ requests. The practice is oriented towards tasks such as administration and purchasing. As one of the managers at Energy expressed,

\[^1\] The content of the three organisations KMI is to a large degree examples of so-called ‘typical knowledge mediation’. Thus, I will come back to these KMI in section 8.3.2, but have chosen to describe the three organisations’ KMI in this chapter to clarify the reasons for choosing these cases (see selection criteria in section 4.2.3).
We are a knowledge organisation with highly qualified workers, and the emphasis is on being a capable buyer and purchaser.

One of the core roles at Energy (and also the role at Energy focused on in this work) is the ‘net operators’. Their main task is to prepare for planned power interruptions and to handle unplanned power failures. Power interruptions need to be planned, for example, when the energy nets need to be repaired or rebuilt.

When the operators get a request for a power failure, they need to formulate an interruption instruction that describes the exact procedure including the definition of the actor responsible for each activity that needs to be performed. Some activities in the procedures are performed internally by an operator – this is the case for energy stations that are remote-controlled – while other activities need to be performed by external entrepreneurs, such as reparations and other activities at stations where the energy needs to be turned on and off manually.

The complexity and length of each procedure varies depending on which energy net is concerned, and there are two different kinds of nets: the ‘small nets’ (SN) and the ‘large net’ (LN). There are three SN and they cover a limited geographical area and have mainly private persons as clients. An operating instruction concerning one of the SN might involve 15 to 20 activities. The LN, on the other hand, covers a large area including large clients such as municipalities and manufactories. An instruction procedure concerning the LN might involve up to 150 activities.

Hence, an operating instruction of power failures of the LN is much more complex than one of the SN. Another difference between the nets is that when a power failure is planned in the LN the procedure needs to include activities to reserve feed the clients with energy via another cable or station. This is not needed for the SN. However, in case of planned power failures of the SN the clients need to be informed which involves another procedure of defining the clients concerned, informing them and explaining the reason for the power failure, time, date and duration. Instructions concerning both the LN and the SN are related to a very high level of security and there is no room for mistakes – a mistake could cost lives. Hereby, there are strict routines to make sure that each procedure is properly formulated and each procedure is controlled twice.

5.1.2 The Content and Aim of the Personnel Process

The Personnel Process was an effort initiated by the parent company to enhance learning and knowledge development, and the Personnel Process was defined as one of the core processes within Energy Group.

The aim of the Personnel Process was to 1) secure that there are enough competences to stand up to the Energy group’s long-term planning and goals, 2) continuously adjust the competence to the needs of the operative business, 3) develop a learning organisation, that is, an organisation under constant improvement and knowledge creation and 4) make sure that the administrative work of staff-related questions is managed efficiently. An overall illustration of the content of the Personnel Process is presented in figure 5-1 below.
As shown in figure 5-1, the input to the Personnel Process included strategies, other processes and the employees, and the Personnel Process was divided into three sub-processes: Culture Refinement, Competence Maintenance and Administrative Services. Each one of the sub-processes contained activities and activity groups. The sub-processes did also have defined outputs in terms of a learning organisation, access to required competences and reports and administrative service.

According to the project manager responsible for developing the Personnel Process, the Competence Maintenance and the Administrative Services were
considered to be described in a satisfactory way, while the Culture Refinement was a remaining challenge. This was mainly due to a lack of measurements to follow up the Culture Refinement. The project group designing the Personnel Process had, however, formulated ‘seven steps to create a learning organisation’, which gave some guidelines regarding what direction to go. As a source of inspiration they had used Peter Senge’s (1990) concept of learning organisations. The steps were goal-oriented and included: 1) a leadership for mutual vision and connection to business and competences, 2) personal responsibility for own development, 3) a culture for innovation and knowledge transfer, 4) goals and measures for give feedback, 5) meeting places for knowledge exchange, 6) an overall view of the competence work and 7) mutual routines with high quality.

5.1.3 The Implementation of the Personnel Process

Even if some initiatives were introduced at Energy, the whole Personnel Process was far from implemented. Initiatives that were introduced included the implementation of an open and flexible landscape office design to facilitate communication and learning, the establishment of a resource pool including eight personnel managers responsible for planning for competences development and guidelines for three annual personnel development talks to support the personnel managers in their work.

It was, however, found that even if the personnel managers had a serious intention to develop Energy’s knowledge practice, they were fighting an uphill battle. In the end, it was the president who made the decisions, and he was highly governed by economic issues.

There were two main reasons for the president to work with the Personnel Process. First, as the implementation of the new Personnel Process was a requirement of the owner and top management of Energy Group, Energy was expected to show that it did introduce new ways to simulate and consciously work with internal knowledge development and learning. A second reason was to give the employees some more attention. As the president explained,

> during last year [read: 2000] we had a pronounced HR [read: human resource] focus. This was partly something that was required by the owner, partly something necessary due to the situation at that time. [. . .] It was about giving the employees some compensation for all the tough working requirements they have been exposed to. We [read: the management] felt that we could not put more pressure on the workers, but had to give them some compensation and opportunities to develop. The tools used [read: to give this compensation] were individual goal talks, development plans, and so on. [. . .] The level of HR focus we now have is good enough.

These two reasons were the main basis of the president to put efforts in creating a stronger HR focus, and the aim was to satisfy the owner and the employees rather than being an initiative focusing on improving the practice. As such it was a political act to show off an expected view of the organisation, and HR was not a prioritised issue on the management agenda. As the president said,

> I do not know very much about what have been done or the result of our enhanced HR focus [. . .] but we will not develop that part of the business further, neither will
we follow up these questions on our board meetings. What we [read: the management] will focus on is the building of energy nets.

The president’s view, which to a large extent affected what was done, was not in line with the intention of the Personnel Process. The president seemed to view the initiative more as something necessary to satisfy different parties, while the personnel managers regarded it as a critical part of the practice. Hence, the initiatives of Energy to enhance learning and secure knowledge development did not turn out to be very prosperous. This conclusion was based on the fact that few initiatives were introduced, and that the respondents experienced few obvious differences.

One explanation to the poor success was a lack of management commitment and funding. As a consequence, the efforts concerning the Personnel Process were down-prioritised. It was also said (by the president and head of the personnel managers) that the content and design of the Personnel Process did not fit Energy’s practice. The head of the personnel managers had also difficulties in understanding how to realise the goals, for example, how to create an environment in which the actors continuously learn from each other. Another hindrance seemed to be that the Personnel Process did mainly focus on administrative routines and guidelines and overall goals, while little was said or done to define what knowledge needed to be mediated, for what and how.

5.2 Publish

In this section the second case – Publish – will be described. Section 5.2.1 describes the practice of the ‘editors’ as the organisational role at Publish in focus of this work, and section 5.2.2 presents the main reasons for developing the Human Capital Process as the focus of Publish’s knowledge management initiative.

5.2.1 The Practice of Publish

The core of Publish’s practice is to develop and produce books to different kinds of clients – teachers, students, private persons and companies. The primary client group is teachers, and almost 98 per cent of the products consist of written educational books (the remaining two per cent concern electronic services, compact discs and tapes). Publish has a traditional hierarchical structure, with a president and management board at the top, financial and personnel support units and three core business units. The three business units and their product repertoire are oriented towards different educational levels: 1) the junior, intermediate and senior level, 2) upper secondary school and 3) university level and organisations.

Editorial work does not only involve proofreading, but the whole process from analysing the market and prospectus for new ideas, projecting new books, planning the production, producing the book, printing, marketing and selling the product (see figure 5-2 below). The process involves activities such as keeping updated by the competitors’ products, following the sales and lifecycle of existing books, investigating potential clients’ needs, engaging authors, structuring the content of books and monitoring the quality of texts and illustrations.
The core of the editors’ work is product development, and most of the times it is about development and production of new books. Each development and production process is accomplished via projects, and the editors have their specific subject domains in within they work, such as pedagogy, language, medicine and maths and those subjects are also related to the three levels of educations described above. For example, one editor works with maths books for the junior, intermediate and senior level, another editor works with maths books for upper secondary school and a third editor works with maths books for university level. The editors mainly work alone or in small groups focusing on the same subject on the same educational level.

One takes great pride in being an editor at Publish, and the editors are keen to preserve a high quality of the products. One of the features of being an editor concerns the creative capability. As one of the editors expressed,

I am burning for the products. The teachers should need and want them [. . .] I want to contribute and help others; in this way the work is very meaningful and this is a necessary prerequisite for me in my work [. . .] It would never be the same to sell candy.

The editors themselves seldom write the books. The author is usually an external person, for example a teacher, a researcher or a consultant. Hence, the development and production of books depends on external authors, and one key task of the editors is to ‘transform’ the knowledge of the authors to salable products.

Book ideas derive either internally through the editors or from external sources. It is common that potential authors present synopses of their book ideas. It could also be the case that teachers express a lack of certain kind of educational material or competitors might offer a book that gives rise to new ideas. Whether Publish develop a certain idea is an internal decision. Thus, most of the times there are no specific clients; there is rather a target group consisting of potential clients. Working towards potential clients means that Publish cannot know for sure how salable a book will turn out to be. Costings are made based on, for example, the outcome of old products and the number of students taking a subject. However, it often boils down to intuition – a feeling of which books are prosperous and which are not.

5.2.2 Main Reasons for the Human Capital Process

During the late 1990s, Publish had performed a number of reorganisations, and when entering year 2000 another reorganisation wave began. The reorganisations began in 1995 when the profit margin decreased, which resulted in a reduction of
CASE DESCRIPTIONS

about 70 employees, structural changes and cut downs in marketing efforts. The changes were driven by an intention to be more efficient and thereby gain higher profits. In 2000 the management still worked hard to accomplish an action program to re-establish the profit margin required by the owner. As one manager expressed,

[w]e are not, and have not been, efficient enough. This is mainly due to a lack of an organised structure for business- and competence development, and those two areas depend on each other. If we had looked outside the firm, we would have realised that we need other kinds of knowledge than before. We need to be more client-oriented instead of production-orientated, which has dominated our practice. This is something that the management cannot talk enough about nowadays, but what are we doing about it? We need a plan for how to work with our competence requirements, and this must be closely connected with other business development efforts.

Another challenge that Publish was facing concerned the age structure of the employees. Over 50 per cent of the staff was over 55 years and reaching retirement age, which involved a risk of losing a lot of knowledge and expertise.

In spring 2001 the management decided that Publish should have three core processes, of which the Human Capital Process was one and the other two were Product Development and Marketing and Sales. The initiative of establishing a Human Capital Process involved an aim to share the expertise of the senior editors to the younger editors, but also to improve the planning and development of business knowledge in a general sense. The responsible for designing the Human Capital Process was the personnel director at Publish.

Even if there was a serious intention at Publish to develop the Human Capital Process the personnel director had difficulties in getting people, including the management group, involved in the design and implementation. Another limiting circumstance seemed to be that the work of creating the new process mainly focused on administrative routines. The management had also difficulties in defining what knowledge was critical for the practice and thereby also difficulties in formulating what knowledge to develop and share. There were some ideas about what knowledge needed to be shared and better utilised, but few initiatives were made to actually do something about it.

5.3 Architect

In this section the third case – Architect – will be described. Section 5.3.1 describes the practice of Architect with a focus on the architects’ organisational role, and section 5.3.2 presents the ideas and design of Architect’s knowledge management initiative, called Architect’s Knowledge Work.

5.3.1 The Practice of Architect

The architects at Architect take a lot of pride in their profession and their work is seen as a manifestation of their creativity and knowledgeability. Their work is about ‘creation’ involving designing new styles and using new combinations of materials. The result of their work is the drawings and descriptions of architectures – as a kind of preparatory product development. It is about contributing to the realisation of ideas of architecture.
Architect has offices in a number of geographical dispersed locations, and the architects represent a number of different architectural areas. The major areas include landscape architecture, furnishing, town architecture, house buildings, hospitals, schools and universities and commercial buildings. Architect has a number of experts – for example, in police buildings, schools, hospitals and hotels – with a long experience within their respective area, but commonly only one or a few experts within each area. The experts are often involved in projects concerned with their expertise because an understanding of the client’s practice and required functionality is often necessary to satisfy the client needs.

The architectural work is project-based, and the architects usually worked in project groups. Usually a senior architect acquires the assignment and is in charge of the client contacts, but the project can engage up to ten architects. The work of planning and drawing models is distributed among the project members who take responsibility for different parts of the project. One of the cores is to utilise the knowledgeability of the architects irrespective of their geographic locations. It is about getting their experiences together to come up with innovative and winning concepts.

The architects act as representatives of Architect and get external assignments to draw different kinds of buildings and styles of architecture. Often, the assignments are preceded by a competition where different architect firms present their solutions of the intended building projects. On the basis of cost, quality, functionality and innovativeness of the presented solutions, one of the firms is chosen and gets the assignment. To get assignments it is also important that the architects can show that they have good experience concerning the specific building in question. It is a lot about confidence and trust in the relationships between the contractors and the architects.

Traditionally, Architect has foremost worked with the landlord (developer/commissioner) of buildings and the constructor, but seldom with the tenant. However, since fifteen years back there was a shift from design towards an enhanced focus on the tenant. This has required an enhanced understanding of the needs of the tenant including the functionality of the intended building. Consequently, the architects need to put more attention to the users’ practice, no matter if it concerns the daily life of a family or a work practice of a hospital.

5.3.2 Architect’s Knowledge Work

Architect has a favourable composition of employees with a good balance between senior and junior architects. However, the firm is facing a shift in generation as several experienced architects will soon retire. Thus, there is a need to mediate the seniors’ knowledgeability to the younger generation. Architect has also predicted that there will be a scarcity of well-educated manpower, and the ability to attract and retain employees is considered to be a question of survival. The opportunities for individual development, freedom to try new ways of working, staff welfare, openness and participation are regarded as keys for recruiting, retaining and developing the architects. Architect also felt that efforts concerning knowledge sharing and knowledge development had previously been ad hoc based without formal and organised structure or clear responsibilities.
Thus, in 2001, Architect decided to introduce a more formal and thought-out ‘knowledge work’ (KW). An overall purpose of the KW was to improve internal and external knowledge networks to facilitate individual competence development by the sharing of knowledge between actors. In turn, this aimed to improve the work and offer better products to the clients and to attract and retain competent personnel. The decision to develop KW was made by the management group and also related to the general business plan. A senior architect – also a member of the management group – was elected to the head responsible of the KW. He became a kind of head coordinator of the KW and was convinced that KW was a critical effort for Architect.

To anchor the ideas within the rest of the organisation, the coordinator started a tour around the different offices and talked with groups of architects to get their views of the knowledge-related needs of Architect. The main purpose was to identify knowledge needs in relation to assignments and clients’ changing demands and two main questions were formulated: what knowledge is critical to develop in order to acquire and accomplish assignments in a better way, and how can knowledge sharing between individuals be improved? The coordinator also wanted to identify persons who were interested in taking responsibility and engaging in the KW.

To summarise the main conclusions of the investigation (tour): There was an agreement that most of the learning took place within the projects, which was considered to be an essential forum for sharing as well as developing knowledge. However, several architects also pointed out the need of complementary forum for learning and knowledge sharing together with the need to develop personal relationships. Several architects thought that the contacts between offices were too limited and they did not take advantage of each other’s experiences properly. They had earlier performed knowledge-focused seminars, which were very appreciated as a forum for both learning and relationship building. Thus, having seminars was something that many architects wanted to develop both in terms of their continuity and content.

Furthermore, the re-use of knowledge gained in projects was an issue that was considered poor. The architects seldom performed knowledge-focused reflection and evaluations of projects. Still, this was considered to be critical in order to exploit and reuse experiences gained in the projects. It was not only about the project result, but also about the working process and how it had worked. Relating to procurement of assignments there were a few number of senior architects who worked with this. Even if other architects participated in the process, they did not really know how to gain assignments or how to communicate with the market and potential clients. Thus, this kind of knowledge needed to be disseminated. It was also concluded that there was a lack of a common and overall view of how to perform projects, that is, the working methods including idea generation needed to be developed and become more explicit.

Knowledge about finished and on-going projects and the architects involved in different projects also needed to be more transparent to facilitate the re-use of knowledge and to know who to ask in different questions. There were also a lot of talk about the senior architects and their expertise which needed to be shared with
younger architects in a more conscious way. In general, there was a widespread opinion that Architect needed to utilise and re-use more knowledge to be efficient and stay competitive.

There were a number of discussions concerning which knowledge areas should be prioritised, who should be responsible for each area and what should be done within the areas. However, in the end of October 2001 a decision concerning prioritised areas, responsibilities, organisation and action plan was made within the management group and the KW was to be implemented in January 2002.

To organise the KW a formal organisation – including a managerial group of the KW consisting of persons responsible for the different areas, an information master and the coordinator – was established to take responsible for the different parts of the work (see illustration in figure 5-3).

As shown in figure 5-3, the KW organisation included three main parts: 1) information and market support, 2) networks and 3) development projects. The first part focused on development of the intranet, the public web site and the marketing materials. The second part aimed to develop networks for knowledge sharing within the prioritised areas, and the third part concerned research projects.

In total ten areas were prioritised. Four concerned so-called market areas (MA) that concerned knowledge related to specific types of building projects including town architectures, house buildings, hospitals and schools and universities. The other so-called knowledge areas (KA) were concerned with knowledge needed in more or less all projects and included: 1) building technique, 2) benchmarking with a focus on architectural trends, 3) environmental issues, 4) innovation and generation of ideas, 5) graphic art and 6) project evaluation and knowledge reuse. Each area had one person responsible for the planning and coordination of activities within specified goals and budget frames. The MA and KA were structured in a matrix organisation to involve architects from all the offices.

Architect also employed an information master to be responsible for developing and updating the external web page and the intranet, including different links and contents. One goal was to expand the intranet through links to each market and knowledge area. Within each area the architects should be able to find information about the purpose and goal of each area, involved persons and their competences and experiences, on-going projects, reference projects, seminars and other knowledge developing activities, clients and suggestions concerning other links and material to read.
In sum, Architect’s KW was carefully planned and implemented. A number of respondents regarded KW as a successful effort, and that was also an overall conclusion that I made on the basis of the activities performed and their noticeable effects. For example, via activities such as seminars and courses, several respondents thought they had become more knowledgeable and could thereby perform new or more knowledgeable actions. The prosperous feature of KW was partly due to a serious support by the management and that the initiative was grounded in the practice and among the architects. A number of architects were also involved in the work and got responsibilities for different areas. Another facilitating circumstance was that the KW had clearly stated what areas of knowledge should be in focus for mediation, how this should be done and for what purposes.
Chapter 6

Three Basic Types of Knowledge Mediation

Based on empirical findings, three basic types of knowledge mediation have been distinguished. To set the scene and to give an overall view, these three types will be briefly described and illustrated by the use of some categories and characteristics that have been identified during the analysis procedure. The three types of knowledge mediation will, then, be further explored via in-depth discussions of empirical examples in the subsequent Chapter 7 to 9.

6.1 Initial Categorisation of Knowledge Mediation

One of the research questions of this work concerns the characteristics of common types of knowledge mediation including, for example, what triggers and who initiates knowledge mediation (see section 1.3.1). Based on the trigger, and partly also the initiator, three basic situations that evoke the need of knowledge mediation have been identified: the problematic specific situation, the problematic typical situation and the non-problematic situation. These situations have also been used to distinguish between three basic types of knowledge mediation (see table 6-1 below).

Along the analysis, additional categories have been identified and used to further explain the similarities and differences between the three basic types of knowledge mediation. One of these categories is the motive\(^1\), which concerns the reason of actors to initiate and accomplish knowledge mediation. Time for utilisation is a fourth category and this category defines when the knowledge in question for mediation aims to be applied in action. Two other categories concern the characteristics of the mediation process and the mediation approach.

\(^{1}\) The concept of ‘motive’ is borrowed from Berger & Luckmann (1966; see also section 4.5.3).
Table 6-1: Categorise and characteristics of three basic types of knowledge mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>Knowledge mediation triggered by specific problems</th>
<th>Knowledge mediation triggered by typical problems</th>
<th>Non-problem driven knowledge mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>An experienced specific problem</td>
<td>An experienced typical problem</td>
<td>A coincident (together with interest or curiosity)</td>
</tr>
<tr>
<td>Initiator</td>
<td>Knowledge needer</td>
<td>Coordinator</td>
<td>Any actor</td>
</tr>
<tr>
<td>Motive</td>
<td>Specific problem-solving</td>
<td>Typical problem-solving</td>
<td>A personal attitude of interest or curiosity</td>
</tr>
<tr>
<td>Time for utilisation</td>
<td>Direct</td>
<td>Future potential</td>
<td>Future potential or direct</td>
</tr>
<tr>
<td>Mediation process</td>
<td>Evolving</td>
<td>Designed</td>
<td>Evolving</td>
</tr>
<tr>
<td>Mediation approach</td>
<td>Pull approach</td>
<td>Push approach</td>
<td>Fortuitous and spontaneous approach</td>
</tr>
</tbody>
</table>

The three types of knowledge mediation described in table 6-1 are seen as basic types of knowledge mediation. However, additional variants and characteristics have also been identified, and they will be explored via empirical examples in Chapter 7 to 9 and abstracted in Chapter 10 and 11. However, first each of the three basic types will be described and illustrated by the use of some fictitious examples.

### 6.1.1 Knowledge Mediation triggered by Specific Problems

One situation triggering knowledge mediation is the *problematic specific situation* in which the need for knowledge mediation originates from an experienced problem related to a specific task of an actor. It is *problematic* as an actor experiences a problem that requires additional knowledge in order to be solved, and it is *specific* as the problem concerns a concrete task that needs to be handled. While the *experienced specific problem* is the *trigger*, the *motive* for initiating the mediation is *problem-solving*, that is, the ambition to solve the specific problem.

To deal with a specific problem, the actor needs to acquire knowledge about how to solve the problem, and there is a prompt need for the knowledge, which means that the *time for utilisation* of the knowledge is *direct*. Usually, it is the actor working with the task and realising the problem that becomes the *initiator* of the knowledge mediation. In this way, it is the one who needs the knowledge (the knowledge needer) who also initiates the mediation and becomes a knowledge seeker. As it is the knowledge needer who initiates the mediation, it is performed via a *pull approach*. The knowledge needer tries to pull knowledge via known and available sources and mediating instruments. The characteristic of the mediation process is *evolving*. It is not planned or structured in advance. It rather takes the shape of an ad hoc based, goal- and requirement driven process.

To clarify the significance of this type of knowledge mediation an example will be used (see also illustration in figure 6-1 below): Imagine a baker who is about to bake a cake which includes certain ingredients, procedure and time in the oven. Suddenly, he experiences a problem because he is not sure about how much of each ingredient to put in the mixture. Via sense-reading, the baker becomes aware of his lacking knowledge (see 1) in figure 6-1). Perhaps the baker has baked this cake...
before but has forgotten about the ingredients, or it might be the first time he is to
bake this certain cake. Either way, he needs to gain additional knowledge to solve
the problem at hand and to be able to bake the intended cake – the baker needs to
gain knowledge to enable proper action.

As far as the baker knows, the knowledge can be gained via an experienced
colleague or via a written recipe. The baker chooses to ask his colleague. Consequently, 2) via a sense-giving act, the baker formulates a specific request that
aims to define the knowledge he needs. 3) The experienced colleague interprets the
request and 4) formulates a reply. 5) When the baker gains the reply this is
interpreted via a sense-reading activity. 6) Having the newly acquired knowledge
the baker knows what ingredients to mixture and continues to bake the cake.
Hereby, the knowledge is directly applied to solve the experienced problem.

A reply

1) Experiences a specific problem
   concerning what
   ingredients
to put in
the cake

2) Formulates
   A request
   pull approach

3) Interprets
   the request

6) Deals w
   with
   the problem
   and bakes the
   cake

The baker
   (knowledge needer)

5) Interprets
   the reply

4) Formulates
   a reply

The experienced
   colleague (knower)

Figure 6-1: Knowledge mediation triggered by an experienced specific problem

6.1.2 Knowledge Mediation triggered by Typical Problems

Another situation triggering knowledge mediation is the problematic typical
situation. This situation has similarities with the previous one, but one main
difference is that this situation is triggered by an experienced typical problem. A
typical problem does not concern a specific task but a typical task, such as a
recurrent and common activity. The motive of the mediation is to solve the typical
problem. Even if the experienced typical problem might have its origin in specific
problems, it is not about solving a specific task at hand by an actor (that is, the
function of the previous type). It is about dealing with a general problem in order to
reduce future problems, rather than solving a concrete, current task.

Any actor might be aware of a typical problem, but the one who initiates the
knowledge mediation is usually a kind of coordinator. That means he is not a
knower or a knowledge needer, but a third person, for example an operational
manager or a staff manager. The coordinator becomes aware of a typical problem
related to some kind of lack of knowledge. The typical problem might evolve from
a specific problem, or it might be an effect of a change decision such as the
introduction of a new information system (IS), which, in turn, would require
knowledge about its functionality and use. Concerning the latter, actors not only
face problems that need to be solved; they also create problems (see Nonaka &
Toyama 2003).
Knowledge mediation to handle typical problems tends to require a certain level of planning and structure, partly as it is initiated by a third person, that is, the coordinator. Hereby, the characteristic of the knowledge mediation becomes designed rather than evolving. The role of the coordinator is, consequently, to arrange required knowledge mediation via a push approach. As it is not about solving a present and concrete task at hand of a specific actor, the time for utilisation of the knowledge being mediated is future and perhaps also potential (rather than direct). This means, the coordinator might not know for sure that the knowledge will be used or when.

Let me continue with the bakery example to illustrate this type of knowledge mediation (see also illustration in figure 6-2 below): The head of the bakery had introduced eBusiness to offer exclusive pastry via Internet. A catering assistant had been assigned with the responsibility of the eBusiness and did a great work. However, problems had occurred when the assistant was out of office. Several deliveries had failed either because they had been delivered too late or the product of delivery had been incorrect. Each of the failed deliveries concerned specific problems, but the underlying problem identified by the head of the bakery was of a typical characteristic. The head realised that the reason causing the problem was that it was only the catering assistant who had the knowledge needed to use the ordering system that the eBusiness was connected to. Consequently, in order to avert the risk for future failures some change was required. Even if several other actors in the bakery were well-aware of the problem, no initiatives were taken to deal with it. Thus, the head of the bakery came to the conclusion that the assistant needed to share his knowledge about the system with someone who could be in charge for the eBusiness if the assistant was away.

![Figure 6-2: Knowledge mediation triggered by an experienced typical problem](image-url)

As illustrated in figure 6-2, 1) the head of the bakery experiences a typical problem that triggers the need for knowledge mediation and the motive is to solve the typical problem of incapability to deal with the eBusiness when the assistant was not at work. 2) The head formulates the need and gives an assignment to the assistant to share his knowledge with the baker. 3) Based on the assignment, the assistant shares his knowledge by showing and describing for the baker how to use the system. 4) When the baker has learned the system he is prepared to take charge of the eBusiness next time the assistant is out of the office, which means that he has gained knowledge for future, potential use. The result of the knowledge mediation
initiative is thereby a likely reduction of future potential problems and also an extended capability of the baker to act on behalf of the assistant and the bakery shop.

6.1.3 Non-problem Driven Knowledge Mediation

Following the two types of knowledge mediation described above, the trigger in both types was an experienced problem. To deal with those kinds of experienced problems deliberate activities of seeking and exposing knowledge were initiated, and the mediation processes were goal- and requirement driven.

Empirical data have also shown that knowledge mediation is not always triggered by experienced problems. There is also non-problem driven knowledge mediation. In such situations the trigger is more of a pure coincidence that, in turn, is governed by a personal attitude involving curiosity or interest. In a way, the attitude is both part of the trigger and the motive for knowledge mediation. The knowledge mediation process is not planned or structured, and there is no deliberate goal that governs the mediation. The mediation process is evolving and occurs more as a kind of fortuitous and spontaneous approach. The whole process is like a random evolving happening and the time for utilisation is future, potential or perhaps direct provided that the new knower has a task in which the acquired knowledge can be applied.

To continue with the bakery example (see also illustration in figure 6-3 below): The experienced colleague is baking a cake while the baker passes by the colleague’s pastry board. The baker might continue with his task, and in that case nothing will happen. However, 1) if something awakens his interest he might stop and observe the work of the experienced colleague. 2) The baker might also formulate a question and ask the colleague to explain what she is doing. 3) The colleague interprets the question and 4) formulates a reply in return. 5) Having interpreted the explanation, 6) the baker might have gained new knowledge that can be useful for him in his future work. If appropriate in relation to his present tasks, he might even be able to use it directly.

![Figure 6-3: Non-problem driven knowledge mediation](image-url)
Chapter 7

Specific Knowledge Mediation

One of the three basic types of knowledge mediation identified in this work, and introduced in Chapter 6, is triggered by experienced specific problems. This type is called ‘Specific Knowledge Mediation’ (SKM). Based on empirical examples from the cases, this chapter presents different variants of SKM, and I have chosen empirical examples that illustrate significant characteristics of this type of knowledge mediation. The examples are structured and discussed along inductively generated categories\(^1\). Thus, this chapter is a partial result along the analysis procedure and does mainly correspond with the first and the second stages of the analysis procedure described in section 4.5.

7.1 Specific Knowledge Mediation Pull Approach

When an actor experiences a specific problem related to a specific task, but lacks knowledge about how to handle it, a need for knowledge evolves. The actor needs to acquire knowledge in order to deal with the problem. As illustrated in figure 6-1 (see section 6.1.1), the actor initiating knowledge mediation triggered by specific problems is commonly the one who needs the knowledge. This initiator is the needer, seeker as well as the receiver in knowledge mediation initiatives, and this initiator tries to acquire demanded knowledge from a knowledge provider (human knower) by the use of different instruments, via a so-called pull approach. There is not only one variant of specific knowledge mediation (SKM) pull approach. Based on how the knowledge mediation is accomplished, a number of variants have been distinguished and these variants will be illustrated in the following subsections.

\(^1\) Sometimes I refer to concepts presented in existing theories, and in those cases references will be given. However, the main theoretical grounding will be seen in Chapter 10 and Chapter 11.
7.1.1 Knowledge Mediation via Limited Interaction

The variant of SKM pull approach that will be described in this section is accomplished via limited interaction, which means that there is limited or indirect communication between the initiator (knowledge seeker, needer and receiver) and the knowledge provider (knower). The motive of the initiator to initiate SKM is to be able to deal with an experienced specific problem situation. The empirical examples presented below are structured under subheadings referring to significant features (categories and characteristics) of the examples.

Written Signs to solve Specific, Elementary Tasks

In Energy the operators used coloured pins to mark power failures and on-going work on the net connection schemes that were put up on the office walls. Each pin colour symbolised a specific meaning, and it was highly important that the operators understood their respective meaning to manoeuvre the nets in a proper way. Thus, the operators had jointly agreed on pre-defined meanings of the colours – as a working norm valid whenever the coloured pins were used – that were described on a crib put on the wall beside the net connection schemes.

When one of the operators was looking at the schemes, he did not remember what a specific colour signified. The operator was newly employed and had previously worked at another energy firm where they also used those kinds of coloured pins. However, within that other firm, the colours signified other meanings, and the operator was not sure about the meanings at Energy. However, he could easily gain that knowledge by reading the crib. Knowing about the meanings of the pin colours this knowledge was then used to interpret what was happening in different nets, that is, to understand what the net connection schemes signified at the given time. The operator needed to do this interpretation to be able to handle the planned power failures in a correct way. Hereby, the experienced problem of not remembering the meanings of the pin colours was related to a specific, present and also elementary task of the operator’s daily work. The problem concerned the understanding of the ‘sign system’ (see Berger & Luckmann 1966; section 2.3.2) used in Energy.

After repeated use of the knowledge about the meanings of the pin colours, the operators usually remembered it and did not need to use the crib again. Hereby, the use of the knowledge referring to the meanings of the colours became internalised (see Nonaka & Takeuchi 1995) among the operators and part of an institutionalised (Berger & Luckmann 1966) typical task of the operators. Hence, the specific problem experienced by the operator did not only relate to a specific elementary task but also to a typical task. Still, each time a new operator was employed, he had great benefit of the crib as it represented critical but easy understandable, accessible and actionable knowledge.

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1 Humans always communicate indirectly by the use of instruments such as language and information systems (see Dewey 1938). Thus, ‘indirect’ here means that the communication is accomplished via the use of written signs and without any face-to-face contact between the knowledge needer and the knower.
Another example of written signs to solve specific, elementary tasks was identified in Architect, where e-mail was used to put simple questions and answers. As one architect said,

[e]-mail is incredible good. We use e-mail to put questions and leave answers, to give notifications and to raise issues. Yesterday I got a request from the project leader about the colour scheme for the mural painting and sent an e-mail back to her to let her know about that. She needed this knowledge to know what colours to order. In general, it is quite simple issues that are brought up via mail.

**Oral Requests to solve Specific, Elementary Tasks**

Concerning knowledge mediation to solve specific, elementary tasks, another variant was identified in Architect. It was about the use of norm values concerning, for example, how to dimension a handicap toilet, the size of a class room, the thickness of a wall and the height and depth of a stair. One of the junior architects needed to get the norm of the dimension of a handicap toilet in order to make the right drawing. She knew that those kinds of measures were available in books and also in databases, but instead of spending time searching for the value herself, she asked a colleague and got a prompt answer.

She would not, however, have asked any colleague about this, especially not a senior architect. She chose to ask a peer in terms of another junior architect. If no peer had been available, she would have searched for the answer in the books or the databases. The reason for not asking any architect was that knowledge about norm values was something the architect thought she should know about.

Some questions you just do not put to anyone. For example, you do not ask anyone about norm values, such as on the dimension of a handicap toilet, because this is something one should know, but do not know about. In those cases I ask a neighbour who is more like my mate rather than asking a senior person. That is because one does not want to show one’s ignorance to a senior person. [. . .] I could also check this in books or on the net but most of the times I ask a mate because that is quicker.

Thus, to avoid getting branded as ignorant, she preferred to ask a peer with whom she had “a close and equal relationship”. This choice implied a conflict between the architect’s organisational role and her more personal identity (see also section 2.2.1). From an organisational perspective, the architect should feel free to ask anyone who could provide with the needed knowledge. However, the respondent’s personal feeling – as a kind of prestige – was primary. Consequently she actually disregarded some of the potential knowledge providers available. Furthermore, preferring to ask someone orally instead of using available written signs as the mediating instrument was considered less time-consuming from the perspective of the knowledge needer, but perhaps not from the perspective of the knower who would be interrupted in his work (see also section 7.3.5).

To continue, even if these kinds of norm values were objected for repetitive use in Architect, this knowledge was not automatically internalised. As one architect

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1 In Publish, one way to try to deal with this kind of conflict was by the use of mentorship. Some of the junior editors had been appointed a senior editor as their mentor, and this was regarded as a great facilitator for putting requests as the junior editors felt more inclined to ask when they had a formally appointed mentor (see section 7.1.2).
expressed “this kind of knowledge is easily forgotten probably because one knows
that it can be easily acquired again”. Another reason why the architects tended to
forget this kind of knowledge might also be due to the number of norm values and
the frequency of the tasks in which they were used. In comparison with the previous
example of Energy, the operator used the colour of the pins more or less daily to
interpret the net schemes, and there were only four different pin colours. However,
the architects had to deal with a large number of different norms partly related to
different kinds of buildings, and as they worked with different building projects,
they did not use the same norms in each project. Accordingly, the infrequent use of
the norm values, together with the large number of different norm values, did likely
contribute to the fact that norm values were easily forgotten.

Another example when oral, rather than written, speech was preferred occurred
when an architect needed knowledge about dump to decide what material to use in a
building situated close to a rock-face. The architect knew she could find some
answers in a database containing descriptions of different materials. However, she
felt she needed to discuss it more closely to be more certain about what material to
use and preferred to talk with an expert.

Thus, the first elementary task was to get in touch with an expert, but the
problem was that she did not know whom to talk with. One solution was to look at
the CVs of the employees’ expertise available on the intranet. Doing that, she might
have found a person to call but she would not know for sure whether it was the right
person; it would have been more of a hypothesis that needed to be tested. Hence, to
get a prompt and more certain answer, she preferred to ask a colleague. She asked
and got a name from a colleague, and when calling the expert, she introduced
herself and referred to the colleague from whom she had got the expert’s name.
Hereby, getting the name from a colleague was not only a way to feel sure she
would call the right person; the colleague’s name was also used to introduce her and
her problem. Having got in touch with the expert, she could continue with the more
complex problem and discuss what material to use to avoid damp damages of the
intended building she was drawing.

In this latter example, the architect came across two situations when she could
have used written signs available via information systems (IS) to gain needed
knowledge. The first situation concerned the material database, and the second
situation concerned the CVs available on the intranet. In both cases the architect
chose to ask a colleague instead. As in the previous example, one reason was that it
was regarded smoother and quicker to ask a colleague than searching for the answer
in the IS. An additional reason was that by putting a direct request to the colleague
the architect thought she would acquire more certain knowledge. Hereby, the oral
dialogue with a colleague was regarded more reliable than the use of the IS (see
further section 7.3.5).

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1 When a building is close to a hill, it is likely that the house will be exposed to more water than normal.
For example, when it is raining, the water will flow down the hill onto the house and thus the construction
needs to be well-thought out to reduce unnecessary water-damage.
Multiple Instruments to solve Specific, Elementary Tasks

Sometimes knowledge mediation involves more than one mediating instrument. One such example was identified in Energy: A small net (SN) operator got a notification of a power failure via a fault report system (an IS, see further section 7.1.3), and needed to contact an entrepreneur and ask him to check this out. As different entrepreneurs worked in different areas, he first needed to identify the geographical location of the failure. To acquire knowledge about the location, he looked at a wall atlas, and based on the specifications from the fault report system, he could identify the location. But as he was not familiar with the entrepreneurs working in that area he asked a by-passing colleague about whom to call. He got a straight answer including whom to call and also where to find his telephone number, which was described in a telephone list (an established document). The operator got the number via the list, and called the entrepreneur to ask him to check and try to handle what had caused the failure.

The core problem experienced by the operator was that he did not know whom to call. To acquire this knowledge he needed to identify the location, the specific entrepreneur working in the area and his phone number. Doing this he used four distinct instruments: the fault report system, the atlas, the colleagues and the telephone list. Thus, even if the specific problem experienced by the operator was related to an elementary task (calling an entrepreneur), the acquisition of the demanded knowledge involved multiple instruments used to gain different parts of solution.

Written Signs to solve Specific, Complex Tasks

The problem situations described above concerned rather elementary tasks, such as knowing whom to call in specific questions. However, SKM pull approach via limited interaction to solve specific, complex tasks was also identified.

For example, the architects worked with different kinds of building projects. Sometimes, these could be related to “standard solutions” of typical buildings or typical parts of building, such as a one-storeyed house or a stair-well solution. Hence, when the architects were to make outlines of a new building, they could sometimes re-use standard solutions, instead of starting out themselves from the beginning, and thereby avoiding “reinventing the wheel”. Some of those standard solutions (drawings) were stored electronically and made available via the intranet. Using those standard solutions saved a lot of time, and the architects could also learn about different typical solutions.

One concrete example was when one of the architects was to draw a multi-story building with four apartments at each floor. The problem he experienced was that he did not know how to design four apartments on each floor and connect those to one stair-well. However, by partly re-using an earlier design solution available via the intranet, he got to know how this kind of design could be handled and could also speed up his work. Standard solutions and descriptions of old building projects (so-

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1 Some architects pointed out a problem with re-using old solutions and affirmed that to get an assignment, one had to come up with a new, selling concept, and relying on old solutions limited the innovativeness. Hence, the re-use of old solutions was not only regarded as a good thing (see also McDermott 1999).
called “reference objects”) were also used as a source of inspiration. Several architects looked at previous drawings available on the intranet and in books to gain new ideas. Prior solutions were products of the architects’ knowledgeability and as such fruitful instruments for mediating knowledge.

It was, however, also mentioned that it was not possible to completely understand a solution just by looking at a drawing as it did not show all knowledge used to make the drawing. Consequently, to fully understand a drawing, there was a need to discuss it with its creator. As one architect explained,

[a] drawing does not explain why a certain solution was chosen, and there might have been a number of prerequisites or restrictions that formed the basis for the final solution, and to learn architectural work, it is important to understand those kinds of restrictions as they are never the same in two different projects.

Still, standard solutions and reference objects were important instruments of knowledge mediation, and storing them on the intranet offered high accessibility. The architects could ask colleagues to get access to paper drawings, but that was often considered too roundabout.

### 7.1.2 Knowledge Mediation via High Interaction

This section describes SKM pull approach via *high interaction* between the knowledge needer and the knowledge provider. High interaction is required when the experienced problem is related to a complex task, including many decisions and sub-solutions, that cannot be solved by a simple question and answer and when no standard solution can be used. The first subsection below illustrates some features of complex tasks, and the subsequent subsections illustrate examples of knowledge mediation to solve specific problems related to complex tasks.

#### Some features of Complex Tasks

Architectural work involves a number of elementary tasks, but in general it is highly complex as there are many different but related issues that the architect needs to pay attention to when making drawings. Sometimes standard solutions can be re-used, but that is not always possible. There might be non-standardised features involving specific limitations and prerequisites that affect the design. One of the architects gave the following description of the complexity of architectural work.

In general, our profession involves complex and broad knowledge rather than narrow expertise. One can say that our work is about understanding problem hierarchies. We face and grapple with *problem solutions*, but each individual problem is as such often quite trivial, for example, how to make a kitchen sink, how to build a well-isolated wall or how to design a functional house for five family members. As such the problems are not that complicated. What is a *real problem* is that there are an *incredible number of problems* that need to be solved at the same time, that is, through one single solution. There are technical problems, physical problem, political problems, functional problems and so forth. There are a number of layers of problems, and to further enhance the difficulties of solving problems, their solutions often oppose each other. A technical solution of a problem concerning a house might be to have thick walls and small windows [to minimise the cost of heating], but to create a cheerful and comfortable atmosphere, one wants large windows and thin
walls. This is just one example of how solutions of isolated problems might be conflicting. Consequently, our profession is to a large degree about understanding and creating problem hierarchies by defining the most important problems that need to be handled, that is, to prioritise between problems and sort them in the right order and then find a solution that cuts through the whole problem structure.

The architect also meant that “sometimes it is hard to formulate a problem to yourself even if you know you are facing one, and consequently even harder to describe it to someone else without having the drawing to refer to”. Hence, when facing a problem, the architect could have difficulties in defining what the problem was. Not being able to define the problem, the architect would not know what knowledge to ask for. Hence, to solve a problem did not only concern the mediation as such but also the capability to define the problem. Another architect made a comparison between complex architectural tasks and elementary IT-related tasks. It is much easier to ask something about IT functionality! Not to grous about IT, but that kind of questions are very concrete, and a knowledgeable person can quickly give an answer such as “push the delete button and it will be fixed”. When it comes to a drawing of a school building or a fire-station, one cannot call someone at another office and expect a quick answer to a question like “I am about to draw a fire-station, how should I do?” There is no short and good answer to such question; one cannot answer “press enter”. One cannot solve the question via the phone either but one has to meet the expert face-to-face. [. . .] When meeting in person, it is much easier to discuss different ideas and come up with solutions.

**Oral Speech to solve Specific, Complex Tasks: A less successful example**

When one of Architect’s offices – called A-office – got involved in an upper secondary level school building project, the architects at A-office experienced a problem due to a lack of knowledge about this type of buildings. To get the assignment, A-office needed to come up with a selling concept. Thus, the school expert within Architect was asked for help, but it was not about a simple and straightforward request concerning a limited issue. To solve the problem, an extensive understanding of these kind of school projects was required, including knowledge about the functions of upper secondary level schools, the normal size of school classes, the educational system defined by the Board of Education, the number of theoretical subjects versus practical subjects taught, the size of classrooms, passages, teachers room, toilets and so forth.

As the architects in A-office did not have any previous experience of this kind of project, they found it hard to clarify and describe the prerequisites as they did not know what to pay attention to. They had difficulties in formulating questions as they did not know what to ask for. In addition, even if the school expert had a long experience of school projects, his knowledge was not easily mediated to enable the architects in A-office to deal with the problem. Designing a school involves a large number of decisions that depend on the specific situational features of the building project in question.

Hence, to understand the prerequisites of the school project, the expert himself needed to get involved in the project. The expert needed to look at the school and
talk with the employees and other actors involved in the project. What the school expert learned by engaging in the project was, then, discussed with the architects in A-office. They discussed different requirements, and based on the school expert’s earlier experiences, he tried to explain how to approach the situational prerequisites of the school. However, the expert had difficulties in expressing all the knowledge demanded to solve the problem and come up with a selling concept. He found it hard to explain how he had identified problems and restrictions and how to transform them into useful solutions. It was difficult because the problem involved a large number of distinct but interrelated sub-problems. Thus, a lot of understanding was created, and many decisions were made by the expert. Talking about how to gain knowledge about restrictions, needs and prerequisites of the school, the expert said,

[that is routine, or perhaps a bad habit; it is the core of the expertise at the same time it is very hard to describe how it is done. When I enter a school building, I can directly see the challenges and the prospects. I get a rough picture in ten minutes, and then I go into the details. For example, when I enter a classroom I ask myself: what room is next to this one? Where is the daylight? What do I reach from this classroom? Then, the questions and possible solutions need to mature in my mind.

A consequence of the difficulties in mediating the expert’s knowledge to the architects in A-office was that the expert had to solve the school project on his own. That means he could not mediate enough knowledge to enable the other architects to accomplish the project. Instead, the expert designed and formulated the concept himself. Hereby, the mediation initiative was not very successful. However, involving the expert in the projects was a good way of taking advantage of and re-using his expertise, and also gaining the assignment.

One circumstance that limited the possibility of succeeding with the knowledge mediation was that the expert performed many of the activities on his own. Even if he had joint discussions with the other architects, the overall understanding stayed in the mind of the expert. A solution could have been to perform the activities together with one of the other architects. However, this was considered costly and time-consuming, and it was considered easier by the expert to do the work on his own. Furthermore, even if there was an intention to mediate the expert’s knowledge to enable the other architects to accomplish the project, there was actually no time to do it as the knowledge demanded concerned such a complex task that needed to be accomplished in a limited time period in order to be able to compete for the assignment.

The problem of mediating the expert’s knowledge was not only specific to this particular school project. It was a general problem in Architect. Experts and architects responsible for assignments commonly performed critical activities on their own. Thus, only parts of their knowledge were mediated to other project members during the projects. Several architects commented on this and as one of

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1 One meeting was with the assigner, the caretaker, the financier, the chief education officer, the headmaster, an engineer and a safety representative, who described the project. Other meetings were with a reference group of teachers. The school expert did also film each of the rooms and observed the teaching in the classrooms in order to pick up on important details; as he explained “equipment and furnishing are important things; they can both hinder and facilitate the teaching”.

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them expressed, “the architect is a black box, and there are few and cursory discussions about how decisions are taken concerning different solutions”. This kind of general problem – labelled ‘typical problem’ (see further Chapter 8) – experienced in Architect had resulted in initiatives to enhance the mediation of experts’ knowledge to other architects. The intention was to take advantage of the deep knowledge that the experts possessed and get them to share it with other architects to enhance their knowledgeability to understand and perform more complex tasks on their own.

**Oral Speech to solve Specific, Complex Tasks: Successful examples**

When one architect in B-office was about to formulate a tender concerning a school project, he felt he did not know what critical issues should be included in such a tender in order to show the client that he knew what he was talking about. Thus, by discussing the prerequisites for the project with the school expert, he gained that knowledge and also learned more about important functions he needed to pay attention to when drawing models of school buildings. He gained the needed knowledge from the expert and was able to continue to solve the problem – that is, to formulate the tender – himself. As the architect (knowledge needer) explained,

> [o]ur school expert is consulted by all offices within the firm. I have used him in several projects, and he has helped me to solve specific problems I have had to tackle, such as the formulation of the tender.

Another example concerned a competition for a laboratory project. The problem was that the architects engaged in the competition had never before drawn up a plan for a laboratory. However, this kind of experience was available through an expert of laboratory buildings working in another office, and this expert was engaged in the project. One goal was to show the client that Architect represented a lot of knowledge within this area, but it was also a way to mediate the expert’s knowledge to the other architects in order for them to finish the project themselves. The expert worked together with the other architects during the initial phase. Thereby the architects learned from the expert and could then continue the project without the expert’s involvement. As one of the architects involved in the project said,

> [t]he client wants to have someone he can have a reliable dialogue with concerning the future laboratory environment, which requires knowledge about historical trends and architectures. Due to the fact that we engaged our colleague, we got the assignment and could also acquire a lot of his knowledge and also gain own experiences about laboratory projects.

The knowledge mediation of the two examples above did not concern simple, straightforward questions and answers. The experienced problems were related to complex tasks requiring dialogues, and even collaborative work, whereby the experts shared parts of their knowledge with the knowledge needers. In comparison with the less successful example in the previous section, one reason for success of the examples in this section was due to the ability of the knowledge needers to describe their problems and formulate specified questions to the experts.
Multiple Instruments to solve Specific, Complex Tasks

An example of an SKM pull approach to solve a complex task involving multiple mediating instruments was identified in Publish. It concerned one of the junior editors who worked with a new language book. The problem the editor was facing was that she did not know how to evaluate the quality of the text and the structure of the new book. This concerned highly significant knowledge as a book representing poor language and design would not get a long life cycle. Thus, she asked a senior editor, who earlier had been appointed as the junior editor’s mentor, about how to make this kind of evaluation. To explain how to make the evaluation, the senior editor used several other books as illustrative examples and discussed their benefits and drawbacks. Thus, to mediate the knowledge, both the experiences of the senior editor and illustrative books were used.

After the discussion, the junior editor felt she knew how to deal with her specific problem of evaluating her book but she was not sure if she would be able to accomplish the evaluation of another book. This was explained by the circumstance that much editorial work is based on long experience. As another senior editor said,

[...] we learn by looking at old books and comparing best-seller with books that have not sold very much. We also make follow-ups on best-sellers and poorly performing books to understand why one book is more popular than another. In the course of time one gets a trained eye and can identify good pictures, good texts, childish illustrations and so forth.

This example showed that even if the knowledge acquired via SKM can be related to a general and common (typical) task of a practice – in the case of the editors, the evaluation of the quality of books – this does not automatically mean that the knowledge receiver has the capability to apply acquired knowledge in such future tasks. Consequently, knowledge as a result of SKM can have different degrees of usefulness, and also generality, to the knowledge receiver. Sometimes an actor gains knowledge via SKM purely to solve a specific problem. Sometimes this knowledge can be used not only in the specific problem at hand of the actor, but also in similar, future tasks. This reasoning relates to the discussion about the internalisation and institutionalisation of the operators’ knowledge of the meanings of the pin colours (see the first example in section 7.1.1).

Continuing with the master-apprentice relationship between the senior editor and junior editor, the senior editor did not only help the junior editor. The junior editor also shared her knowledge and contributed to an enhanced knowledgeability of the senior editor. As the senior editor explained,

I also get help, not so much about publishing knowledge, but I ask questions about the functions and use of our different information systems that I consider difficult because I am not used to work with such systems.

When the senior editor asked the junior editor about how to use different kinds of information systems, the mediation was accomplished by a combination of describing and showing how to do. That is, the junior editor described and showed how to work with the information systems.

Another example was given by an architect who had been consulted by one of the other offices within Architect and the architects at that office wanted help with a
police building project. The architect who got the request was an expert in police buildings, and he visited the other office and brought drawings of earlier police building projects (reference objects) he had been involved in. He showed the drawings and described different solutions, their benefits and drawbacks. In this way the architects in the other office got to know about what to pay attention to when drawing a police building. The police building expert emphasised that he would never have been able to mediate that knowledge without meeting and reasoning about different solutions.

### 7.1.3 Knowledge Mediation via Joint Creation

The variant of specific knowledge mediation pull approach that will be discussed in this section is labelled knowledge mediation via ‘joint creation’. As the label implies, the key feature of the variant is that the knowledge mediation is accomplished via a joint creation of the needed knowledge. A knowledge needer requests certain knowledge to be able to solve a specific task, but the intended knowledge provider cannot offer a solution. Instead, the knowledge needer and the intended knowledge provider jointly create the knowledge demanded to solve the problem. Hence, joint knowledge creation builds on a mutual exchange of knowledge between the involved actors.

**Joint Creation to solve Specific, Complex Tasks**

One example of joint knowledge creation to solve a complex task was identified in Publish and concerned the initial stages of a new product development process. One core during the projecting phase (see figure 5-2, section 5.2.1) was to get to know what kind of books teachers – as potential clients – need in order to be able to decide what book to produce. To acquire this knowledge, multiple instruments, such as questionnaires, interviews and observations, were used to get the teachers’ views. One problem with the interviews was to get clear and “true” answers. As one editor explained,

> [o]ne cannot just ask what they want because in that case one will seldom gain any useful answers. One needs to be very **specific when formulating questions**. [. . .] One also needs to be observant concerning conflicting answers and follow up the answers with observations.

Conflicting answers could concern different teachers who used different pedagogical methods, which, in turn, required different kinds of educational materials. Several editors had noticed conflicts between what the teachers said they wanted and what they actually used in teaching. For example, during a meeting with a reference group of teachers, two editors (one senior editor and one junior editor) asked them about their need for exercise books. They all said that they did not use that kind of books in education. However, when observing their teaching, the junior editor realised that the teachers actually worked quite a lot with examples and exercises, which indicated a need for such tools.

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1 This can be related to Argyris & Schön (1996:13) who talk about ‘espoused theory’ in terms of “the theory of action which is advanced to explain or justify a given pattern of activity” versus ‘theory-in-use’ which refers to “the theory of action which is implicit in the performance of that pattern of activity”.

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As there was a conflict between what they said and what they did, the junior editor got confused and asked the senior editor what conclusions to draw concerning the need for exercise books. The senior editor could not give any answer, and the two editors needed to *jointly discuss* how to interpret the conflicting findings and how this understanding could be transformed into a salable product. As a result, the editors concluded that an exercise book was needed, and they formulated an idea of a new educational material. This was followed by calculations in order to see if the intended exercise book seemed to be economically defensible. To do those calculations, the editors asked the sales and marketing manager about which figures to include, they made estimations of how many students could be expected to take the course for which the book was developed and they used the sale and order system (an information system) to find out how many editions similar books had sold earlier.

Still, even if they used a number of instruments to gain the knowledge demanded for making the decision about whether the book should be developed or not, there were a lot of uncertainties. Neither the junior, nor the senior editor had any definite answer. They had to *reason to jointly come up with a likely solution*, and doing that they had to “rely a lot on intuition”. Hence, the knowledge the editors needed during the projecting phase was not only related to a complex task, it was also “uncertain” knowledge.

*The Significance of Information Systems to solve Specific Tasks*

Another example of the need for a joint creation of knowledge was observed in Energy. This example showed the significance of information systems (IS) as critical instruments to gain knowledge: An entrepreneur called Energy to tell the operator in charge of the large net (LN) that a tree had fallen on the overhead electric wire. A woodman – with no connection with Energy – had by mistake cut down a tree that had fallen on the wire. So far no one was hurt, but the entrepreneur wanted the operator to quickly open the line as it had started to smoke and there was a risk of fire.

The operator realised the severe situation but was not sure exactly which line was concerned. Thus, he asked the entrepreneur about his location. This seemed to be a simple question. Still, it was not easy to answer because the entrepreneur was not sure himself about his exact location. Thus, to clarify the entrepreneur’s location, the operator had to ask *more specific questions* to get the answer, questions such as: What is your exact location? Is it between X and Y, or between R and X? To be able to formulate those questions, the operator used the *geographical net information system*, where he found the X, Y and R. Hence, by using the IS, the operator could specify the questions and was able to limit the possible geographical area and finally define where the entrepreneur was located. Then, the operator could open the proper line to reduce the risk of a real fire breaking out.

As the line needed to be opened immediately, there was no time to figure out how to reserve feed the clients affected by this unplanned power failure before the

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1 To ‘open’ a line means that the power is turned off and no electricity is passing, and to ‘close’ means that the electricity is turned on and can pass through the line.
line was opened. Thus, the next step was to quickly find a reserve feed solution – a more complex problem to solve. To reserve feed the net, the operator realised that he needed to use one of the small nets (SN) but was not sure how. Thus, he put a request to the operator who worked with the SN in question and asked how the SN could be used to reserve feed the affected station and its clients. The SN operator could not make sense of the question and had to ask for clarification, which he got, but he still could not give an answer. Thus, by looking at each other’s IS, they needed to reason about possible solutions. Having exchanged a couple of alternatives, they jointly came up with a solution and started to rearrange the energy flow in order for the clients to get their electricity back.

The whole process from the time the line was opened until all the clients got their energy back lasted only about five minutes, but these were stressful minutes which almost ended up in a panic as it had started to blaze from the tree. However, as the two operators worked very closely with each other and were very familiar with each other’s tasks, they could solve the problem without any major accidents occurring.

Another example in Energy concerned an operator who was working with a planned power interruption instruction of the large net (LN). The interruption instruction involved a formulation about how to reserve feed the clients affected by the interruption, but the operator did not know how to do it. He tried to figure out a solution by looking in an IT-based “interruption dictionary”, which had been formulated by one of the senior interruption planners and included all different kinds of procedures and tips for planning interruptions of more or less all the stations of the net. However, since the planner had left Energy six months earlier, the dictionary had not been updated (see further section 7.3.5). As there were likely changes to the net after the dictionary was updated the last time, the operator did not rely on the procedures in the dictionary. Thus, he chose to ask a colleague for advice. The colleague was not sure about how to reserve feed the net either. Hence, together they discussed different alternatives, and by the use of the geographical net information systems of the LN and the SN (the latter needed to be used to reserve feed the LN), they managed to find a solution.

What, among other things, signifies these examples is that intended knowledge providers do not always have a ready answer. Sometimes the solutions need to be jointly created by the actor needing the knowledge and the one getting the request. In addition, both examples showed that the information systems played a significant role in order to create the knowledge needed to continue the tasks.

### 7.2 Specific Knowledge Mediation Push Approach

As illustrated in the examples in section 7.1, knowledge mediation triggered by experienced specific problem situations might be initiated by the actor who needs additional knowledge. However, knowledge mediation can also be accomplished via a push approach. A push approach is used when a knower (knowledge provider) initiates the mediation on the basis of an experienced problem that he believes will affect another actor’s actions. Just as in the SKM pull approach, the trigger of the SKM push approach is an experienced specific problem, and the motive for initiating knowledge mediation is to enhance the knowledgeability of the actor
challenged by the specific problem. SKM push approach can be accomplished via limited or high interaction and likely also via joint creation. However, what signified identified examples of SKM push approach was that they seemed to represent different kinds of institutionalised routines. It could be a kind of informal routine that had evolved over time as a way to deal with the practice in a good way, it could be a more formal routine based on organisational structures or working methods or it could be a kind of pre-designed IT-based routine.

7.2.1 Knowledge Mediation via Informal, Oral Routines

One example of a SKM push approach was noticed during the unplanned power failure caused by the tree that had fallen on one of the overhead electric wire (see section 7.1.3). The operator in charge of the LN asked one of the SN operators for help in order to reserve feed the clients who got affected by the failure. However, the LN operator also realised that the failure in the LN would directly affect the other SN and generate power failure indications in their net systems.

Thus, at the same time as he tried to solve the reserve feeding (together with one of the SN operators), he loudly announced to the other SN operators that “the line between X and Y has broken” and gave a brief explanation of what had happened. Knowing this the other operators could just sit and observe when the power failure was indicated in their systems. If the LN operator had not told what had happened, the SN operators would have had to start searching for the failure themselves. But as they got to know about the failure, even before they had realised the problem themselves, they did not have to search for the failure and could directly explain to the clients what had happened.

It had become natural for the operators to tell each other directly when problems occurred as a kind of informal, institutionalised routine. One facilitating circumstance in Energy was that the operators worked in an open landscape office and could just call out whatever was needed. This was quite different compared to their previous organisational structure, where there were four geographical dispersed operation centres. As one of the operators said,

[i]t is greatly advantageous to sit together like we do today. Earlier, when there was a failure in the LN, we had to make phone calls to the SN centres to tell them about the failure. We had to make the calls so they would not have to make an unnecessarily search for the leakage in their systems. However, phone calls took time, and nowadays I can just shout it out and everyone will know. This is an incredible benefit [. . .]. As we now sit together we can easier utilise each other when we need support.

One critical prerequisite for SKM push approach is that the knower is aware of the fact that another actor might need certain knowledge to solve a problem. In other words, the knower needs to anticipate other actors’ need of knowledge and share this knowledge with them before they realise the problem and request the knowledge themselves. Hereby, the knower needs to know about the specific tasks of other actors.
7.2.2 Knowledge Mediation via Formal, Oral Routines

Another variant of SKM push approach concerned the change-over between shifts in Energy. In comparison with the informal routine in section 7.2.1, this had become more of a formal routine. Each time before an operator finished his shift he had about twenty minutes at his disposal to tell the successor what he needed to know. This could, for example, concern planned and on-going power failures that needed to be observed or an unplanned failure that needed to be followed up. This routine was highly appreciated by the operators as they got to know about important on-going problems that they needed to follow-up and handle during their shift. Thus, this formalised routine made the operators starting a shift prepared for the specific tasks that they needed to solve and they often got the solution from the finishing operator.

Another example of SKM push approach was identified in Architect. This example did also concern a kind of formal routine that was based on the organisational structure and the way projects were organised at Architect. A senior architect in charge of a building project concerning student apartments had made a rough sketch and described his idea to one of the junior architects who was asked to draw an outline. The junior architect was informed that the house should include two buildings with some kind of connection and hold 20 apartments. The contractor also required a certain number of parking places, and the senior architect highlighted that the view out of any window should not be another house wall. Based on these criteria, the junior architect started to make a drawing. When finished, she showed the drawing to the senior architect and told him that to solve the parking requirements an underground car park was needed. However, as the constructor had mentioned certain economic frames, the senior architect could directly say that an underground car park did not fit into the restrained budget. In addition, when looking at the drawing, he realised that it was a four floor building and the building could not be higher than three floors.

The senior architect had forgotten to tell the junior architect about those two additional restraining prerequisites. Thus, the junior architect had not done anything wrong but had to re-do the drawing. In this way, lacking knowledge about all prerequisites caused an unnecessary duplication of work. Furthermore, it was not easy for the junior architect to know about the additional restrictions. However, as she said “next time I will probably remember this and ask about whether there are any economic frames or other restrictions”. Thus, she felt that she had learned from this situation.

7.2.3 Knowledge Mediation via IT-based Routines

One of the core tasks of the operators at Energy was to maintain and control that the energy nets were working satisfactory. When there was a power failure in the large net (LN), this was automatically reported via the geographical net information system (IS). Hereby, the LN operator got automatically informed via the system, almost at the same time as the failure occurred. The notification was accomplished both via a failure indication on the computer screen of the IS and via a connected alarm. In turn, this automatic knowledge mediation was made possible due to the
pre-designed functionality of the geographical net IS – as such this IS was a crucial instrument that automatically provided the operators with critical knowledge concerning the energy nets. Looking into the net IS the operator could often also identify between which stations the failure had occurred. When the stations were remote controlled, the operator could sometimes also handle the failure from his location via the net IS.

The geographical net information systems concerned with the small nets (SN) did not have the same kind of functionality, and the SN operator did not get automatic alarm via these systems when a SN failed to function properly. The intention of Energy was to connect all the energy nets in one single geographical net IS, but so far that system was not fully developed. Thus, when there was a power failure in one of the SN its clients called Energy to report the failure. The failure was reported to the marketing unit where the actor receiving the report entered the failure into a fault report system, which was another information system. In turn, this fault report system informed the SN operator about which client had called in and reported the failure and where the client was located. Based on that information the SN operator tried to locate what station and energy lines were affected by using the SN system. However, this was not always easy to do as the SN systems did not show all the stations and lines (as the LN system did). Thus, to identify the location, the operator usually had to make use of paper drawings on the energy nets as complementary instruments to gain needed knowledge.

The core of the examples in this subsection is that they show the significance of information systems as pre-designed and institutionalised instruments for mediating knowledge critical for actors’ work. The examples also show that by designing IS that have this kind of automatic communicating function enables actors to use IS as mediation instruments in SKM push approach as a pre-designed IT-based routine for knowledge mediation.

7.3 Influencing Circumstances

In the above sections, a number of examples of SKM have been described, categorised and discussed, and the aim was to identify significant characteristics and variants of SKM. The examples also included descriptions of circumstances influencing knowledge mediation. In general, empirical examples have shown that it is often a combination of different circumstances that affect whether and how knowledge mediation is accomplished. Still, six main categories of influences have been identified – the problem situation, the knowledge (aimed to be mediated), the knowledge receiver, the knowledge provider, the mediating instrument and the working environment – and these influencing categories will be discussed in the following subsections. To clarify the influencing circumstances, I will sometimes refer to the examples described earlier in this chapter and sometimes use additional examples as illustrations.

7.3.1 The Problem Situation

One of the significant circumstances influencing knowledge mediation concerns the characteristics of the ‘problem situation’. As shown in the examples above, all
problems concerned specific problems related to specific, present tasks of an actor (the specific task could also be an instance of a typical task, see discussions in section 7.1.1 and 7.1.2). The specific tasks could be distinguished as elementary or complex. Consequently, the experienced problem situations were labelled as elementary or complex.

When the actors experienced an elementary problem – that is, a problem related to an elementary task – required knowledge mediation, to solve the problem, was seldom any problem. If the problem was both elementary and related to a typical task, it seemed even easier. For example, the problem the operator experienced when he could not remember the meanings of the pin colours was an example of an elementary problem related to a typical task, and just by looking at the crib the operator gained the knowledge he needed.

Sometimes, even complex specific problems that concerned specific tasks as instances of typical tasks could be solved quite easily. For example, the architects made use of standard solutions to facilitate the work of new drawings. Many times this was no problem; the architect could apply earlier typical drawings, or part of typical drawings, to the specific problem and task.

However, the more complex and context-specific the experienced problem was, the harder it was to accomplish required knowledge mediation. For example, the school expert could not express all knowledge needed by the architects in A-office to enable them to accomplish the school project themselves. This can be explained by the large number of sub-problems involved, and that the knowledge needed was based on long personal experience and hard to articulate (see also section 7.3.2).

A primary hindrance seemed to be due to insufficient and defective problem descriptions. The more complex an experienced problem was, the harder was it to describe it and to formulate specific questions. As the architects in A-office were not capable to formulate any specified questions, the school expert himself had to get involved in the project. He needed to thoroughly look into the prerequisites of the specific school to be able to ‘translate’ his pre-knowledge about school project into the specific school. Without engaging in the project this would not have been possible as the problem description offered by the architects in A-office was far too vague. Having gained an understanding of the building project the expert could formulate the questions (to himself) and thereby also find a context-specific solution. In sum, when the problem descriptions and questions were unclear this was a hindrance for knowledge mediation. On the other hand, when the problem descriptions and questions were clear and limited, this facilitated the mediation.

Another characteristic that seemed to facilitate knowledge mediation concerned the criticality of the experienced problem situation. Actors seemed to realise when there was a specific problem that needed to be solved and understood that it was critical for the practice that the problem was dealt with. The influence of the criticality of problem situations was in particular distinct in Energy, and the operators did not hesitate to share their knowledge to help each other.

7.3.2 The Knowledge

Knowledge mediation was also influenced by the characteristics of the knowledge in question for mediation. As the school expert explained, some knowledge was just
hard to express because it was based on a long experience and taken for granted (see section 7.1.2). Thus, even if the school expert himself could use his knowledge without any hindrances, it was sometimes difficult for the expert to articulate his knowledge to other architects.

Still, if the questions were clearly and closely specified, and if the knowledge needer and the knowledge provider had the possibility to reason about the problem situation, these were circumstances that facilitated the mediation and could partly balance the difficulty of expressing knowledge. For example, when the school expert was asked to give some advice concerning a tender he could help because the other architect (the knowledge needer) was able to specify the questions. Or in the case of the junior editor, who did not know how to evaluate the quality of a book but could acquire this knowledge via reasoning with a senior editor who used other books as illustrative examples. The knowledge providers in these two examples did not have any formula or ‘recipe’ knowledge, but could share their knowledge by reasoning about the problem situations and possible solutions.

Hence, it did not seem as it was the characteristics of knowledge that was the real cause of difficulty. It seemed as it was more due to an inability of actors to describe the problems together with a lack of time to reason about problems that were the underlying problems. Several respondents also emphasised lack of time as a hindrance to knowledge mediation.

To continue, whether knowledge could be regarded as general or non-general did seem to influence knowledge mediation. General knowledge concerns the typical, for example, the meanings of the coloured pins in Energy or the norm values in Architect. General knowledge seemed to be rather easy to mediate and use, while non-general knowledge – such as the knowledge demanded to accomplish the school project – was harder to ask for, mediate and use.

Furthermore, in problem situations when the needed knowledge lacked a proven record, it was harder to accomplish the mediation. Mediation of this so-called hypothetic, uncertain knowledge tended to require a dialogue between the actors involved and sometimes a joint creation of possible solutions. It also seemed harder to get the needer to use hypothetic knowledge. If there were any optional and more reliable instruments to use to gain needed knowledge, those were preferred. However, sometimes the actors did not have an option and needed to use uncertain knowledge to deal with their tasks. For example, the editor could seldom be sure about whether a projected book would become a best-seller or not. Still, they had to take the decision to produce it or disregard it as a new product. The same situation was found in Energy, where the operators did not always know for sure how to reserve feed the energy nets but had to try out a potential solution.

On the other hand, when the knowledge in question was considered as certain, this seemed to facilitate both the mediation process and the knowledge utilisation (see the example of the pins used in Energy, section 7.1.1).

7.3.3 The Knowledge Receiver

One characteristic of the knowledge receiver (needer, seeker) that affected the mediation process concerned his pre-knowledge. On the one hand, if the receiver had experiences of tasks similar to a present problem situation, this facilitated both
the identification of the problem, the formulation of the request and the interpretation of the answer. On the other hand, if he did not have this kind of prior experience this was a hindering circumstance.

Concerning pre-knowledge, it was not only about the actual problem; it was also about knowing what mediating instruments were available, that is to know who was good at what and thereby know whom to ask for help to deal with specific questions or where to find a solution. “Not knowing whom to ask” was a hindrance mentioned by several respondents in all three organisations. It was also said that this was “usually not a problem for the ones familiar with the organisation, but it could be hard for new employees”. Knowing whom to ask for help was also related to the importance of relationships and networks (see further below and in section 7.3.6).

Even if a knowledge needer knew about a colleague, who could provide with needed knowledge, this person was not automatically asked for help. This related to a kind of prestige including a fear of being apprehended as ignorant or dumb if putting a request (see section 7.1.1). For example, in Energy, two operators were working with an interruption instruction but were insecure about how to reconnect and reserve feed the net. They knew they could call a certain entrepreneur and get a certain answer, but were not comfortable with that since they had already asked him twice about this specific instruction. As one of them said,

[i]t feels really dumb to call him again. He must think that we are totally ignorant. [The other operator nodded and said] We write in this way and then we might perhaps check with him [read: the entrepreneur] later.

A similar attitude was expressed by several architects, who felt that their knowledgeability was judged and criticised when showing suggestions and asking for feedback from other senior architect.

The prestige and fears described seemed to be related to lack of relationships. Hence, to know whom to ask, to have the courage to ask and to get him to share his knowledge seemed to be partly dependent on the relationship between the actors involved. As one architect explained,

[g]etting to know each other and develop networks is one way to get rid of inhibitions such as a lack of courage to ask, because it is much easier to call someone if you know him. For example, the IT network [a group of architects working with IT related issues] meets regularly to discuss bigger issues but between the meetings we often call and ask each other about more specific issues. When you come to me with technical questions and I do not have any answer, I just call one in the group. I have a relation with them, thus, to me it is very easy to make a phone call.

As discussed in section 7.1.1, prestige did also imply a conflict between the organisational and more personal role. That is, sometimes a personal feeling of prestige is stronger and is prioritised at the expense of what might be the best for the practice and the actor in his organisational role. Accordingly, when actors choose not to use a certain knowledge provider due to personal feelings, they might also limit their potentiality to enhance their knowledgeability and thereby also their potentiality to improve their capability to knowledgeable actions.

Sometimes the knowledge needer did also choose not to use a certain knowledge provider because he suspected that he would not get the support he wanted. For
example, when showing a drawing, the architects often wanted to discuss the benefits and drawbacks of the drawing and get tips about how to think in order to improve it. However, a ‘bad’ experience of some of the architects was that instead of a jointly talk about the suggested solution (drawing), some senior architects tended to give them the ‘right’ solution without any discussion. In the perspective of the re-use of knowledge, it might be good, but not in the perspective of knowledge creation and learning. By getting a solution, rather than a discussion, the architects felt they did not get the opportunity to reflect and come up with own solutions. Thus, to make sure that they got the support they wanted, they preferred to have a brainstorm session with a peer rather than with a senior architect.

However, it was not always like this. For example, one junior architect had got the assignment from a senior architect to draw an in-house stair-well for a house building project. The junior architect was not sure about how to do it and got some drawings, from the senior architect, on the overall building in which the stair-well should be designed. The senior architect also asked him to come up with one or two sketches that they could discuss the next day. Based on the sketches, the senior architect asked questions to the junior architect. Questions such as: Is it the right dimension there, or which dimension should it be? Does this detail fit into the rest of the building? In this way, the senior architect did not say that it should be in one or another way, but asked questions to get the junior architect to come up with the answers himself. The whole procedure was more like a Socratic dialogue1, than an offer of a finished solution.

Furthermore, SKM push approach presumes that the intended knowledge receiver is willing to take part of other actors’ (the providers’) knowledge. However, this did not always seem to be the case. A knower might acknowledge (what he believes is) a need of another actor and try to share his knowledge, but the intender receiver might behave as he is not interested. One of the architects described when such a situation had occurred at his office. The office had quite recently got a new office manager, who came from one of the larger offices. The architect said that he had noticed (that is, he thought) that the new manager did not have the regional knowledge that was passable in the smaller town where the office was located. The architect meant that the manager relied a lot on his previous experiences and way of acting against clients in the larger city where he previously had worked. This had become obvious to the architect when they got a problem with one of the clients who refused to pay for all the work Architect had done in a project. They had tried to get paid, but had not shown to be very successful. Thus, the manager wanted to send a sharply formulated letter to the assigner and even threatened to initiate a legal process. However, the architect meant “that was perhaps a practicable behaviour in larger cities, but it was not the way to act in their small town”. The architect had tried to get the manager to act in another way but had not succeeded because the manager thought that his idea of acting was the

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1 Plato took as one of his tasks to write down Socrates’ words together with his own ideas. For this the dialogue was regarded as an excellent form of presentation. The dialogue form represented an argumentative form that could be used to test and develop ideas (see the Socratic dialogue in Plato’s Teaitetos, Plato 1996; see also Mittelstrass 1995).
appropriate one. As a consequence, the architect “feared that they would lose the client due to a spoiled relation”.

Another example was found in Publish, where one of the senior editors described when she had tried to share some of her knowledge with some of the junior editors and felt that her ideas were not taken seriously. She said she felt like “some junior editors are just not interested in listening to advice”.

These examples of what was interpreted as ‘unwillingness’ to take part of other actors’ knowledge could be due to that the office manager at Architect and the junior editors at Publish – as the intended receivers – did not experience any problem whereby they *did not see any need for the knowledge offered*. This was implied by the office manager at Architect who thought that his way of acting was the appropriate one. Another explanation was put forward by one of the junior editors who thought that some of the senior editor’s advices were obsolete, that is, the senior editor in terms of the *knowledge provider was not considered reliable* (see also section 7.3.3). A third explanation was that the intended receivers *wanted to continue to do things in their own way* as a kind of prestige and self-sufficiency. As one of the senior architects said,

> [m]any people do not realise that they need to learn more, and that there are other, new ways of thinking. Senior architects tend to be *self-sufficient* and act as “if something has worked before why should it not work now”. Senior architects act as they have preferential right of interpretation in relation to architects born in the 1970s. This kind of attitude is hard to change, and in that regard the organisation suffers from inertia. However, we are a knowledge-firm and must act on the basis of that – the competition is very tough and we continuously have to develop our capability.

Comparing the example of Publish and the one of Architect, one interesting difference was identified. Some senior architects were considered to be *self-sufficient* because they acted as if they did not perceive junior architects’ ideas useful. On the other hand, in Publish it was the junior editors who acted as if they did not perceive the knowledge provided by the senior editor as useful. This is interesting as one might expect that experts and senior actors would be regarded trustworthy and useful as they have a long experience. However, just because someone has a long experience – as the senior editor who had worked over 25 years at Publish – did not automatically mean that the intended receivers regarded the senior actor to be a trustworthy and usable knowledge provider.

In addition, when actors talk about other actors’ willingness and unwillingness we need to be aware of the fact that it is their interpretation of other actors’ behaviour and their interpretation might be biased. Hence, it was important for me to get concrete examples of situations when actors behaved as they were unwilling, and also to try to gain the view of the actors who were interpreted as unwilling to take part of other actors’ knowledge, in order to make my own interpretations.
7.3.4 The Knowledge Provider

The knowledge provider is usually a human actor\(^1\) who shares and expresses his knowledge via mediating instruments. One prerequisite for knowledge mediation is that the provider is willing to share his knowledge. If the provider is unwilling to share his knowledge, that would be a significant hindrance to knowledge mediation. A willingness of the knowledge providers, in terms of the knowers, was a characteristic that more or less all examples of SKM showed. I did actually not find any example of SKM where the knower behaved as he was unwilling to share his knowledge. If an actor asked for help, the one getting the request seemed to do his best to give support, and a number of respondents expressed opinions such as “one always gets help when one asks”. As one architect said, “my experience is that we are generous when it comes to knowledge sharing. You just have to make a call and ask someone who is proficient within a certain area and you will get help”. A similar opinion was expressed by an operator at Energy,

\[\ldots\] whether I am unwillingness to share my knowledge if some other operator needs help? No, one cannot behave in such a manner; it would be out of the question. I know that if I help someone else with his problem, sooner or later I will get something in return – perhaps the next time I might be the one who needs help. \[\ldots\]

We work closely together, support and help each other when needed.

The willingness to share knowledge seemed to have its basis in a kind of service-mindedness against colleagues and clients. The needs for knowledge were based on specific problems that needed to be solved. It was specific problems related to the on-going business, and the knowers seemed to be highly inclined to give support in order to enable the practice to proceed in a proper way. In this way, willingness was also related to the criticality of the problem situation (see section 7.3.1) and the pragmatic purpose of the requested knowledge. Even if the problems or questions were not always specified, by reasoning or engaging in the tasks, the knowers could often get a picture of the tasks that needed to be solved. In this way, the understanding of the purpose of the knowledge in question for mediation seemed to facilitate knowledge mediation.

Pride was another characteristic that seemed to facilitate knowledge mediation from the perspective of the knowers. Several respondents expressed opinions such as, “one wants to help others and one feels proud when someone asks for one’s help. Someone just has to put the question”. Hereby, the organisational role as experts was something that knowers wanted to show.

One hindrance that was discussed by some respondents was a lack of communicative capability of knowers. One architect meant that whether individuals have a communicative capability is dependent on their personal qualities,

\[\text{[s]ome are gifted with a communicative ability, some are not. One soon finds out who is communicative and who is not, and you will continue to ask the former but}\]

\(^1\) Human actors might also design instruments that have functionalities that enable automatic knowledge provision such as the geographical net IS for the LN in Energy (see section 7.2.3) and in such cases the IS can be seen as a knowledge provider. However, if we talk about IS as knowledge providers we need to be very clear that in such cases we cannot use ‘knowledge provider’ as a synonymous with ‘knower’.
not the latter. This does not, however, mean that the former is better [read: more knowledgeable] than the latter.

Several architects and operators meant that they quickly got a feeling about who were good people to ask for help and who were not. For example, the operators were quite aware of which entrepreneur to call when they needed help and whom not to call. However, one architect added that this could also be a prejudice (instead of a fact), that is, a bias created on the basis of certain personal characteristics or a lack of a personal relationship,

[op]ne might have an opinion that someone has a poor communicative ability but this might not be the case. Still, one easily makes a conscious choice not to ask that person, but in reality he might be highly communicative – he just never got a chance to show it.

Another characteristic of the knowledge provider that showed to be a hindrance concerned reliability. If the receiver does not regard the knowledge provider to be reliable and trustworthy, that provider will likely not be used (see also the previous section). Thus, when a knower initiates SKM push approach, it is important that the intended receivers regard him as trustworthy and knowledgeable and also acknowledge their need for the knowledge.

Another issue that affected knowledge mediation in terms of its effects concerned the consciousness of the knower. For example, in Architect there was not always possible for the knower to directly tell the potential knowledge needer. Consequently, sometimes the knower forgot to mediate knowledge to the one who would need it, as in the case of the senior and junior architect (see section 7.2.1). Sometimes this did also occur in Energy during the shift changes. That is, sometimes the finishing operator forgot to tell about tasks and circumstances that the starting operator needed to know about and handle.

7.3.5 The Mediating Instrument

Human actors express and communicate knowledge via different kinds of mediating instruments, such as oral and written language. Human actors can also use technology, such as telephone or IT-based information systems (IS), to mediate their knowledge. Many of the empirical examples showed that written signs were often mediated by the use of IS. Hence, concerning written signs, this section does mainly focus on written signs available via IS (rather than paper documents) as the mediating instruments.

Using written signs via IS was a way to make signs “more available and easy accessible”. One might also expect IS to be appropriate instruments when the problems were elementary. However, when there were alternatives, the knowledge needer tended to choose to ask someone directly instead of searching in IS or books. In other words, a person-to-person strategy was often preferred as a means to mediate knowledge, rather than a person-to-document-to-person strategy\(^1\).

\(^1\) Still, even if the direct contact with human actors were preferred, several empirical examples from the cases showed that multiple mediating instruments, including oral and written signs and IS, were used.
Two circumstances affecting the choice of mediating instruments concerned which one the knowledge needer regarded as the most certain and the less time-consuming instrument to use (see section 7.1.1). However, it seemed like the evaluation of the most reliable and quickest instrument to use was a bit arbitrary. Written signs available in IS were often considered less reliable than oral signs expressed by an actor1.

For example, the architect who needed a name for a dump expert did not look into the database to get the name, but preferred to ask a colleague. Asking the colleague could likely have resulted in the wrong name too. Still, asking the colleague was considered more certain. Concerning the less time-consuming instrument to use, this was evaluated from the perspective of the knowledge needer. However, considering the perspective of the knower, asking him did, in fact, intrude on his organisational time, but that did not seem to have any significant influence on the choices of the knowledge needers2.

Consequently, simplicity to the knowledge needer was a criterion used to choose mediating instruments. It was a criterion based on an individual perspective, rather than the individual actor’s organisational role in the practice as a whole. That is, if the knowledge needer would have considered the most efficient way from the organisational perspective, the knowledge needer might have chosen to search for the knowledge by the use of available IS.

Concerning IS as unreliable instruments related to an uncertainty of whether the contents were updated or not. For example, the senior interruption planner at Energy (see section 7.1.3) was considered to be highly knowledgeable and had an overall view of all the nets and how interruptions should be planned. Continuously, he had described this knowledge in terms of procedures in an IT-based interruption dictionary, which (earlier) had been frequently used by the operators. In this way, Energy had earlier had internalised procedures to update and maintain the organisational documents describing interruption instructions. But ever since the interruption planner left Energy, this updating routine had not continued. Thus, nowadays the operators did not rely on the content as they knew it was not updated. Consequently, the dictionary was not used as it was not considered to represent a reliable and actionable content.

A similar situation was identified in Publish that had tried to get the editors to use an IT-based client information system as an instrument to gain knowledge about previous and potential, new clients. However, as the content had shown to be poorly updated, many editors did not use the system. This kind of uncertainty of the content of IS resulted in a kind of degeneration of IS as mediating instruments. This also showed the importance of not only proper content, but also proper content at the present time when the content were to be used.

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1 Actors seemed to presume that human actors were updated, and if they were not, they would say so. This could not be expected that from IS as they did not always tell whether the contents were updated and certain. Thus, using written signs via IS the knowledge needer often had to make this evaluation himself.

2 One architect made a comment related to this issue, but it did not hinder her from asking a colleague; it did just hinder her from using the telephone to ask a colleague in another office: “One knows that everyone else is so stressed and in the middle of own projects, thus one do not want to call and disturb without due cause. [. . .] In this way, it is easier to check with a colleague in the office because then one can feel if there is a good timing or not”.
However, there were not only hindrances or limiting circumstances of using IS. Information systems showed to be useful for mediating knowledge to solve complex problems. For example, the architects’ re-use of standard solutions of typical house buildings and reference objects was highly facilitated by the use of the intranet, which contributed to a high degree of availability of signs. As one senior architect explained,

[in a couple of days I will meet a potential client concerning a new hotel building project. To convince him about our expertise, I need to have some good reference objects. Thus, I have searched on our intranet and found that Architect was recently engaged in another large hotel project. This project material, including the tender, drawings and other descriptions, is perfect for me to use as a basis when talking with the client and I have evidence that shows that we are good at this kind of buildings. In this way, our intranet is an intrinsic tool to gain usable knowledge.

However, everyone at Architect did not agree on the usefulness of the intranet. Some architects complained about the “lack of actionable knowledge” available on the intranet. They meant that the intranet did only contain “information” about different happenings and projects, rather than usable knowledge. As one architect said,

[w]e need to get information about present reference objects and not only about finished ones. In particular, we need to disseminate knowledge about which present problems different architects are facing in on-going projects. That would help a lot both to know whom to contact to get help, and also to help others with problems they have. But this requires continuous updating of the net pages and some kind of indication when new materials have been stored there. Otherwise, if one look at a web page a couple of times but do not notice any new material, one will soon neglect to look there again.

The architects who did not consider the intranet to be a useful instrument to gain knowledge based their view on the circumstance that they had not found the content of the intranet useful. Another explanation could be that they had not used the system enough to find out what content the intranet could offer. For example, Energy had a huge system, where more or less all organisational documents should be stored, but few knew where to look in order to find documents about specific issues. The system was mainly used to look at documents a certain actor had stored himself, rather than as a tool for knowledge mediation between actors. The difficulties in finding the right documents were also noticed in Architect. As one of the architects said “one limitation of the intranet is that there has to be a smoother and easier way to get the information you are searching for”.

Finally, the design and use of IS made it possible to institutionalise automatic SKM push approach. For example, in Energy, the geographical net IS of the LN was used as a mediating instrument in SKM push approaches (see section 7.2.3). This was possible because the IS had a pre-designed functionality that indicated when failures or other odd occurrences were happening in the real net. Hereby, this IS did automatically produce and deliver signs to the operator. This was highly critical to the operators in their daily work, and by the use of the IS they quickly and automatically got to know when something had happened in the net.
7.3.6 The Working Environment

Concerning the characteristics of the working environment, empirical examples showed that geographical closeness of actors – in terms of nearness and easiness to ask colleagues directly when facing problems – was a major facilitator of knowledge mediation. As one operator at Energy said, “we work as a team, but it has not always been like that; it was not until we moved to the same building and got to know each other”. Working together in a landscape office design, the operators could directly and easily share knowledge with each other.

In the contrary case, geographical distances were regarded as a hindrance, in particular for asking for help. Also, within an office the distance could be a hindrance. For example, in the larger offices within Architect, the architects moved around and created new office designs when new large projects were established. As one of the architects noticed when we walked across the office,

[as you can see it is a bit messy here at the office because we are changing working places. We move around in the office when we get large assignments. To sit close together in the project group is a necessity to be able to easily discuss the project, prerequisites and ideas. Now we are about ten architects who are involved in a large hospital project that surely will last for a year or so, and it is important that we sit close together.

Another architect made similar comments and said,

[it] often goes against the grain to call someone with a complex question. It is much easier to walk around the office and ask someone directly by referring to an outline on a paper. [. . .] The reasoning and the outlines are the tools to identify the problem and find a solution. That is why it is preferable to ask someone here in the office. For those reasons it would be better with an open landscape office; distance is a problem and a barrier for asking [. . .] Of course, it is marginal to us here as we sit in the same building and on the same floor. Still, it would facilitate if we sat even closer to each other. It would facilitate knowledge sharing and it would also make it much easier for new employees to get to know our practice.

It was not only about distance and closeness of the geographical working environment, but also in terms of the emotional atmosphere. Sometimes knowledge mediation required personal contacts and mutual knowledge exchanges in order for actors to come up with a solution, especially when the problems concerned complex tasks. Thus, good relationships were a facilitator of knowledge mediation and made it easier for a knowledge needer to ask without being afraid of getting judged as ignorant (see also section 7.3.3). Hereby, emotional closeness seemed to be a facilitator, while emotional distances could hinder knowledge mediation. As one architect explained,

I believe that we senior architects feel that the network is working, but that is not the same for more recently employed. Thus, it is very important for the junior architects to build their networks. In this connection, our knowledge work project [see description in section 5.3.2] is a good catalyst to facilitate and speed up the creation and development of Architect’s networks. [. . .] I do not mean that our knowledge work is only for the junior workers, it is also positive for us senior architects; everyone meet and get to know more people and gain broader and new insights.
7.4 Significant Findings and Comments

The main purpose of this chapter was to investigate variants and characteristics of SKM and what circumstances might influence SKM. In this section, the most significant findings of SKM will be summarised and briefly commented.

7.4.1 Characteristics of Specific Knowledge Mediation

There are some characteristics that unite identified variants of SKM and those are described in table 7-1 below. In comparison with the characteristics of the basic type of SKM introduced in Chapter 6 (see table 6-1 and section 6.1.1), the further investigation of empirical examples from the cases showed that there are fewer uniting characteristics than I initially thought.

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>An experienced specific problem related to a specific and current task of one or several actors</td>
</tr>
<tr>
<td>Motive</td>
<td>Solving a specific experienced problem</td>
</tr>
<tr>
<td>Time for utilisation</td>
<td>Direct utilisation</td>
</tr>
</tbody>
</table>

Besides these uniting characteristics, varying characteristics of variants of SKM have also been identified in the empirical examples. Hence, the basic type introduced in section 6.1.1 has shown to be one variant of SKM, that is, the SKM pull approach (see section 7.1). The other basic variant is SKM push approach (see section 7.2). Each of these two variants has, in turn, their respective instances (sub-variants), showing varying characteristics. In table 7-2 below, the varying characteristics that have been found for SKM pull approach and SKM push approach are presented. The ‘or’ in the table indicates that the certain category have shown varying characteristics that, in turn, represent parts of the sub-variants of the SKM pull approach and the SKM push approach.

<table>
<thead>
<tr>
<th>Category</th>
<th>SKM pull approach</th>
<th>SKM push approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>Knowledge needer (seeker, receiver)</td>
<td>- Knower (knowledge provider), or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Automatic IS who produce signs</td>
</tr>
<tr>
<td>Approach</td>
<td>Pull</td>
<td>Push</td>
</tr>
<tr>
<td>Mediating</td>
<td>- Oral speech, or</td>
<td>- Oral speech, or</td>
</tr>
<tr>
<td>instrument</td>
<td>- Written speech on paper documents, or</td>
<td>- Written speech on paper documents, or</td>
</tr>
<tr>
<td></td>
<td>- Information systems, or</td>
<td>- Information systems, or</td>
</tr>
<tr>
<td></td>
<td>- A combination different instruments (multiple instruments)</td>
<td>- A combination different instruments (multiple instruments)</td>
</tr>
<tr>
<td>Mediation</td>
<td>- Evolving and occasional</td>
<td>- Evolving and occasional, or</td>
</tr>
<tr>
<td>process</td>
<td></td>
<td>- Routinised and recurrent</td>
</tr>
<tr>
<td>Degree of</td>
<td>- Limited (when written signs or simple question and answer are used), or</td>
<td>- Limited (when written signs or simple question and answer are used), or</td>
</tr>
<tr>
<td>interaction</td>
<td>- High (when dialogue and joint creation is required)</td>
<td>or</td>
</tr>
<tr>
<td>between actors</td>
<td></td>
<td>- High (when dialogue and joint creation is required)</td>
</tr>
</tbody>
</table>
One of the categories presented in table 7-2 above concerns the ‘mediation process’, and this category has not been in focus of the discussions concerning the empirical examples. Hence, some comments should be made: Based on empirical examples of SKM pull approach the mediation processes were evolving and occasional, while examples of SKM push approach showed evolving and occasional as well as routinised and recurrent characteristics. Perhaps SKM pull approach could also be routinised and recurrent. However, such an example was not identified in the empirical data, which might be due to that it might be difficult for a knowledge needer to know in advance when he will face a specific problem.

Furthermore, several of the examples of SKM were facilitated by prior initiatives based on experienced typical problems (see further Chapter 8). For example, the use of IS as mediating instruments was a result of earlier initiatives to facilitate knowledge mediation. That is, some actor had earlier realised a need to communicate knowledge by the use of IS, which in turn facilitated SKM.

### 7.4.2 Facilitating and Hindering Circumstances

Concerning influencing circumstances, six main categories have been identified and discussed: the problem situation, the knowledge, the knowledge receiver, the knowledge provider, the mediating instrument and the working environment. The way these categories might influence SKM are summarised in the two tables below. Table 7-3 describes characteristics that might facilitate knowledge mediation and table 7-4 describes characteristics that might hinder knowledge mediation.

In the tables I use attributes such as ‘easy’ and ‘hard’. These words should not be interpreted as ‘a piece of cake’ or ‘impossible’. They are relative expressions, for example an elementary problem is easy to describe in comparison with a complex problem.

**Table 7-3: Facilitating characteristics of main categories influencing SKM**

<table>
<thead>
<tr>
<th>Category</th>
<th>Descriptions of facilitating characteristics</th>
<th>Facilitating influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem situation</td>
<td>Elementary problems concerning elementary and perhaps even typical tasks; limited and common tasks.</td>
<td>Easy to describe by the use of oral and written signs. Easy to relate to specific questions and easy to give answers to.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>General knowledge – knowledge about the typical and common; a kind of ‘recipe’ knowledge.</td>
<td>Easy to express and mediate as it is usually valid no matter of situated features of a problem. Easy to utilise.</td>
</tr>
<tr>
<td></td>
<td>Certain knowledge – knowledge that has a proven record.</td>
<td>Easy to express and mediate as it has a proven record. Easy to utilise.</td>
</tr>
<tr>
<td>Knowledge receiver</td>
<td>Pre-knowledge of the receiver including experiences related to the problem and task in question, and knowledge about available mediating instruments and knowledge providers.</td>
<td>Having pre-knowledge makes it easy to describe problem, formulate questions, and make sense of signs, and to know where and how to find demanded knowledge.</td>
</tr>
<tr>
<td></td>
<td>Willingness to take part of other actors’ knowledgeability.</td>
<td>Facilitates the mediation and utilisation of knowledge.</td>
</tr>
<tr>
<td>Knowledge provider</td>
<td>Willingness to share knowledge. Relates to a service-mindedness towards colleagues and clients, and</td>
<td>Facilitates the mediation of knowledge. It is about doing one’s best to help colleagues in their work to secure that the</td>
</tr>
<tr>
<td>Category</td>
<td>Descriptions of facilitating characteristics</td>
<td>Facilitating influences</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Mediating instrument (primary with a focus on IS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral language is considered fast and certain as a mediating instrument.</td>
<td>Oral speech is preferred as it is considered fast and more certain to use in comparison with the use of IS.</td>
<td></td>
</tr>
<tr>
<td>High degree of availability of the content of IS.</td>
<td>By the use of IS many actors get access and can re-use written signs.</td>
<td></td>
</tr>
<tr>
<td>Institutionalised, pre-designed functions of IS.</td>
<td>Facilitates the routinisation and recurrence of SKM push approach.</td>
<td></td>
</tr>
<tr>
<td>E-mail as IT-based knowledge mediation.</td>
<td>Facilitates simple questions and answers between receivers and providers.</td>
<td></td>
</tr>
<tr>
<td>Working environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical closeness of actors.</td>
<td>Facilitates the mediation in terms of putting requests, joint reasoning and interpretation of answers.</td>
<td></td>
</tr>
<tr>
<td>Emotional closeness of actors.</td>
<td>Facilitates and encourage the needer to put requests and ask for help.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 7-4: Hindering characteristics of main categories influencing SKM**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description of hindering characteristics</th>
<th>Hindering influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem situation</td>
<td>Complex and context-specific problems concerning complex tasks involving many sub-problems and context-specific prerequisites.</td>
<td>Hard to describe and formulate questions that encompass all that needs to be known to solve the problem. Hard to give straightforward answers and solutions.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Knowledge based on long experience.</td>
<td>Hard to express partly as parts of the knowledge is often taken for granted by the knower.</td>
</tr>
<tr>
<td></td>
<td>Non-general knowledge is dependent on the situatedness of the specific problem and task.</td>
<td>Hard to express and mediate because it is not related to any standard solution or ‘recipe’ knowledge.</td>
</tr>
<tr>
<td></td>
<td>Hypothetic knowledge – uncertain knowledge that lacks a proven record.</td>
<td>Hard to express and mediate as it relates to uncertainty and insecurity.</td>
</tr>
<tr>
<td>Knowledge receiver</td>
<td>Lack of pre-knowledge of the receiver including experiences related to the problem and task in question, and knowledge about available mediating instruments and knowledge providers.</td>
<td>Lacking pre-knowledge makes it difficult to describe problem, formulate questions and interpret and use mediated knowledge. Hinders the needer to know where to find needed knowledge.</td>
</tr>
<tr>
<td></td>
<td>Unwillingness to take part of other actors’ knowledgeability, due to self-sufficiency or that the receiver has not acknowledged any problem or need for additional knowledge.</td>
<td>Hinders the mediation and utilisation of knowledge.</td>
</tr>
<tr>
<td>Knowledge provider</td>
<td>Lack of communicative capability – difficulties of the knower to express and communicate his knowledge (might be a bias of the needer concerning the characteristics of the</td>
<td>Hinders the knowledge to be mediated. Hinders a needer to ask knowers for help if they are considered having lacking communicative capability.</td>
</tr>
<tr>
<td>Category</td>
<td>Description of hindering characteristics</td>
<td>Hindering influences</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td><em>Unreliability</em> – the needer (receiver) might not consider the knower to be a useful and trustworthy knowledge provider.</td>
<td>Hinders a needer to ask the knower for help (SKM pull approach). Hinders knowers to share knowledge to other actors (SKM push approach).</td>
</tr>
<tr>
<td>Mediating instrument (primary with a focus on IS)</td>
<td><em>IS and written signs are time-consuming</em> to use as mediating instruments.</td>
<td>Needers might disregard IS and written signs as instruments because those are considered time-consuming to use.</td>
</tr>
<tr>
<td></td>
<td><em>IS might be unreliable</em> as instruments because the needer is not sure whether the content is updated.</td>
<td>If unreliable, the IS are disregarded as mediating instruments, which results in a <em>degeneration</em> of the IS use.</td>
</tr>
<tr>
<td>Working environment</td>
<td><em>Geographical distance</em> of actors.</td>
<td>Hinders the mediation process, including putting requests, joint reasoning, getting and interpreting answers.</td>
</tr>
<tr>
<td></td>
<td><em>Emotional distance</em> of actors – lack of personal relations between knowers and knowledge receivers.</td>
<td>Hinders the receiver to put requests and ask providers for help; there is a reluctance to ask for help if there is no personal relations.</td>
</tr>
</tbody>
</table>
Typical Knowledge Mediation

The basic type of knowledge mediation discussed in this chapter is triggered by experienced typical problems – so-called ‘Typical Knowledge Mediation’ (TKM). The chapter follows the same structure as the previous Chapter 7, and illustrates variants and characteristics of TKM by the use of empirical examples. Some features that have shown to be significant for TKM concern the characteristics of the initiator and the knowledge receiver and the importance of planning and design.

8.1 Typical Knowledge Mediation Push Approach

The experience of typical problem situations concerns typical tasks; tasks that often are common and recurrent in the specific practice. When an actor identifies a typical problem it triggers the need for ‘typical knowledge mediation’ (TKM). Both the pull approach and the push approach are applied in TKM, just as in SKM. In the following subsections, two variants of TKM push approach will be discussed. The criterion used to categorise examples of TKM push approach into the two variants concerns the characteristics of the knowledge receiver. The receiver is either specific or intended (that is, unspecified at the time of the initiative), and often many in number.

8.1.1 Knowledge Mediation to Specific Receivers

One of the core business areas within Architect was school building projects, and the knowledge demanded to accomplish those kinds of projects was possessed more or less by one expert – the school expert. Hence, the school expert was often involved when specific school projects were initiated, and several architects talked about how they used him to gain knowledge required to deal with specific problems

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1 As commented in Chapter 7, specific problems, triggering the need for SKM, concern specific tasks that sometimes also can be related to typical tasks. That is, specific tasks might be instances of typical tasks. However, following the categorisation of this work, the specific problem does always concern a specific current task of an actor, while the concern of the typical problem is not a specific current task but a general experienced problem and thereby the typical problem is also oriented towards future tasks.
(see section 7.1.2). However, the fact that the knowledge of school projects was mainly possessed by one single actor became a problematic issue, not least as the expert reached retirement age. Architect had realised that there was an urgent need to mediate the expert’s knowledge to enable other architects to take charge of future school projects. Hence, a typical problem had been identified and needed to be solved in order to secure the knowledgeability of future actions related to school projects. In the following, two initiatives that aimed to deal with this problem will be discussed.

TKM push approach to Specific Receivers: A less successful example

The school expert was highly aware of the problem introduced and explained above. This was also an issue he had raised seven years earlier as all school projects were so dependent on him, and because of a lack of time he had felt difficulties in handling them all by himself. As the school expert explained,

[t]hat was and is highly dangerous. We have a number of offices who project schools but no one but me has the knowledgeability to deal with the initial phases until the outline is defined, and those phases concern the most important tasks. If you cannot do the initial work, the result is seldom very good.

At that time (that is, seven years earlier), it was decided by the management of Architect that the school expert should give a series of seminars – two seminars every year – for a selected group of architects from different offices. Seminars were chosen because of the need to reason about issues involved in the complex task of drawing schools. Ten architects were selected by the office managers. The first meeting was a two days seminar led by the school expert, and the idea was to discuss practical issues related to school projects. They reasoned about the goal of the curriculum, how to handle teachers, what to think about when initiating school projects and what to consider when re-building schools. As expressed by two of the participants, the seminar went very well and they had gained an overall picture of the tasks and problems related to school projects.

The overall purpose of the seminars was not, however, the mediation as such. The purpose was to get the participants involved in school projects whereby they could use and further develop their newly gained knowledge. As the school expert said,

[t]he area as such is not very remarkable, and I have gained this expertise more or less for free as I have been working with school projects more than 30 years. Anyone can learn to perform school projects – one just needs the opportunity to apply the knowledge and gain own experiences by working in the field.

However, due to a retrogression of the market Architect did not get any new school projects. Consequently, the seminar participants did not get any opportunity to use and continue to develop their knowledge of school building projects. Instead, they preceded working with other kinds of building projects such as hospitals, houses and apartments. Hence, the initiative to mediate the knowledge did not offer any real effects, and the second seminar was never performed.
**TKM push approach to Specific Receivers: A successful example**

In the beginning of 2000, the whole problem situation came up to the surface again as the school expert was getting closer to retirement, and the management realised that something had to be done. As the school expert described,

[in 2000] I got a request from the management to do something. They asked me to plan a seminar or the like. But at that time I responded that I did not have the time to do it because I had so damn much to do, but they insisted and said “Make a plan!” However, nothing concrete happened as I just did not have the time. [. . .] Then, last summer [in 2002] our promoter started the process again.

At this time – in summer 2002 – the promoter (that is, the coordinator and head of Architect’s knowledge work, see section 5.3.2) said to the expert that he really needed to do something to share his knowledge with the other architects. To do this, the school expert required a budget and a group of architects who had a genuine interest in developing their knowledge of school building projects. As he explained,

[the promoter and I asked around to identify architects who were interested in learning about school projects. I required that they were genuinely interested in this, and told them that they had to work actively to get school project assignments. Otherwise it would be a waste of time for everyone.

Seven young, female architects were selected and established a school group with the school expert as the head. The group met to discuss practical issues of school projects – similar to the first seminar seven years earlier (see above section). Additional seminars were planned and performed to further discuss different school building designs, their benefits and drawbacks.

The group did also decide to produce a book about school projects. This book would serve as a kind of handbook describing what to pay regard to and how to perform school projects. The school expert was the main knowledge provider of the content of the handbook, but one of the group members – who had some experience of school projects – got the overall responsibility of editing and producing the handbook.

At this point of time, the school expert was involved in discussions about rebuilding schools in four municipalities. Instead of having those discussions separate in each municipality, the expert invited them to a two day seminar to discuss and exchange experiences. Part of the idea was to involve the school group and introduce them to the potential clients. Twenty-five representatives of the municipalities came to the seminar, which was a very good opportunity for the young architects to listen to and participate in discussion about school, the school system and school-related problems. As one of the architects in the group said,

[it] was very interesting to see our expert in action and listen to the way he approached different questions, how he expressed himself and what kind of terminology he used. It struck me how important people’s skills are and it is important to stand out as a nice and socially competent person. [. . .] Everyone knows that we are good at drawing buildings but it is much more than that – it is about being a good person. Thus, it was very good to meet all the external parties and establish relationships with them. Now, as we have met, it would not be any problems for me to call any of them. Then, of course, there were a lot of discussions
about factual matters. [. . .] We learned about different schools and their situations. For example, one problem of some villages was that the number of inhabitants was decreasing which, in turn, affects the school practices. Several general issues were raised and discussed, which gave me another perspective on school projects. I realised that there are so much more to consider than just the drawing.

The initiative to mediate the expert’s knowledge to the group members was considered successful by the involved parties. Most important, however, was that the young architects got involved in real school projects. Those projects were, in turn, used by the school expert to continue to share his knowledge by discussing how different problems had been handled in the specific projects by the young architects. Nevertheless, the mediation initiative was not easy to accomplish. The knowledge related to complex tasks and involved a number of critical issues to pay regard to. Thus, the expert had to consciously reflect and plan what to discuss on the seminars.

In sum, the initiative was triggered by an experienced typical problem concerning lack of knowledge of other than the school expert to accomplish school projects. Even if several architects were well-aware of this typical problem, they had not taken any initiative to deal with it. Thus, the coordinator needed to assign the expert to mediate his knowledge and give him a budget. The actual mediation included a number of face-to-face dialogues between the expert and the group members, and also additional knowers such as the representatives of the municipalities. The interaction between the expert and the group members was high and involved multiple mediating instruments including oral and written language and reference objects. A lot of the knowledge gained could be utilised by the architects rather directly as they got involved in new school projects.

8.1.2 Knowledge Mediation to Unspecified Receivers

This section discusses two variants of TKM push approach to unspecified knowledge receivers. That is, receivers who were not specified in advance but were intended rather as a target group. One of the variants concerns TKM accomplished via oral speech in face-to-face communication. The other variant concerns communication via written signs and information systems. As in the examples in the previous section 8.1.1, the initiator is a coordinator who uses a push approach to initiate the mediation initiatives.

**TKM push approach to Unspecified Receivers via Oral Speech**

One essential aim of Architect’s knowledge work was to establish internal and external networks to facilitate the sharing and re-use of knowledge to improve the architects’ knowledgeability to skilful actions (see section 5.3.2). Hence, a core task was to plan and realise seminars for internal and external parties. Seminars were a way to get people to know each other and thereby facilitate knowledge mediation. The seminar leaders – as the primary knowledge providers – were usually internal architects, but external parties were also invited to hold seminars. Some seminars were performed in small groups up to ten participants, while other seminars were offered to a large number of participants, up to 60 actors.
During the first eight months of the knowledge work, over thirty seminars were arranged that together involved over six hundred internal workers and about one hundred external parties. These were figures Architect was proud of and regarded these as evidence that people were engaged and motivated to gain and share knowledge. In general, there was a positive attitude towards Architect’s knowledge work. As several architects maintained, via the gatherings they “got to know each other better”, which made it “easier to know whom to call if one had certain questions and also to really make the call”. They also felt that the content of the seminars were relevant to the practice and that they gained a lot of useful knowledge.

One critical issue concerned the utilisation of the knowledge gained. In this regard, timing was regarded as an important aspect in the sense that acquired knowledge needed to be applied in action in order to be valued and proven as useful. Just the possession of knowledge did not make any change; it was the utilisation of knowledge that made difference to the architects. For the knowledge to be utilised in action, the architects needed to get tasks and assignments in which the knowledge could be applied (see discussions in section 8.1.1). Otherwise, some feared that “the knowledge gained would be forgotten”. This related to the fact that the seminars aimed to prepare actors to be able to accomplish future knowledgeable actions.

There were examples when the knowledge gained from the seminars was applied quite soon after the mediation to deal with specific tasks, which was preferable in order to gain personal experiences related to the knowledge and thereby increase the likelihood that the knowledge would be memorised. For example, one of the seminars aimed to enhance the participants’ knowledge of the functions of science parks. It was about ‘general knowledge’ of typical problems, prerequisites and goals of science parks. Shortly after the seminar one of the participating architects got involved in a science park project and got the opportunity to apply the gained knowledge in the concrete project. Having participated in the seminar, the architect felt she was able to give a much richer description to the client concerning the ideas and solutions of the project. She felt she knew much more about what this kind of project was about, whereby she could create a higher trust in the relationship with the client. Another positive effect expressed by the architect’s manager was that,

[after the seminar she] [read: the architect] seemed to be more committed and engaged in this particular business area. It was a step forward for her in her role as an architect since she had broadened her knowledge and manifested the new knowledge in a real project.

Another architect gave another example of the importance of timeliness. He had enrolled to a seminar on university buildings and meant “this internal seminar is perfect in timing as I know we will soon get invited to discuss two new school projects”. One of the projects concerned a new natural science department, and the other concerned a campus for a technical branch.

The seminar will be very useful for the initial discussion [read: with the potential clients], which is critical for us in order to get commissioned. We will discuss different layouts and approaches to handle local school programmes and their
practices. Having discussed this on the seminar, we will have an advantage when we enter concrete discussions with the clients as we can show different solutions and that we have a great understanding of the clients’ practices.

The seminars were a good way of involving a large number of architects in knowledge mediation initiatives, which were accomplished via a push approach in the sense that a coordinator planned and assigned seminar leaders to share their knowledge via the seminars. However, the push approach needed to be complemented by initiatives – as a kind of pull approach – of the unspecified receivers. A lack of commitment from the potential knowledge receivers to participate in the seminars would be enough for the initiatives to fail. However, this did not seem to be any problem in Architect. Quite the reverse, the architects found the seminars very useful and interesting and wanted to participate.

**TKM push approach to Unspecified Receivers via Information Systems**

The seminars were considered successful and important initiatives. However, Architect had also realised that it could not rely only on personal meetings as these were highly time-consuming and costly efforts. Thus, Architect wanted to develop and enhance the use of IT-based information systems (IS) as mediating instruments. The idea was to enable actors to continuously update each other around activities and on-going projects and to give access to reference objects, standard solutions and innovative ideas of architecture via IS.

Thus, a newly employed information master got an assignment to develop the design and structure of Architect’s intranet. The information master created a link from the homepage to each of the market and knowledge areas where the individuals responsible for each area could store news, descriptions and drawings. Via those links, the architects could gain knowledge about prior and on-going projects, project members, tips about books to read or trade fairs to visit and planned activities such as seminars and study tours. In this way, the architects could keep themselves updated about the practice and news by using the intranet. However, one architect said,

> “The intranet is very useful when one knows where to look, but sometimes it takes such a long time to find what you are looking for, and you might prefer to search for the knowledge somewhere else, like asking a colleague. One seldom surfs on the net just for fun or due to general curiosity; one just does not have the time for that. To learn the most important is to have a specific problem that you need to deal with and to be quite sure that you will find an answer on the net otherwise the likelihood is quite low that you use the intranet to gain what you need to know.”

Several arguments were put forward as reasons for not using the intranet: lack of time, unclear purpose of the intranet, the content was not updated, information overload and roundabout to use. Several respondents also claimed that there was “no routine in using the intranet for searching for knowledge”, and this had been very clear to one of the office managers when he noticed that the architects did not know what knowledge could be acquired via their intranet. Another architect said,

> “The intranet does not work very well as a news bulletin or knowledge disseminator partly because people do not go in there very often, partly because the content is not
updated in a proper way. [...] There is so much information on the net, and it is hard to take in all new information. Persons do not have the time or the knowledge about what is there. [...] There is a risk that useful knowledge gets lost in the cyber space.

Still, there were several architects who maintained that the intranet was an important tool for knowledge mediation as well as an important complement to face-to-face meetings. One challenge was to get more architects to use the intranet as a mediating tool, and the architects needed to be more enlightened about the content and usefulness of the intranet.

Furthermore, even if some were sceptical about the use of the intranet, there were also a number of respondents who asserted that the intranet was frequently used. One office manager said,

> everybody uses the intranet several times a day – we want and need to know what is going on. You can get all kinds of information via the net – for example, president’s information and information about new assignments and projects that have been awarded – and I must keep myself updated around these kinds of issues. It is important in order to have good references when trying to acquire assignments as well as a basis for generating ideas. For example, if I were to talk with a potential client about a new hotel project, I would refer to a hotel project Architect just finished in another town. I know about this hotel project because I have read about it on the net. Thus, by using the intranet, I get a continuous knowledge update.

To keep updated seemed to be of particular importance for the managers and the architects responsible for acquiring new assignments. However, as another architect pointed out,

> everyone is part of creating goodwill and gaining new assignments. Thus, it is important to know about the history of the firm and about what is going on, which, in turn, becomes an important transparency measure that is essential for us. Before the days of computers, and especially the intranet, information was sent out on paper to the office managers. However, the information was not systematically forwarded to the rest of the employees. The manager selected some employees who he thought should have the information. This was a good strategy to minimise information overload, but there was a risk that information did not reach all the people who needed it. Nowadays, via the intranet everyone has access to the information and it is a much higher level of transparency concerning the practice.

The decision to use the intranet as a mediating instrument involved a push approach in the sense that the coordinators - including the head of the knowledge work and the actors responsible for each of the market and knowledge areas – planned for and engaged knowledge providers to express and communicate their knowledge via the intranet. Those initiatives also required that the potential, unspecified receivers engaged by using the system, as a kind of pull approach. However, several respondents meant that such pull approach initiatives needed to be driven by specific needs (as in SKM, see Chapter 7) and that they did not have the time or enough interest to just surf around without a specific purpose.

This showed a relationship between TKM and SKM as the former is a prerequisite and facilitator for the latter. This also implied a need to be clear about how to present the content and make it easy to find and search for. Using IS as mediating instruments did also seem to put high requirements on the clarification of
the intended receivers and for what tasks the content of IS can be actionable to them. If the potential receivers and the purpose of IS content were unclear, this seemed to contribute to opinions that the whole purpose of the system was unclear, and consequently a degeneration of the IS use (see also section 7.3.5).

8.2 Typical Knowledge Mediation Pull Approach

This section discusses TKM pull approach in which the initiator is a knowledge needer (receiver). Empirical data have shown rather few examples of this TKM variant, and they did not show to be very successful. Still, they are interesting when considering the reasons and effects of failing with intended mediation (see also section 8.4.4). The examples of TKM pull approach that will be described were identified in Architect and concerned client-related knowledge. Section 8.2.1 aims to give an introductory picture of Architect’s intention and the architects’ attitudes towards client-related knowledge, and section 8.2.2 discusses two examples of TKM pull approach.

8.2.1 Client-related Knowledge: A sensitive issue in Architect

In Architect, senior architects were the ones responsible for the projects and the client contacts. This was rather natural as discussions with the clients often required long experience and it was important to show the client that Architect was a trustful and competent firm to use. Consequently, many senior architects had developed networks and relationships with old and potential clients. It was, however, also said that all architects should develop their external networks in order to gain new assignments. Thus, to have knowledge about potential clients and how to approach them was critical to gain assignments.

Even if several architects said they did not regard relationships as ‘personal’, there were examples of situations concerned with client-related knowledge where architects behaved as they were offended. One such example concerned an external seminar to which Architect had invited potential and old clients. One of the architects got to know that several invited external parties were part of his personal network, and some did represent ‘his clients’. He got quite upset over the fact that he was not involved in the invitation and did not consider it to be proper that the seminar coordinator had invited ‘his contacts’ without telling him first. The coordinator described his view of this and said,

> people here want to keep their own personal contacts because the assignments are gained through contacts. To share knowledge about external contacts involving potential clients is a very sensitive issue. An architect is like a hanky; as soon a client has started to fancy one specific architect, this person will get all the assignments. If another architect gets to know the client, there is a risk that he will be the next person who gets the assignment. Hence, architects are not inclined to share their knowledge about old or potential clients.

Another architect maintained that he was good at sharing his knowledge about clients and relationships but thought there was a tendency within the office that people did not want to share this kind of knowledge. He had previously worked at
another architectural firm, and when getting employed at Architect, he told his new colleagues about his earlier clients with whom he felt he had good contact.

I did this because I believe it is important that everyone knows what contacts and good relationships we have. This is important to know in order to coordinate and make the best of what we have. It would, for example, not look very good if two persons from Architect call the same client in the same day – in that case the client would wonder if we do not talk at all with each other. [. . .] But several times it has happened that someone else here at the office has contacted my clients without my knowing it. For example, one of my clients was asked out for lunch by a colleague. I consider that to be a really bad behaviour especially when I had said that I have good contact with that certain client. This way of acting is just counterproductive. It would be much better if I would have joined the lunch as I already have a good relation with the client. [. . .] It is not like I have monopoly in certain clients but why should another architect work alone with my clients when I already have a good contact. [. . .] Just imagine what the client would think; he probably wondered why I was not participating in the meeting or the lunch. [. . .] However, I believe there are other people here at the firm who think “this is my contact and solely mine” and do not want to let someone into their personal territory. I do not want it to be like that and I do not think I am, but I feel that some people do not want to share their knowledge of clients and relationships.

8.2.2 Oral Requests for Client-related Knowledge

Even if several architects said they did not regard client-related knowledge as a personal belonging, some had a tendency to behave as it was. One of the junior architects explained that she did not have any network or knowledge of how to approach potential clients, but she wanted to develop this knowledge in order to be able to gain assignments. In other words, she experienced a typical problem of not having the knowledge to approach potential clients and gain assignments. To deal with this problem, she had asked a senior colleague whether he could describe how to approach clients. However, the initiative came to nothing as she never got any response, and she felt that the senior architect was unwilling to help as he neglected to answer the question.

Another architect had been to a seminar on school buildings offered to both internal workers and external parties. During the seminar he and the other architects had realised that the external parties did not know very much about Architect. They had a view of Architect as good, but expensive. However, during the seminar the external parties had gained an enhanced understanding and trust in the knowledgeability of Architect. The seminar did actually result in a new assignment from one of the external parties participated, and the client said that it was an effect of his enhanced understanding and reliability of the expertise Architect represented. Hereby, the participating architects realised that they needed to work more with direct contacts with potential clients. Thus, after the seminar one of the architects asked a colleague to write down people he knew and who were important people to contact in order to show that Architect is a good potential partner in building projects. The architect who got the request was considered to have a well-established network, which could be used to gain more assignments. However, he avoided responding to the question, which, in turn, was interpreted as him being
reluctant to share his knowledge, and the architect who had put the request became very disappointed.

Both examples illustrated initiatives in knowledge mediation to deal with experienced typical problems. Both initiatives were also in line with Architect’s intention that all architects should contribute and take responsibility for gaining assignments. However, as the requests were not answered, the intended mediation initiatives were never accomplished. A practical consequence was that the architects requesting the knowledge did not gain the needed knowledge and could thereby not solve their experienced problems as intended.

One dilemma was that the more the senior architects did to develop their contacts and gain assignments, the less was the opportunity of younger architects to learn how to approach potential clients. Furthermore, one might consider the architects who were interpreted as unwilling to share their client-related knowledge as egoistic and working against the best for Architect as a whole. However, looking further into the reasons for not sharing, additional explanations were identified (see further section 8.4.4).

8.3 The Importance of Planning and Design

One feature significant of TKM is the need for planning and design. The degree of planning and design varies: One TKM initiative might require limited planning and design, while another demands a lot of planning and design. In general, however, initiatives in TKM require some level of planning and design. Planning and design refers to activities such as coordination, deciding on what knowledge to mediate and how, design of mediating instruments and defining prerequisites, budget frames and responsibilities. In the following, empirical examples will be presented to show the importance of planning and design.

8.3.1 Planning and Design of Typical Knowledge Mediation

This section presents an example of TKM initiated in Energy, and the aim is to illustrate the need for planning and design, which showed to be a crucial matter for many TKM initiatives to succeed. The example discussed below is also interesting as it illustrates circumstances that might hinder TKM (see also section 8.4).

Some Background to the Typical Problem Experienced in Energy

Part of Energy’s vision was to create a large-scale organisation and to reach this a number of previous independent units merged and moved together. To the net operators this meant that four geographical dispersed main centrals were brought together. Initially, this was done without any major operative changes. The operators moved to new premises, where they sat in an open landscape office, but they continued to work with their ‘own’ net: the large net (LN) or one of the three small nets (SN).

Some critical instruments to be able to manage the energy nets were the computerised geographical net information systems that as such can be seen as institutionalised instruments for knowledge mediation (see also section 7.1.3 and 7.2.3). Apart from that the actual energy nets looked different, the functions of the
SN systems were very similar but their functions differed a lot in comparison with the LN system, which was much larger and involved a much more complex supervision system. Furthermore, unplanned power failures were much more frequent in the SN than in the LN. Several operators expressed opinions such as, “as a LN operator one can sit and twiddle one’s thumbs while the SN operators need to be much more active as something is happening all the time”. Even if the operators were joking about this, it had been quite a sensitive issue as the LN traditionally had been regarded as the system. As the operative manager said,

[t]he LN has always been the ‘mother’ of Energy Group, while the SN and their management have been treated as something the ‘cat dragged in’. Thus, when we moved together, it was a culture crash. SN operators and LN operators have different routines, workload, working benefits and so forth. [. . .] In many ways the LN operators have had a much more beneficial working situation.

One challenge when the operators moved together was to create a good working team of the LN and SN operators. In addition, to continue the development of a large scale organisation, the management decided that all the operators should learn each other’s IS to be able to manage any of the energy nets.

As the energy nets needed to be supervised day and night, the operators worked in shifts. One aim of having operators who were knowledgeable to handle all systems was to be able to reduce the number of operators working each of the shifts. The operators and their two managers (one operative manager and one personnel manager) had several discussions about the need for learning each other’s systems. Not only to be able to reduce the number of operators working at each shift, but also to be better prepared to deal with absence due to illness and vacations. Thus, the operators were well-aware of the situation, and the two managers thought the knowledge mediation between the operators would be realised more or less automatically. As the personnel manager said,

[w]e [read: the operational manager and the personnel manager] thought that now when everyone sits just a couple of metres from each other, they would start to learn from each other and take own initiatives to learn each other’s nets. [. . .] However, six month passed by and still no operator had made any effort to learn another net. Definitely not the LN operators, as they considered their system to be much more important than the SN.

The Initiatives and Difficulties in getting the Mediation Started

As the knowledge mediation did not work automatically, the two managers felt they had to “push the operators to take initiatives”. The two managers did also agree that it was the task of the personnel manager to make sure that the mediation was accomplished. Thus, the personnel manager talked with the operators of one of the SN systems and asked them to start to learn the LN during the days when many operators were working. The idea was that they should learn the LN system by sitting next to one of the LN operators. Some of the SN operators started to learn a new net, but instead of focusing on learning the LN they focused on learning another SN. The personnel manager got a bit annoyed as he had explicitly asked them to learn the LN, which was also the most complex system to learn. In addition, there were only a few LN operators left in the organisation. Consequently,
knowledge of the LN had become scarce. Still, the SN operators focused on learning another SN.

When the personnel manager asked the operators why they did not take more concrete initiatives to learn each other’s systems, he got answers like “we cannot make any own decisions about which net we should work with a particular day as this is already scheduled”. The manager also asked “if you sit four metres from a colleague can you not just ask him if you can work on each other’s systems during the shift?” and got answers like “well, I could have done that, but as he did not say anything, I did not do it either”. The operators also meant that they were too few and did not have the time to teach each other. They meant that they had to work with the system they managed in order to deal with the on-going practice.

To the personnel manager, the main hindrance was that the LN operators were not inclined to share their knowledge,

[t]he LN operators do not want to let go of their knowledge; doing that they will not have anything left that just they know of. They do not want to share it because they want to maintain their key position. This is not only about feeling indispensable; it is also about having a better bargaining position. For example, one operator might say “OK I can work during Midsummer but then I want an extra 2,000”. But the more operators who can manage the LN system, the less is the bargaining room for the individual operator and thereby we can also decrease additional compensation. This is a fact and also the major reasons for not sharing critical knowledge.

The personnel manager did not seem to have any doubts that his understanding of the problem was correct, and he said that this was also an understanding of some of the operators, who had brought up this issue with him. However, he also pointed out,

[n]o one would say it in open; they only tell me under four eyes. They also talk about others’ unwillingness to share, not their own. This also means that I need to weigh the operators’ words and cannot believe all that they say. Still, I am convinced that some just do not want to share their knowledge, but they would never admit it; not to me and not to you.

As the personnel manager predicted, talking with the operators, few expressed any personal unwillingness to share their knowledge. Several operators did rather emphasise the reverse in the sense that they were very good at learning and helping each other. As one LN operator said,

I do not see myself as a key person and would not try to take advantage of my expertise in order to get more work or overtime. That kind of behaviour might exist within other departments, but here we work together, support and help each other. It is only good if several operators can manage the same nets because then we can better support each other. I have several times joked with the guys [read: the other operators] and said “I do not want to teach you because then you won’t wake me up [read: during night shifts] and then I won’t get any qualified overtime!” But one cannot think and act in that way. [. . .] If I get more money that is a bonus and nothing I can count on.

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1 Qualified overtime means that the operator gets compensation for three hours overtime every time he gets wakened by an alarm during night shifts.
Hence, the personnel manager’s view and the view of the LN operator seemed contradictory. On the one hand, perhaps the personnel manager had a biased view, that is, a view that he had constructed and which did not reflect the reality. Still, this was the personnel manager’s interpretation of the situation. On the other hand, perhaps the LN operator was reluctant to share his knowledge but did not want to admit it because he feared he would be interpreted as egoistic. Thus, I had a dilemma because I could not know for sure whether the LN operator was willing to share his knowledge or not.

However, continuing talking with the operators, some of the operators did actually bring up hindrances similar to the ones described by the personnel manager. When talking about reasons for not sharing knowledge, one operator said “one thing is to keep one’s position here at Energy. There is a risk of being noticed if one is not a key person, thus, it feels better to know something that no one else can”. Hereby, one hindrance was a *fear of being substituted and getting noticed*, and so long as the operators possessed certain key knowledge, some felt this risk less threatening. A few operators did also point out the issue of *economic compensation*. As one operator said “knowledge sharing reduces the opportunities to get extra income by working overtime and night shifts”. Some operators also talked about *prestige* in terms of the traditional view of LN as more important, and about LN operators who did not want to work with the SN as these demanded more activity than the LN. Several of the operators also felt *insecure* when working with a new net system, and as security is highly critical in their work, this was one reason for *hesitating to learn* a new system.

Thus, even if I was suspicious towards the contradiction of what the personnel manager versus the LN operator had said, there were other operators who talked about the same reasons, for not sharing knowledge, as the ones put forward by the personnel manager. Hereby, empirical data showed that there were hindrances that caused a disinclination of at least some of the operators to share their knowledge (see also section 8.4.4). It should be noted that the operators did seldom use the word ‘unwillingness’, but talked about ‘reasons for not sharing’, and they did not seem to be unwilling for the sake of a pure personal attitude, but disinclined to share their knowledge due to certain underlying reasons.

Several operators also emphasised that this kind of TKM – that is, the intention that the operators should learn each other’s net systems – *had to be governed* by someone with authority. This was also something the personnel manager had realised and he explained that “as the operator had not learned each other’s systems ‘voluntarily’, I had to force them by changing their schedules and introducing job rotation”. Thus, the personnel manager planned and re-scheduled the operators’ work. Having done that, the operators started to exchange knowledge to learn each other’s net systems. Some thought it was a bit frustrating because there were so many new things to learn. One of the LN operators did also feel it was a bit tiresome to get the same questions over and over again but realised that it was necessary in order for everyone else to learn the LN. In general, however, according to the operators, the mediation worked well when the new schedule was introduced. As one of the operators said,
his kind of change needs to be initiated from above. Initially, it did not work as there was a lack of management from our managers, but ever since the personnel manager re-scheduled [read: the operators] everything has worked out well.

8.3.2 ‘Knowledge Management’ to Solve Typical Problems

In the following, additional examples will be given to illustrate the need for planning and design of TKM. The examples concern the knowledge management initiatives (KMI) at Energy, Publish and Architect (see also descriptions in Chapter 5). Comparing those initiatives, there were varying degrees of success, which, in turn, can be partly explained by varying degrees of planning and design.

Knowledge Management Initiatives at Energy, Publish and Architect

Energy’s new Personnel Process aimed to support the maintenance, development and sharing of knowledge. The Personnel Process was carefully designed by a project group and described in a thick handbook. However, when it was to be implemented in Energy, it was obvious that the design by the project group was not enough. Even if the personnel manager at Energy thought the ideas were good, he was not able to engage the rest of the management to put efforts and resources to implement the process. Furthermore, the Personnel Process was described on an overall level and did not specify what to do on the basis of Energy’s needs. Even if the handbook described different activities that were considered important, it did not include any descriptions of what knowledge to mediate or how. This was something that needed to be defined in Energy. However, the initiative to define critical knowledge became far too detailed in order to be usable. In general, few mediation initiatives were planned and implemented. This was partly due to a lack of funding by the management, partly due to unclear responsibilities of the personnel managers in relation to the operative managers, and it was the personnel managers who should be responsible for the Personnel Process.

Similar observations were made in Publish that wanted to develop a new process to improve the development and sharing of knowledge – a Human Capital Process. The management of Publish thought that as a knowledge-intensive firm, they needed this kind of ‘knowledge management’ process. The personnel director at Publish became responsible for designing, developing and maintaining the Human Capital Process. A suggestion of the overall content of the process, including administrative responsibilities and activities, was formulated and presented to the management. However, it was not defined what knowledge needed to be mediated or how. Thus, one task of the management was to come up with a clarification of core knowledge areas that needed to be in focus of the KMI.

At this point, the planning and design work began to hobble; no one took the question of defining critical knowledge areas seriously enough to do something about it. Instead, the question was put back to the personnel director. The management wanted the new process to work but did not engage in the work. It took about five months until a suggestion of the core knowledge was formulated. This was also one and a half years after the idea of a Human Capital Process had been presented to the employees, who still had not a clue about what or how the process was supposed to work.
One previous attempt in Publish aimed to take better advantage of experiences from the book projects. However, even if the Publish’s process model includes two defined evaluations (see figure 5-2, section 5.2.1), those were accomplished very ad hoc based and the first evaluation were seldom performed at all. Several editors said they preferred to start with new projects rather than spending time on reflecting on old projects, and this related to the fact that they had to report all the time they spent on each book project (as a working norm). The editors also complained they did not know how to perform such reflections and evaluations. As one of the publishing managers expressed,

[w]e need to take better advantage of gained project experiences and share them with each other, but I am afraid that such discussions get too strained. [. . .] They are hard to manage and one needs to have a lot planned in advance and have a clear purpose. Still, we need to exchange experiences to create a common understanding of our process and better utilise the editors’ knowledge, but we lack tools to do it.

In comparison with Energy and Publish, Architect’s KMI seemed to be more prosperous. Architect had carefully planned and designed a formalised organisation with clear goals, budget and responsibilities. Architect had also identified ten knowledge-related areas that represented the core knowledge of Architect’s practice. Four of them concerned ‘market areas’ in which Architect worked and had very good expertise, while the other areas concerned supportive knowledge needed in, more or less, all architectural projects. Hereby, Architect had clearly defined what areas, and parts of the practice, should be in focus of the work. The actors, responsible for the ten areas, planned and performed seminars to communicate knowledge, and developed the contents available via the intranet. A core idea was also to develop internal and external networks around the ten areas to create and reinforce relationships between actors and thereby facilitate knowledge sharing.

Many initiatives were one occasions, such as seminars, but there were also initiatives that aimed to institutionalise knowledge mediation. An example of the latter concerned an initiative in establishing knowledge-focused project evaluations. As a support of those evaluations, a guide, describing a number of questions that should be individually and jointly reflected upon, was developed. The aim was to exchange experiences and thereby improve the performance of future projects. The evaluations were considered fruitful to get each other’s interpretations of events and to create intersubjective knowledge. It also showed to be a good way of reinforcing good relations between the project members, and to receive and give feedback to each other’s performance. Still, Architect had difficulties in making the architects to accomplish this kind of activity as a natural part of all projects. The main hindrance seemed to be that the architects rushed into new projects in order to get new chargeable hours rather than spend time reflecting on finished projects.

This latter example showed one initiative that Architect found troublesome (see also a similar effort in Publish described above). However, the knowledge work as a whole was considered as a successful effort; it had contributed to an enhanced knowledge of the architects, better performed projects and more opportunities to gain assignments.
Comments and Comparison between the Cases

Comparing the initiatives of Publish, Energy and Architect, they were all triggered by perceived typical problems, which concerned a need to better share and utilise the knowledgeability of the actors. However, Energy and Publish had difficulties in concretising their problems. They talked about the need for enhanced learning and better utilisation of the actors’ knowledge, but this was discussed on a highly abstract level. They had also difficulties in defining what knowledge needed to be mediated and how. Hence, few concrete initiatives were implemented.

In contrast, Architect based its initiative on the needs of the practice, and ten knowledge-related areas were defined. Architect designed and established a formal organisation to take charge of the work including responsible persons for each of the identified areas. The goals, tasks and focus of each area were clearly defined and the responsible actors knew what to do and with what purposes. The organisation around Architect’s knowledge work did also meet continuously to share experiences and tips with each other, and to discuss how to develop their work. Hereby, the knowledge work – as one sub-practice of Architect – had also its own ‘knowledge practice’ (see reasoning in section 3.1.4).

Furthermore, Architect’s initiative was supported by committed actors as well as by the management via funding. The initiative was not only based on the management’s problem views; it was also grounded within the organisation, among the architects. One could say that Architect’s initiative was highly practice-oriented. The knowledge to be mediated was clearly defined on the basis of typical needs of the practice, and it was rather easy for the actors to understand the intended purposes of different initiatives. In sum, Architect had carefully planned and designed its KMI and this seemed to be a major reason for success, while the lack of planning and design of initiatives based on the needs of the practice seemed to be one of the major reasons for not being that prosperous in Energy and Publish.

8.3.3 The Design of IT-based Knowledge Mediation

One initiative in Energy (which was not discussed as part of the Personnel Process) to enhance the communication of knowledge concerned the geographical net information systems. One of Energy’s aims was to create a large-scale production. To handle larger geographical areas and more clients required a new and developed IS, and a goal expressed by the president was to “codify knowledge and store it in one system”. This system was a new kind of geographical net IS that was supposed to replace the existing four geographical net IS. As the president said,

[The new computer system makes it easier for us to handle larger amounts of information and knowledge as they will be in an electronic form. Thereby, it will also be easier to handle larger and larger [read: energy] nets. We now find ourselves in a transition period. That is, a lot of knowledge is in the heads of people or on paper and we are working with putting everything into our computer system. When we have consolidated the knowledge into the computer, we can then take further steps towards a large-scale production. [. . .] The work will then be more rational, and the need for employees will be reduced.]
In comparison with the president’s view of the Personnel Process (see section 5.1.3), this initiative concerning the new IS was clearly related to an intention to change the practice. It was about mediating actors’ knowledge about the energy nets by the use of IS, and above all to make the practice less dependent on individuals. As the president said,

> [o]ur core knowledge is about the customers and the nets. That is what we have and that knowledge is what we are living for. [. . .] Now we have a number of employees who know a lot about the customers and the quality of the nets. They know, for example, that certain parts of the nets need to be taken care of [read: to be replaced or repaired] and that other parts that are working well. We are now building up this knowledge in the computer system, but we have a critical phase, as we might not succeed in getting this knowledge into the system concurrently with employees’ retirement.

Even if a lot of the operators’ knowledge of the customers and the nets could be expressed by the use of language, there was also knowledge that was hard to verbalise and structure in a useable way in the IS. As several operators expressed, knowing about the terrain around the nets and areas that were especially exposed to power failures was to a large degree about being familiar with the geographical and actual looks of the landscape. This was, however, knowledge that the IS was not designed to handle.

Still, the initiative to develop and use a new IS to communicate knowledge about the nets and the customers was a serious and practice-based attempt. It also required a lot of work. To design and to fill the system with correct content was a task that had proceeded for a number of years, and the system was still not ready for implementation. However, the operators thought that the new system would facilitate their work, partly as it would encompass all the energy nets, partly as it had more functionality than the existing SN systems (see section 7.2.3).

### 8.4 Influencing Circumstances

In this section, circumstances that have shown to influence TKM will be further discussed and categorised. The main categories of influencing circumstances, and several of the characteristics, are the same as the ones presented in section 7.3. As will be shown in the following, there are also some additional characteristics that influence TKM.

#### 8.4.1 The Problem Situation

The problem situations triggering TKM were in many cases related to complex, typical tasks, such as how to manage the energy nets and the geographical net IS in Energy and how to accomplish building projects in Architect. The complex characteristic of problems was a hindering circumstance in the sense that the mediation could not be performed quickly and easily; it required time and dialogue (see example in section 8.1.1). As one office manager at Architect described,

> [w]e have one older architect who soon will retire. There we have a problem, because when he is leaving, we lose a great expert. We intend to consult him when he has retired, but one of my architects has started to work with him to learn from
him [as a kind of mentorship]. However, one cannot just pour over all competence from one individual to another; it takes time to become competent. [. . .] We also need additional ways of assimilating his expertise, for example, via seminars. We had a seminar a couple of weeks ago which the expert was in charge of and that was a good way of disseminating some of his expertise to other architects.

A similar experience was gained in Publish and did also concern a highly experienced editor who was getting closer to retiring. To deal with this, a new editor was employed about two years earlier in order to have time to learn from the senior editor. According to the publishing manager, the senior editor and the junior editor, this kind of mentorship worked out very well, and the two editors worked closely with each other. However, when the senior editor retired and it was time for the junior editor to do the work on her own, her manager realised that the junior editor was not that competent as the manager had expected. The junior editor had learned a lot but found it difficult to make own decisions and know how to plan for new books when she did not have the senior editor to ask for help. Thus, the complexity of the senior editor’s knowledge made it difficult to mediate it to the junior editor even if the editors had ample of time at their disposal.

No matter if TKM concerned complex or more elementary problems, the characteristic of the typical problems required a certain degree of planning and design. When initiatives were introduced without proper planning and design, they tended to fail, and when initiatives were planned and designed, this facilitated the implementation. As the head of Architect’s knowledge work said, “the initiative to share our school expert’s knowledge with the school group would never have been possible without formal efforts and money” (see also the comment of one of the operators at Energy in section 8.3.1).

Furthermore, typical problems related to complex tasks could also be difficult to define, and the woollier problem descriptions, the harder it was to know what to do. This also related to the purpose of initiatives (and thereby also the purpose of the knowledge intended to be mediated1). If the purpose of initiatives was unclear to the actors, this was a hindrance to the knowledge mediation and utilisation.

For example, the management of Publish did not consider the production process to be efficient enough and thought if the editors were better in managing the book projects, the production process would be speeded up. Consequently, a compulsory project management course was offered to the editors. However, having taken the course did not make any obvious difference. As some of the editors expressed, they did not realise what the difference would be in comparison to their present way of working. They did not understand the significance of the project management knowledge or how it would improve the projects. Several editors meant that the purpose of the initiative and the knowledge mediated was not clarified. Thus, they did not know what was expected in terms of changed way of performing projects.

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1 Whether knowledge is considered to have a clear purpose is dependent on the perspective of the actors, that is, the knowledge receiver and the knowledge provider (see further section 8.4.3 and 8.4.4).
8.4.2 The Knowledge

Concerning the characteristics of the knowledge to be mediated, one hindering circumstance was that the knowledge could be difficult to verbalise (see also section 7.3.2). As the school expert explained,

[i]t is no real problem to describe facts such as goals and the content of the school system, historical trends in school buildings and certain building norms. But it is difficult to describe how to think about school buildings, how to approach teachers, how to talk with politicians and how to evaluate existing school buildings.

As TKM aimed to solve typical problems, a facilitating circumstance was when related knowledge could be generalised and formulated in terms of rules and procedures (so-called ‘general knowledge’, see section 7.3.2). However, it was not always possible to formulate general knowledge. In addition, even if TKM was triggered by a typical problem, the knowledge in question of mediation was to be used in a future concrete task that might involve situational prerequisites. Thus, the mediation did sometimes require both general and non-general knowledge. The use of non-general knowledge was facilitating and several architects emphasised that it was easier to talk about knowledge on the basis of a specific task in which it had been used. For example, the lecturer on science parks used concrete solutions of prior projects as a basis for explaining the significance of this kind of architecture, and the school group discussed different aspects, benefits and drawbacks by the use of prior school project solutions.

It was also shown that the usefulness of knowledge seemed to influence the degree of willingness of the knowers to share their knowledge (see examples in section 8.2.2 and 8.3.1). If a knower thought that some knowledge would become less useful to him if he shared it, this seemed to be a reason for trying to hold on to it (see further section 8.4.4).

8.4.3 The Knowledge Receiver

Two circumstances that seemed to reduce the motivation of knowledge receivers to absorb and use knowledge were a lack of timing and a lack of clear purpose of initiatives. For example, in Publish, initiatives were taken to mediate knowledge about project management, but the editors had difficulties in internalising the new knowledge, partly because they did not see the usefulness of it (see section 8.4.1).

Another example of a lack of motivation concerned the way the editors performed their proofreading. A lot of book outlines were sent to Publish via mail, and the management wanted to speed up the process by having the editors proofread and make corrections directly in the word processing programme instead of on print-outs. The editors were taught how to review and make correction notes in the word processing programme. However, even if they had gained the knowledge about how to use the programme, no editor proofread or made corrections on the screen. As one senior editor expressed,

I will not and do not sit and edit on the screen. Not even the younger editors do that. We print out the documents, make the changes and corrections and then send them back to the author via traditional post. Then, the author is the one making the actual changes in the text and this is how it works.
Furthermore, when an actor thought he would need certain knowledge, this was a motivator for him to participate in mediation initiatives (see example in section 8.1.2). However, if it, then, took too long time before the knowledge was applied, the knowledge was easily slipped out off the actors’ memory. For example, in Energy a number of actors got to learn the functions and usages of a new administrative IS that were about to be implemented. However, the implementation was delayed for over four months, and when it was time to start using the new system much of the earlier gained knowledge was forgotten.

A hindrance of some of the operators to learn a new net IS was that they preferred to work with familiar tasks that they were used to, rather than to learn and work with a new net IS (see section 8.3.1). This was partly related to security, and they felt insecure working with a new IS and were afraid that faults would occur.

Knowledge mediation is not only concerned with the receivers’ motivation to take part of knowledge. It is also about the receivers’ capability of absorbing and applying knowledge in concrete actions. Both the absorption and the utilisation of knowledge are influenced by the pre-knowledge of the receiver. If the receivers lacked pre-knowledge, this made it harder for them to absorb and make use of the knowledge that aimed to be mediated. For example, some of the junior architects in the school group felt that it sometimes was hard to follow discussions – for example, during the two day seminar arranged by the school expert – as they were not familiar with the context and the terminology used.

8.4.4 The Knowledge Provider

One characteristic of the knowledge provider that seemed to hinder TKM concerned an unwillingness to share knowledge (see section 8.2.2 and 8.3.1). Even if one might consider it selfish not to share knowledge, there were, at least, two reasons that helped to explain this kind of behaviour. Those reasons concerned the usefulness of knowledge and prevailing norms (concerning the latter see section 8.4.6).

Concerning the usefulness of knowledge: If an architect shared his knowledge about clients and this knowledge was used and enabled another architect to gain an assignment, the client contact was not really usable any longer to the initial knower, at least not at that point of time. Hence, in Architect, knowledge about relationships and clients became less useful when shared. Some architects uphold that this was not the way they looked at it and meant that the most important issue was that the assignments were gained by someone at Architect. Still, they did not always act in line with what they said, and as one architect explained,

[o]ne wants to maintain and develop own good relationships. [. . .] Everyone wants to have their own mates who give them assignments. That is how it works. Then, there are individuals who are very generous and share their networks, for example our school expert. But, on the other hand, he is 65 now and does not need the knowledge or contacts any longer as he is retiring.

Another architect maintained that,

[w]e have a strong tendency to hoard our personal knowledge of, for example, how to gain assignments and accomplish building projects, and we need to work more
across office borders and thereby utilise our knowledge resources in a better way – we have been poor in doing so within Architect.

The usefulness of knowledge did also influence the net operators’ willingness to share knowledge (see section 8.3.1). By sharing knowledge about the net system, the operators (in particular the LN operators) would decrease their possibilities of earning extra money, and perhaps also increasing the likelihood of getting noticed. In other words, if a larger number of operators were able to manage the nets, this would decrease their opportunities to use the knowledge. The unwillingness to share knowledge, due to the risk of decreasing its usefulness, was reinforced by prevailing norms (see further section 8.4.6).

Furthermore, being skilled at a task or an area also related to a kind of prestige and pride. One SN operator explained this in terms of feeling indispensable and special. He had recently learned how to handle the interruption statistics of the LN and was now in charged of this task. He was also the only operator who knew about this as the previous statistician had left Energy. Thus, he was the expert of interruption statistics and explained his feeling about this.

It is fun to be special and a key person. It is fun to know something no one else does. But if someone would like to learn how to do the statistics, I would not hesitate in sharing my knowledge. However, I would not take any own voluntarily initiatives to teach others – they would have to ask me. [. . .] As long as I am somewhat of a specialist it is fun.

The desire to keep the feeling of being indispensable and special was one additional reason that explained why some behaved as if they were hesitant in sharing their knowledge.

Another circumstance restricting the willingness to mediate knowledge was identified in Publish. During a production meeting in one of the units, one editor went through the minutes from a reference group meeting that she and a colleague had had with a number of teachers. The protocol included a number of ideas of new books and potential authors. As such, those kinds of minutes were instruments mediating knowledge useful for new product development. However, even if the minutes could be useful to the editors in the other units, the publishing manager and the editors had made a conscious decision not to spread them outside their own unit. As the publishing manager said,

[i]deas about potential authors and new product ideas are sensitive information and should not be disseminated as this information might be misused.

This utterance was based on a previous experience: Earlier these kinds of documents had been made available to all other units and editors. At one time an editor in another unit had read the minutes and then met a potential author mentioned in the minutes and said that she had heard that the author was going to write a book for Publish. However, that was not what the minutes had said and it was not decided at all; the person was only mentioned as a potential author for a new product idea but she had not yet been contacted. Even if this example might sound trivial, it did deteriorate the relationship with the author. As a consequence, it was decided that ideas about products and authors should not be disseminated due
to the risk of being misused. Hereby, this example involved a mistrust of other actors’ capability of handling knowledge in a proper way.

Another reason for not accomplishing knowledge mediation initiatives was a lack of time. As the operators explained, they had talked about knowledge mediation between the operators since a year back, but due to a lack of time and shortage of staff, everyone had worked with the net they best managed\(^1\) (see in section 8.3.1). A lack of time was also a hindrance that the school expert mentioned (see section 8.1.1).

### 8.4.5 The Mediating Instrument

Written signs, in particular by the use of IS, were a good way to make expressions of actors’ knowledge more available and accessible. However, the verbalisation of knowledge to be able to store the signs in IS was also a time-consuming procedure. One facilitating circumstance of Energy’s initiative to develop a new geographical net IS was that the intended knowledge receivers and the use of the knowledge to be communicated via the IS were clarified (see section 8.3.3). The geographical net IS was designed for the operators in order to facilitate their work; this was clear both to the IS designers and the operators.

The content and use of the intranet in Architect did not have the same specified receivers and purposes. The intranet was offered to all architects as an instrument to continuously get updated about all different kinds of practice-related issues. As the intranet communicated a large number of different issues, some architects meant that this made it difficult for them to find and gain knowledge that could be useful in their work.

It seemed as if IS sometimes were stuffed with a lot of good ideas and surely usable content. However, if the receivers were unspecified, and the pragmatic purpose of the content was unclear to the potential receivers, this seemed to hinder actors to use IS as mediating instruments (see section 8.1.2). For example, several architects talked about the content of the intranet in terms of “information”, while they wanted “actionable knowledge”. Perhaps they had not used the intranet enough to find out what it could offer, or perhaps they lacked the capability of acknowledging the usefulness of the knowledge they could gain by using the intranet.

### 8.4.6 The Working Environment

Empirical examples of TKM showed the importance of geographical and emotional closeness as facilitating circumstances (just as SKM, see section 7.3.6). This was also something that Architect had realised and tried to facilitate by establishing networks and relationships. The focus on networks and relationships was an effort to create affiliation and trust between the architects. Energy and Publish had also realised the importance of facilitating communication, and had decided to implement open landscape offices as a way to decrease communication barriers. In

\(^1\) Still, one might question if they had more time when the new schedule was introduced. Hence, this did not seem to be a very valid argument.
comparison, Energy’s and Publish’s initiatives were more passive, while Architect more actively engaged in creating networks.

Another issue related to the working environment, concerned the organisation of the three firms’ KMI. Architect had created a formal structure and organisation to support its knowledge work and this showed to be a facilitating circumstance. The more activities that were performed, the more triggered were the architects to continue their knowledge work. This was also due to the positive effects of the activities, interpreted by the architects. For example, participating in seminars enhanced the actors’ knowledgeability, which, in turn, improved their performance, and by exchanging knowledge with external parties new assignments had been acquired.

Energy and Publish were less prosperous in establishing a working environment in which initiatives could prosper, and they lacked commitment from their management. Furthermore, the fact that the responsibility of developing the ‘knowledge practices’ at Energy and Publish was assigned to the human resource personnel did also seem to hinder the work from prospering. The human resource personnel did not seem to have enough knowledge of the core practices to manage the development work and implementation themselves.

A characteristic of the working environment that seemed to be particularly essential concerned established norms. When established norms clashed with intentions to share and communicate knowledge this seemed to be a major hindrance. Hence, the unwillingness to share knowledge was not only about a risk of decreasing the usefulness of the knowledge (see section 8.4.4); it was also about a risk of decreasing opportunities to advancement or financial compensations. As one architect explained,

[. . .] Naturally, everyone is careful to take care of the contacts already established.

The architects who gained assignments were rewarded with higher salaries and additional perks such as a company car and bonus. To gain assignments was also the way to get to the top of the firm and to become a partner. Consequently, if an architect would share his knowledge of clients and relationships with other architects, he would give up parts of his possibility of promoting his own career and get a higher salary.

The unwillingness to share knowledge, due to conflicting norms, and also the risk of decreasing the usefulness of knowledge, did also show a conflict between the organisational role and personal aspirations. Instead of paying attention to the circumstance that knowledge was used by any actor for the best of the organisation, there was a tendency that actors (in terms of knowers) decided what they wanted to possess themselves versus what could be shared with others. Without being fully aware of it, Architect and Energy had actually encouraged this kind of behaviour by establishing their prevailing reward and career systems.
8.5 Significant Findings and Comments

This section summarises and comments on the most significant findings related to TKM. This includes a recapitulation of uniting and varying characteristics of identified TKM variants and influencing circumstances.

8.5.1 Characteristics of Typical Knowledge Mediation

In many ways, TKM is similar to SKM. However, one main difference is that TKM deals with experienced typical problems, rather than specific problems that is the focus of SKM. A typical problem might evolve due to experiences of similar and repetitive specific problem situations. For example, the repetitive engagement of the school expert in the school projects (see section 7.1.2) gave rise to the need to mediate his knowledge to other architects (see section 8.1.1). Hereby, the motive of TKM is to deal with typical problems related to typical tasks of the practice. The time for using the knowledge intended to be mediated via TKM is commonly future and potential. The use of the knowledge might be direct, provided that there is an appropriate task of the receiver in which the knowledge can be applied. Hereby, sometimes the knowledge as a result of TKM can be utilised rather directly after the mediation to deal with a specific task. Table 8-1 below presents the characteristics that unite variants of TKM.

Table 8-1: Uniting characteristics of Typical Knowledge Mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>An experienced typical problem related to a typical and often common task of the practice</td>
</tr>
<tr>
<td>Motive</td>
<td>Solving a typical experienced problem</td>
</tr>
<tr>
<td>Time for utilisation</td>
<td>Future, potential utilisation (occasional direct utilisation)</td>
</tr>
</tbody>
</table>

There are also characteristics that vary depending on which basic variant of TKM is concerned: the push approach or the pull approach. These two variants have, in turn, their sub-variants in terms of varying characteristics (see table 8-2 below). The ‘or’ in table 8-2 indicates that the certain category have shown varying characteristics that represent parts of the sub-variants of the two basic variants of TKM.

Table 8-2: Varying characteristics of Typical Knowledge Mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>TKM push approach</th>
<th>TKM pull approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>Coordinator</td>
<td>Knowledge seeker (or coordinator)</td>
</tr>
<tr>
<td>Approach</td>
<td>- Push (to specific receivers), or Pull follow by pull (to unspecified receivers)</td>
<td>Pull</td>
</tr>
<tr>
<td>The receiver</td>
<td>- Specific receivers, or Unspecified receivers</td>
<td>Specific receiver</td>
</tr>
<tr>
<td>Mediating instrument</td>
<td>- Oral speech, or Written speech on paper documents, or Information systems, or A combination different instruments (multiple instruments)</td>
<td>- Oral speech, or Written speech on paper documents, or Information systems, or A combination different instruments (multiple instruments)</td>
</tr>
<tr>
<td>Mediation</td>
<td>- Designed occasional (once)</td>
<td>Evolving and occasional</td>
</tr>
</tbody>
</table>
TYPICAL KNOWLEDGE MEDIATION

<table>
<thead>
<tr>
<th>Category</th>
<th>TKM push approach</th>
<th>TKM pull approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>process</td>
<td>occurrence), or</td>
<td>- High (when dialogue is required), or</td>
</tr>
<tr>
<td></td>
<td>- Routinised and recurrent</td>
<td>- Low when written signs or IS are used</td>
</tr>
<tr>
<td>Degree of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interaction</td>
<td>- High (when specific receivers), or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Limited (when unspecified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>receivers)</td>
<td></td>
</tr>
</tbody>
</table>

One significant characteristic of TKM push approach is that it involves not only a knowledge provider and a knowledge receiver but frequently also a coordinator. Even if any actor might experience a typical problem, it is commonly a coordinator who initiates TKM by planning and assigning knowledge providers to expose and mediate their knowledge. Furthermore, in TKM push approach the receivers might be specified or unspecified at the time of the initiative. When the receivers are unspecified, the push approach needs to be followed by a pull approach, which is obvious in TKM push approach that uses IS as mediating instruments. TKM push approach might be a designed once occurrence or a designed routine that aims to be institutionalised. A seminar is an example of the former, while mediation via an information system is an example of the latter.

Concerning TKM pull approach, the initiator is a specific receiver who intends to acquire knowledge to deal with an experienced typical problem. The initiator might also be a coordinator who tells the knowledge needer to search for and gain certain knowledge (such as in the case of the operators who were asked to learn each other’s net systems). In the TKM pull approach, the character of the mediation process tends to be evolving and occasional.

Another characteristic of TKM concerns the degree of interaction. Usually, when the receivers are specific, the interaction tends to be high while it tends to be low when the receivers are unspecified. This also relates to the mediating instruments used. For example, using IS as instruments, there is naturally a low degree of interaction between the receiver and the knower as they interact via the IS. If the mediation is accomplished by a face-to-face dialogue, the interaction is higher.

8.5.2 Facilitating and Hindering Circumstances

As shown in section 8.4, influencing circumstances have been grouped into six main categories: the problem situation, the knowledge, the knowledge receiver, the knowledge provider, the mediating instrument and the working environment. Table 8-3 presents facilitating characteristics of these categories, and table 8-4 presents hindering characteristics.

Table 8-3: Facilitating characteristics of main categories influencing TKM

<table>
<thead>
<tr>
<th>Category</th>
<th>Descriptions of facilitating characteristics</th>
<th>Facilitating influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem situation</td>
<td>Elementary and typical problems concerning elementary and typical tasks; common, repetitive and limited tasks.</td>
<td>Easy to describe by the use of oral and written signs. Easy to relate to specific questions. Easy to give answers.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>General knowledge – knowledge about the typical and common; a kind of ‘recipe’ knowledge.</td>
<td>Easy to express and mediate as it is usually valid no matter of situated prerequisites of problems. Easy to utilise.</td>
</tr>
</tbody>
</table>
### Category Descriptions of facilitating characteristics

**Certain knowledge** – knowledge that has a proven record. Easy to express and mediate as it has a proven record. Easy to utilise.

**Pre-knowledge** of the receiver including experiences that relate to the problem and task in question and knowledge about available mediating instruments and knowledge providers. Having pre-knowledge makes it easy to describe problem, formulate questions, and make sense of signs, and to know where and how to find the demanded knowledge.

**Willingness** to take part of other actors’ knowledgeability. When the receiver acknowledges a need for certain knowledge, this motivates him to learn from others.

**Willingness** to share one’s knowledge. Willingness seems to be based on a service-mindedness towards colleagues and clients. Facilitates the mediation of knowledge. It is about doing one’s best to help colleagues in their work to secure that the practice continues in a proper way.

**Oral language** – regarded as the most reliable instrument. TKM might involve complex typical problems that require oral speech.

**IS** – high degree of availability of the content of IS. Facilitates the access to and re-use of written signs, particularly signs related to general knowledge.

**Geographical closeness** of actors. Facilitates the mediation process in terms of putting requests, joint reasoning and interpretation of answers.

**Emotional closeness** of actors. Promotes and encourages actors to put requests, ask for help and also to help others.

### Table 8-4: Hindering characteristics of main categories influencing TKM

<table>
<thead>
<tr>
<th>Category</th>
<th>Description of hindering characteristics</th>
<th>Hindering influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem situation</td>
<td><strong>Complex, typical problems</strong> concern complex tasks and involve many sub-problems.</td>
<td>Often more difficult to reason about a typical complex problem than a specific complex problem.</td>
</tr>
<tr>
<td></td>
<td><strong>Lack of planning and design</strong> of the mediation initiative.</td>
<td>Hinders TKM to be accomplished.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Knowledge based on long experience.</td>
<td>Hard to express as it is often taken for granted by the knower.</td>
</tr>
<tr>
<td></td>
<td><strong>Non-general knowledge</strong> is dependent on the situatedness of the specific problem and task.</td>
<td>Hard to express and mediate because it is not related to any standard solution.</td>
</tr>
<tr>
<td></td>
<td><strong>Decreased usefulness</strong> of knowledge when shared.</td>
<td>Limits the willingness of knowledge providers to share their knowledge.</td>
</tr>
<tr>
<td></td>
<td><strong>Unclear purpose</strong> of the knowledge being mediated.</td>
<td>Hinders actors to engage in mediation and also use mediated knowledge.</td>
</tr>
<tr>
<td>Knowledge receiver</td>
<td>Lack of motivation when there is a <strong>lack of timeliness</strong> between the mediation and the utilisation.</td>
<td>When there is long between the TKM and knowledge utilisation, this might decrease the motivation of the receiver.</td>
</tr>
<tr>
<td></td>
<td>Lack of motivation when there is an <strong>unclear purpose</strong> of initiatives and</td>
<td>The receiver might not understand the usefulness of knowledge which hinders</td>
</tr>
<tr>
<td>Working environment</td>
<td><strong>Geographical closeness</strong> of actors.</td>
<td>Facilitates the mediation process in terms of putting requests, joint reasoning and interpretation of answers.</td>
</tr>
<tr>
<td></td>
<td><strong>Emotional closeness</strong> of actors.</td>
<td>Promotes and encourages actors to put requests, ask for help and also to help others.</td>
</tr>
<tr>
<td>Category</td>
<td>Description of hindering characteristics</td>
<td>Hindering influences</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Knowledge provider</td>
<td>Unwillingness to share knowledge due to certain underlying reasons.</td>
<td>Relates to the usefulness of knowledge and conflicting norms.</td>
</tr>
<tr>
<td></td>
<td>Lack of time.</td>
<td>Hinders mediation to be accomplished.</td>
</tr>
<tr>
<td></td>
<td>Mistrust of other actors capability to use knowledge in a proper way.</td>
<td>The knower might suspect that knowledge will be misused.</td>
</tr>
<tr>
<td>Mediating instrument (primary with a focus on IS)</td>
<td>When IS are considered roundabout to use.</td>
<td>Might hinder IS to be used as mediating instruments.</td>
</tr>
<tr>
<td></td>
<td>Time-consuming and demanding to design and update the content of IS.</td>
<td>Might hinder IS to be used as mediating instruments.</td>
</tr>
<tr>
<td></td>
<td>Lack of clarification of the users of IS and the usefulness of IS content.</td>
<td>Unspecified, potential receiver might not be aware of the usefulness of IS.</td>
</tr>
<tr>
<td></td>
<td>Lack of searching method to find specific content in IS.</td>
<td>If IS are hard to use, this hinders actors to use the IS.</td>
</tr>
<tr>
<td>Working environment</td>
<td>Geographical distance of actors.</td>
<td>Hinders the mediation process, including putting requests, joint reasoning, getting and interpreting answers.</td>
</tr>
<tr>
<td></td>
<td>Emotional distance of actors – lack of relationships between knowledge providers and knowledge receivers.</td>
<td>Hinders receivers from putting requests and asking knowers for help.</td>
</tr>
<tr>
<td></td>
<td>Prevailing norms that conflict knowledge sharing.</td>
<td>Such norms might hinder knowers’ for sharing their knowledge.</td>
</tr>
<tr>
<td></td>
<td>Lack of structure and organisation of TKM.</td>
<td>A lack of structure, commitment and funding hinders TKM to be accomplished.</td>
</tr>
</tbody>
</table>
Random Knowledge Mediation

This chapter will discuss the third basic type of knowledge mediation identified in this work, called 'Random Knowledge Mediation' (RKM). This type of knowledge mediation is not triggered by any experienced problem. It is more of a random activity governed by attentiveness and curiosity and by which actors gain knowledge without consciously searching for it.

9.1 Variants of Random Knowledge Mediation

The main characteristic of ‘random knowledge mediation’ (RKM) is that it occurs as a coincidence and without a deliberate and pre-defined pragmatic intention of the actors engaged in such mediation. Based on empirical examples from the cases, three variants of RKM have been identified. The criterion used to distinguish between the three variants of RKM concerns how the mediation was accomplished, which also relates to the mediating instrument used for the mediation. The three variants are RKM via observation, RKM via conversation (oral speech) and RKM via written signs and IS.

9.1.1 Random Knowledge Mediation via Observation

In Architect, the architects had traditionally worked with hand-made drawings and models. Paper drawings were spread out on the desks where the architects were working. This required a lot of space but it also offered an overall view of what the architects were working with. It was not only for the benefit of the working actor. It was also beneficial to other architects in the sense that it made it easy for them to get a picture of what colleagues were working with by looking at the drawings and models. Some architects meant that acquiring knowledge “by walking around and observing other actors was a common behaviour”, as a kind of routine. In addition, to know what projects different colleagues were working with was considered important in order to know who had experience of different kinds of tasks and projects. As one architect expressed,
[o]ne just had to take a walk around the office and look at different drawings spread out on the tables. Thereby one quickly got a picture of the specific projects the colleagues dealt with.

Hence, the work with hand-made drawings offered a transparency of the architects’ work, actions and action results. This also facilitated the mediation of knowledge of different projects. To be more specific, it facilitated RKM via observation as the architects could get to know about other architects’ expertise, actions and products without any conscious and deliberate intention to gain certain knowledge.

The architects’ work changed a lot with the advent of computers. After the computerisation, the architects worked a lot with computers and made drawings using computer aided design (CAD) programmes. Using CAD made it easier to make drawings as the programme often had pre-defined standard measurements\(^1\) – such as standard height, depth and length of stairwells – that could be used. Knowledge about those kinds of measurements was manifested in the system functionality. The use of computers also resulted in a more limited need for working space, and it was easier and less time-consuming to make changes in a drawing (previously the drawings had to be redone). Having the drawings stored in information systems also offered an enhanced accessibility, which facilitated the re-use of standard drawings (see example in section 7.1.1).

However, the computerisation did also result in a reduced transparency of the architects’ work. As a consequence, the computerisation led to a decreased opportunity for RKM via observation. As the architects began to make drawings by using computer-based software, they did not have the drawings spread out on the desks in the same way any longer. Accordingly, it was more difficult to easily get to know what colleagues were working with by walking around in the office. As one architect explained,

\[j\]ust by walking around one does not get the same kind of understanding of what different architects are working with. Even if you would look at a screen you will have difficulties in getting the whole picture – you just cannot get that from a limited screen picture. Now we [read: the architects] work more individually at our own desks and with our own desktop. [. . .] One limiting effect of the computerisation is that the overall understanding of what is done and going-on within the firm is less clear.

Hereby, the earlier spontaneous ‘getting updated’ – that is, to get to know about different practice-related issues by walking around and observing actors and their work – was not possible in the same way after computerisation. Still, the enhanced use of IS made it easier to communicate knowledge about news, on-going projects, reference objects, seminars and other activities. Hence, computerisation had both facilitating and hindering influences on knowledge mediation.

The use of IS was also related to an idea of creating a “paperless office”. However, even if the architects to a large degree used CAD to make drawings they

\(^1\) This is an example of knowledge mediation and re-use of knowledge that can be accomplished by formulating knowledge in terms of pre-defined rules or procedures, so-called ‘general knowledge’. This also illustrates one of the cores of IS, namely as instruments for mediating and re-using knowledge.
still used the paper print-outs when they needed to show and discuss different solutions. As one architect explained,

[w]hen I need to look at, or discuss, a drawing I never use the screen. One prints the drawings and uses them as a basis for discussions. As one old colleague once said to me “the paperless office is just as likely as the paperless toilet”, and I believe we consume more paper than ever. Each new outline is made on paper [. . .] but as soon as we need to make a straight line, we use the computer since it is much quicker.

The point here is that knowledge mediation via observation does not need to be planned in advance such as the traditional mentorship (which would be characterised as TKM). Observation can also be accomplished without planning and also without the knower (in terms of the observed actor) being aware of that he is observed. RKM via observation is a random coincidence or a part of a routine (as in Architect, where the architects got used to walk around and observe each other).

Another kind of observation identified in the empirical data was overhearing other actors’ conversations. It could be a conversation between two colleagues or between a colleague and a client. Observing and listening to conversations was considered to be a very fruitful way of gaining knowledge. As one architect said, “one just has to pay attention to what happens around you and you will gain a lot of knowledge”. Similar opinions were expressed in Energy,

[s]ince we started to work in this open environment, a lot of learning occurs just by listening to colleagues talking with each other on the other side of the desk. You also learn a lot when people talk on the phone, for example, you can learn about how to approach a client who is upset or angry.

Overhearing other actors’ conversations was also a way for the listener to acknowledge issues that she might not be aware of or had not thought about. For example, one architect meant that overhearing others’ conversation did sometimes enable her to gain new knowledge that she had not thought about but which could be useful for her in her future tasks. Empirical data showed that observation and overhearing are fruitful ways to learn about the practice and how to behave in different situations. In sum, RKM via observation can be accomplished by an actor’s (as a potential knowledge receiver) observation of the actions and action results (products) of other actors or by overhearing other actors’ conversations.

9.1.2 Random Knowledge Mediation via Conversation

Many times observations were followed by spontaneous discussions concerning ongoing work. For example, when the architects walked around the office and saw a drawing on the desk, they often asked the architect about his project. This could end by a quick question and answer about what kind of project the architect was working with. It could also result in a deeper dialogue concerning challenges, solutions or restrictions, which could even result in the joint creation of new solutions or ideas. Discussions about projects were highly facilitated by having drawings to look at whereby different aspects could be shown on the drawings. Hence, spontaneous discussions about the architects’ work were facilitated by the manifestations of their knowledge in drawings and illustrations.
Many respondents at Architect thought, however, that the computerisation had not only reduced the opportunities for observation but also the number of spontaneous talks between the architects about their tasks and projects. The reason for this was that the architects’ knowledge had become less transparent after the computerisation of their work, which limited the opportunities of spontaneously getting involved in conversations.

Another example of RKM via conversation was story-telling. Story-telling can occur as part of problem-solving, that is as part of SKM and TKM. However, stories were also told without being triggered by any experienced problem that needed to be solved. An actor might have experienced something he just felt he wanted to tell his colleagues.

For example, in Energy, when the operators shifted work, the operator finishing his shift told the new operator about the happenings during the previous shift. Sometimes those stories related to knowledge that the new actor would need during his shift (that is, an example of SKM push approach, see section 7.2.1). However, stories were also told just because the finishing operator considered them interesting. For example, the situation when the tree had fallen on the overhead electric wire and how the LN operator handled that situation (see section 7.1.3) was an example of a story that was told to the operators who were not present at the time when it occurred. This story was not told to help the other operators to deal with a specific or typical problem, it was told because it was an interesting and odd story. Still, the other operators could learn from the story. As one operator said, “we learn how to think and how one can act when urgent situations appear and that is especially important for me as I am rather new in my work”.

Knowledge mediation via storytelling initiated by a knower had become part of a habit (routine) in Energy and the operator who was to begin his shift came about 20 minutes in advance in order for the finishing operator to have time to tell him about the daily occurrences. Thus, it was a kind of recurrent, habitual random knowledge mediation (that, as mentioned above, often also involved SKM).

In sum, RKM via conversation is one variant of knowledge mediation and it often occurs as a complement to observation to clarify what actors are working with. RKM via conversation can be initiated by an actor as a potential knowledge receiver because he is curious, or it can be initiated by a knowledge provider who wants to tell about a certain experience.

### 9.1.3 Random Knowledge Mediation via Written Signs and IS

The computerisation in Architect had some hindering effects on RKM via observation and via conversation. However, it had also benefits as it enhanced the availability of gaining knowledge despite of geographical distances.

For example, the architects could acquire knowledge about typical standard solutions via the intranet and reuse this knowledge in an on-going project (as an example of SKM, see section 7.1.1). Hereby, parts of the architects’ knowledgeability were manifested in drawings and models, and via technology it was made public in the firm. To utilise this opportunity of public access required an awareness of what projects had been conducted within the different offices. Thus, a general need was to keep updated concerning news, on-going and old projects (as
an example of TKM). In this regard, the intranet made descriptions and solutions available so the architects could keep abreast with on-going projects and news (see section 8.1.2).

Written signs available via IS and books did also enable RKM. Actors could gain knowledge by the use of written signs and IS without having any problem to solve. For example, many architects read architectural journals and some read project descriptions available via the intranet whereby they got new ideas that could be useful for them in their own work. Such knowledge could concern new materials to be used for different kinds of architectural solutions.

The fact that a lot of written signs were made available via IS was a consequence of prior TKM initiatives, and TKM to unspecified receivers (see section 8.1.2) facilitated both SKM and RKM. Hereby, there were obvious relationships between the three types of knowledge mediation (see further section 10.2.4).

Some comments should be made here concerning the intention of different types of knowledge mediation. In TKM the intention is to deal with a typical problem, for example, a manager (coordinator) realises the need to continuously feed the actors with news and decides to do this via an IS. In turn, an actor (potential receiver) might use the IS with an intention to gain specific knowledge to deal with a specific problem – as in SKM. The actor can also use the same IS without any conscious intention but still gain knowledge that might be useful in future actions – as in RKM. Accordingly, RKM is not triggered by any conscious pragmatic intention of the actor (as the potential knowledge receiver); the trigger is more of a personal curiosity or interest.

9.2 Influencing Circumstances

This section will discuss circumstances that showed to have significant influence on RKM. Those circumstances concern the actors in terms of the potential knowledge receivers and knowledge providers involved in RKM, the mediating instrument and the working environment.

9.2.1 The Knowledge Receiver and the Knowledge Provider

Based on the empirical data of this work, RKM was not triggered by any experienced problem. It was more of a random activity driven by attentiveness, interest and curiosity of the one taking an initiative that might result in RKM. Thus, the trigger and the motive of initiating RKM were based on the attitude of the actors involved in RKM. If a potential knowledge receiver or a potential knowledge provider lacked attentiveness, interest or curiosity, that would hinder RKM. Hence, one prerequisite for RKM was that actors paid attention to what happened around them; otherwise the opportunities for RKM would disappear or decrease.

Another hindrance was if an actor did not want to show his work (which was similar to one of the hindrances to TKM). For example, some architects had experienced that sometimes when they had asked colleagues about their drawing, the colleagues did not want to show it. One senior architect recalled and described such a situation,
[. . .] I believe he felt insecure, but it was an experienced colleague and I was quite new at that firm when this happened. I approached him and asked what he was working with. He literally threw himself over his drawing and replied “this is nothing you should care about”. I did not understand a thing [. . .] I thought he felt ashamed of his drawing. But I had no intention to grouse his work, I just wanted to know what he was working with and that was out of pure curiosity. I interpreted his behaviour as he was insecure and perhaps he did not want to show the drawing because it was not finished. He was probable afraid of being criticised.

As the senior architect himself said, it was his interpretation of the situation. Hence, he could not be sure whether his interpretation corresponded with the view of the colleague, and he had not asked the colleague to explain his behaviour. However, a junior architect expressed a similar view when referring to her own behaviour when someone asked about and wanted to look at her work. Thus, there seemed to be situations in which some architects hesitated to show their work because they feared they would be criticised. As the junior architect described,

> [w]hen one shows one’s drawings to someone else one gets evaluated as the drawing is a manifestation of my knowledge and capability. Still, we are quite good at showing each other our work [. . .] and one needs to keep in mind that drawings are not like an excel sheet where the final solutions are all the same. We come up with different solutions depending on who you are as a person and what kind of experiences you have. But it is a fact that one gets a bit nervous when showing the work to someone else because one knows that one will be judged; that is just how it works.

Two circumstances that hindered actors to tell stories were the risk of bragging or being evaluated as ignorant. In Publish the editors had been encouraged to tell each other about their experiences. However, if there were good experiences, the editors tended to be unwilling to reveal them for a fear of appearing boastful. On the other hand, if they had done something wrong – which was considered as ‘bad’ experiences – there was a tendency not to tell about them either because the editors did not want to be regarded as failures or, as one editor said, the “black sheep”.

Another hindrance to RKM was a lack of time. Several architects meant that they seldom had time to surf the net or read journals purely of curiosity. They mainly used written signs and information systems when they had specific problems to deal with and knew that they could find an answer via those mediating instruments.

Gaining and utilising knowledge via RKM was also hindered when the receiver lacked capability and pre-knowledge to interpret signs and apply the new knowledge in specific actions. On the contrary, when actors had such capability and pre-knowledge, this facilitated the acquisition and utilisation of knowledge. This was shown in Architect, and when the architects had relevant pre-knowledge, they could easier understand what other actors were working with, and also contribute with own knowledge.

### 9.2.2 The Mediating Instruments

One significant characteristic of RKM was the absence of any conscious and deliberate intentions of searching for any particular knowledge. RKM occurred more as a happening partly depending on how transparent practice-related
knowledge was. In this regard, the use of information systems was a facilitator as IS enabled so-called public access to signs expressing and manifesting actors’ knowledge. Hereby, instead of looking in different binders and books, information systems, such as Architect’s intranet, offered an access to a large number of issues via links and different web pages.

However, the large amount of signs stored in IS could also be a hindrance as the IS users might have difficulties in sorting out and finding useful contents. In other words, sometimes there might be too much content for the IS users to deal with, and this was an issue that several architects brought up.

9.2.3 The Working Environment

The working environment was one circumstance that significantly influenced RKM. An open landscape office (geographical closeness) design and close cooperation between actors facilitated observation, overhearing and spontaneous conversations between actors. Energy had implemented an open landscape office design, and Publish was about to do it. In both firms, this was based on a conscious decision to enhance communication and knowledge sharing. As described by the president of Energy,

"The exterior of the office is an attempt to speed up the association between the different units and individuals. [. . .] It is a way to enhance learning and create an atmosphere where everyone knows each other and, thereby, knows whom to ask in different questions."

The positive effect of having an open landscape office was also expressed by one of the more recently employed operators at Energy.

"I would never have got to know everyone and got such an overall picture of what people are doing so fast if we had been sitting in own rooms. With own rooms you are more isolated and it is not that easy to go in to a colleague and ask questions. Now one can talk to anyone you see, and it feels more simple and spontaneous."

Some offices within Architect had also implemented open landscape designs, and when establishing larger project, the project member often moved around in the office to sit close together. In this way, Architect’s way of seating derived from the need to sit close together when working in teams. It was considered as a “necessity to be able to easily discuss the project, its prerequisites and ideas”.

The positive attitudes towards the open landscape office designs and cooperation did also imply the importance of good relationships – emotional closeness – as a facilitator for knowledge mediation (see also discussion in section 7.3.6 and 8.4.6).

However, the open landscape office design was not only related to benefits. Sometimes the actors did not want to be observed or overheard. As one architect said,

"It is more difficult to call someone when you know you will be over-heard, especially if you feel a bit insecure concerning the task or issue. In those cases, I prefer to go and make the call where I can be on my own. For example, if I need to

1 These circumstances did also facilitate SKM and TKM. However, to be triggered at all, RKM was more dependent on geographical closeness of actors.
call and ask someone about something I am not sure about I rather go to another room. [. . .] Sometimes one just prefers to request or get to know things without others’ awareness. That is because one does not want to stand out as dumb or ignorant.

One of the managers at Energy did also emphasise some drawbacks of the open landscape office design. He said that, in the open landscape office design, it was “more troublesome to have personal talks with the employees”. When he wanted to give feedback – positive or negative – to someone, he did not want to have other colleagues around that could listen. Several respondents at Energy meant that there were fewer spontaneous talks since the landscape office design was implemented. Energy had a number of small rooms to be used when privacy was required. However, the manager argued,

[y]ou just do not book a conference room to give some feedback. The whole thing would in that case be so exaggerated, and what you want is to be spontaneous.

Another initiative in Energy that aimed to enhance communication and spontaneous knowledge sharing was the establishment of a kind of arena where the employees informally and naturally could meet and discuss different issues\(^1\). This arena was a large dining-room where the employees could have coffee and lunch. However, after about a year the president thought the employees took too long breaks and made a frequency analysis by clocking how long time they actually took breaks. According to the result his suspicion was confirmed – the employees had way too long breaks. Thus, he put up some general rules, informed the employees during an information meeting and said to the personnel managers to make sure the time limits were followed; otherwise he would have to implement a time clock. The rules formulated said that the morning break should not be longer than ten to fifteen minutes, the lunch should be 30-45 minutes and there should be no break during the afternoon. One observable result was that the employees’ coffee breaks soon became shorter. However, one personnel manager meant,

[n]ow the president is satisfied because everyone drinks less coffee and have shorter breaks, but it sends bad signals to the staff. They consider this as the management does not believe that they can be responsible for their own work and working time. Furthermore, to have less cups of coffee does not mean that we work more. [. . .] However, you do as you are told; you just do not bite the hand that feeds you.

It is, of course, important to look at the time in relation to productivity\(^2\). It is also easier to measure how much time actors are not working than to measure how productive they are when not having breaks and the pay-back of knowledge mediation, good relationships and a friendly atmosphere. Still, the initiative to enhance communication and learning versus the rules defined by the president at Energy were quite contradictory. The result of the new rules was quite obvious –

\(^1\) This was a TKM initiative as it was based on the idea that there were too poor communication and learning between actors and units. Thus, to deal with this typical problem, Energy established a new arena to facilitate communication and learning, which in turn facilitated RKM.

\(^2\) A basic calculation: If 50 out of one hundred workers take ten minutes longer break then they are supposed to do each day, and work eight hours per day, approximately 20 days per month in eleven month this is in total 1833 hours which is 229 working days; in rough terms one year of manpower.
shorter coffee breaks. A less observable consequence might be a decrease of RKM; a decrease of the actors’ opportunity to gain new knowledge to enable future and more knowledgeable actions. Thus, the time actors were not having coffee breaks did not necessary correspond to an enhanced productivity.

9.3 Significant Findings and Comments

The main point of this chapter was to show that knowledge mediation is not only triggered by experienced problems that need to be solved. Knowledge mediation might also occur as a coincidence together with attentiveness, interest or curiosity. Such knowledge mediation has similarities with the notion of ‘serendipity’, which is described as the “faculty of making fortunate finds by chance” (Webster’s Dictionary 1993:473; see further section 10.2.3). Based on empirical data, a number of characteristics of this non-problem and non-requirement driven knowledge mediation have been outlined and these will be summarised in section 9.3.1. Then, section 9.3.2 summarises circumstances influencing RKM.

9.3.1 Characteristics of Random Knowledge Mediation

The characteristics uniting the variants of RKM concern the trigger, the motive, the approach and the time for application (see table 9-1 below). The trigger is a coincident or part of a habit. The motive – and also part of the trigger – is a personal attitude involving attentiveness, curiosity or interest. RKM presumes that actors have the opportunity and also an acuteness of perception to make discovery without consciously searching for them.

The approach is fortuitous and spontaneous, rather than being a conscious pull or push approach. Still, some actor needs to take an initiative by paying attention to other actors and the mediating instruments available in the environment. In this regard, even if RKM is not a conscious activity to mediate knowledge to deal with certain problems, some actors need to take an initiative, for example, by listening (pull approach) or by telling a story (push approach).

Concerning time for utilisation, the utilisation of knowledge gained via RKM is commonly potential and future, but if appropriate for a present task of an actor, the knowledge might be used rather directly (just as in TKM; see section 8.5.1).

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>A coincident or a habit (non-problem driven) together with a personal attitude of attentiveness, curiosity or interest</td>
</tr>
<tr>
<td>Motive</td>
<td>A personal attitude of attentiveness, curiosity or interest</td>
</tr>
<tr>
<td>Approach</td>
<td>Fortuitous and spontaneous (involves a pull or push initiative)</td>
</tr>
<tr>
<td>Time for utilisation</td>
<td>Future, potential utilisation (occasionally direct)</td>
</tr>
</tbody>
</table>

There are also some varying characteristics depending on the certain variant of RKM (see table 9-2 below). Three basic variants of RKM have been identified and those are distinguished based on how the mediation was accomplished: RKM via observation, RKM via conversation or RKM via written signs and IS.
The initiator can be any actor – either a potential receiver or a potential knower. It is a specific actor who observes other actors, asks a question, tells a story or uses an IS whereby knowledge is mediated. Concerning the mediation process it is commonly evolving, but can also be part of an established routine.

Table 9-2: Varying characteristics of Random Knowledge Mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>RKM via observation</th>
<th>RKM via conversation</th>
<th>RKM via written signs and IS</th>
</tr>
</thead>
</table>
| Initiator           | The observer (receiver) by being attentive | - The one (receiver) asking something, or  
|                     |                     | - The knower who tells about something | The user (receiver) of written signs and IS |
| Mediating instrument| Observation and/or overhearing | Oral speech, might be facilitated by written signs | Written signs and IS |
| Mediation process   | - Evolving and occasional, or  
|                     | - Part of established routines and recurrent | - Evolving and occasional, or  
|                     |                     | - Part of established routines and recurrent | |
| Degree of interaction| Limited | - High, or  
|                     |                     | - Limited | Limited |

9.3.2 Facilitating and Hindering Circumstances

This section summarises circumstances that have shown to influence RKM. Table 9-3 below summarises facilitating circumstances, while table 9-4 summarises hindering circumstances.

Table 9-3: Facilitating characteristics of main categories influencing RKM

<table>
<thead>
<tr>
<th>Category</th>
<th>Descriptions of facilitating characteristics</th>
<th>Facilitating influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge receiver</td>
<td><em>Attentiveness, curiosity and interest</em> to take part of other actors’ knowledgeable (relates to willingness and motivation).</td>
<td>Facilitates and is often a prerequisite for RKM to be initiated.</td>
</tr>
<tr>
<td></td>
<td>Pre-knowledge related to the task or issue in question.</td>
<td>Facilitates the mediation as well as utilisation of knowledge.</td>
</tr>
<tr>
<td>Knowledge provider</td>
<td><em>Willingness</em> to share and mediate one’s knowledgeable, relates to <em>pride</em> and partly also a <em>service-mindedness</em> towards colleagues and clients.</td>
<td>Facilitates the mediation of knowledge.</td>
</tr>
<tr>
<td>Mediating instrument (with a focus on IS)</td>
<td><em>Public access</em> to IS content offers high degree of <em>accessibility</em> of the content of IS.</td>
<td>Facilitates the access to and re-use of written signs whereby IS users can randomly gain new knowledge.</td>
</tr>
<tr>
<td>Working environment</td>
<td><em>Geographical closeness</em> of actors.</td>
<td>Facilitates and encourages RKM.</td>
</tr>
<tr>
<td></td>
<td><em>Emotional closeness</em> of actors.</td>
<td>Facilitates and encourages RKM.</td>
</tr>
<tr>
<td></td>
<td><em>Openness and transparency of actors’ knowledge, actions and action results.</em></td>
<td>If the work of actors is easily observable and if actors collaborate, this facilitates RKM.</td>
</tr>
<tr>
<td>Category</td>
<td>Description of hindering characteristics</td>
<td>Hindering influences</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Knowledge receiver</td>
<td>Lack of awareness and interest in other actors’ work</td>
<td>Hinders the initiating of RKM.</td>
</tr>
<tr>
<td></td>
<td>Lack of time.</td>
<td>Hinders the initiating of RKM.</td>
</tr>
<tr>
<td></td>
<td><em>Incapacity to apply knowledge in action.</em></td>
<td>The receiver might not know how to apply knowledge in specific actions, which hinders its utilisation.</td>
</tr>
<tr>
<td>Knowledge provider</td>
<td><em>Unwillingness to share knowledge due to fears of being evaluated as ignorant, unskilled or as a braggart.</em></td>
<td>Hinders the accomplishment of RKM, and might also decrease the transparency of actors’ knowledgeability.</td>
</tr>
<tr>
<td></td>
<td>Lack of time.</td>
<td>The knower might consider himself not to have the time to mediate his knowledge.</td>
</tr>
<tr>
<td>Mediating instrument</td>
<td><em>IS as roundabout or time-consuming instrument to use.</em></td>
<td>Limits the degree of IS use and hinders thereby RKM via written signs and IS.</td>
</tr>
<tr>
<td>(with a focus on IS)</td>
<td><em>IS as limiting the transparency of actors’ work.</em></td>
<td>Computerisation might reduce the transparency of actors’ work, which might decrease opportunities for RKM via observation and RKM conversation.</td>
</tr>
<tr>
<td></td>
<td>The risk of “information overload” by the use of IS.</td>
<td>The users might not be able to sort out and find their way in too much content.</td>
</tr>
<tr>
<td>Working environment</td>
<td><em>Geographical distance of actors.</em></td>
<td>Hinders actors to initiate RKM.</td>
</tr>
<tr>
<td></td>
<td><em>Emotional distance of actors, involving lack of personal relations between potential knowers and potential knowledge receivers.</em></td>
<td>Hinders actors to initiate RKM.</td>
</tr>
<tr>
<td></td>
<td><em>Lack of transparency of actors’ knowledge, actions and action results.</em></td>
<td>Hinders RKM to occur.</td>
</tr>
</tbody>
</table>
Chapter 10

Theorising Knowledge Mediation

One of the basic questions asked in this work is what common types of knowledge mediation between actors in organisations are. Via empirical data, three basic types of knowledge mediation have been identified and categorised (see Chapter 6 to 9). In this chapter, the variants and characteristics of the three types of knowledge mediation will be further theorised as part of the last analysis stage – concerning explicit grounding, theory validation and theory condensation – described in section 4.5.3. The disposition of this chapter follows an action-oriented paradigm including basic prerequisites for knowledge mediation (section 10.1), variants of mediation processes (section 10.2) and consequences of knowledge mediation (section 10.3).

10.1 Basic Prerequisites for Knowledge Mediation

This section focuses on grounding basic categories relating to the phenomenon of knowledge mediation. It is about analysing and controlling the validity of evolving theory (see Goldkuhl & Cronholm 2003; section 4.5.3). This will mainly be done by comparing inductively generated categories (including subcategories) with existing theories that relate to knowledge mediation between actors in organisations. Section 10.1.1 will theorise about prerequisites for knowledge mediation on the basis of the evocation of the need for knowledge mediation, and section 10.1.2 will theorise about instruments for knowledge mediation.

10.1.1 Evocation of the Need for Knowledge Mediation

As discussed in section 2.6.4, the reference model presented (see figure 2-3) does not say anything about what evokes the need for knowledge mediation. However, to understand knowledge mediation, it seems important to pay regard to what triggers the need for knowledge mediation. Following Szulanski (2000:13), “[a]n opportunity to transfer exists as soon as the seed for that transfer is formed, [. . .] which in turn] may trigger problemistic search for suitable solutions”. Hereby, Szulanski also talks about trigger as one category, but does not discuss what this
‘trigger’ might consist of. Related to the trigger, we also need to consider the motive of initiating knowledge mediation. That is, what do actors want to accomplish by initiating knowledge mediation?

Talking about trigger and motive, we also need to consider the actors involved in knowledge mediation. The view of knowledge mediation outlined in this work builds on certain basic actor roles. Two of these are the knowledge receiver and the knowledge provider. These actor roles are central as knowledge is created via social interaction (see section 2.3.1). A third basic role is the initiator, who is the actor initiating knowledge mediation. Depending on who the initiator of knowledge mediation is different approaches are applied.

The trigger, the motive, the initiator and the approach are four prerequisites for (and categories of) knowledge mediation and these prerequisites will be discussed based on the following questions: What triggers the need for knowledge mediation? What is the motive of initiating knowledge mediation? Who acknowledges the need and initiates knowledge mediation? What approach to accomplish knowledge mediation does the initiator apply? This section closes with a summary of the characteristics of these prerequisites.

The Trigger of Knowledge Mediation

Following Dewey (1938), it is the identification of some indeterminate features of a situation that evokes individuals to inquire (see also section 2.2.3). This was also shown in the empirical data in the sense that actors’ experiences of problematic features of situations were common triggers of knowledge mediation.

Looking further into the empirical data, the characteristics of experienced problems differed. This resulted in a classification of two subcategories: specific problem situation and typical problem situation. The former concerns when an actor experiences a specific problem relating to a specific and present task that needs to be solved. While the latter concerns the experience of a typical problem that relates to a typical, and often common, task of the practice. These triggers have in turn helped to categorise two basic types of problem driven knowledge mediation: ‘specific knowledge mediation’ (SKM) and ‘typical knowledge mediation’ (TKM).

Concerning ‘specific’ and ‘typical’, those and similar notions are used in the KM literature in relation to the characteristics of the knowledge (see Zack 1999; Hendriks 2001). They are also used in relation to the characteristics of the tasks (see Dixon 2000). Goldkuhl & Braf (2001) talk about ‘typical’ and ‘particular’ situations that in turn relate to knowledge about the typical (‘general knowledge’) and knowledge about the particular (‘specific knowledge’).

The key here is not, however, the characteristics of the task or the knowledge but the classification of specific versus typical problems (see further section 11.1.1). This classification is useful to understand different types of knowledge mediation (see Chapter 7 and 8 and section 10.2). In addition, the distinction between specific and typical problem situations can be seen as a contribution to the KM literature, which has paid rather limited attention to the characteristics of the trigger as a prerequisite (category) to understand knowledge mediation.

Knowledge mediation is not only triggered by problematic situations. Empirical data have shown that knowledge mediation might also be evoked as a pure
coincidence (or as part of a routine). An actor might experience a situation that evokes some kind of interest or curiosity, which might result in knowledge mediation. The trigger of this non-problem driven knowledge mediation is a coincident together with a personal attitude of attentiveness, curiosity or interest.

This non-problem driven knowledge mediation is the third basic type of mediation identified in this work and it is called ‘random knowledge mediation’ (RKM, see Chapter 9). Such mediation might, for example, make actors aware of the existence of knowledge that they did not know was either available or needed. During the analysis procedure I have had some difficulties in labelling this third type of knowledge mediation and its trigger. In this regard, the notion of ‘serendipity’ has shown to be useful (see also section 9.3). Serendipity is described as the “faculty of making fortunate finds by chance” (Webster’s Dictionary 1993:473). Or as Myrdal (2002:162, my translation) expresses, serendipity occurs when “we have gained new knowledge that we have not consciously searched for”. This is the core of RKM; it is triggered and accomplished without any conscious search for certain knowledge and without any particular problem to solve.

In sum, SKM and TKM are triggered by experienced specific versus typical problem situations, while RKM occurs in terms of serendipity triggered by coincident together with attentiveness, curiosity or interest.

The Motive of Knowledge Mediation

Following the empirical data, the motive of SKM and TKM is problem-solving. That is, they are both goal- and requirement driven and aim to solve experienced problems. This is in line with several scholars, who mean that being challenged by problematic situations is a motive for gaining knowledge (see Dewey 1931, 1938; Berger & Luckmann 1966; Schön 1983; Molander 1996; Goh 2002; see also section 2.2.2 and 2.2.3). As Goh (2002:28) suggests, “[a] means of driving the information sharing and knowledge transfer is to encourage a problem-seeking and problem-solving culture”. The motive of SKM and TKM is to a high degree intentional; they intend to solve experienced problems. This follows Dewey (1938), who argues that productive inquiry is not a random or ad hoc based search; it is a deliberate and intentional activity to deal with experienced problems (see section 2.2.3).

RKM, on the other hand, is not goal- or requirement driven, and it is not intentional in the same way as SKM and TKM. As described in the above section, RKM occurs in terms of serendipity in the sense that a situation evokes an interest or curiosity of an actor to perform certain actions that might result in knowledge mediation. Hereby, the motive, and partly also the trigger, of RKM is governed by the attitude of actors. In addition, awareness of what happens in the working environment is critical for RKM to occur. To Liedman (2001:224, my translation) for serendipity to occur, “one must already have seen something to be able to see what is new. One also must be curious and attentive”.

In sum, the motive of initiating SKM and TKM is problem-solving, while RKM is motivated by attentiveness, curiosity or interest of actors. One can also say that the trigger, as well as the motive, of RKM is about serendipity. In addition, SKM and TKM are intentional from the perspective of the initiator and with respect to
specific or typical tasks that need to be solved, while RKM is unintentional in the sense that it does not involve any particular pragmatic purpose of the initiator.

**The Initiator of Knowledge Mediation**

When talking about trigger and motive, we also need to pay regard to the actor initiating knowledge mediation. In SKM the initiator is often a specific actor who needs to solve a specific task or want to help other actors to solve their specific tasks (see examples in section 7.1 and 7.2). In other words, the initiator of SKM is either the intended knowledge receiver in terms of being a knowledge needer or the intended knowledge provider in terms of a knower. The initiator might also be an IS that based on its pre-designed functionality automatically produces and delivers signs to the IS users.

In TKM the initiator might be the intended knowledge receiver or likely also an intended knowledge provider. However, empirical data have shown that the initiator of TKM is commonly a coordinator who is a third person that has acknowledged a typical problem that needs to be handled. As described in section 8.1, the coordinator is an actor who initiates TKM, but not in the role of being a potential knowledge receiver or knowledge provider. One task of the coordinator is to accomplish collaboration between actors and their actions to realise knowledge mediation. Talking about actors coordinating KMI, the KM literature often uses concepts such as ‘knowledge chief officer’ (CKO) and ‘knowledge officer’ (see Nonaka & Takeuchi 1995; Davenport & Prusak 1998; von Krogh et al. 2000), which have similarities with my category ‘coordinator’. However, the concept of ‘coordinator’ is here preferred as this actor might not necessarily have a formal role as a CKO, which tends to be an assumption in the KM literature (see further section 11.1.1).

In RKM the initiator might be any actor in terms of either a potential knowledge receiver or a potential knowledge provider. In fact, the knowledge receiver, knowledge provider and coordinator of SKM, TKM and RKM are all ‘potential’ as the knowledge mediation has not yet been initiated (that is, in this section 10.1.1, I just discuss prerequisites for knowledge mediation). However, in RKM the potential characteristic is more obvious in the sense that the initiator has no conscious pragmatic intention of gaining or sharing knowledge.

**Approaches to Knowledge Mediation**

Depending on who initiates knowledge mediation, two basic approaches have been identified: the pull approach and the push approach. SKM as well as TKM have shown empirical examples of both approaches. RKM does also involve either a pull approach or a push approaches but not in the same way as SKM and TKM. RKM is not conscious and intentional in the same way as SKM and TKM. Thus, the overall approach applied in RKM is labelled ‘fortuitous and spontaneous’ (see also section 9.3.1).

In general, the pull approach is used when the initiator is a knowledge receiver (see examples in section 7.1 and 8.2), while the push approach is used when the initiator is a coordinator, a knower or an IS with automatic push functionality (see examples in section 7.2 and 8.1).
The labels ‘push’ and ‘pull’ are also used by Dixon (2000). To Dixon, ‘push’ means that knowledge appears automatically without the user needs to look for it, while ‘pull’ means that the user needs to search for the knowledge. In this work, push and pull have similar meanings, as described by Dixon. However, one difference is that Dixon talks about push and pull in relation to the use of information systems while this work uses ‘push’ and ‘pull’ in a more general sense to classify different variants of knowledge mediation. As such, the push approach and the pull approach have been seen in both IT-based and none IT-based knowledge mediation.

**Summary of Some Basic Prerequisites for Knowledge Mediation**

In sum, the trigger and the motive of knowledge mediation are important categories to understand how the need for knowledge mediation is evoked and why knowledge mediation is initiated. The trigger and the motive do also relate to the actor who initiates knowledge mediation, that is, the initiator. Depending on the characteristic of the initiator, different approaches are applied. Thus, the initiator and the approach are two additional categories part of the prerequisites for knowledge mediation. Table 10-1 summarises the characteristics of the trigger, the motive, the initiator and the approach of each of the three basic types of knowledge mediation.

**Table 10-1: The characteristics of some prerequisites for Knowledge Mediation**

<table>
<thead>
<tr>
<th>Category</th>
<th>SKM</th>
<th>TKM</th>
<th>RKM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger</td>
<td>An experienced specific problem related to a specific and current task of an actor(s)</td>
<td>An experienced typical problem related to a typical, often common, task of the practice</td>
<td>Serendipity: A coincident, or part of a habit, together with a personal attitude</td>
</tr>
<tr>
<td>Motive</td>
<td>Intentional, specific problem-solving</td>
<td>Intentional, typical problem-solving</td>
<td>A personal attitude of attentiveness, curiosity or interest</td>
</tr>
<tr>
<td>Initiator of knowledge</td>
<td>- Knowledge needer (receiver)</td>
<td>- Coordinator</td>
<td>- Potential knowledge receiver, or</td>
</tr>
<tr>
<td>mediation</td>
<td>- Knower (knowledge provider)</td>
<td>- Knowledge needer (receiver)</td>
<td>- Potential knowledge provider</td>
</tr>
<tr>
<td></td>
<td>- Automatic IS</td>
<td>- Knower (knowledge provider)</td>
<td></td>
</tr>
<tr>
<td>Approach to knowledge</td>
<td>- Pull approach</td>
<td>- Pull approach</td>
<td>- Fortuitous and spontaneous (involves a push or a pull approach)</td>
</tr>
<tr>
<td>mediation</td>
<td>- Push approach</td>
<td>- Push approach</td>
<td></td>
</tr>
</tbody>
</table>

**10.1.2 Instruments for Knowledge Mediation**

When a need for knowledge mediation has been triggered and motivated, one of the subsequent issues concerns how the knowledge is to be mediated. As illustrated in figure 2-3 (see section 2.6.4), knowledge mediation is accomplished via mediating instruments. The concept of ‘mediating instrument’ derives from Vygotsky (1986) who contends that individuals do always communicate via instruments (see further section 2.4.2; see also Berger & Luckmann 1966; Wertsch 1998). For example, in oral communication the mediating instrument is oral language (speech, signs), while written language is the instrument used in IT-based communication.
In the following, the notion of ‘mediating instrument’ will be further discussed based on Hansen et al.’s (1999; see also section 3.2.2) knowledge management (KM) strategies, that is, the codification strategy and the personalisation strategy. These two strategies are frequently referred to in the KM literature, and Hansen et al. present some interesting ideas that might be useful for this work.

**Codification versus Personalisation Strategy (Hansen et al. 1999)**

Following Hansen et al. (1999), the codification strategy is applied in organisations that have a technology-oriented KM approach. Knowledge is ‘codified’ and mediated by the use of IS via a people-to-document approach; “it [read: knowledge] is extracted from the person who developed it, made independent of that person, and reused for various purposes” (Hansen et al. 1999:108). The codification strategy “allows many people to search for and retrieve codified knowledge” (ibid.). By contrast, the personalisation strategy is applied in organisations where “knowledge is closely tied to the person who developed it and is shared mainly through direct person-to-person contacts” (Hansen et al. 1999:107). Hansen et al. (1999:108) also argue that the personalisation strategy focuses on dialogue between individuals, while the codification strategy is accomplished by the use of “knowledge objects in a database”. They mean that “knowledge that has not been codified – and probably couldn’t be – is transferred in brainstorming sessions and one-on-one conversations” (ibid.). The authors also claim that organisations should choose one main strategy (see also section 3.2.2).

I agree with a number of positions presented by Hansen et al. For example, the assumptions that knowledge can be expressed by the use of oral and written signs and that written signs can be detached from the original knower (see also Berger & Luckmann 1966; Clark & Brennan 1991; section 2.3.2). However, based on the empirical data of this work, it does not seem proper that organisations should choose one main strategy (see also reasoning in section 3.2.2). Each of the empirical cases of this work has shown examples of the personalisation as well as the codification strategy as defined by Hansen et al. In fact, several empirical examples involve both strategies (see the examples of knowledge mediation accomplished by the use of multiple mediating instruments, section 7.1.1 and 7.1.2). Empirical data also show that even if written signs are available, a person-to-person strategy is often preferred (see section 7.3.5).

Furthermore, the distinction between codified knowledge and knowledge that is not codified (and needs to be transferred via person-to-person dialogues) can be questioned. How is knowledge mediated between individuals if it is not codified in some sense? Following Vygotsky (1986), actors communicate by the use of instruments (see section 2.4.2). When actors – consciously or unconsciously – mediate knowledge between each other, their knowledge needs to be externally manifested and exposed in some sense. That means to enable knowledge mediation the knowledgeability of actors needs to be accessible to other actors. Actors’ knowledge can be manifested in their actions or action results that are observable to others or it can be exposed by the use of language including oral or written signs.

The following is a clarification of the view of mediating instruments and communication strategies suggested by and applied in this work. Based on
empirical data, I will open with some brief discussions about three fundamental ways of communicating knowledge and their respective mediating instruments.

**Observation of Actions and Action Results**

Observation is one way to mediate knowledge between actors. ‘Pure observation’ is observation without the use of language. Observation might be *intentional* and *planned* as in a master-apprentice relationship where the master aims to show the apprentice certain tasks (as an example of TKM). Observation might also be *unintentional* in the sense that an actor just happens to see certain actions of another actor without any of them having an intention to mediate knowledge (as in RKM via observation).

Pure observation might be complemented by the use of language. For example, the master explains something to the apprentice while showing it in action or an actor overhears a conversation between other actors. As in the latter case, the conversation does not have to be between the observer (over-hearer) and the observed actors. Still, the observed actors’ use of language while communicating facilitates knowledge mediation to the observer. Consequently, knowledge mediation via observation can be accomplished both with and without the use of *language*. Either way the knowledge might be mediated intentionally or unintentionally, consciously or unconsciously, from the acting actors to the observing actor as a kind of *person-to-person strategy* (see Hansen et al.’s personalisation strategy).

**Communication via Oral Signs**

As discussed earlier in this dissertation, the use of language is likely the most significant instrument for knowledge mediation (Berger & Luckmann 1966; see also section 2.3.2). For example, actor A might ask actor B to explain what he is doing (as in RKM via conversation, see section 9.1.2), or actor A might ask actor B to help him to deal with a specific problem (as in SKM pull approach, see section 7.1). The initiative of actor A might result in a *simple question and answer* or evolve into an *extended dialogue* in which knowledge is mutually exchanged and developed by the actors. In both cases, the knowledge mediation is accomplished by the use of language via oral communication.

Using language to mediate knowledge involves sense-giving as well as sense-reading. Sense-giving is about expressing knowledge by the use of language and sense-reading is about interpreting expressions (see Polanyi 1969; section 2.3.2). We might say that sense-giving is a kind of codification and sense-reading is about interpreting codifications. Still, to Hansen et al. (1999), the use of oral person-to-person communication is classified as a personalisation strategy involving *non-codified knowledge*. However, communication by the use of language always involves ‘codification’ – sense-giving – of knowledge. Hence, Hansen et al.’s distinction between the personalisation strategy and the codification strategy does not hold when scrutinising their respective underlying meanings.
Communication via Written Signs

Even if language origins from face-to-face situations it can be detached from the direct meeting by the use of written language (see Berger & Luckmann 1966; Clark & Brennan 1991; see also section 2.3.2). For example, actor A might put a request to actor B via an e-mail that actor B responds to. As in oral communication, this example is also a person-to-person communication but by the use of written signs (instead of oral signs). Following Hansen et al. (1999:108), this would fall into personalisation strategy and they explicitly state that “[t]o make their personalization strategies work, [. . .]. Knowledge is shared not only face-to-face but also over the telephone, by e-mail, and via video-conferences”. Again, the distinction between personalisation and codification seems unclear as the use of, for example, e-mail presumes that knowledge has been ‘codified’.

Nonetheless, by the use of written signs, knowledge can be extracted from the actor (the original knower and knowledge provider) who possesses it, and the expressions (written signs) can be stored and made available to many other actors via information systems; as in TKM push approach to unspecified receivers and in RKM via written signs and IS (see section 8.1.2 and 9.1.3). Following Hansen et al. (1999:108), this is one of the core elements of the codification strategy and “[t]his approach allows many actors to search for and retrieve codified knowledge without having to contact the person who originally developed it”.

Communication Strategies: An Alternative View

First of all, instead of using Hansen et al.’s term ‘KM strategy’, the term ‘communication strategy’ will be used as an overall label. The reason for choosing this alternative label is that the meaning of the concept becomes clearer. That is, the core of what is discussed in this section 10.1.2, and also by Hansen et al. (1999), concerns the communication modes and strategies used to mediate knowledge.

By analysing empirical examples from the cases, I realised that some of the significant differences between sense-giving via oral signs and written signs (as two kinds of ‘codification’) concern the degree of detachment, accessibility and preservation. In face-to-face dialogue – person-to-person – the codification is limited in terms of detachment in the sense that the mediation is dependent on the presence of the actors involved in the process. It is accomplished ‘here and now’ and demands a co-presence of the actors involved in the face-to-face dialogue (see also Clark and Brennan 1991).

Concerning accessibility, the face-to-face dialogue is more or less private between the actors involved in the communication. Not private in a strict sense but private between the organisational actors participating in the conversation. That means there are limited possibilities for others to take part of the knowledge communicated. Other actors might overhear a conversation, but the accessibility is still limited to the actors present ‘here and now’. Clark & Brennan (1991) also talk about these features but use other terms; they talk about detachment and accessibility in terms of ‘immediacy’ of the face-to-face conversation in which actors are present and can see, hear and perceive each other (see section 2.3.2).

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1 The notion of ‘detachment’ is borrowed from Berger & Luckmann (1966; see also section 2.3.2).
Concerning preservation this is also limited in the face-to-face communication as the opportunity to take part of the utterances will only exist for a moment. When the actor has finished his utterances, the meanings of the utterances will (at best) only exist in the minds of the actors listening to it. In this way, it is a limited preservation of the signs communicated in face-to-face dialogues (they might even be forgotten). Thus, the opportunity to access the signs is instant, and parts of the communication might need to be repeated if any of the actors forget what has been said. This instant characteristic of face-to-face communication can be compared with Clark & Brennan’s (1991) notions of ‘evanescence’ and ‘recordlessness’, meaning that spoken language fades away, and the actors’ actions leave no record or artefact.

Empirical data have also shown examples of face-to-face situation when an actor (a knowledge provider) expresses parts of his knowledge to a large audience, which concerns person-to-people via oral communication (as in TKM push approach to unspecified receivers, see section 8.1.2). If the number of participants is high, several actors will have access to the mediated knowledge. However, even if the audience has access to the speaker’s utterances, the speaker has restricted access to the addressees (Clark & Brennan 1991; Clark 1996). Thus, in oral communication person-to-people the accessibility is somewhat limited in comparison with oral communication person-to-person.

Going back to the person-to-person communication, this might also be accomplished via written signs using a person-to-document-to-person strategy (for example, by the use of e-mail). In such a case, the accessibility has almost the same limitation as in oral communication; the communication is limited to those having access to the written signs. The preservation, however, is higher as the actors will have the written signs expressing their knowledge about certain referents (see figure 2-1, section 2.4.2) even after their communication has finished. Hence, written signs have a higher degree of preservation than oral signs. Written signs have permanence, while oral signs are instant. This follows that written signs can be preserved, made available and used over and over again. Concerning detachment, the communicating actors do not need to meet face-to-face, still it is a person-to-person contact.

The communication of knowledge can also be accomplished without personal or direct contacts. For example, an expert can express parts of his knowledge concerning his expertise and store the expressions in an IT-based information system. Written signs will hereby become accessible for many actors. They get public to the organisational actors, and perhaps also to external actors. The signs might be addressed to a certain group of actors or just to anyone via a person-to-document-to-people strategy. For example, Architect had experienced a typical problem that concerned the need to continuously update the architects with news and part of the solution was to make signs available via the firm’s intranet (see section 8.1.2).

Empirical data also showed that IS were not only used to make expressions and manifestations of actors’ knowledge accessible as in TKM push approach. IS were also used as mediating instruments in SKM push approach to support the daily work of actors. For example, Energy had developed an IS that automatically provided the operators with signs representing the current state of the energy net (see section
7.2.3). This was a result of a previous TKM initiative that, in turn, facilitated the operators’ work via SKM push approach enabled by a pre-designed functionality of the IS (see ‘automatic action’ of IS, Goldkuhl & Ågerfalk 2000; section 2.5.1).

Using IS as instruments for knowledge mediation, the signs expressing actors’ knowledge are detached from the original knower. This kind of detachment can reach a point when the receiver might not know who the original knower (in terms of the knowledge provider) is. When the knower and the knowledge receiver are anonymous to each other, there is a kind of de-personalisation of the signs representing the knower’s knowledge. Still, even if the receiver does not know the knower and producer of the signs, the receiver can take part of the knower’s knowledgeable via the written signs available via documents and IS. As in person-to-document-to-person communication, the person-to-document-to-people strategy has a high degree of permanence.

In sum, based on the investigation of the two strategies suggested by Hansen et al. (1999), and in comparison with empirical data and other theories (for example, Vygotsky 1986, Clark & Brennan 1991), I would like to propose an alternative view of communication strategies. Besides pure observation, there are two basic ways to communicate – oral communication and written communication – that, in turn, can be related to oral signs and written signs respectively as two basic mediating instruments. When analysing these two communication modes and their respective instrument, three partly interrelated characteristics of signs representing actors’ knowledge following a scale from one extreme to another have been identified. These characteristics concern the degree of accessibility that varies from private to public, the degree of preservation that varies from instant to permanent and the degree of detachment that varies from personal-dependent to de-personalised (see illustration in figure 10-1 below).

As shown in figure 10-1, we have the personalisation strategy on the one extreme and the publication strategy on the other. The label ‘publication strategy’ is preferred as an alternative to Hansen et al.’s ‘codification strategy’ as both the personalisation and the publication involve the use of signs as a kind of ‘codification’ of actors’ knowledge. As also shown in figure 10-1, a distinction (see the dashed line) has been made between pure observation and the use of signs in oral and written communication. That means that pure observation does not involve signs in terms of linguistic utterances, while oral communication and written communication involve the use of linguistic utterances.

![Figure 10-1: A spectrum of characteristics of signs used in two basic communication strategies](image-url)
The Role of Information Systems in the Two Communication Strategies

Then, what is the role of information systems in the two communication strategies? The core of the personalisation strategy is that actors communicate person-to-person, and often by meeting and talking face-to-face. The personalisation strategy might also involve the use of technology whereby actors can communicate without meeting face-to-face. Empirical data have shown examples of actors using telephone or e-mail, which are technology-based instruments for communication. However, even if actors use technology does not mean that the technology represents an IS. E-mail is a designed technology-based artefact to facilitate communication, but the communication as such is seldom organised and pre-designed. The communication via e-mail between actors can concern any issue and there are few pre-defined rules of how to communicate.

The application of a personalisation strategy to facilitate and perform knowledge mediation focuses on arranging situations and places where actors can meet and talk without the use of pre-designed and organised IT-based information systems.

The core of the publication strategy, on the other hand, is that actors do not have to meet or have personal contacts but will still be able to acquire and share knowledge. Hence, in the publication strategy, information systems have an essential role. Information systems enable actors to communicate without seeing or knowing about each other as participants in knowledge mediation. This is because IS are pre-designed and organised instruments for communication. As such IS are not only pre-designed technology-based artefacts. Information systems are also arranged and systemised ways to communicate certain pre-defined contents.

Hereby, when applying a publication strategy to facilitate and perform knowledge mediation, information systems are crucial as organised and systemised instruments for communication.

Reflecting on the different characteristics of the two communication strategies, the publication strategy might be preferable as written signs made available via IS represent a higher degree of preservation and accessibility in comparison with oral signs in the personalisation strategy. For example, some actors might have formulated certain working procedures in order to facilitate the work of other actors who can take part of the written working procedures via an IS without talking with the producers of the procedures. There are, however, three circumstances in favour of the oral communication and the personalisation strategy.

First, in the personalisation strategy the actors involved have the opportunity to repeat and formulate follow-up questions to make sure that they understand each other. This kind of exchange of utterances is not possible when actors just have the written signs to rely on, and, based on empirical data, that tends to hinder actors to use IS and written signs to gain knowledge (see section 7.3.5). Second, the personalisation strategy facilitates a further discussion about the knowledge referent. In this way, the actors might discuss an issue from different perspectives or based on varying prerequisites. For example, they might talk about general knowledge about typical working procedure and how that knowledge can be applied into a specific task and context. Third, written expressions of knowledge might be obsolete if they are not updated when needed. This is also valid for oral expressions.
However, empirical data have shown that there is a lower degree of reliance of the content of written signs than of oral signs.

There are both benefits and drawbacks with the personalisation strategy as well as the publication strategy. One is not better than the other, and based on empirical data it is questionable if organisations should choose one main strategy, as asserted by Hansen et al. (1999). I would rather say that the personalisation strategy and the publication strategy complement each other and are useful in different ways. Depending on, for example, the characteristics of the experienced problems sometimes a personalisation strategy is required, sometimes a publication strategy is sufficient and sometimes a combination of the two communication strategies is needed. The suggestion of this work is not to choose one main strategy, but to use both strategies as complementary. This is in line with Walsham (2004:7) who suggests a “blended approach” in which signs mediated by the use of IS are complemented by other forms of interaction such as face-to-face meetings.

10.2 Variants of Knowledge Mediation Processes

Based on empirical findings, three basic types of knowledge mediation have been identified (see Chapter 6). When further investigating the empirical data variants of these types have been observed (see examples in Chapter 7 to 9). In this section, the variants of the three basic types will be illustrated. Some theoretical grounding will be done, but a primary goal of this section is to investigate the conceptual structure of evolving theory (see ‘internal grounding’, Goldkuhl & Cronholm 2003; section 4.5.3). All variants involve at least two distinct actor roles: the knowledge receiver (also called the knowledge needer or the knowledge seeker depending on the certain variant of knowledge mediation and the stage in the knowledge mediation process) and the knowledge provider (the original knower). Hereby, the view of knowledge as socially constructed (see section 2.3.1) is manifested in all variants. Furthermore, based on the reasoning in section 10.1.2, the following subsections pay explicit regard to the communication strategy as an additional category used to understand knowledge mediation.

Be it also noted that when comparing the identified variants discovered in the empirical data, I realised that several variants were very similar. Thus, the conceptualisations in the following subsections will not illustrate all identified variants. Instead, earlier presented categorisations and variants (see Chapter 6 to 9) will be further abstracted and condensed. The aim is not to reach one central category, as argued in GT by Strauss & Corbin (1998), but to integrate and refine evolving theory (see Goldkuhl & Cronholm 2003). To make the analysis procedure of this work transparent, all identified variants described in the previous chapters are summarised in appendix 1. In relation to the illustrations below, references will be given to the concerned variants presented in appendix 1.

One final and important comment should be made: The illustrations and categorisations presented in the following subsections might be interpreted as idealistic, and perhaps also simplistic, types and variants of knowledge mediation. In this regard, I want to emphasise that they are idealisations. Not in the sense that they are necessary desirable or represent average types and variants, but in the sense
that they are the result of my abstractions and condensations of the empirical data collected in this work (see reasoning about “[t]he ideal type” in Nurminen 1988:18ff.). They are also simplifications of knowledge mediation as they presume that the initiators are capable of defining experienced problems and describe those to other actors in an understandable way. However, as shown in the empirical examples, this is not always the case. Still, it would not be meaningful to illustrate all possible variants or potential hindrances and facilitators in the descriptions and figures below. I will theorise about circumstances influencing knowledge mediation in Chapter 11.

10.2.1 Variants of Specific Knowledge Mediation

One of the three basic types of knowledge mediation identified in the empirical data is specific knowledge mediation (SKM), which is triggered by experienced specific problem situations (see Chapter 7). An actor experiences a problem situation – an indeterminate situation (Dewey 1938; see section 2.2.3) – due to a lack of knowledge. In order to deal with the problem, additional knowledge is needed. In the following subsections, different variants of SKM will be discussed and illustrated based on the reference model presented in section 2.6.4 (see figure 2-31).

**SKM Pull Approach via Personalisation Strategy**

Empirical data have shown that the actor working with the specific task is often the one who initiates SKM and becomes the knowledge seeker who aims to acquire certain knowledge to be able to accomplish the task at hand. When the initiator is the one who needs knowledge, the mediation is based on a pull approach. As shown in the empirical examples in section 7.1.1 and 7.1.2, SKM pull approach involves different degrees of interaction between the knowledge receiver and the knowledge provider, and different kinds of instruments. Based on the discussion in section 10.1.2, another category that seems to have a higher ‘analytical power’ (Strauss & Corbin 1998) is the ‘communication strategy’. Thus, the following categorisations will use the ‘communication strategy’, rather than the degree of interaction and the mediating instruments, to distinguish between variants of SKM.

Starting with SKM pull approach via limited interaction, three variants have been identified (see section 7.1.1; see also variant 1, 2 and 3 in appendix 1). Those are specified on the basis of the degree of interaction and also the mediating instruments used to accomplish the mediation. When re-classifying these variants based on their respective communication strategy, variant 1 represents the publication strategy while variant 2 and 3 represent examples of the personalisation strategy. The latter two only differ in regard to the mediating instrument used (written versus oral signs). Variant 5 in appendix 1 (see examples in section 7.1.2) is almost identical with variant 3; the only difference here is the degree of interaction. Hence, variant 2, 3 and 5 are very similar and do all apply a personalisation strategy. Thus, these three variants have been condensed and

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1 As illustrated in figure 2-3, ‘signs’ refer to the actors’ understanding about a certain knowledge referent. The figures in this section 10.2 will not include illustrations of ‘knowledge representation’ due to the risk that the figures would become too messy. Still, the idea of knowledge representation as described in section 2.6 underlies all the figures in section 10.2.1 to 10.2.3.
categorised into one variant labelled *SKM pull approach via personalisation strategy* (see illustration in figure 10-2 below).

To explain how to read figure 10-2: 1) Via sense-reading (sr), and based on certain pre-knowledge (pk), an actor – the knowledge receiver (seeker and needer) – experiences a specific problem situation related to a specific task. 2) To solve the experienced problem, the actor – in the role of being a knowledge seeker – formulates an oral or written request via a sense-giving (sg) activity towards another specific actor – the knowledge provider – who the seeker believes can provide with the needed knowledge. 3) The knowledge provider interprets the request on the basis of his pre-knowledge (pk) and 4) via sense-giving (sg), he formulates an oral or written reply to fulfil the needs of the seeker\(^1\). 5) The knowledge seeker – now in terms of knowledge receiver – interprets the reply, gains the needed knowledge and 6) applies it to solve the experienced problem.

![Figure 10-2: SKM pull approach via personalisation strategy](image)

To further explain the communication illustrated in figure 10-2, Sacks’ (1992) concept of *turn-taking* will be used. Turn-taking means that one actor talks and then stops and another actor continues to talk and then stops. Following Sacks (1992), to fulfil the intention of a conversation, there needs to be an ordered pair of utterances (a first and a second\(^2\)) produced by different actors – a so-called *adjacency pair*. For knowledge mediation to be fulfilled, a request needs to be followed by a reply that corresponds to the request\(^3\). The communication illustrated in figure 10-2 shows only one turn-taking, which, in this work, is classified as *limited interaction*. However, to accomplish the mediation, the communication might need to continue with additional numbers of turn-takings, which would be referred to as *high interaction*. This is not shown in the figure, which focuses on illustrating significant characteristics and basic underlying ideas rather than all variants of turn-takings and process flows.

**SKM Pull Approach via Publication Strategy**

As mentioned in the above subsection, variant 1 (see appendix 1) represents a SKM pull approach via a publication strategy. This means that a knowledge seeker does

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\(^1\) This presumes that the knowledge provider understands the request and can give a relevant reply.

\(^2\) Within dialogue theory the first utterances is categorised as an initiative and the second as a response (see Linell 1998; Schiffrin 1994).

\(^3\) There are also other types of responses and adjacency pairs, for example, greeting-greeting, offer-acceptance, request-acceptance and complaint-excuse (Levinson 1983; Sacks 1992).
not need to have personal contact with, or even know, the knowledge provider, but the seeker can still take part of another actor’s (the provider’s) knowledge via signs and thereby gain knowledge. In the publication strategy, the signs can be mediated via information systems (IS) and paper documents such as books and journals. Hereby, parts of the provider’s knowledge has been ‘detached’ (see section 10.1.2) from him and made available via written signs (as part of a TKM initiative, see further section 10.2.2). Thus, in the publication strategy the knowledge seeker does not formulate an oral request and expects the provider to give a reply. The seeker might be able to formulate a written request and get a reply from an IS, for example, if the content of the IS has pre-defined indexes and searching opportunities. Otherwise, the seeker needs to actively search in the content of the IS or a book to find the knowledge demanded to solve the experienced problem.

Based on the empirical data from the cases, IT-based IS are nowadays often used as mediating instruments in the publication strategy. One reason for an extended use of such systems is partly due to the broad functionality offered by contemporary IS. The use of IS also facilitates a broader accessibility to the content, and many actors can get the same information at the same time.

Figure 10-3 below illustrates SKM pull approach via publication strategy. As shown in the figure, the mediating instrument represents an IS. However, the characteristics of this variant do also apply if the mediating instrument was a book or other paper document. Concerning the degree of interaction between the knowledge seeker and the knowledge provider, this is limited and indirect as the communication is accomplished without any direct contact between the two actors. The interaction between the knowledge seeker and the IS can, of course, be high. However, in this work, when talking about ‘interaction’, this refers to the interaction between human actors, that is, the knowledge receiver and the original knower.

1) Sense-reading (sr) of an experienced specific problem situation related to a specific task
2) Sense-giving (sg) pull approach
3) Searches an answer in
4) sr of signs
5) Applies the knowledge to handle the task

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**Figure 10-3: SKM pull approach via publication strategy**

It should be emphasised that this variant presumes the existence of an IS together with previous sense-giving activities (by the use of written signs) of one or several knowledge providers. Hereby, SKM pull approach via publication strategy is made

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1 For example, in Publish the editors used pre-designed reports available in an IT-based order system to get to know who bought a certain book and how many copies were sold.
2 Following Sjöström & Goldkuhl (2002), an IS has often several knowledge providers. Still, there are four possible situations when using IS as instruments for human communication: ‘one to one’ situations where one actor intervenes using an IS and one actor can receive the message (or parts of it), ‘one to many’ situations, ‘many to one’ situations and ‘many to many’ situations (ibid.).
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possible due to earlier sense-giving activities of the knowledge providers (see the dashed square), who often are unknown to the IS users. This implies a connection between SKM pull approach via publication strategy and earlier performed TKM initiatives. This means that an actor (usually a coordinator) has previously experienced a typical problem that he tried to solve as a kind of anticipated need for future knowledge mediation that is facilitated by the design and use of an IS as the mediating instrument (a TKM push approach via publication strategy, see figure 10-8 below). The coordinator might have recognised a need to make certain knowledge available to actors to facilitate common and typical actions. Hereby, there is an important relation between SKM and TKM (see further in section 10.2.2 and 10.2.4).

SKM Pull Approach via Combined Strategies

Looking further into the variants in appendix 1, variant 4 and 6 only differ concerning the degree of interaction (see examples in section 7.1.1 and 7.1.2). Notwithstanding this discrepancy, they have similar characteristics and involve multiple instruments, including a combination of a personalisation and a publication strategy.

Furthermore, comparing variant 4 and 6 with variant 7, there are several similarities. The main difference between the two former and the latter is that variant 7 is accomplished via a joint creation of the knowledge needed. This means that the actors involved in variant 7 develop and gain knowledge together. However, a joint creation of knowledge might be the fact in more or less all variants of the personalisation strategy. Thus, the central issue here is to illustrate a variant that represents the use of multiple instruments and a combination of the two strategies, that is the SKM pull approach via combined strategies (see figure 10-4).

Figure 10-4: SKM pull approach via combined strategies

The interaction between the specific knowledge receiver and the specific knowledge provider(s) represent the personalisation strategy, while the use of the IS represents the publication strategy. The publication strategy does not necessarily involve an IS; it might also involve a book or journal. In addition, the dashed lines

1 The coordinator (and also the knowledge providers) try to influence and change the world in some way (‘acting-through-intervention’, Sjöström & Goldkuhl 2002). When the result of the providers’ sense-giving – the written signs – is used by the receiver (the IS user), the signs aim to influence the understanding of the user (‘acting-through-receiving’, ibid.).

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around the IS, signs and the unknown knowledge provider(s) illustrate that the signs available via the IS are a result of an earlier TKM initiative.

**SKM Push Approach via Personalisation Strategy**

Besides the SKM pull approaches illustrated in figure 10-2 to 10-4 above, empirical data have also shown examples of SKM initiated by a knowledge provider, that is, SKM *push approach*. Variant 8 to 10 in appendix 1 represent SKM push approach. The empirical examples underlying those variants have been classified and categorised based on different kinds of routines (see section 7.2). However, reflecting on that categorisation, SKM push approach is not necessarily and always part of routines and one can also question how to distinguish between informal and formal routines. Hence, as an alternative and conceptually clearer category of classification I have preferred to use the communication strategy (just as in the previously presented and condensed variants in figure 10-2 to 10-4).

Comparing variant 8 and 9 the only difference concerns the degree of interaction that is not significant enough to be used as a distinguishing category. However, variant 10 is more unique as this applies a publication strategy while variant 8 and 9 represent personalisation strategies. Thus, variant 8 and 9 is condensed into one variant called *SKM push approach via personalisation strategy* (see figure 10-5 below). Even if figure 10-5 illustrates a limited interaction – actually not even a single turn-taking or an *adjacency pair* (Sacks 1992) – the interaction of this variant can be either limited or high, depending on the characteristics of the problem (see further section 11.1.1 and 11.1.2).

As shown in figure 10-5, 1) in a push approach it is the knowledge provider who identifies a problem related to another actor’s task. 2) Instead of being passive and wait for a potential request from the other actor – the intended knowledge receiver – the knowledge provider forestalls the receiver by exposing his knowledge via oral or written signs. 3) The signs are interpreted and related to the receiver’s pre-knowledge as part of her sense-reading before it can be applied in her action (4).

![Figure 10-5: SKM push approach via personalisation strategy](image)

For the SKM push approach to be successful – in the sense that the exposed knowledge will be interpreted as actionable and be used in action – assumes that the provided signs are understood to the receiver, relevant for her task and that she realises this and has the capability to apply it in the specific action. The receiver might neglect the advice or might have difficulties to interpret it whereby she might ask for clarification (that is, a turn-taking in the interaction).
SKM Push Approach via Publication Strategy

As mentioned above, variant 10 in appendix 1 differs in comparison with variant 8 and 9 in terms of communication strategy and mediating instrument. Hence, variant 10 is a significant knowledge mediation variant called SKM push approach via publication strategy. Hereby, instead of using ‘IT-based routine’ (see section 7.2.3), the communication strategy is used as the distinguishing category. SKM push approach via publication strategy is made possible due to earlier TKM initiatives (just as ‘SKM pull approach via publication strategy’, see figure 10-3 above; see further ‘TKM push approach via publication strategy’ in figure 10-8 below). SKM push approach via publication strategy represents a pre-designed and institutionalised variant of knowledge mediation. One significant characteristic of this IT-based variant is its pre-designed functionality, which enables a push approach to the IS users as the knowledge receivers.

As illustrated in figure 10-6 below, the knowledge providers – who fill the IS with content – are often unknown to the receivers, and the providers as well as the receivers are often many in number. The receivers are specified – for example, in terms of a specific organisational role – in this variant of the publication strategy. This is shown in the examples in section 7.2.3, where the geographical net IS in Energy were instruments for the operators in their daily work. The IS of the LN did automatically produce and deliver signs to the LN operators based on its pre-defined functionality, and the IS of the SN did automatically deliver signs entered by an actor working at the marketing unit.

Finally, the interaction between the knowers and the receivers is limited as they do not have any direct contact and might not even know about each other’s roles in the mediation process.

![Figure 10-6: SKM push approach via publication strategy](image)

10.2.2 Variants of Typical Knowledge Mediation

In this section, variants of typical knowledge mediation (TKM) will be illustrated. Just as the variants of SKM illustrated in section 10.2.1, the variants presented here will also be re-categorised and condensed based on the communication strategy. I will also use the ‘approach’, which follows the characteristic of the initiator, and empirical data have shown examples of both the push approach and the pull approach. Another significant feature of TKM is the need for planning and design. TKM is typically about arranging knowledge mediation activities in order to
prepare for future mediation and to facilitate actors’ acquisition of knowledge to enable them to deal with future actions in a competent way. In this regard, the coordinator has a significant role in TKM.

TKM Push Approach via Personalisation Strategy

The need for TKM might be realised by any actor, but following the empirical data the one commonly initiating TKM push approach is a kind of coordinator, for example an operational manager or a staff manager. The coordinator identifies a typical problem\(^1\), which triggers him to initiate a TKM initiative and the motive is to solve the experienced, or perhaps created\(^2\), problem. The coordinator plans the mediation and assigns one or several knowledge providers to share their knowledge related to the typical problem. As such this variant is a kind of arranged knowledge mediation initiative; it is pre-planned and pre-designed.

Even if the coordinator gives the ‘assignment’ to a knowledge provider, the coordinator might need to support parts of the design and follow-up the mediation process. For example, the knowledge provider might need support in defining the intended receivers and how to accomplish the mediation.

Furthermore, coordination might be accomplished in different ways (see Mintzberg 1983, 1998; Melin 2002). For example, concerning the operators who were to exchange knowledge about the energy nets (see example in section 8.3.1), the personnel manager first tried to get the knowledge mediation accomplished based on informal communication (as ‘mutual adjustment’, Mintzberg 1983). However, this did not work, and the personnel manager had to plan (re-schedule their work) and follow-up the initiatives, which was more of ‘direct supervision’ (Mintzberg 1983). The knowledge work of Architect (see section 5.3.2 and 8.3.2) was to a large degree about ‘standardising’ activities performed within the knowledge work in order to establish and maintain its ‘knowledge practice’ (as a ‘standardisation of work processes’, Mintzberg 1983).

However, the most significant feature of TKM is that it to a large degree is about ‘standardising skills and knowledge’, which indirectly strives to achieve standardisation of work processes and results of organisations’ core work practices (see Mintzberg 1983). TKM is about securing that actors possess and have access to knowledge that is considered critical to the practice. Having this knowledge enhances the knowledgeability of the actors to perform skilful actions.

To continue, when investigating the variants of TKM push approach described in appendix 1, both variant 11 and 12 showed to apply a personalisation strategy. Two differences concern the characteristics of the receivers and the degree of interaction. Variant 11 has specific receivers and is accomplished via high interaction; while variant 12 has unspecified receivers and limited interaction (see examples in section

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1 A typical problem often concerns typical and recurrent tasks of a practice that are to be performed by several actors. For example, one such task in Energy concerned the operators’ management of the energy nets and related information systems.

2 As Nonaka & Toyama (2003:3) maintain, “[i]nstead of merely solving problems, organizations create and define problems, develop and apply knowledge to solve the problems and then further develop new knowledge through the action of problem solving”. One example of creation of a typical problem is when Energy decided to establish a large-scale production, which required that the operators learned to handle all the energy nets including their respective net IS (see section 8.3.1).
8.1). However, based on the communication strategy, those two variants will be grouped under the label *TKM push approach via personalisation strategy* (see illustration in figure 10-7 below). TKM push approach via personalisation strategy might be accomplished via a course, a seminar or mentorship, and face-to-face interactions might be complemented with written signs produced by the specific knowledge provider or other actors.

As shown in figure 10-7, 1) the coordinator experienced a typical problem and 2) requests one or several knowledge providers to mediate their knowledge related to the experienced problem. 3) Based on the pre-knowledge of the knowledge providers, they interpret the request and the problem formulated by the coordinator. If they do not understand the request or do not know how to deal with it, a dialogue might evolve between the coordinator and knowledge providers (this is, however, not shown in the figure). 4) When the knowledge providers are clear about what to do, they expose their knowledge via sense-giving by the use of oral (perhaps complemented by written signs) towards the specific or unspecified knowledge receivers. 5) Then, the signs are interpreted by and related to the receivers’ pre-knowledge. As between the coordinator and the knowledge providers, there might be a number of turn-takings (high interaction) between the knowledge providers and the receivers in order to accomplish intended mediation, or the mediation might be accomplished via low interaction as shown in the figure.

The intention of the coordinator is that the knowledge mediated should facilitate and be utilised by the receivers in their future actions. Hence, the receivers might not have a current task in which the knowledge can be directly used, and in such cases the knowledge utilisation will be potential and future rather than direct (6a). However, the receivers might have, or soon after the mediation get, a specific task in which the gained knowledge can be directly applied (6b).

Following the empirical data, knowledge utilisation as a consequence of TKM is often future and potential. This shows a *preparing* characteristic of TKM in the sense that the mediation aims to communicate knowledge for future use. Hence, when successfully planned and performed, TKM push approach via personalisation strategy might reduce the number of future experienced specific problem situations as the actors might already possess the knowledge demanded to handle specific tasks and will not experience any problem. Hereby, one aim of TKM push approach via personalisation strategy is to prepare actors to be knowledgeable to handle typical and common tasks related to their organisational roles. Such knowledge might concern procedures, working methods, standard solutions and products.
TKM Push Approach via Publication Strategy

Another variant of TKM push approach is accomplished via the publication strategy (see variant 13 in appendix 1). TKM push approach via publication strategy is accomplished by the use of IS\(^1\) (or other public signs such as handbooks). The mediation is initiated by a coordinator who wants to expose certain knowledge to a large group of potential and often unspecified receivers.

For example, a manager (coordinator) might identify a need to disseminate organisational news on the firm’s intranet in order for everyone to keep themselves updated in a quick and easy way, or implement a new IS to provide actors with signs representing knowledge about clients, sales and orders. Those examples concern experienced typical problems, and the initiatives aim to facilitate future TKM and thereby enhance the knowledgeability of actors to perform future skilful actions. Hereby, TKM push approach via publication strategy aims to prepare actors to be knowledgeable to deal with future actions, and presumes that actors take initiatives in using IS. In other words, knowledge mediation via TKM push approach via publication strategy is not completed just because an IS is filled with the intended content (the signs expressing certain knowledge). To enhance actors’ knowledgeability for future actions – as a preparatory initiative – requires not only a push approach but also a pull approach in the sense that intended receivers use the IS (see the dashed square in figure 10-8 below). Hence, this variant relates to TKM pull approach via publication strategy as illustrated in figure 10-10 below.

Furthermore, based on empirical data, actors do seldom use IS just to ‘surf’ and search around without any specific purpose. IS are mainly used when actors experience a specific problem that needs to be solved. Hence, this TKM variant does also relate to the SKM variants illustrated in figure 10-3, 10-4 and 10-6 above. As such the TKM push approach via publication strategy facilitates future SKM.

No matter if the TKM push approach via publication strategy facilitates the TKM pull approach via publication strategy or a variant of SKM, one challenge of the coordinator is to get actors, in terms of intended knowledge receivers, to use IS as mediating instruments. As such, the coordinator has a regulative role (Goldkuhl 2002) and needs to motivate actors to use IS.

One additional issue needs to be clarified: Even if IS are common instruments in contemporary organisations, they are not there as a kind of natural phenomenon. IS are designed and implemented by human actors. Thus, when initiating this kind of TKM variant, the coordinator needs to arrange for intended IS to be designed and implemented and formulate the rules for the IS. These tasks do also concern the regulative role of the coordinator. Hence, this TKM variant does also involve another role, that is the IS developer as a kind of TKM artefact designer.

As illustrated in figure 10-8 below, the coordinator needs to 2a) assign an IS developer to design and implement the IS and 2) request the knowledge providers to fill the IS with relevant content (2b). This should not be interpreted as organisations need to implement a new IS each time this TKM variant is initiated. When an IS has

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\(^1\) In general, IS commonly involve a kind of meta-knowledge in terms of headings, links and pre-defined reports. However, the most significant contents of many IS are specific (non-general knowledge, see section 7.3.2). For example, the client information system in Publish had pre-defined headlines, but the signs describing a certain client were always specific, and also the most interesting to the editors.
been implemented, it might be used for additional TKM initiatives with or without modifications of the IS functionality. Having obtained the requests, these are interpreted by 3a) the IS designer and 3b) the knowledge providers. 4) The IS designer then develops and implements the IS, which 5) is filled with signs expressing the providers’ knowledge.

6) This is, then, followed by a pull approach of the intended, often unspecified knowledge receivers, 2c) who have been motivated to use the IS. As mentioned above, the receivers’ pull approach is either part of a TKM or a SKM and 7) the receivers interpret the signs provided by the IS. The acquired knowledge is either 8a) possessed for potential future use or 8b) directly utilised.

TKM Pull Approach via Personalisation or Publication Strategy

Empirical data have also shown examples of TKM pull approach, which occurs when a knowledge needer (receiver) experiences a typical problem and initiates TKM. This variant of TKM pull approach can be accomplished both via the personalisation strategy and the publication strategy. Variant 14 in appendix 1 applies a personalisation strategy (see figure 10-9 below), while variant 15 in appendix 1 represents a publication strategy (see figure 10-10 below).

TKM pull approach via personalisation strategy has many similarities with SKM pull approach via personalisation (see figure 10-2 above). The main difference is that the TKM variant is triggered by a typical problem, while the SKM variant is triggered by a specific problem. The same reasoning applies to TKM pull approach.
via publication strategy (see figure 10-10 below) and SKM pull approach via publication strategy (see figure 10-3 above).

**Figure 10-10: TKM pull approach via publication strategy**

### 10.2.3 Variants of Random Knowledge Mediation

The third basic type of knowledge mediation observed in the empirical data is random knowledge mediation (RKM). RKM is not triggered by any experienced problem. It is about *serendipity* (see section 10.1.1). However, like SKM and TKM, RKM is also about social construction of knowledge. As Liedman (2001) argues, serendipity does not mean that a single actor will make any breakthrough purely on his own; knowledge is a common social concern, and even if actors work relatively isolated they interacts with the environment and other actors via books, journals and television. In this section variants of RKM will be conceptualised and re-labelled. The main category used to distinguish between variants of RKM is the communication strategy used. It is also meaningful to distinguish between two variants of RKM via personalisation strategy, and this is done by the use of mediating instrument as distinguishing category.

**RKM via Personalisation Strategy and Observation**

One variant of *RKM via personalisation strategy* is accomplished via *observation* (see examples in section 9.1.1). This variant of RKM corresponds to variant 16 in appendix 1 and is illustrated in figure 10-11 below. One feature of this variant is that the observed actors might not be aware of the observing (or overhearing) actor\(^1\). Thereby, the observed actors might not be aware of his role as knowledge provider. Still, knowledge mediation can be accomplished. The observing actor is attentive and pays regard to what happens in the working environment; she focuses her awareness and this involves intention and consciousness. However, she has no intention in regard to what potential knowledge she might gain and how that knowledge might be used.

Following figure 10-11, one example of *RKM via personalisation and observation* is 1) when an actor B is working with something and another actor A passes by and pays attention to B’s work. 2) Actor A *observes* actor B in action and B’s action results and 3) actor A interprets what she is observing whereby she might gain new, useful knowledge. What the observing actor A makes sense of and adds

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\(^1\) The dashed line in figure 10-11 aims to signify that the actors do not need to have any conscious interaction with each other.
to her pre-knowledge might be 4a) useful for her future actions or 4b) if appropriate, the knowledge might be used directly in a specific task.

One instance of observation is if actor A overheard other actors’ speech. Actor A might listen to actor B and actor C’s conversation and learn from that.

As shown in the empirical data, several respondents regard observation and overhearing as both common and important ways to learn from others. However, this variant presumes that there is an opportunity for actors to observe the work of colleagues or overhear their dialogue and interaction (see further section 11.1).

**Figure 10-11: RKM via personalisation strategy and observation**

**RKM via Personalisation Strategy and Conversation**

The other variant of *RKM via personalisation strategy* is accomplished via *conversation* (see examples in section 9.1.2). In this variant, any of the actors engaged in the conversation might be the initiator. This means the mediation might be initiated by a (potential) knowledge receiver or a (potential) knowledge provider.

For example, observation might be followed or complemented by a dialogue between the observing and observed actors. The observing actor might ask the observed actor about what he is doing, or the observed actor might start a conversation. The conversation might be characterised by a short question and answer (as one ‘adjacency pair’, Sacks 1992) or involve a number of ‘turn-takings’ (ibid.). The former characterises limited interaction and the latter high interaction.

In limited interaction the initiating actor (in terms of a potential knowledge receiver) might get to know what another actor is working with. That is, the knowledge receiver acquaints herself with the work of the provider (see ‘knowledge by acquaintance’, James 1890; see also figure 6-3). Conversation involving high interaction might result in deeper ‘knowledge about’ (James 1890) certain work-related issues; it might even result in a mutual exchange and development of knowledge.

Figure 10-12 below illustrates *RKM via personalisation strategy and conversation*, which combines variant 17 and 18 in appendix 1. The initiator might be a (potential) knowledge receiver as in variant 17 or a (potential) knowledge provider.

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1 In Energy the operators usually told each other about the happenings during the previous shift. Sometimes this concerned knowledge useful for the new operator during his shift (as in SKM push approach via personalisation strategy, see figure 10-5 above). Sometimes the operators told each other about certain interesting or odd experiences without any problem-solving purpose in mind (as in RKM via personalisation and conversation).
provider as in variant 18. In addition, both involved actors might gain new knowledge that might be useful in their respective actions.

**RKM via Publication Strategy**

The final variant to be conceptualised concerns *RKM via publication strategy*, which corresponds to variant 19 in appendix 1 (see also section 9.1.3). Any actor can acquire knowledge via ‘public’ mediating tools such as information systems (IS), reports, books and articles via serendipity. Actors use different mediating instruments without any particular (specific or typical) pragmatic motive or intention but can still acquire useful knowledge. Actors might read a book or use an IS just because it seems interesting. This variant of RKM is made possible due to earlier TKM initiatives (see the dashed square in figure 10-13). The knowledge gained might be immediately useful, or be of potential future use.

Figure 10-13 illustrates this variant of RKM by the use of IS as the mediating instrument, but the instrument could also be another kind of public mediating instrument. However, the use of technology as the mediating instrument might enhance the opportunities of serendipity as technology enables actors to publish and get access to the content of IS irrespective of their geographical locations (see Stenmark 2003; see also section 3.2.4).

**10.2.4 Basic Types and Variants: Relations and Summary**

In this section, the relations between the basic types and variants of knowledge mediation will be clarified, and the variants of knowledge mediation illustrated in section 10.2.1 to 10.2.3 will be summaries.
Starting with the relations between the SKM, TKM and RKM, one identified relation is between SKM and TKM. One or many similar experienced specific problems might result in the acknowledgement of a typical problem (as in the case of the school expert’s knowledge, see section 7.1.2 and 8.1.1). One subsequent TKM initiative might be a kind of preparing activity that aims to minimise the number of future experiences of specific problems, as the TKM push approach via personalisation strategy (see figure 10-7). Another subsequent preparing TKM initiative might be the TKM push approach via publication strategy (see figure 10-8), which facilitates future TKM pull approach via publication strategy (see figure 10-10), variants of SKM (see figure 10-3, 10-4 and 10-6) as well as RKM via publication strategy (see figure 10-13). The role of TKM push approach via publication strategy as a facilitator is highly related to the use of IS as the mediating instruments. As such, TKM push approach via publication strategy is a pre-designed and organised initiative to support and enable institutionalised IT-based knowledge mediation.

TKM as well as RKM might decrease the need for future SKM as the occurrence of experienced specific problems might be reduced.

In the end, all types of knowledge mediation aim to enhance the actors’ knowledgeability to accomplish skilful actions. The main relations between the three basic types of knowledge mediation are summarised in figure 10-14 below.

![Figure 10-14: Relations between the three basic types of knowledge mediation](image)

On the basis of Chapter 6 to 9 and appendix 1, section 10.2.1 to 10.2.3 have re-categorised and condensed variants of SKM, TKM and RKM. To give an overall view of varying and uniting characteristics, the condensed variants are summarised in table 10-2 below.
Table 10-2: The characteristics of basic variants of specific, typical and random knowledge mediation

<table>
<thead>
<tr>
<th>Variant process</th>
<th>Communication strategy</th>
<th>Approach</th>
<th>Initiator</th>
<th>Knowledge provider</th>
<th>Mediating instrument</th>
<th>Knowledge receiver</th>
<th>Degree of interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKM pull approach via personalisation strategy</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Specific knowledge seeker (receiver)</td>
<td>Specific knower</td>
<td>Oral or written signs</td>
<td>Same as initiator</td>
<td>Limited or high</td>
</tr>
<tr>
<td>SKM pull approach via publication strategy</td>
<td>Publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (receiver)</td>
<td>Knower(s), unknown to the receiver</td>
<td>Written signs via IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>SKM pull approach via combined strategies</td>
<td>Personalisation and Publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (receiver)</td>
<td>Knowers, specific and known, and unknown to the receiver</td>
<td>Multiple instruments: oral &amp; written signs, IS</td>
<td>Same as initiator</td>
<td>Limited or high</td>
</tr>
<tr>
<td>SKM push approach via personalisation strategy</td>
<td>Personalisation</td>
<td>Push</td>
<td>Specific knower</td>
<td>Specific knower</td>
<td>Oral or written signs</td>
<td>Specific receiver</td>
<td>Limited or high</td>
</tr>
<tr>
<td>SKM push approach via publication strategy</td>
<td>Publication</td>
<td>Push</td>
<td>IS, based on own pre-defined functionality, or in interaction with knower</td>
<td>Signs produced by IS, or by knower(s), often unknown to the receiver, and mediated via IS</td>
<td>Written signs via IS</td>
<td>Specified receiver</td>
<td>Limited</td>
</tr>
<tr>
<td>TKM push approach via personalisation strategy</td>
<td>Personalisation</td>
<td>Push</td>
<td>Coordinator</td>
<td>Specific knower(s)</td>
<td>Oral signs, perhaps complemented with written signs</td>
<td>Specific receiver(s)</td>
<td>High</td>
</tr>
<tr>
<td>TKM push approach via publication strategy</td>
<td>Publication</td>
<td>Push</td>
<td>Coordinator, by the support of IS developer</td>
<td>Knower(s), often unknown to the receivers</td>
<td>Written signs via IS</td>
<td>Intended, unspecified, receivers</td>
<td>Limited</td>
</tr>
<tr>
<td>TKM pull approach via personalisation strategy</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Specific knowledge seeker (receiver)</td>
<td>Specific knower</td>
<td>Oral or written signs</td>
<td>Same as initiator</td>
<td>High or Limited</td>
</tr>
<tr>
<td>TKM pull approach via publication strategy</td>
<td>Publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (receiver)</td>
<td>Knower(s), unknown to the receiver</td>
<td>Written signs via IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>RKM via personalisation strategy and observation</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Observing, specific actor (receiver)</td>
<td>Observed, specific actor(s)</td>
<td>Action, action results and signs</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>RKM via personalisation strategy and conversation</td>
<td>Personalisation</td>
<td>Pull or push</td>
<td>Specific potential knowledge receiver or provider</td>
<td>Specific knowledge provider</td>
<td>Oral signs</td>
<td>Same as initiator</td>
<td>High or Limited</td>
</tr>
<tr>
<td>RKM via publication strategy</td>
<td>Publication</td>
<td>Pull</td>
<td>User of IS (receiver)</td>
<td>Knower(s), unknown to the receiver</td>
<td>Written signs via IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
</tbody>
</table>
One category that has not been discussed in section 10.2.1 to 10.2.3 concerns the mediation process. In table 6-1, SKM and RKM is characterised as evolving, while TKM is characterised as designed. Then, in Chapter 7 to 9 the characteristics have been further specified: SKM as evolving and occasional or routinised and recurrent (see table 7-2), TKM as designed occasional, routinised and recurrent or evolving and occasional (see table 8-2) and RKM as evolving and occasional or part of established routines and recurrent (see table 9-2). When comparing these characteristics of the three basic types, only TKM had one unique characteristic, which is ‘design occasional’. Except that, any of the three types could involve any of the other characteristics. Hence, this was not considered to be a meaningful category to continue to use – that is also the reason why ‘mediation process’ is not included in table 10-2 above.

Reflecting on the variants presented in table 10-2, there are likely additional variants of knowledge mediation. One possible variant is SKM initiated by a coordinator. A manager might identify a lack of knowledge of a specific actor who is to perform a specific task, and request 1) that actor to acquire the knowledge to be able to perform a knowledgeable action or 2) another actor – in terms of an intended knowledge provider – to share his knowledge with the needing actor. Two other possible variants are TKM and RKM via combined strategies. Even if the empirical data of this work have not shown any examples of such variants, those can likely be found in other empirical cases. Still, the three basic types of knowledge mediation together with their variants presented in table 10-2 are considered to represent a stable and congruent base for understanding different kinds of knowledge mediation between actors in organisations.

10.3 Consequences of Knowledge Mediation

Knowledge mediation is not performed for its own sake; it is performed as a means of facilitating action (see section 2.2). The purpose of knowledge mediation is to enhance actors’ knowledgeability to skilful actions or what might be called ‘informed actions’ (Langefors 1993; see section 1.1.1). This is an issue that has been discussed in both present and previous chapters. Still, as knowledge utilisation – in terms of realisation of intended and desired practical consequences of knowledge mediation – is a core element of organisational practices, some additional comments should be made. Hence, this section will further discuss and theoretically ground some key issues concerning the practical consequences of knowledge mediation initiatives.

10.3.1 Improving Actors’ Knowledgeability in Action

One assumption of this work is that the basic motive of actors to develop knowledge is to be able to cope with the world (see section 2.2.2). By developing knowledge actors enhance their capability to deal with their organisational tasks.

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1 Talking about ‘core’ refers to two issues: First, without the utilisation of knowledge, that intends to be or has been mediated, organisational practices will not get any pay-back of investments in knowledge mediation. Second, knowledge is what makes organisations work. Thus, organisations continuously need to create and mediate knowledge to maintain and develop their practices (see also section 1.1 and 3.1).
This presumes, of course, that the knowledge is actionable in relation to the actors’ organisational roles. Otherwise, the practical consequences of knowledge mediation – the knowledge utilisation (see section 2.6.1) – will not be realised and mediation initiatives will not be of use to organisations. As Hendriks (2001:65) states, [. . .] the value of its knowledge management is not about changes brought about in the cognitive capacities of the organization but rather the organization’s ability to act based on its cognitive capacity.

In a pragmatic vein, knowledge is for action, and the main purpose of mediating knowledge is to facilitate action. This means that we cannot only pay regard to the result of knowledge mediation in terms of enhanced knowableability of actors but also the effects (consequences) in terms of enhanced knowableability in actions1.

The recognition of the importance of the practical consequence of knowledge mediation has been evident in the empirical data. The actors strived to acquire knowledge to be used in action; the actors demanded actionable knowledge. Hereby, they valued knowledge in relation to its usefulness for them in their organisational roles.

Then, were the knowledge mediation initiatives in Energy, Publish and Architect successful in the sense that they resulted in more knowableable actions? In other words, what difference did the knowledge mediation initiatives make? When the knowledge utilisation was future and potential (as in several examples of TKM and RKM), it was difficult to evaluate the degree of success as the knowledge had not been applied in action; that means the practical consequences had not yet been realised. However, many initiatives were regarded as successful by the respondents, and that was also verified by empirical examples. Empirical examples showed that the mediation of knowledge enabled actors to perform actions, that is, without the mediation, they would not have known what to do or how. The mediation of knowledge enhanced actors’ knowableability to perform more skilful actions and new types of actions. In turn, this was of high value for the practices as well as for the individual actors who, among other things, felt more competent and got new inspiration to do a good work.

There were also examples of initiatives that were less successful. When the experienced problem situations related to complex tasks, it was difficult to mediate required knowledge from a knowledge provider to a knowledge receiver and enable the latter to handle the task himself (see example in section 7.1.2). It was also evident that the organisations – in particular Energy and Publish – had difficulties in successfully implementing some of their intended TKM initiatives (see section 8.3.2). This was partly due to a lack of planning and design of the initiatives together with unclear purposes. In comparison, Architect put more efforts in planning and designing what to do, why and with what purposes. Architect’s TKM initiatives were also clearly grounded in the needs of the practice. Accordingly, the TKM of Architect seemed to prosper, and this was also a common opinion of

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1 This reasoning is in line with von Wright (1971) who separates between action, its results and its effects. As exemplified by Goldkuhl (2004:15), “[a]ction is the active performance of an action; e.g. the opening of a window. The result is what is within the range of the actor (what is being done); in this case the opened window. The effects are what arises as consequences of the performed action; in this case the possible fresh air flowing into a room”.
several architects. By Architect’s TKM initiatives, the architects enhanced the sharing and re-use of knowledge and developed networks and relationships which facilitated both internal and external knowledge mediation and cooperation.

10.3.2 Practical Effects of Different Types of Mediation

As shown by the empirical data, knowledge was mediated both with and without the use of technology, and both IT-based and none IT-based knowledge mediation were of importance. Concerning practical consequences of IT-based and none IT-based knowledge mediation, some differences have been observed. For example, intended consequences of IT-based knowledge mediation might not be realised due to a lack of IS use and because of actors tend to prefer face-to-face dialogues. On the other hand, IT-based knowledge mediation – in particular via the publication strategy – offers a high accessibility and preservation of the signs expressing actors’ knowledgeability. Hereby, both IT-based and none IT-based mediation have benefits as well as drawbacks (see further discussion in section 11.2).

Another issue, concerning the practical consequences of different types of knowledge mediation, relates to the time for knowledge utilisation (see also section 11.1.3). SKM is characterised by direct utilisation as the knowledge in question is demanded to solve problems related to present specific tasks of actors (as the knowledge receivers). Thus, the consequences of SKM are rather easy to identify, and the immediate and specific needs seem to be two of the keys of success in SKM. If the knowledge receiver in TKM and RKM has an appropriate task in which the knowledge can be applied, the consequences of TKM and RKM might also be rather directly observable. However, knowledge utilisation as a result of TKM and RKM tends to be potential and future. This is mainly due to TKM and RKM not being triggered by any specific problem; TKM aims to deal with a typical problem and RKM is unintentional when it comes to specific practical consequences of the mediation.

Furthermore, TKM is a preparing activity that aims to secure that actors will have actionable knowledge to solve future tasks, and to facilitate future SKM, TKM and RKM (see section 10.2.2 and 10.2.4). Two critical circumstances to be able to realise the practical effects of TKM are that the knowledge receivers 1) have or get specific tasks in which the knowledge can be applied and 2) are capable to apply the knowledge in the specific tasks (see also section 11.1.3). If those circumstances are not fulfilled, the practical and intended consequences of TKM will not be realised. In addition, if there is a too long gap between the mediation and the time for utilisation, the mediated knowledge might also be forgotten, or the knowledge might be looked upon as useless because the receiver is not capable of applying it to a specific task.

Concerning RKM this type is about serendipity. However, just because there is no intentional and certain purpose of such mediation, this does not mean that there is no practical usefulness of knowledge mediated via RKM. RKM tends to concern specific and actionable knowledge that an actor uses or has experienced and which also might be useful for other actors in their current or future work. RKM might also make actors aware of knowledge that they did not know existed or that they needed.
In sum, one might say that SKM is intentional and short-termed, TKM is intentional and long-termed and RKM is unintentional and occurs as serendipity. Most fundamentally, all three types of knowledge mediation have pragmatic meaningfulness.

10.3.3 Repetitive or One-time Utilisation of Knowledge

Based on the empirical data from the cases, knowledge mediation differs concerning whether the processes and the consequences are occasional or repetitive. Following Szulanski (1996, 2000; see section 3.2.1), one assumption of the consequences of knowledge mediation is institutionalisation (routinisation) of the knowledge being mediated. Institutionalisation might be desirable when knowledge mediation concerns ‘general knowledge’ about typical tasks, such as working methods, norm measurements and standard solutions (see also section 7.3.2). TKM initiatives tend to aim at repetitive use of the knowledge being mediated. However, knowledge is not always suitable for routinisation. Some knowledge might only be useful for a specific task (see ‘infrequent tasks’, Dixon 2000).

For example, in Architect the architects needed knowledge about architectural work which was utilised in all different kinds of projects – repetitive utilisation of knowledge. The architects also need to understand the clients’ practices in order to create designs that supported the specific client’s needs. For example, one architect designed a cinema and another architect designed an exclusive public bath. To create proper solutions, the architects needed to understand the specific needs of the clients. However, the architects did not believe that the knowledge about these clients’ practices would be needed and used again as the knowledge concerned rather odd practices. Still, the architects demanded the knowledge of those practices to accomplish the project, but it was a one-time utilisation of knowledge and not really relevant for routinisation.

Hereby, we should not only focus on the routinisation of knowledge as an effect of knowledge mediation initiatives, but pay attention to the usefulness of knowledge no matter if it is used once or several times. Hereby, the suggestion in section 3.2.1 to replace Szulanski’s (1996, 2000) two latter process stages – ramp-up and integration – with knowledge utilisation seems relevant and appropriate. It is, of course, good if the knowledge mediated is reutilised over and over again, but this needs to be put in relation to the usefulness of the knowledge in action. If there are no repetitive and similar actions in which the knowledge can be applied there is no basis for routinisation.

The point to be made here is that knowledge mediation might occur once and be followed by one-time or repetitive utilisation. Similar kinds of knowledge mediation initiatives can also be routinised – as in the case of the operators who mediated knowledge between the shifts (see section 7.2.2) – and be followed by one time or repetitive or utilisation.

In sum, four distinct combinations of knowledge mediation and knowledge utilisation have been identified and can be related to the three types of knowledge mediation as shown below.
• One time mediation – one time utilisation
  o Primary related to SKM and RKM
• One time mediation – repetitive utilisation
  o Primary related to TKM via personalisation strategy, but also to SKM and RKM
• Repetitive mediation – one time utilisation
  o Primary related to SKM
• Repetitive mediation – repetitive utilisation
  o Primary related to TKM via publication strategy

SKM is mainly oriented towards ‘one time mediation-one time utilisation’ as the focus is to solve a specific problem. SKM might also result in ‘one time mediation-repetitive utilisation’ if the receiver will be confronted with similar future tasks (as the one that triggered the need for SKM) and remembers the knowledge. SKM might also concern ‘repetitive mediation-one time utilisation’ as when the mediation process is routinised but concerns specific knowledge that is applied just once. TKM via personalisation strategy tends to focus on ‘one time mediation-repetitive utilisation’. While TKM via publication strategy focuses on ‘repetitive mediation-repetitive utilisation’ as signs available via IS are mediated to and used by many actors, which also shows the value in investing in IS as mediating instruments. Then, RKM can be related to one time mediation followed by one time or repetitive utilisation.
This chapter focuses on abstracting circumstances influencing the three basic types of knowledge mediation identified in this work. Inductively generated categories and characteristics will be theoretically grounded and discussed, for each of the three types of knowledge mediation, along an action-oriented paradigm, including the prerequisites for knowledge mediation (the initiation stage), the process of mediating knowledge (the implementation stage) and the consequences of knowledge mediation (the utilisation stage). The chapter also comprises an analysis of when information systems can be used as suitable mediating instruments. In sum, this chapter is concerned with the second and third of my research questions (see section 1.3.1).

11.1 Influencing Categories and Characteristics

In the empirically oriented chapters, influencing circumstances have been discussed, conceptualised and classified (see section 7.3, 8.4 and 9.2). In this section, the inductively generated categories and characteristics will be theoretically discussed and grounded via comparisons with existing theories (as a kind of ‘theoretical matching’, Goldkuhl & Cronholm 2003; see section 4.5.3). Six main categories of influences have earlier been identified and used: the problem situation, the knowledge, the knowledge receiver, the provider, the mediating instrument and the working environment.

Concerning ‘the mediating instrument’, I have chosen to treat this in a separate section as this category requires an analysis involving not only influencing characteristics but also a clarification of IT-based versus none IT-based knowledge mediation (see section 11.2). Furthermore, along the data analysis I have realised that some influencing circumstances are primarily related to the role of the initiator – no matter if the initiator is a potential knowledge receiver, a potential knowledge
provider or a coordinator. Hence, the initiator is a seventh category that will be discussed.

The categories focused on in this section will be discussed and structured along an action-oriented paradigm model including: 1) the prerequisites for mediation (‘initiation stage’, Szulanski 1996), which concerns circumstances influencing whether knowledge mediation will be identified and initiated, 2) the process of mediation (‘implementation stage’, ibid.), which concerns circumstances influencing the actual process of mediating knowledge and 3) the consequences of mediation (‘utilisation stage’ that is a consolidation of Szulanski’s ‘ramp-up stage’ and ‘integration stage’), which concerns circumstances influencing the utilisation of knowledge. The categories will be discussed for each of the three basic types of knowledge mediation – specific knowledge mediation (SKM), typical knowledge mediation (TKM) and random knowledge mediation (RKM) – and comparisons will be made between the three types (as a kind of ‘internal grounding’, Goldkuhl & Cronholm 2003; see section 4.5.3).

11.1.1 Prerequisites for Mediation: Initiation Stage
This section focuses on circumstances that might influence the prerequisites – the initiation stage – for knowledge mediation. That is, circumstances that influence whether the actual mediation of knowledge will be identified and initiated.

The Problem Situation: Influencing Characteristics
Looking into the KM literature there is little written about the ‘problem situation’ as an influencing category. Prior research commonly discusses four other influencing categories: the knowledge, the source, the recipient and the context (see Teece 1977; Rogers 1983; Leonard-Barton 1990; Szulanski 1996, 2000). Szulanski (2000) talks about triggers and problem-solving, and Dixon (2000) talks about the nature of the task and triggers. However, neither of these scholars focuses on the problem characteristics as circumstances that might influence knowledge mediation. Thus, the problem situation is not a significant category of influence in prior KM research.

However, ‘problem situation’ is discussed by other scholars. Dewey (1938) talks about the experiences of indeterminate situations as triggers of productive inquiry (see also Berger & Luckmann 1966; Schön 1983; and section 2.2.3 and 10.1.1). Hence, ‘problem situation’ seems to be a relevant category, and empirical data have shown that it is an important category to understand knowledge mediation and its influencing circumstances.

Four characteristics of ‘problem situation’ have been identified: elementary versus complex and specific versus typical. An ‘elementary problem’ is defined as a limited and often simple problem that relates to a limited and often simple task (see examples in section 7.1.1). A ‘complex problem’, on the other hand, relates to a

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1 In section 11.1.1, concerned with the initiation stage, ‘initiator’ will be discussed as a main category with ‘knowledge receiver’ and ‘knowledge provider’ as subcategories. While section 11.1.3 only discusses the knowledge receiver as the other two do not really influence the knowledge utilisation stage.

2 This model follows Strauss & Corbin’s (1998) concept of paradigm (see section 4.5.2; see also the reference model in figure 2-3, section 2.6.4), and is also grounded in Szulanski’s (1996; 2000) process model of knowledge transfer (see section 3.2.1 and 10.3.3).
complex task and involves a large number of sub-problems that need to be solved (see examples in section 7.1.2 and 8.1.1).

A ‘specific problem’ concerns a specific task at hands of an actor. Specific problems often involve context-specific and unique prerequisites. This is similar to the concept of ‘particular situation’ that is unique and does not relate to any familiar situation or pre-defined solution (see Goldkuhl & Braf 2001). A ‘typical problem’ relates to a typical and often common task of a practice, and a typical task does often have some pre-defined solution\(^1\) (see ‘typical situation’, Goldkuhl & Braf 2001).

A specific problem, concerning a specific task, might also be a specific instance of a typical task. That specific problems might concern either specific (particular) tasks or instances of typical tasks became obvious when comparing SKM and TKM. I realised that it was highly important to differ between the characteristics of the problem and the characteristics of the related task\(^2\).

Then, how do the characteristics of the problem influence the initiation stage of the three basic types of knowledge mediation? Starting with RKM, this type can quickly be dismissed as the category of problem situation is not an issue of RKM. However, the problem situation is highly relevant for SKM and TKM.

In both SKM and TKM, when experienced problems are elementary, this characteristic facilitates the initiation stage in the sense that such problems tend to be easy to identify and understand. In other words, ‘problem setting’ (Schön 1983; see also Dewey 1938) in terms of ‘sense-reading’ (Polanyi 1966) is rather easy to accomplish. When problems are complex, this is a hindrance of SKM as well as TKM; it might hinder the mediation to be initiated as the problem might be difficult to define, that is, the complex characteristic might cause difficulties in problem setting\(^3\).

One circumstance facilitating SKM is that SKM is triggered by an experienced specific problem situation, a specific ‘indeterminate situation’ (Dewey 1938). The specific characteristic of the problem is facilitating as it relates to a specific task that can be used as a concrete basis for problem setting. If the specific problem is elementary and can be related to a typical task, it is even easier to define and there might even be some pre-defined standard solution that can be used to solve the problem.

On the other hand, a typical problem triggering TKM tends to be more difficult to define, especially when it is complex in character. This is because there is no concrete basis to use as a foundation for problem setting, which, in turn, makes the problem harder to limit and concretise. Hereby, the typical character of problems might hinder TKM to proceed\(^4\). In sum, experienced specific problems tend to be

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\(^1\) For example, norm measurements and standard solutions (see section 7.1.1).

\(^2\) Initially during the analysis I took for granted that a specific problem related to a specific task and a typical problem related to a typical task, and vice versa. Consequence when identifying typical tasks in relation to SKM I related that to typical problems, which became confusing and conceptually incorrect.

\(^3\) Whether sense-reading and problem setting is facilitated or hindered depends not only on the characteristics of the problem but also on the capability and pre-knowledge of the initiator (see further below).

\(^4\) For example, the management of Publish had recognised a typical problem – in terms of a need to create a Human Capital Process – but had difficulties in defining how to deal with it (see section 8.3.2).
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easier to define than typical problems, and the problem setting is a critical prerequisite for knowledge mediation in order to know what knowledge is needed, that is, to know what to inquire.

Another circumstance that seems to facilitate SKM (in particular SKM pull approach) is the acute (critical) characteristic of experienced specific problems (see section 7.3.1). That is, knowledge is required by an actor to solve a specific problem and to be able to continue with the task as an ‘informed action’ (Langefors 1993). Typical problems are not acute in the same way to the individual actor; typical problems are principally critical to the practice as a whole. As a consequence, actors (both in terms of receivers and providers) tend to be less inclined to initiate TKM. This implies that if knowledge is not pragmatically necessary to the individual actor, there are fewer motives to acquire it than if the knowledge is related to an acute problem that needs to be handled, as in SKM (see Berger & Luckmann 1966).

The Knowledge: Influencing Characteristics

Concerning the characteristics of the knowledge aimed to be mediated, there is a great deal written about this issue in the KM literature. A number of scholars build on Nonaka & Takeuchi’s (1995) use of the concept of ‘tacit knowledge and ‘explicit knowledge’, which is a distinction that derives from Michael Polanyi. It is said that tacit is more difficult to share, while explicit knowledge is rather easy to share. However, as reasoned in section 3.1.3, tacit and explicit knowledge are not two separate forms of knowledge; they are inseparable and also necessary components of all knowledge (Polanyi 1966; see also Tsoukas 1996).

Furthermore, few scholars make a distinction between influencing circumstances along different stages; they rather focus their reasoning on the actual mediation, that is, the implementation stage (see section 11.1.2).

One scholar who discusses influences along a process model is Szulanski (1996, 2000), who talks about ‘causal ambiguity’ as a characteristic of knowledge that hinders all process stage, including the initiation, implementation, ramp-up and integration. However, it is not fully clear how the causal ambiguity of knowledge hinders the initiation stage or what the concept means. Szulanski (1996:30) describes causal ambiguity in terms of ‘depth of knowledge’, and refers to Lippman & Rumelt (1982),

> [m]odeling a capability as a production function, Lippman & Rumelt (1982) argued that difficulty in the replication of a capability is most likely to emanate from ambiguity about what the factors of production are and how they interact during production.

Lippman & Rumelt (1982) talk about causal ambiguity in terms of uncertainty, but causal ambiguity does not seem to primarily relate to the characteristics of the knowledge, at least not in relation to the initiation stage of knowledge mediation. In regard to the initiation stage, causal ambiguity rather seems to be related to the difficulties to fully describe a complex problem or process. Hence, ‘causal

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1 This was observed in Energy when the operators acted as they were disinclined to exchange knowledge about the energy net IS (see section 8.3.1). Such hindrance can also be related to an individual versus an organisational perspective (see discussion about ‘prestige’ below).
‘ambiguity’ seems to be close to the concept of ‘indeterminate situation’ and the difficulties of ‘problem setting’. Accordingly, it is the complexity of a problem or a task that makes it hard to describe fully (not the characteristics of knowledge, as argued by Szulanski 2000). Furthermore, based on the empirical data from the cases, the characteristics of ‘knowledge’ have not shown to represent any significant influencing circumstance during the initiating phase. In the initiation stage, the focus is rather on the problem situation. The characteristics of knowledge might, however, influence the actual mediation (see section further 11.1.2).

The Initiator: Influencing Characteristics

The initiator can be any actor including a potential knowledge receiver, a potential knowledge provider or a potential coordinator. They are ‘potential’ since they have still not initiated the actual mediation; in this stage the actor just identifies a problem (SKM and TKM) or comes across an opportunity for mediation (RKM). The categories knowledge receiver and knowledge provider are commonly referred to as ‘recipient’ respectively ‘source’ in the KM literature (see Szulanski 1996, 2000; Dixon 2000) but have more or less the same meaning as the categories used in this work.

The category coordinator has similarities with concepts such as chief knowledge officer (CKO) and knowledge officer in the sense that it is a third person who takes responsible for planning and designing knowledge mediation (see also section 10.1.1). However, there is a risk of isolating the ‘knowledge practice’ to the responsible of a certain department or a formal role. That is what was done in Energy and Publish that assigned the KM work to the personnel managers who seemed to lack proper knowledge of the practices and had difficulties in defining and implementing initiatives. Architect, on the other hand, created an organisation involving over ten architects who knew about the needs of the practice and were working operative with architectural work. Architect’s knowledge work did also involve an IT-expert and commitment of the management. Hereby, Architect acknowledged the need to integrate its knowledge work with the use of technology and the firm’s operative and strategic goals. As Hansen et al. (1999:116) maintain,

[. . .] companies that isolate knowledge management risk losing its benefits, which are highest then it is coordinated with HR, IT, and competitive strategy.

Relating to ‘problem setting’, one circumstance that facilitates both SKM and TKM is when the initiator has a sense-reading capability of identifying and defining the problem. The identification and definition of the problem is, in turn, facilitated if the actor has prior experiences related to the present problem. On the contrary, if the initiator lacks a sense-reading capability and does not possess relevant pre-knowledge, these circumstances hinder the mediation to be initiated.

The ‘problem’ as such motivates actors to initiate knowledge mediation as means for problem-solving. However, the initiator (particularly in terms of a potential knowledge receiver) might not know about any available knowledge provider or mediating instrument (see lack of known ‘knowledge sources’, Sverlinger 2000). Even if the initiator knows about a potential knowledge provider or mediating instruments, those might not be used. This might be due to a suspicion of not
getting the kind of support wanted or a kind of prestige concerning a fear of being criticised or interpreted as ignorant. This kind of prestige has foremost been found in SKM and RKM (see section 7.3.3 and 9.2.1), but is also likely in TKM.

Prestige relates to a more personal identification of actors (rather than the organisational role; see also section 7.1.1 and 7.3.3). However, individuals are part of organisations via their organisational roles and positions (see section 2.2.1). Thus, even if prestige might be natural from an individualistic perspective, prestige might be problematic from an organisational perspective. Actors act on behalf of an organisation, and they do this by interacting with other actors. Thus, there is a need to try to overbuild individualistic behaviours that clash with the interest of the organisation. If actors do not ask a colleague because of prestige, this might impede opportunities for the practice to prosper.

The initiator – in terms of the knowledge receiver in SKM and TKM – might also believe that the provider lacks communicative capability (lack of ‘sense-giving’ ability of the provider), or that the provider or mediating instrument is unreliable (see lack of reliability and trustworthiness, Szulanski 2000). Furthermore, the initiator – in terms of the knowledge provider in SKM and TKM – might be hindered because he believes the receiver will not pay any attention to the knowledge aimed to be mediated (see ‘lack of motivation of recipient’, Szulanski 2000). The knower might suspect that the receiver will ignore the advice.

In TKM, the initiator – in terms of the knowledge receiver – might be disinclined to acquire new knowledge due to a wish to continue to work with familiar tasks as a kind of security in the organisational role (see lack of motivation, Szulanski 1996). Two additional circumstances that might hinder TKM are if the initiator – in terms of the knowledge provider – notices a risk of feeling less indispensable if he shares certain knowledge, or that the sharing of knowledge might conflict with the prevailing norm system (see further below in section ‘The Working Environment’). A knowledge provider might also be reluctant to initiate mediation due to the risk of decreasing the usefulness of the knowledge in question (see further ‘The Knowledge’ in section 11.1.2.).

These latter hindering circumstances of TKM have showed the importance of the role of the coordinator who needs to take responsibility of planning, designing and requesting actors to accomplish TKM (see also section 8.3 and 10.2.2). Coordinators have a kind of ‘regulative role’ (see Goldkuhl 2002) in the sense that they need to formulate the prerequisites and goals for TKM (see further ‘The Initiator’ in section 11.1.2). Thus, when a coordinator initiates TKM and has the capability of planning and designing TKM, this seems to be a circumstance that facilitates the mediation to proceed.

Furthermore, the initiators – both in terms of knowledge providers and coordinators – in SKM as well as TKM need to be aware of the specific tasks of other actors. Consequently, one hindrance is when a potential initiator is unaware of specific problems and tasks of other actors (as potential knowledge receivers). The potential initiator might be familiar with other actors’ work in general terms, but

1 As one of the operators at Energy maintained, as long as he had the opportunity to feel special due to his expertise, he would enjoy that feeling. Thus, he would not take any own initiatives to share his expertise.
might not know in detail what problems actors face. Another circumstance that might hinder TKM, and likely also SKM and RKM, is when the initiator – in terms of the knowledge receiver – suspects that the intended knowledge provider is not inclined to help (see further section 11.1.2). Finally, in RKM, attentiveness, interest and curiosity are facilitating characteristics of the initiator, while a lack of those characteristics hinders RKM to be initiated.

The Working Environment: Influencing Characteristics

The way the category ‘working environment’ is used in this work is similar to what some KM scholars talk about in terms of ‘the context’ (see Szulanski 1996, 2000; Szulanski & Cappetta 2003). To Szulanski (1996:32),

[a]n organizational context that facilitates the development of transfers is said to be fertile. Conversely, a context that hinders the gestation and evolution of transfers is said to be barren.

The influencing characteristics of the working environment can also be related to the idea of the need for a ‘knowledge-oriented culture’ (see Davenport & Prusak 1998; Nonaka & Takeuchi 1995) and McDermott’s (1999) ‘management challenge’ that concerns the establishment of an environment that supports and values knowledge sharing (see section 3.2.2).

Talking about influencing circumstances, I prefer, however, the category of ‘working environment’, rather than ‘context’ or ‘culture’. In this work, and in comparison with Szulanski (1996, 2000) and Szulanski & Cappetta (2003), the word ‘context’ is used in a broader sense and includes more than just the working environment (and the culture). The context is always there; it is the background and surroundings of all situations and activities. Concerning ‘culture’ this can be seen as part of the ‘working environment’, but ‘culture’ is an indistinct concept and has not been used as an explanatory category in this work.

Concerning the working environment, four of the main influencing circumstances that have been identified are: geographical distance versus geographical closeness and emotional distance versus emotional closeness.

Concerning geographical distance versus closeness, such circumstances influenced SKM, TKM as well as RKM. In variants of the personalisation strategy of SKM and TKM, geographical distance showed to be a hindrance for asking for help, in particular if the problem in question was complex and if there was a lack of relationship between the receiver and provider, while geographical closeness was a facilitating circumstance. A similar reasoning is valid for RKM. However, as RKM is about serendipity, geographical closeness is a prerequisite for RKM via personalisation to occur at all, and geographical distance is consequently a definite hindrance of RKM via personalisation strategy.

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1 This was an issue that puzzled one of the office managers at Architect. He meant that ever since the introduction of the internet it was much easier to get to know about different projects that actors were working with. However, one restriction was that “one does not know what kind of current problems different actors are working with”, which limited the possibilities of actors (in terms of coordinators and knowledge providers) to initiate knowledge mediation, and even to identify problems of other actors.

2 We might, for example, talk about ‘general contexts’ such as the organisational context and ‘specific contexts’ such as the context of a concrete example of SKM pull approach publication strategy.
Whether a working environment can be characterised in terms of emotional distance or emotional closeness concerns the degree of relationships between actors and can also be related to the concept of trust. Several scholars talk about a lack of trustful relationships as a hindrance of mediation (see von Krogh 1998; Hansen 1999; Szulanski 2000; see also section 3.2.3). Emotional distance and emotional closeness have also their counterpart in Szulanski (1996:32) who maintains that “arduous relationships” might be a hindrance to knowledge mediation, while closeness or even “intimacy” of relationships is highly supportive.

The initiation stage of SKM, TKM as well as of RKM is facilitated by emotional closeness, while it is hindered by emotional distance. This becomes even more obvious when relating these characteristics to some of the hindering characteristics of the initiator. Hindrances such as prestige and suspicions that providers are unwilling to share their knowledge will likely be reduced and perhaps even disappear if the actors involved have close and trustful relationships. On the other hand, those hindering characteristics of the initiator will likely be reinforced if there are emotional distances between actors.

Another characteristic of the working environment that significantly influences RKM concerns the degree of transparency of actors’ actions and action results. If a working environment is characterised by a high transparency of actors’ actions and action results, this facilitates RKM, while a low degree of transparency hinders RKM (see examples in section 9.1.1). The meaning of transparency can be related to the concept of ‘affordance’ (Gibson 1979). An affordance refers to the pragmatic function an object offers human actors. For example, an open landscape office offers a facilitating affordance in terms of easiness for actors to observe each other in action.

An additional characteristic of the working environment that might influence knowledge mediation concerns established and prevailing norms. As mentioned above (see in section ‘The Initiator’), potential knowledge providers might be unwilling to share their knowledge due to conflicting norms. Conflicting norms have not been identified as a hindrance to SKM or RKM, but as a potential hindrance to TKM. Two examples of conflicting norms are reward systems and carrier systems. If a potential knowledge provider identifies a risk of decreasing his opportunities to economic compensation or bonus or career advancement, this seems to be a significant hindrance of that actor to initiate knowledge mediation. With the exception of a few studies (see Braf 2000; de Long & Fahey 2000; section 3.2.3), this influencing characteristic of norms is seldom discussed in the KM literature.

11.1.2 The Process of Mediation: Implementation Stage
Following Szulanski (1996:28), “[t]he implementation stage begins with the decision to proceed”. That is, when the potential hindrances to initiate the actual mediation process are overcome. In this section, circumstances influencing the process of mediation of SKM, TKM and RKM will be discussed on the basis of the

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As actors we might, for example, see a door and know that we can use it to leave or enter a room. The door is the object that affords the possibility of leaving and entering a room.
problem situation, the knowledge, the initiator, the knowledge receiver, the knowledge provider and the working environment. Since the previous section has already discussed these categories and several of their characteristics in relation to existing theories, this section 11.1.2 and the following section 11.1.3 will involve less of theoretical grounding.

**The Problem Situation: Influencing Characteristics**

As discussed in relation to the initiation stage, the ‘problem situation’ is not a category that influences RKM. However, the characteristics of the problem situation do influence SKM and TKM, and also in ways similar to the ones of the initiation stage (see the previous section 11.1.1). However, instead of mainly concerning sense-reading (as in the initiation stage), the implementation stage concerns both sense-reading and sense-giving (see Polanyi 1966; section 2.3.2), and actors’ capability of sense-giving and sense-reading is influenced by the characteristics of the problem.

In SKM and TKM and when the experienced problem situation is *elementary*, this facilitates the *problem setting* both in terms of *sense-giving* of the problem (describing the problem) and *sense-reading* of the *problem description*. On the other hand, when the problem is *complex*, this characteristic makes the problem setting, both in terms of sense-giving and sense-reading, more difficult.

Furthermore, sense-giving in SKM is facilitated as there is a *specific problem* and a concrete task to use as a basis for describing the problem. However, sense-giving in TKM might be hindered as there is no specific problem and no concrete task to use as a basis for sense-giving – there is just a typical problem that might have a number of different alternative solutions.

In addition, as in the initiation stage, the implementation stage of SKM is facilitated as experienced problems tend to be acute and need to be solved directly in order for the actors to continue their work. Typical problems experienced in TKM are not critical in the same way, at least not to the individual actor. Thus, the lack of criticality of typical problems tends to hinder TKM. Based on empirical data, it seems like *the more critical knowledge is* for the ongoing operation *the more inclined are people to help out each other.*

**The Knowledge: Influencing Characteristics**

The empirical data from the cases have shown that sometimes actors can articulate their knowledge; sometimes they are less successful in articulating their knowledge (see Polanyi 1966; Giddens 1984; Rolf 1985). Actors can possess knowledge and can act upon it, but are not necessarily able to express it by the use of language (see ‘practical consciousness’, Giddens 1984).

In this regard, a lot of prior KM research builds on the distinction between tacit versus explicit knowledge (see Nonaka & Takeuchi 1995; Davenport & Prusak 1998; Dixon 2000). However, based on empirical data, it has not shown to be meaningful to try to define what *is* tacit versus explicit knowledge (or what is practical versus discursive consciousness, Giddens 1984) as these dimensions of

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1 This was especially obvious in the Energy, where the operators were highly helpful in SKM (see example in section 7.2.1), but reluctant to participate in TKM (see section 8.3.1).
knowledge are not static or independent of each other and there is no bar between them. All knowledge has traits of both tacit and explicit characteristics. As Polanyi (1966) argues, knowledge itself is either tacit or based on tacit knowledge.

Some influencing characteristics of knowledge that have been identified during the analysis procedure are: hypothetic versus non-hypothetic knowledge and general versus non-general knowledge.

Hypothetical knowledge is defined as knowledge that has not yet any proven record, while non-hypothetical knowledge is knowledge that has been tested and showed to be valid and useful. These characteristics are also discussed by other scholars. Szulanski (1996, 2000) and Szulanski & Cappetta (2003) talk about proven versus unproven knowledge as alternative labels but attach the same meaning as in this work. Compared with my labels, I regard ‘proven’ and ‘unproven’ as better words to use; they are conceptually more ‘elegant’. Thus, those two will be used in the subsequent work.

General knowledge is about the typical objects and situations, while non-general knowledge is about the particular – the specific and unique – objects and situations. The meanings of these two knowledge characteristics are similar to Hendriks (2001; see also section 3.2.4), who uses the labels ‘generic’ versus ‘situated’ knowledge and Goldkuhl & Braf (2001), who use the labels ‘general’ versus ‘specific’ knowledge. My label non-general is not regarded to be suitable, but I feel hesitant to use ‘specific’ as this is a core characteristic of the problem triggering SKM and might therefore be confusing. However, Hendriks’ notion of situated knowledge is preferable as an alternative to ‘non-general’ knowledge.

When the implementation stage concerns general knowledge, this knowledge characteristic might facilitate the mediation, while the implementation stage might be hindered if it is concerned with situated knowledge. That is because actors are often more familiar with the typical than with the specific and unique, and the typical problems and tasks might have some already finished solutions, as a kind of ‘recipe knowledge’ (Berger & Luckmann 1966). This is valid in SKM, TKM as well as RKM. However, even if TKM as such concerns typical problems, this does not mean that ‘recipe knowledge’ is always available.

Furthermore, one circumstance that seems to facilitate SKM is that the intention and pragmatic purpose of the knowledge becomes clear as it can be related to and discussed based on a specific problem concerning a specific task that needs to be handled. On the other hand, in TKM there is a risk that the intention and pragmatic purpose is unclear, which hinders the mediation in the sense that actors might have difficulties in defining the problem and consequently also how to solve it.

Another characteristic of knowledge that seems to hinder TKM concerns the usefulness of knowledge (see also Jenkins 2004). Knowledge might become less useful or even useless when shared, which, in turn, might be a rationale of actors

1 Instead of defining actors’ potential difficulties in articulating knowledge as caused by the characteristics of the knowledge, this work relates these kinds of difficulties to the characteristics of the problems and tasks and the sense-giving capabilities of the actors.

2 The standard solutions of typical house building in Architect are examples of general knowledge, while the knowledge about a specific client’s practice involves situated knowledge.
not to share their knowledge\(^1\). This observation is of particular interest as several KM scholars build their theories on the assumption that ‘knowledge grows when shared and with use’ (see Davenport & Prusak 1998; Quinn et al. 2002). The KM literature also tends to presume that knowledge mediation always is desirable as if ‘the more we know the better we are’ (see section 3.3.2). However, this is a fallacy – knowledge and knowledge mediation is only of value if the knowledge is useful to the individual actors in their organisational roles, and the practice will only benefit if the knowledgeability of the actors is utilised in actions. In other words, we need to put knowledge in relation to its practical usefulness; that is, the consequential aspect of knowledge mediation.

Some KM scholars also talk about characteristics such as ‘complex’ and ‘simple’ knowledge (see Hansen 1999). Initially, similar labels were also used in this work. However, when further analysing their meanings, I realised that those characteristics do not really concern the knowledge. Knowledge as such is not complex or elementary. It is the problems and tasks that are complex or elementary (simple). It is the complex and indeterminate (Dewey 1938) features of the problems and tasks that make required knowledge mediation hard to accomplish. If actors would have the capability to specify all the parts and questions related to complex and indeterminate problems and tasks, the mediation would not be that difficult. However, actors are often incapable of specifying questions and give exhaustive solutions related to complex problems and tasks (see ‘causal ambiguity’, Lippman & Rumelt 1982).

**The Initiator: Influencing Characteristics**

No matter whom the initiator is (the coordinator, the knowledge receiver or the knowledge provider) one characteristic that facilitates the mediation concerns the initiator’s capability to *sense-giving* (Polanyi 1966). This is in particular critical in SKM and TKM, where the ‘problem’ needs to be formulated and described, but it is also valid in RKM via personalisation strategy and conversation, where the initiator needs to verbalise a question or express parts of his knowledge. On the contrary, if the initiator lacks a sense-giving capability, he will have difficulties in describing the problem and expressing his knowledge. This reasoning follows Szulanski & Cappetta (2003:519; see also Szulanski 2000:14) who maintain that,

> [t]he source’s mastery and ability to articulate a practice is often incomplete as is the recipient’s ability to specify the environment where new knowledge will be applied.

Furthermore, in TKM, where the initiator commonly is a *coordinator*, there is a need for *planning* and *design*. Without proper planning and design, there is a risk that such initiatives will not succeed (see ‘lack of management and commitment’, Sverlinger 2000). The need for planning and design are not characteristics of the coordinator but relates to the responsibilities of the coordinator. As described in section 10.2.2, a coordinator of TKM push approach via publication strategy has, at least, three distinct responsibilities: 1) to request an IS developer to design and implement the IS (TKM artefacts), 2) to request the knowledge providers to express

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\(^1\) For example, if an architect shares his knowledge about clients, this knowledge might be useless if another architect gains an assignment from that client (see section 8.2).
and mediate their knowledge and 3) to motivate the intended receivers to use and take part of the signs communicated via the IS. These responsibilities concern the regulative role (Goldkuhl 2002) of the coordinator. Thus, when knowledge mediation is initiated by a coordinator who has an inadequate regulative role, this might hinder the mediation; while an adequate regulative role seems to facilitate the mediation (see examples in section 8.3).

This reasoning follows Szulanski (2000:15; see also Leonard-Barton 1990), who emphasises the hindering characteristic of “poor coordination”, and Szulanski (1996:32) who maintains that,

[. . .] formal structure and systems, sources coordination and expertise, and behaviour-framing attributes of the organizational context affect the number of attempts to transfer knowledge and the outcome of those attempts.1

The Knowledge Receiver: Influencing Characteristics

One hindrance of SKM, TKM as well as RKM concerns a lack of intersubjective knowledge of the receiver and the provider. That is, they might have difficulties in communicating and understanding each other due to different pre-understanding and experiences, or because they lack a common terminology (see Szulanski 2000; Berger & Luckmann 1966).

Furthermore, following Langefors’ (1993; see section 2.5.2) infological equation, the knowledge the receiver will be capable to acquire via mediation depends on a combination of the signs (mediating instruments) used and the pre-knowledge and the sense-reading capability (see absorptive capability, Cohen & Levinthal 1990; Mowery et al. 1996) of the receiver, at a given time. The sense-reading capability of the receiver is largely a function of the receiver’s pre-existing knowledge (Dierickx & Cool 1989), and a lack of relevant pre-knowledge and a sense-reading capability hinders the mediation, while relevant pre-knowledge and a sense-reading capability facilitate mediation.

In SKM push approach and TKM push approach, one hindrance is that the intended receiver might ignore the knowledge offered by other actors. Szulanski (2000) refers to this kind of behaviour as a ‘lack of motivation’ that might be caused by a ‘not invented here syndrome’ (NIH-syndrome, Katz & Allen 1982). If actors neglect knowledge because of a kind of self-sufficiency this is labelled prestige. However, this kind of behaviour might not necessary or only concern prestige. A receiver might be disinclined to take part of the knowledge offered because the receiver does not regard the task as problematic or because the knowledge provider or mediating instruments are regarded unreliable.

A potential hindrance to TKM is when the receivers are disinclined to take part of new knowledge because they do not want to work with new tasks, while TKM is facilitated when the receivers are eager to learn new tasks2. Concerning the

1 Szulanski (1996) discusses this in relation to the influencing characteristics of the context. However, following the categorisation of this work, it is primarily related to the coordinator’s regulative responsibility to create prerequisites to facilitate knowledge mediation.

2 For example, some operators at Energy were reluctant to learn each other’s net IS partly because they wanted to continue to work with familiar tasks, while several architects were eager to learn and take part of the seminars offered by Architect’s knowledge work.
characteristics of the knowledge receiver significant in RKM, those are similar to the ones in the initiation stage. Lack of attentiveness, interest and curiosity hinders RKM, while attentiveness, interest and curiosity facilitate RKM. In addition, a lack of time of the receiver to read books and to use information systems hinders RKM via publication strategy.

The Knowledge Provider: Influencing Characteristics

As described above, one hindrance of SKM, TKM and RKM concerns a lack of intersubjective knowledge of the knowledge receiver and the knowledge provider (see Szulanski 2000). Another hindrance is if the knowledge provider lacks a sense-giving capability to express his knowledge.

In SKM and TKM, in particular when problems relate to complex tasks, the provider might feel he lacks the time to mediate his knowledge. Lack of time is emphasised by Sverlinger (2000) as the major hindrance to knowledge mediation (see also Chase 1997; Davenport & Prusak 1998; section 3.2.3). One solution to a lack of time in SKM is that the knowledge provider solves the problem himself, which means that the knowledge is reused in similar tasks by the same actor (as in ‘serial transfer’, Dixon 2000; see also the less successful example in section 7.1.2). However, this solution does not involve knowledge mediation between actors. Thus, if similar specific problems are likely to occur again this might be a good reason for initiating TKM (as was done in Architect, see section 8.1.1 in relation to the examples in section 7.1.2).

One facilitating circumstance of SKM is the knowledge providers’ willingness to mediate their knowledge. As several respondents expressed, “if one just puts the request one will always get some support”. This relates to a kind of service-mindedness towards colleagues, and indirectly towards clients, to do one’s best for the sake of the practice, and this attitude seems to be reinforced by the criticality of the specific problem situation that needs to be solved in SKM. As Wasko & Faraj (2000:171) maintain, actors who are willing to share their knowledge “act out of community interest rather than self-interest”. Furthermore, actors also tend to be pride when asked for help, and this was in particular shown in examples of SKM.

In TKM, however, the knowledge provider tends to be less inclined to mediate his knowledge. The provider might be disinclined to share his knowledge for several reasons such as if he 1) suspects he will feel less indispensable as a kind of prestige, 2) fears it will threaten his position, 3) believes it will decrease his possibilities to advancement or economic compensation, which concern conflicting norms or 4) suspects that the knowledge will become less useful or even useless when shared.

The KM literature commonly talks about ‘unwillingness’ of knowers’ to share their knowledge, which, in turn, is related to the ‘knowledge is power syndrome’ (Quinn et al. 2002; Butler 2003) or ‘lack of motivation and incentives’ (Szulanski 1996; Davenport & Prusak 1998; Sverlinger 2000). Following Szulanski (2000), unwillingness might be caused by a fear of losing ownership of the knowledge, or

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1 One exception concerned the school expert who mediated his knowledge to a group of younger architects (see section 8.1.1). However, the school expert had reach retiring age and did not need his knowledge any longer, which might have contributed to his willingness to share his knowledge.
losing a position of privilege or superiority or disinclination to devote time and resources to support the mediation, which are similar to the reasons identified in this work. Concerning the threat of not being able to maintain a position, Szulanski (2000:14f.; see also Leonard-Barton 1990; Hayes & Walsham 2003) maintains that, 

\[\text{the source or the recipient may do more or less than it is expected from them, leading to situations where the recipient usurps roles of the source or where the source intrudes on the domain of the recipient.}\]

One hindrance of RKM is if a potential knowledge provider does not want to show or talk about the own work. Some architects expressed a feeling of being evaluated when they showed their ideas and solutions. Even if they felt this was getting better, there were still traces of disinclination to expose their work because a fear of being criticised. Two other hindrances concern the risk of bragging (see also Bansler & Havn 2003) or being evaluated as ignorant (as in Publish, see section 9.2.1; see also Pfeffer & Sutton 2000). Those hindrances all falls into prestige as a hindrance to RKM.

**The Working Environment: Influencing Characteristics**

Concerning the characteristics of the working environment that influence the implementation stage those are the same as the characteristics influencing the initiation stage (see section 11.1.1). Emotional closeness, in terms of good relationships between the knowledge receiver and the knowledge provider, facilitates SKM, TKM as well as RKM. Concerning good relationships, several respondents – both in the role of being receivers and providers – thought this was one reason why knowledge mediation functioned well. On the contrary, when there was emotional distance – lack of relationships – this was a hindrance.

Concerning geographical distance, the process of mediating knowledge is facilitated when actors can show their problem or tasks. Thus, using illustrations and products to explain problems and tasks is a facilitator of SKM, TKM and RKM (via personalisation strategy). Reversely, when there is geographical distance, it is harder to mediate knowledge as the actors do not have the same opportunity to use illustrations and products as means to explain and reason about problems and solutions.

Another potential hindering circumstance of TKM concerns norms (see also section 11.1.1). Norms might also influence RKM in the sense that RKM via personalisation strategy might not be accomplished because actors prioritise operative on-going tasks. For example, when actors need to debit their time on projects and clients, they are less inclined to spend time on issues that are not chargeable and necessary to perform their tasks (see also Braf 2000; de Long & Fahey 2000).

**11.1.3 Consequences of Mediation: Utilisation Stage**

The consequences of mediation concern the knowledge receivers’ utilisation of the mediated knowledge in action. As discussed earlier, the primary purpose of

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1 This was also a fact that Architect paid attention to in planning and designing its knowledge work where development of personal networks was one of the core tasks.
knowledge mediation is to enhance actors’ knowledgeability in actions; that is, to establish so-called ‘informed actions’ (Langefors 1993). Investigating and analysing the actual practical consequential effects of knowledge mediation as well as their influencing circumstances is sometimes hard because the relation between a certain mediation process and its consequences might be difficult to acknowledge or the utilisation might not yet have been realised. Still, some observations have been made concerning influencing circumstances in the utilisation stage. Those circumstances concern the problem or task in which the mediated knowledge intends to be utilised, the mediated knowledge and the knowledge receiver in terms of the actor using the knowledge. The other categories are not discussed in this section as they do not really influence the utilisation stage.

The Problem or Task: Influencing Characteristics

Concerning knowledge utilisation as a consequence of SKM, one facilitating circumstance is that the mediation and the utilisation are close to each other in time. In other words, there is a natural timeliness of the task, in which the knowledge intends to be utilised, in relation to the mediation process. On the other hand, the utilisation as a consequence of TKM, and also RKM, tends to be future and potential in the sense that the knowledge receiver might not be sure when or if he will get the opportunity to utilise the knowledge. A lack of timeliness of the task in relation to the mediation process hinders knowledge utilisation as an effect of TKM and RKM. Lack of timeliness might result in the receivers having forgotten the knowledge when it is time to use it (see example in section 8.4.3). On the other hand, when the receivers soon after the mediation get a task in which the knowledge can be applied, this facilitates the utilisation (see examples in section 8.1.2).

Another circumstance that facilitates the utilisation as a consequence of all three types of knowledge mediation concerns the repetitive characteristic of tasks (see discussion in section 10.3.3). If the knowledge mediated can be re-used by the receivers, they will get better and better at utilising the knowledge (see the concept of institutionalisation, Berger & Luckmann 1966; see also Szulanski 1996).

The Knowledge: Influencing Characteristics

One hindrance of SKM is when the knowledge is unproven (see Szulanski 1996, 2000). Still, sometimes there is no proven knowledge available to the actor, and he might need to use unproven knowledge even if he feels unsure about the results. On the reverse, if knowledge has a proven record this seems to facilitate all three mediation types (ibid.).

A hindrance of knowledge utilisation as a consequence of TKM is when the mediation is concerned with general knowledge. General knowledge sometimes needs to be adjusted to the specific prerequisites for the concrete task in which the knowledge is to be applied. This means that general knowledge might need to be ‘translated’ in order to be actionable in the concrete task and it might need to be complemented with situated knowledge (see further the subsequent section). A similar hindrance to knowledge utilisation as a consequence of RKM (and likely also as a consequence of SKM), is that situated knowledge used in one specific task
might be difficult to utilise in another specific task that has other situated prerequisites (see also Sverlinger 2000; section 3.2.3).

A facilitating circumstance of RKM is that actors can gain knowledge they did not know existed or that they needed. This is one of the cores of RKM as it is about serendipity. An actor might, for example, learn about what other actors are working with which, in turn, makes it easier for him to understand the practice and who is good at what. Such knowledge might also be important next time the actor faces a problem and needs help.

**The Knowledge Receiver: Influencing Characteristics**

Concerning the receiver as the knowledge user, one hindrance to knowledge utilisation is if the receiver is reluctant to accept other actors’ knowledge (see NIH-syndrome, Katz & Allen 1982; see also section 11.1.2) This might, for example, be due to a self-sufficiency of the receiver as a kind of prestige.

A potential hindrance to knowledge utilisation as a consequence of TKM is if the receiver is incapable to translate mediated knowledge into the specific task. The receiver might acknowledge that he has gained knowledge that relates to a task he needs to handle, but might not know how to apply it. The ‘translation problem’ might also influence knowledge utilisation as a consequence of SKM and RKM. As Sverlinger (2000; see also section 3.2.3) maintains, situated knowledge from one project might be difficult to generalise and use in another project. Still, the translation problem seems to be most significant to TKM. This is because many TKM tend to focus on mediating general knowledge – knowledge about typical and common tasks of the practice – while SKM and RKM primary concern situated knowledge or specific instances of typical knowledge. Thus, the utilisation of general knowledge as a consequence of TKM might put a greater demand on the need for translation to suit the general knowledge to the specific task in which it aims to be applied. However, if the receiver has experiences from similar tasks this will likely facilitate the utilisation of the mediated knowledge.

**11.1.4 Influencing Circumstances: Comments and Summary**

As reasoned above, several of the influences are similar in SKM, TKM and RKM. However, there are also some differences in what circumstances influencing the different types of knowledge mediation. Thus, to understand which influences actors might face in knowledge mediation, we need to pay regard to which mediation type, and also what stage in the process, is concerned. Furthermore, several of the influencing circumstances are also similar to the ones suggested by prior research (see section 3.2.3 and 3.2.3). However, I have also identified some influencing circumstances that are less emphasised in prior research, such as norms in conflict with knowledge mediation and the importance of the usefulness of knowledge.

Table 11-1 below gives a brief summary of significant characteristics of the main categories that might influence SKM, TKM and RKM. In the table, the minus signs (-) refer to hindrances; the plus signs (+) refer to facilitators; and three lines (---) mean that the category has no significant influencing characteristic.
### Table 11-1: Summary of Circumstances Influencing the three Basic Types of Knowledge Mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>Specific Knowledge Mediation</th>
<th>Typical Knowledge Mediation</th>
<th>Random Knowledge Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisites for Mediation: Initiation Stage</strong></td>
<td></td>
<td></td>
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<tr>
<td>The problem situation</td>
<td>+ Elementary problems</td>
<td>+ Complex problems</td>
<td>-</td>
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<tr>
<td></td>
<td>- Complex problems</td>
<td>- Typical problems</td>
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<td></td>
<td>+ Specific problems</td>
<td>- The none-acute characteristics of problems</td>
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<tr>
<td></td>
<td>+ The acute characteristic of problems</td>
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<tr>
<td>The initiator</td>
<td>+ Sense-reading capability</td>
<td>+ Lack sense-reading capability</td>
<td>- Prestige</td>
</tr>
<tr>
<td></td>
<td>- Lack sense-reading capability</td>
<td>+ Pre-knowledge related to the problem</td>
<td>+ Attentiveness, interest and curiosity of the actors</td>
</tr>
<tr>
<td></td>
<td>+ Pre-knowledge related to the problem</td>
<td>- Lack of pre-knowledge related to the problem</td>
<td>- Lack of attentiveness, interest and curiosity of the actors</td>
</tr>
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<td></td>
<td>+ Problem-solving motives the initiators</td>
<td>- Lack of knowledge about available providers or mediating instrument</td>
<td>- Initiator (receiver) suspects the provider is unwilling to share his knowledge</td>
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<tr>
<td></td>
<td>- Lack of knowledge about available providers or mediating instrument</td>
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<td></td>
<td>- Prestige and suspicion of not getting the kind of support wanted</td>
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<td></td>
<td>- Initiator (receiver) believes the provider lacks communicative capability or is unwilling to share his knowledge</td>
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<tr>
<td></td>
<td>- Initiator (receiver) is unwilling to share his knowledge</td>
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<tr>
<td></td>
<td>- Unawareness of initiator (provider or coordinator) of potential receivers problems, tasks and needs</td>
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<td></td>
<td>- Prestige</td>
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<td></td>
<td>+ Attentiveness, interest and curiosity of the actors</td>
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<tr>
<td></td>
<td>- Lack of attentiveness, interest and curiosity of the actors</td>
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<td></td>
<td>- Initiator (receiver) suspects the provider is unwilling to share his knowledge</td>
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<td></td>
<td>- Initiator (provider) wants to feel indispensable or suspects that the receiver is not interested</td>
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<td></td>
<td>- To the provider, the sharing of knowledge might conflict prevailing norms or decrease the usefulness of the knowledge</td>
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<tr>
<td></td>
<td>- When coordinators are the initiators this facilitates the mediation to be initiated</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Unawareness of initiator (provider or coordinator) of potential receivers problems, tasks and needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The working environment</td>
<td>- Geographical &amp; emotional distance</td>
<td>- Geographical &amp; emotional distance</td>
<td>- Geographical &amp; emotional distance</td>
</tr>
<tr>
<td></td>
<td>+ Geographical &amp; emotional closeness</td>
<td>+ Geographical &amp; emotional closeness</td>
<td>+ Geographical &amp; emotional closeness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Prevailing norms conflicting knowledge sharing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CHAPTER 11

<table>
<thead>
<tr>
<th>Category</th>
<th>Specific Knowledge Mediation</th>
<th>Typical Knowledge Mediation</th>
<th>Random Knowledge Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Problem Situation</strong></td>
<td>+ Elementary problems</td>
<td>+ Elementary problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Complex problems</td>
<td>- Complex problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Specific problems</td>
<td>- Typical problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ The acute characteristic of problems</td>
<td>- The none-acute characteristics of problems</td>
<td></td>
</tr>
<tr>
<td><strong>The Knowledge</strong></td>
<td>+ General knowledge</td>
<td>+ General knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Situated knowledge</td>
<td>- Lack of general knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Clear intention and purpose of knowledge</td>
<td>- Unclear intention and purpose of knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Decreased usefulness of the knowledge when shared</td>
<td></td>
</tr>
<tr>
<td><strong>The Initiator</strong></td>
<td>+ Sense-giving capability</td>
<td>+ Sense-giving capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lack of sense-giving capability</td>
<td>- Lack of sense-giving capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Inadequate regulative characteristics of the coordinator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ Adequate regulative characteristics of the coordinator</td>
<td></td>
</tr>
<tr>
<td><strong>The Knowledge Receiver</strong></td>
<td>- Lack of intersubjective pre-knowledge in relation to the provider</td>
<td>- Lack of intersubjective pre-knowledge in relation to the provider</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lack of relevant pre-knowledge and sense-reading capability</td>
<td>- Lack of relevant pre-knowledge and sense-reading capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Relevant pre-knowledge and a sense-reading capability</td>
<td>+ Relevant pre-knowledge and a sense-reading capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prestige or disinclination to take part of other actors’ knowledge because they are regarded unreliable or the receiver has not acknowledge any problem</td>
<td>- Prestige or disinclination to take part of other actors’ knowledge because they are regarded unreliable or the receiver has not acknowledge any problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Wants to work with familiar tasks</td>
<td>- Wants to work with familiar tasks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Eagerness to learn new tasks</td>
<td>+ Eagerness to learn new tasks</td>
<td></td>
</tr>
<tr>
<td><strong>The Knowledge Provider</strong></td>
<td>- Lack of intersubjective pre-knowledge in relation to the knowledge receiver</td>
<td>- Lack of intersubjective pre-knowledge in relation to the knowledge receiver</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lack of sense-giving capability</td>
<td>- Lack of sense-giving capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lack of time to mediate knowledge</td>
<td>- Lack of time to mediate knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Service-mindedness towards colleagues</td>
<td>+ Pride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Pride</td>
<td>- Prestige or disinclination to share knowledge due to a fear the knowledge will become less useful or conflicting norms</td>
<td></td>
</tr>
</tbody>
</table>

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### Theorising Circumstances Influencing Knowledge Mediation

<table>
<thead>
<tr>
<th>Category</th>
<th>Specific Knowledge Mediation</th>
<th>Typical Knowledge Mediation</th>
<th>Random Knowledge Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The working environment</td>
<td>- Geographical &amp; emotional distance</td>
<td>- Geographical &amp; emotional distance</td>
<td>- Geographical &amp; emotional distance</td>
</tr>
<tr>
<td></td>
<td>+ Geographical &amp; emotional closeness</td>
<td>+ Geographical &amp; emotional closeness</td>
<td>+ Geographical &amp; emotional closeness</td>
</tr>
<tr>
<td></td>
<td>- Prevailing norms conflicting knowledge sharing</td>
<td>- Prevailing norms conflicting knowledge sharing</td>
<td>- Prevailing norms conflicting knowledge sharing</td>
</tr>
<tr>
<td>Consequences of Mediation: Utilisation Stage</td>
<td>+ Elementary problems and tasks</td>
<td>+ Elementary problems and tasks</td>
<td>+ Elementary tasks</td>
</tr>
<tr>
<td></td>
<td>- Complex problems and tasks</td>
<td>- Complex problems and tasks</td>
<td>- Complex tasks</td>
</tr>
<tr>
<td></td>
<td>+ Timeliness of the task in relation to the mediation process</td>
<td>+ Lack of timeliness of the task in relation to the mediation process</td>
<td>+ Lack of timeliness of the task in relation to the mediation process</td>
</tr>
<tr>
<td></td>
<td>+ Repetitive characteristic of the task</td>
<td>+ Repetitive characteristic of the task</td>
<td>+ Repetitive characteristic of the task</td>
</tr>
<tr>
<td>The problem or task</td>
<td>- Unproven knowledge</td>
<td>General knowledge might be difficult to apply in a task what also requires situated knowledge</td>
<td>+ Proven knowledge</td>
</tr>
<tr>
<td></td>
<td>+ Proven knowledge</td>
<td>+ Proven knowledge</td>
<td>+ New knowledge, that the receiver did not know was needed or existed</td>
</tr>
<tr>
<td></td>
<td>+ Knowledge from one specific task might be hard to apply in another specific task</td>
<td>+ Knowledge from one specific task might be hard to apply in another specific task</td>
<td>- Knowledge from one specific task might be hard to apply in another specific task</td>
</tr>
<tr>
<td>The knowledge receiver</td>
<td>- Prestige</td>
<td>- Prestige</td>
<td>- Prestige</td>
</tr>
<tr>
<td></td>
<td>- Lack of translation capability</td>
<td>- Lack of translation capability</td>
<td>- Lack of translation capability</td>
</tr>
<tr>
<td></td>
<td>+ Experiences from similar tasks as the task in which the knowledge intends to be utilised</td>
<td>+ Experiences from similar tasks as the task in which the knowledge intends to be utilised</td>
<td>+ Experiences from similar tasks as the task in which the knowledge intends to be utilised</td>
</tr>
</tbody>
</table>
11.2 IT-based Knowledge Mediation

This section focuses on circumstances in which information systems can be seen as suitable instruments for knowledge mediation, which concerns the third research question of this work (see section 1.3.1). To give an answer to this question, two sub-questions will be considered: 1) What are the fundamental differences between IT-based and none IT-based knowledge mediation? 2) What influencing circumstances – facilitators and hindrances – can be seen in IT-based knowledge mediation?

11.2.1 IT-based versus None IT-based Knowledge Mediation

Talking about ‘mediating instrument’ refers to the signs used to mediate knowledge between actors. To Berger & Luckmann (1966:50f.; see also section 2.4.2),

[a] sign may be distinguished from other objectivations by its explicit intention to serve as an index of subjective meanings. To be sure, all objectivations are susceptible of utilization as signs, even though they were not originally produced with this intention. [. . .] Signs are clustered in a number of systems. Thus there are systems of gesticulatory signs, of patterned bodily movements, of various sets of material artefacts, and so on. [. . .] Language, which may be defined here as a system of vocal signs, is the most important sign system of human society.

In this work, the focus has been on language as the primarily sign system used to communicate knowledge. Basically, actors use language in oral and written speech. Oral speech refers to oral (vocal) signs, while written speech refers to written signs. Following the discussion in section 10.1.2, oral signs are used in the personalisation strategy, commonly in the face-to-face conversation, while written signs can be used in the personalisation as well as the publication strategy. Actors might apply a personalisation strategy by using e-mail (written signs) as the mediating instrument, or actors can mediate knowledge via IS without knowing each other as in a publication strategy.

Based on empirical data from the cases, organisations seem to strive to extend the use of IS as a way to facilitate communicate and make signs available to a larger number of actors (knowledge receivers). However, empirical data have also shown that, when possible, the use of oral signs are often preferred rather than written signs via IS. When actors need to deal with complex problems and tasks, oral communication might be required. But actors tend to prefer oral communication even when the problems and tasks are elementary and could be handled via IS. It seems like actors want to talk with each other and they seem to feel more confident when having oral communication than when using written signs.

This can be explained by the circumstance that oral communication, in particular face-to-face, offers a number of facilitating features that cannot be found in written communication. Oral face-to-face communication is characterised by visibility and audibility and the actors can easily ask for clarifications if they have difficulties in understanding each other (see further table 2-1 in section 2.3.2 and section 10.1.2).

1 The use of an IS might be regarded as a meta-instrument that, in turn, mediates written signs.
However, oral communication has also certain restricting features. Oral communication is *private*; thus, only the actors present ‘here and now’ can take part of the mediation. Oral communication is also *instant* as it does not leave any record, except in the memory of the actors (see the concepts of ‘recordlessness’ and ‘evanescence’ Clark & Brennan 1991; Clark 1996; see also section 10.1.2).

Written communication via IS, on the other hand, represents a *high degree of accessibility* as IS can be used to reach a large number of potential knowledge receivers. In this sense, the signs provided via IS are *public* to all actors having access to the IS (see section 10.1.2). The use of IS also represents a *high degree of preservation*. We might say that IS has an “*action memory* as a repository of messages held by the system” (Goldkuhl & Ågerfalk 2000:12, *italics* in original). Hereby, the signs are *permanent* and accessible as long as they are part of the IS content. Information systems are not only used to communicate knowledge related elementary problems and tasks. Information systems are also used to enable actors to handle complex problems and tasks by mediating so-called general knowledge, that is, knowledge about the typical.

Comparing oral and written communication – in terms of none IT-based versus IT-based knowledge mediation – they have their respective advantages and limitations. One overall difference that seems to be of significance is that in oral communication actors have the possibility to reason about the issue in question. Even if they initially do not have any ‘recipe knowledge’ to offer each other, they can come up with a proper solution through a dialogue. That means that actors might find it difficult to express their knowledge and, in such cases, the reasoning might be a facilitating circumstance. On the other hand, the use of IS presumes and requires that the knowledge providers have the capability to express their knowledge in written signs and store the signs in the IS. In other words, the providers need to have a sense-giving capability and also the feeling of how much knowledge needs to be expressed in order for the receivers to be able to interpret (see sense-reading, Polanyi 1966) and make use of the signs. In comparison with oral communication, the use of IS and written communication seem to put higher requirements on actors’ capability of sense-reading and sense-giving.

### 11.2.2 IT-based Mediation: Influencing Circumstances

This section focuses on facilitators and hindrances that can be seen in IT-based knowledge mediation. Following the action-oriented paradigm used in section 11.1, the influencing circumstances of IS are most obvious in the process of mediation, that is, the implementation stage. However, the characteristics – in terms of facilitating and hindering circumstances – of mediating instruments also influence the choice of instrument to use, which is a matter of the initiation stage. Concerning the last stage – the consequences of knowledge mediation – this has not shown to be relevant to discuss based on the mediating instruments used as this stage is not concerned with the mediating instrument but with the utilisation as a result of the mediation process. The influencing circumstances of IS as mediating instruments are summarised in table 11-2 below.
Prerequisites for Mediation: Initiation Stage

One way in which the characteristics of mediating instruments might influence the initiation stage concerns the choice of instrument. As mentioned above, empirical data showed that when having the opportunity to choose, the face-to-face personalisation strategy tends to be preferred at the expense of the publication strategy by the use of IS. Actors tend to regard IS as less reliable and more time-consuming to use in comparison with oral communication. Hence, already in the initiation stage the use of IS as mediating instruments might be hindered because the IS content is considered unreliable (see also Bansler & Havn 2003) or that IS are considered time-consuming to use. The choice of IS might also be hindered because information systems are regarded roundabout to use. IS can be regarded as roundabout to use because the IS users lack knowledge about how to use the system or because lack of retrieval abilities of the system (see Braf 2000). Furthermore, IS might not be used because there is no established routines to use IS as mediating instruments.

All these circumstances hinder IS to be used as mediating instruments. Thus, even if an organisation has designed and implemented an IS, there is a risk that the IS degenerates as a mediating instrument because it is not used. These hindrances are valid no matter the certain type of knowledge mediation, but have been most obvious in SKM. However, if actors do not to use available IS, the opportunities of RKM via publication strategy will be highly reduced. Information systems offer opportunities and possibilities to serendipity, but this presumes that the systems are used (see Stenmark 2003).

Empirical data also showed that an enhanced computerisation of work might decrease the transparency of actors’ actions and action results, which, in turn, reduces the opportunities of RKM via personalisation. However, this latter hindrance does not only concern limiting characteristic of IS but also how work is organised.

In TKM, information systems tend to be chosen as mediation instruments to facilitate high access of signs as IS enable a large number of potential receivers to take part of the IS content. The use of IS also represents a high degree of preservation, which also facilitates the choice of IS as mediating instrument in TKM.

An additional circumstance that seems to hinder TKM and RKM concerns a lack of time. It seems like many actors do not feel they have the time to use IS, especially not when they do not have a specific problem or task to solve1. Lack of time is a hindrance emphasised by several scholars (see Chase 1997; Davenport & Prusak 1998; Sverlinger 2000; Bansler & Havn 2003).

Finally, as discussed earlier, it seems like actors often want to talk with each other to maintain and develop personal relationships and that they feel flattered when getting questions related to their knowledgeability (see Constant et al. 1994; Dixon 2000; Bansler & Havn 2003). Accordingly, personal relations are important for knowledge mediation. In comparison with oral communication especially face-

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1 Several respondents meant that they did not have the time to surf the intranet without a specific intention and that the ‘real’ learning primary occurs when they had a specific problem to solve.
to-face, the use of IS (via publication strategy) offers more limited opportunities to develop personal relationships, which might be a hindrance to all three types of knowledge mediation. In this sense, the de-personalisation – that is, the high degree of detachment of knowledge – is a hindrance to using IS as mediating instruments (see also section 10.1.2).

The Process of Mediation: Implementation Stage

One hindrance of IS as mediating instruments concerns the lack of interaction between the knowledge receivers and the knowledge providers. If the receivers have difficulties in interpreting the signs, there are limited possibilities to put additional questions in interaction with the IS. This relates to the de-personalisation of signs representing actors’ knowledge, which limits the possibilities to reason about problems and to find proper solutions (similar ideas are presented by McDermott 1999; Sverlinger 2000). Signs in IS might be poorly formulated or be too few in order for the receivers to interpret their meaning as intended by the provider. Another hindrance is if the content of information systems is not updated, which results in a lack of reliability of the knowledge receiver in relation to the IS.

Concerning the lack of updated content of IS, this can be related to Langefors’ (1993) infological equation that emphasises the importance of time. The importance of time is also emphasised by Langefors as part of ‘information elements’ (also referred to as ‘elementary messages’ and ‘e-messages’). As Langefors (1993:109) maintains,

[an information element is the knowledge of something elementary, or simple, about an (identified) object. [. . .] This may be an elementary property, a relationship or the participation in an event. It was soon recognized that information elements must also include knowledge of the time (or time interval) when the object was known to possess the property. [. . .] In conclusion, an information element includes three components: the object (or the object group), the property, and the time.

Hence, the knowledge gained via information systems is not only governed by the pre-knowledge of the receiver at a given time; it is also governed by the quality and relevance of the signs provided by the IS at a given time. At a given point of time – for example, when the signs are stored in the IS – the signs might be updated, relevant and correct. However, at a give time later on, the same signs might not be correct or relevant any longer – they might have become obsolete. This shows the importance of continuously updating the content of IS.

Furthermore, even if the receivers might be able to interpret the signs provided by an IS, they might be unable to apply the knowledge in a specific task, which is a hindrance related to the ‘translation problem’ (see section 11.1.3; see also Sverlinger 2000).

There are not only hindering characteristics of IS use. IS offer high accessibility, and the receivers might use the IS content over and over again, whenever they like. The use of IS offers repetitive use since the IS content represents permanence in the sense that the receivers can go back to the IS if they forget something. Thus, IS can actually over-bridge the problem when actors forget knowledge that earlier has been mediated. Furthermore, in comparison with oral communication, the use of IS does not require the co-presence and direct contact between the receivers and the
providers. This is not least critical for organisations that are geographically dispersed (such as Architect).

Furthermore, one highly significant and facilitating characteristic of IS concerns the possibility of using IS as institutionalised mediating instruments. Empirical data showed that SKM push approach via publication was enabled by the use of pre-designed functionalities of IS (see section 7.2.3). However, it is not only about automatic SKM push approach via publication strategy by the use of IS; institutionalisation of IS as mediating instruments is a matter of getting actors to use IS as a natural part of their work. This also relates to TKM as a preparatory initiative that enables SKM pull approach via publication strategy, TKM pull approach via publication strategy and RKM via publication strategy (see section 10.2).

Another hindrance of the use of IS identified by Sverlinger (2000) is that actors do not feel the organisation has the proper technology for knowledge mediation. This hindrance was not observed in the empirical data of this work. The empirical data from the three cases did rather imply the reverse. The three organisations seemed to have relevant technology, a problem was rather a lack of IS use.

In the table 11-2 below, identified and significant influencing circumstances of information systems as mediating instruments are summarised. The table includes influencing circumstances concerning the initiation stage and the implementation stage. The minus signs (-) refer to hindrances, while the plus signs (+) refer to facilitators.

<table>
<thead>
<tr>
<th>Specific Knowledge Mediation</th>
<th>Typical Knowledge Mediation</th>
<th>Random Knowledge Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisites for Mediation: Initiation Stage</strong></td>
<td><strong>Prerequisites for Mediation: Initiation Stage</strong></td>
<td><strong>Prerequisites for Mediation: Initiation Stage</strong></td>
</tr>
<tr>
<td>- Unreliable content</td>
<td>- Roundabout and time-</td>
<td>- Unreliable content</td>
</tr>
<tr>
<td>- Roundabout and time-</td>
<td>consuming to use</td>
<td>- Roundabout and time-</td>
</tr>
<tr>
<td>- De-personalisation of</td>
<td>- De-personalisation of</td>
<td>- Lack of IS use hinders</td>
</tr>
<tr>
<td>signs representing actors’</td>
<td>signs representing actors’</td>
<td>the opportunity to</td>
</tr>
<tr>
<td>knowledge</td>
<td>knowledge</td>
<td>serendipity to occur</td>
</tr>
<tr>
<td>+ Offers high accessibility</td>
<td>+ Offers high preservation</td>
<td>- De-personalisation of</td>
</tr>
<tr>
<td>+ Offers repetitive use</td>
<td>+ Independent of direct</td>
<td>signs representing actors’</td>
</tr>
<tr>
<td>+ Independent of direct</td>
<td>interaction with providers</td>
<td>knowledge</td>
</tr>
<tr>
<td>+ Enables institutionalised</td>
<td>+ Enables institutionalised IT-based knowledge mediation</td>
<td></td>
</tr>
<tr>
<td>IT-based knowledge mediation</td>
<td>+ Enables institutionalised IT-based knowledge mediation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Processes of Mediation: Implementation Stage</th>
<th>The Processes of Mediation: Implementation Stage</th>
<th>The Processes of Mediation: Implementation Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Poorly formulated or too few signs</td>
<td>- Poorly formulated or too few signs</td>
<td>- Poorly formulated or too few signs</td>
</tr>
<tr>
<td>- Incorrect, not updated signs</td>
<td>- Incorrect, not updated signs</td>
<td>- Incorrect, not updated signs</td>
</tr>
<tr>
<td>+ High accessibility</td>
<td>+ High accessibility</td>
<td>+ High accessibility</td>
</tr>
<tr>
<td>+ Offers repetitive use</td>
<td>+ Offers repetitive use</td>
<td>+ Offers repetitive use</td>
</tr>
<tr>
<td>+ Independent of direct interaction with providers</td>
<td>+ Independent of direct interaction with providers</td>
<td>+ Independent of direct interaction with providers</td>
</tr>
<tr>
<td>+ Enables institutionalised IT-based knowledge mediation</td>
<td>+ Enables institutionalised IT-based knowledge mediation</td>
<td>+ Enables institutionalised IT-based knowledge mediation</td>
</tr>
</tbody>
</table>
11.2.3 The Applicability of IT-based Knowledge Mediation

Based on the previous discussions in section 11.2.1 and 11.2.2, this section summarises situations in which IS are seen as suitable mediating instruments, that is, IT-based knowledge mediation by the use of IS. This section also includes a discussion concerning some coordination and design prerequisites that seem to be important to consider when organisations aim to develop institutionalised IT-based knowledge mediation.

*Information Systems as Suitable Mediating Instruments*

One might expect that the communication of knowledge related to complex problems and tasks would require face-to-face conversations, while IS would be more appropriate when communicating knowledge related to elementary problems and tasks. One might also expect that IT-based knowledge mediation is most appropriate for general knowledge, while none IT-based mediation is required when situated knowledge is concerned. However, none of those statements are correct.

IS have shown to be suitable instruments to mediate knowledge related to elementary as well as complex, typical problems and tasks. Furthermore, information systems do not only or mainly involve general knowledge (as, for example, implied by Hendriks 2001). Information systems mediate *general as well as situated knowledge*. Take, for example, a client information system; such an IS mediates both general knowledge in terms of headlines and categories (concerning client name, contact person and telephone number) and situated knowledge in terms of the clients’ name, the specific client contact and the clients telephone number.

Information systems have also shown to be significant instruments that enable knowledge mediation to be *institutionalised*. This is valid for SKM, TKM as well as RKM. However, institutionalised IT-based knowledge mediation has shown to be of particular significance in the SKM push approach via publication strategy, where IS enable the mediation to be more or less automatic (see ‘automatic action’ enabled via IS, Goldkuhl & Ågerfalk 2000; section 2.5.1).

It should, however, be noted that the institutionalisation of IS as mediating instruments presumes prior TKM initiatives, and also that actors use available IS.

Furthermore, information systems are appropriate when a large *number of receivers* intend to use the content. Information systems are also appropriate when the mediation should not be restricted to the ‘here and now’ of actors participating in knowledge mediation, but to be *independent of time and geographical location* (see also Stenmark 2003).

Information systems also facilitate the opportunities of *serendipity*, that is, RKM via publication strategy. The use of IS also offers high *permanence* in the sense that an IS represents an ‘action memory’ (Goldkuhl & Ågerfalk 2000) through which the signs (IS content) are available to the IS users as long as the signs are not deleted from the IS.

Table 11-3 below summarises identified and significant circumstances when IS can be used as suitable instruments for knowledge mediation.
Table 11-3: Circumstances when IS are suitable Mediating Instruments

<table>
<thead>
<tr>
<th>Circumstances offered by IS</th>
<th>Information systems …</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serendipity</td>
<td>enable and enhance the prospects of receivers to gain knowledge that they did not now exist or was needed.</td>
</tr>
<tr>
<td>Institutionalisation</td>
<td>enable routinisation, formalisation and automation of IT-based knowledge mediation.</td>
</tr>
<tr>
<td>Prepared and pre-designed mediation</td>
<td>enable organisations to prepare and design for future SKM, TKM and RKM.</td>
</tr>
<tr>
<td>Independence of actors’ geographical location</td>
<td>enable knowledge mediation independent of the ‘here and now’ of actors.</td>
</tr>
<tr>
<td>Accessibility of IS content</td>
<td>enable high accessibility of signs that can reach many actors</td>
</tr>
<tr>
<td>Permanence of IS content</td>
<td>enable repetitive use of IS content by many actors</td>
</tr>
<tr>
<td>Communicate knowledge about both elementary tasks and complex and typical tasks</td>
<td>mediate knowledge related to elementary as well as complex problems and tasks.</td>
</tr>
<tr>
<td>Communicate both general and situated knowledge</td>
<td>mediate both general and situated knowledge, at least, when the knowledge relates to limited and elementary problems and tasks.</td>
</tr>
</tbody>
</table>

Coordination and Design Prerequisites for IT-based Mediation

Concerning coordination and design prerequisites required to develop IT-based knowledge mediation in organisations, those do mainly relate to the regulative role of coordinator. Having identified a typical problem that intends to be solved by the use of IT-based knowledge mediation, in which an information system intends to be the mediating instrument, the coordinator has three distinct roles (see also section 10.2.2 and 11.1.2).

First, the coordinator needs to define the goals and functions of the IS as the mediating instrument and request an IS developer to design and implement an information system – a TKM artefact – that corresponds to the intended goals and functions. The coordinator also needs to request knowledge providers to express and share their knowledge by the use of written signs stored in the IS and motivate intended receivers to use the IS as a mediating instrument (see also the ‘social’ and ‘personal’ challenge, McDermott 1999; section 3.2.2).

These regulative roles of the coordinator raise certain issues concerning what knowledge to mediate, to whom and for what. The knowledge intended to be mediated via the IS needs to be actionable to the intended receiver in his organisational role. As Jenkins (2004:4170) contends, one of the most critical design criteria is that the content of information systems is practical,

[to be practical it [read: the content of the IS] needs to either be applied or it must assist in the application of other pieces of information.

Accordingly, in order to benefit from knowledge mediation initiatives via IS, there needs to be a clear idea of 1) what knowledge 2) which actors need 3) for what actions. Still, based on empirical data, several TKM initiatives tend to be unclear in all three, or some of these, aspects. Following Langefors (1966), we need to understand how actors can make use of knowledge in order to understand what knowledge is needed (see section 1.1.2 and 2.2.2). This is also emphasised by Nurminen (1976:76f.) who states that,
... human being receive and understand a considerable amount of information which they cannot and perhaps do not intend to use for any purpose. Here the reception of information is an end in itself, or its only purpose is the satisfaction of curiosity. In this paper, I analyze the information system as the result of a deliberate and rational design, nor do I see any reason to include in the information system or its output end-in-itself information of this type. In what follows, therefore, the concept of information is defined as including some purpose or function.

Hence, when developing IT-based knowledge mediation the coordinator needs to be clear about what knowledge aims to be mediated by the IS. The coordinator needs to clarify and perhaps also help the knowledge providers to express their knowledge in appropriate formats and richness interpretable by the intended receivers. The knowledge also needs to be related to the tasks to which it belongs (see Jenkins 2004). The IS user should not have to guess what the knowledge could be good for, or search a great deal in order to access signs representing needed knowledge. As suggested by Hall et al. (2003:67), one design consideration is that “the system must be able to discover and retrieve useful information”. The design of IS also needs to include as close specification as possible and relevant concerning the primary and intended knowledge receivers.

Having designed and implemented an IS, the coordinator also needs to make sure that someone is responsible for updating the IS content in order to avoid the risk that actors will regard the IS content as unreliable, which likely will result in a degeneration of IS as mediating instruments. Concerning the content of IS, it is important to state the point of time when the content was stored in the IS in order for the receiver to easier be able to evaluate whether the content is relevant and correct. This is in line with Langefor’s (1993) accentuation on time as a part of e-messages and also the infological equation (see section 11.2.2). This also follows Hall et al. (2003:67) who state that,

... the system must be able to provide its users with confidence in the organization’s memory through facets such as verifying accuracy, maintaining currency, and encouraging growth.

Finally, we need to acknowledge all information systems as mediating instruments – not only so-called knowledge management systems. All information systems are instruments for communicating knowledge and as such highly valuable to organisational practices.

Be it also noted that IS are not the solution of knowledge mediation or knowledge management. IS are useful mediating instruments, but all knowledge is not suitable for being mediated via IS, and actors need to develop personal relationships, which many times facilitate, and sometimes also are a prerequisite for, knowledge mediation. In sum, organisations need to develop both IT-based and none IT-based knowledge mediation; they complement each other and offer different benefits and restrictions.
This closing chapter will summarise the findings of this work and discuss their implications in relation to the problem area. Based on the empirical findings from the cases, the chapter opens with some reflections on knowledge management as the point of departure of this work. This is followed by a discussion about the theoretical and the practical implications of the contributions of this work. The chapter also includes some reflections on applied research approach and suggestions for future research.

12.1 Back to the Point of Departure

As described in Chapter 1, the point of departure of this work is the field of knowledge management (KM), which is approached as a part of informatics. No doubt the KM literature presents many useful ideas, but it also gives rise to criticism1. In retrospect and based on the empirical findings generated in this work, one can reflect on whether my critique was reasonable and whether empirical data have opposed common ideas of the KM literature.

One common ‘truism’ that can be found in the KM literature, and which I have argued against, is the view of knowledge as objectified. The mainstream KM literature seems to treat knowledge as an independent commodity that can be transformed and transported around in organisations (see Spender 2003; Styhre 2003). Regarding knowledge as a critical organisational asset is as such not a problem. The problem is when the asset-based view is followed by a view of knowledge as reified, that is, when we approach knowledge as we are used to approach and manage tangible assets. The mediation of knowledge is not about ‘transferring’ a ‘piece of knowledge’ from one actor to another as the ‘content perspective’ of knowledge implies (see section 3.1.3).

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1 See my reasoning and criticism in Chapter 1 and 3. See also, for example, Gray & Meister (2003) who maintain that KM research lacks a common conceptual core, and Styhre (2003) who holds that the area abounds with woolly concepts.
examples from the cases, the mediation of knowledge is a process including actors, their pre-knowledge, sense-giving and sense-reading capabilities and the mediating instruments used to communicate their knowledge. Accordingly, we need to acknowledge the view of knowledge mediation as a process including these constituents in order to better understand how knowledge is and can be communicated.

I have also criticised KM for being an illusive and unclear concept, and this criticism has also been verified by the empirical data of this work (see also Gray & Meister 2003; Styhre 2003). Energy and Publish had the intention to develop their ‘knowledge practices’. However, both organisations found it difficult to clarify what to do and how. Even if they had formulated some overall goals, it was not clear what their KMI should be about or strive to attain; the goals were unclear and imprecise (see also section 4.2.4 and 8.3.2).

In this work, KMI is regarded as activities that aim to establish situational knowledge practices (see also section 3.1.4 and 4.2.1). Hence, the object of KMI is the intended situational knowledge practice, and organisations need to clarify how their situational knowledge practices should function and what they aim to achieve. As was shown in Energy and Publish, a lack of such clarification is a major hindrance of KMI. To be distinct in what to achieve and how is necessary in order to develop situational knowledge practices (see Architect as a prosperous example).

Furthermore, during this work I could also verify the criticism that many KMI tend to fail to acknowledge the context in which knowledge is communicated and used (see also Scarbrough et al. 1999; Harrison 2002; Walsham 2001; Garvey & Williamson 2002). The work of Energy and Publish, as well as my initial research focus, lacked a proper acknowledgement of the context, and as such Energy’s and Publish’s KMI, as well as my discussions based on my initial research focus, became abstract and vague. I realised the need for understanding the context in which knowledge mediation and knowledge utilisation occurs, an understanding including actors, their knowledge, actions and mediating instruments.

KM has also been criticised for being too focused on technology, whereby many KMI have failed (see McDermott 1999; Scarbrough et al. 1999; Harrison 2002; Walsham 2001; Garvey & Williamson 2002). Empirical data have shown that IT-based knowledge mediation is one essential and organised way to communicate knowledge, but it is not the single solution. In addition, just because organisations develop and implement information systems, this does not mean that the IS are automatically used as mediating instruments. Hence, we need to pay regard to the process of knowledge mediation by the use of IS and not focus on IS as mediating instruments in isolation. We also need to pay attention to the need for establishing relationships between actors (as Architect did) and none IT-based knowledge mediation as a complementary way to communicate knowledge.

Then, does this work contribute to a clarification of the concept of KM? I would say it does. This work contributes to a clarification of the concept of KM, including its ontological and epistemological considerations (see also section 12.2 and 12.3). ‘Knowledge mediation’ is regarded as a core of KM, and the mediation of knowledge has been approached on the basis of certain assumptions including 1) knowledge as human knowledge demanded for action, 2) knowledge mediation as a
process of articulating and interpreting signs representing actors’ knowledge and 3)
signs as mediating instruments, including language and IS and manifestations of
actors’ knowledge in actions and action results. By categorising different types and
variants of knowledge mediation, their characteristics and influencing
circumstances, this work contributes to a clarification of the contexts in which
knowledge mediation occurs. Understanding when, why and how knowledge
mediation occurs is a prerequisite for proper planning and design of KMI as means
to develop organisations’ knowledge practices that, in turn, aim to improve other
sub-practices of the organisations. Such understanding is needed when developing
IT-based as well as none IT-based knowledge mediation.

12.2 Theoretical Implications of this Work
Throughout this work, issues relating to the phenomenon of knowledge mediation
have been discussed both on the basis of empirical data and in relation to different
theories. Hence, the way the findings of this work verify and complement prior
research has partly been included in the previous discussions. However, the main
contributions of this work and their theoretical implications will be summarised
below.

12.2.1 Knowledge Mediation: Basic Types and Variants
This work is about identifying and characterising common types of knowledge
mediation between actors in organisations. Knowledge mediation can be triggered
by a number of reasons and events: Actors might acquire knowledge to enable
career advancement, and actors might expose their knowledge to make sure that
others are aware of their expertise and skills, which might be a way to secure a
position and to feel important (see Hayes & Walsham 2003). More fundamentally,
however, is that knowledge mediation is commonly triggered by experienced
problems that need to be solved. This is in line with a number of scholars (see
Dewey 1938; Schön 1984; Cook & Brown 1999) and might be regarded natural –
perhaps even trivial – as the organisational role of actors is to accomplish
something, that is, to perform productive and skilful actions within their
organisational roles. Still, the KM literature tends to neglect or take the
consequential practical effects of knowledge mediation for granted. Thus, the
relations between actors, their knowledge and their actions have not received proper
or enough attention in prior KM research.

I have also found that ‘experienced problems’ might have different
characteristics: specific or typical. This is interesting, especially since the KM
literature tends to be concerned with typical problems and focus on mediating so-
called ‘general knowledge’ related to typical tasks such as ‘best practices’ rather
than specific problems (see further below). However, experiencing specific
problems and to solve those via knowledge mediation is another common type of
mediation that needs to be considered in order to understand how to enhance
knowledge mediation in organisations.

On the basis of the characteristics of experienced problem (the trigger) two basic
types of knowledge mediation were identified: specific knowledge mediation
(SKM) and *typical knowledge mediation* (TKM). SKM aims to mediate knowledge to deal with specific problems that need to be solved directly, while TKM is more of a *preparatory initiative* that deals with typical problems related to future tasks. Both SKM and TKM need to be put in relation to their consequential effects. That is, the knowledge intended to be mediated needs to be related to the action in which it is to be used. The core is to *mediate actionable knowledge to enable actors to knowledgeable actions*.

TKM as a preparatory initiative can be further explained by the concept of institutionalisation (see also section 2.2.1). Organisations need to organise and coordinate actors and their activities in order to be efficient and do the right things in a proper way. TKM is a way to *organise and institutionalise knowledge mediation*. However, all TKM will not be institutionalised. A seminar is an organised way to mediate knowledge, but it is often a one-time occurrence and therefore not relevant for institutionalisation. IT-based information systems, on the other hand, have the potentiality of being both organised and institutionalised instruments for knowledge mediation (see further section 12.2.3).

Knowledge mediation is not always a conscious and intentional activity to solve problems (as ‘productive inquiry’, Dewey 1938). Knowledge mediation also occurs in terms of *serendipity*, that is, when actors randomly find useful knowledge. This non-problem driven *random knowledge mediation* (RKM) is the third basic type of knowledge mediation identified in this work.

Besides the characteristics of the trigger, additional categories and characteristics have been identified and used to describe and distinguish between these three basic types of knowledge mediation (see Chapter 10). Each of the three types also has a number of *variants* that have been described and conceptualised (see section 10.2 and summary in table 10-2). No matter which of the three types is concerned, knowledge mediation involves, at least, one *knowledge provider* and one *knowledge receiver*. TKM push approach does often also include a coordinator as an additional actor role, and TKM push approach via publication strategy might also involve an IS developer as a fourth actor role.

Then, how do these findings stand in relation to prior KM research? First of all, the findings of this work derive from *another perspective* than prior research by initially focusing on the ‘trigger’ and the ‘initiator’ of knowledge mediation. I wanted to investigate *what gives rise to knowledge mediation*, and not only how a general knowledge mediation process might look like. In comparison with, for example, Szulanski’s (1996, 2000) process model of knowledge transfer, this work offers a more detailed description and illustration of different *types* and *variants* of knowledge mediation. This work also differs from Dixon (2000)¹, not only in terms of the initial focus on ‘trigger’ and ‘initiator’, but also in the sense that this work has not been limited to organisations successful in knowledge mediation or planned and conscious initiatives. This work has a *broader approach*, which enabled the identification of SKM, TKM as well as RKM. This work also pays attention to the motive of actors to share their knowledge, which Dixon’s study pays little regard to.

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¹ The reason for making explicit comparisons with Szulanski (1996; 2000) and Dixon (2000) is that these two researchers were used as a theoretical basis when outlining this work (see section 1.2.1 and 3.2.1).
This work also differs from Szulanski’s and Dixon’s studies as it focuses on instruments used to mediate knowledge. This focus derives from the view of IS as essential instruments for and parts of IT-based knowledge mediation. As such, this work also contributes to the IS field by further clarifying the contexts in which IS are used as mediating instruments.

The contributions of this work should not be seen as a substitute but rather a complement to Szulanski’s and Dixon’s studies – a complement highlighting partly another perspective that has resulted in another view, additional types and variants of knowledge mediation and partly other characteristics of knowledge mediation between actors in organisations.

Furthermore, in comparison with a great deal of prior KM research that tends to treat knowledge mediation as a rather unproblematic phenomenon (see criticism in Spender 2003), this study gives prominence to the complexity of knowledge mediation, for example, in terms of the importance of sense-giving and sense-reading of actors as necessary parts of knowledge mediation (see also Walsham 2004).

In addition, as mentioned above, a lot of prior KM research concerns the design and development of knowledge mediation mainly in terms of TKM. TKM initiatives are highly important, not least to institutionalise knowledge mediation and to enhance communication and reuse of knowledge. However, we should not forget SKM and RKM as two additional important types of knowledge mediation. SKM has shown to be a common and perhaps also the most straightforward mediation process as it is based on the needs to solve specific problems. RKM is important partly to get to know about things actors did not think about via ‘serendipity’. These three mediation types are all valuable to organisations, and the three types are also interrelated and affect each other (see section 10.2.4 and figure 10-14).

In sum, this work offers a broader and, in some respects, also a more detailed clarification of the contexts and characteristics of different types of knowledge mediation. It does not only pay attention to pre-designed knowledge mediation (TKM) and general conceptualisation including activities such as creation, identifying, capturing, collecting, adapting, organising, applying and sharing of knowledge (see section 3.2.1). This work presents three basic types of knowledge mediation and their variants and characteristics.

12.2.2 Circumstances Influencing Knowledge Mediation

This work has not only paid attention to describe basic types of knowledge mediation, but it also has explained when knowledge mediation works and when it does not work. Investigating influencing circumstances – including facilitators and hindrances – is a common theme in prior KM research (see Argote & Ingram 2000; Argote et al. 2000; Sverlinger 2000; Chauvel & Despres 2002). Compared with prior research, which commonly focuses on four main categories of influences – the knowledge, the recipient, the knowledge source and the context – this work uses partly different labels (categories) and has also identified three additional influencing categories. In total, seven influencing categories have been presented in this work and these are the problem situation, the knowledge, the initiator, the
knowledge receiver, the knowledge provider, the working environment and the mediating instrument (see section 11.1 and 11.2.2).

The ‘problem situation’ has been critical to describe both the characteristics of different types of knowledge mediation and some circumstances influencing the mediation processes. SKM and TKM, which are triggered by experienced problems, are not only concerned with ‘problem-solving’. SKM and TKM also involve ‘problem setting’. Concerning problem setting, actors might experience problems but have difficulties in defining them, which, in turn, hinders the mediation process (see also Dewey 1938; Schön 1983).

Another contribution of this work, in relation to prior KM research, is that the influencing circumstances are identified for each of the basic types of knowledge mediation, which has shown that some influences are more common in certain types of knowledge mediation (see section 11.1). With inspiration from Szulanski (1993, 1996), a process perspective has also been applied, which made it possible to also clarify what circumstances influence different process stages for each of the three types of knowledge mediation (see summary in table 11-1 and 11-2).

In general, this study verifies a number of influencing characteristics suggested by prior KM research. However, besides the characteristics of the problem situation and the initiator, there are some additional influencing circumstances that should be accentuated partly as they are essential to understand knowledge mediation, partly as they are given little or no attention in prior KM research.

One circumstance that facilitates SKM concerns the acute and critical characteristic of the experienced problem. The more acute and critical the problem stands out to be, the more inclined actors are to request for and to provide with knowledge. In turn, this shows a high degree of service-mindedness of actors towards colleagues and indirectly also towards clients. As TKM does not derive from a specific problem that needs to be solved by an actor to continue his on-going work, actors seem to easier ignore the need for initiating TKM – especially when such mediation might decrease the usefulness of knowledge or come into conflict with prevailing norms (see further below).

When actors fear that knowledge might become less useful or even useless when shared, this is a rationale for not sharing knowledge. This has not been identified as a significant hindrance for SKM but certainly a potential hindrance in TKM. The ‘usefulness of knowledge’ shows the importance of considering the consequential practical effect of knowledge mediation. This means that we need to pay attention to the utilisation of knowledge as knowledge mediation aims to enable and improve actors’ knowledgeability in action (see Dewey 1938).

The influence of the usefulness of knowledge can also be discussed in relation to one of the ‘axioms’ in the KM literature. It is often argued that knowledge grows when shared, which is based on the assumption that the more knowledge actors share with each other, the more knowledgeable they will become (see Davenport & Prusak 1998; Quinn et al. 2002). I agree with this view in the sense that the intended result of knowledge mediation is to enhance the knowledgeability of actors (even if the knowledge gained by a receiver will never be an exact copy of the provider’s knowledgeability). However, ‘shared’ knowledge is not always actionable knowledge. Some knowledge turns less useful when shared, and sometimes even
useless. Hereby, knowledge might get ‘consumed’ by use. In a pragmatic vein, knowledge is of no value to the knower if it is not actionable for him in his organisational role. Having this in mind, it might be about time to give up the partly naïve idea that knowledge sharing is always good and valuable, and instead consider the consequential practical effects of knowledge mediation (see also Langefors 1966, 1993; Nurminen 1976).

The disinclination of actors to mediate their knowledge because it might become less useful when shared might be reinforced by prevailing norms. For example, norms concerning career advancement, economic compensation and requirements to generate chargeable working hours are circumstances that might clash with intentions to enhance knowledge mediation. Such conflicting and prevailing norms have in particular shown to be potential hindrances to TKM. However, with some exceptions, the mainstream KM literature has paid little attention to norms as circumstances that might influence knowledge mediation (see further section 3.2.3).

Another interesting circumstance that might hinder actors to ask for knowledge is prestige including fears of being judged or evaluated as ignorant and unskilled. Such feelings imply the importance of trustful relationships, which is suggested as an important prerequisite for successful KMI and learning (Lave & Wenger 1991; von Krogh 1998; Szulanski 2000; von Krogh et al. 2000; Goh 2002; Roth 2002). This kind of prestige also shows a potential conflict between actors’ organisational roles and their more personal identifications (see also section 11.1.1). This is an issue that needs to be considered when aiming at developing knowledge mediation in organisations.

Decreased usefulness of knowledge when shared, norms conflicting knowledge sharing and prestige are three circumstances that might make actors unwilling to share their knowledge. ‘Unwillingness’ might be seen as an overall label and characteristic of actors that might hinder knowledge mediation. However, ‘unwillingness’ as such does not offer any explanatory power to understand why actors might be disinclined to communicate what they know (see also section 3.2.5). It is the reasons causing the unwillingness that are of interest. Hence, we should be careful in talking about unwillingness without investigating and acknowledging the underlying reasons.

Furthermore, if knowledge, as a result of knowledge mediation, is not used in action, there is a risk that it will be forgotten. Hence, the timeliness of knowledge in relation to its utilisation is important. This is critical in TKM, and also in RKM, where the actors might not know when the mediated knowledge might be needed and used in action. Prior research talks a lot about time in the sense that a lack of time is a major hindrance for knowledge transfer (see Chase 1997; Davenport & Prusak 1998; Sverlinger 2000), which also has been emphasised by respondents in this study. However, the timeliness of knowledge mediation in relation to knowledge utilisation is not a common issue in the KM literature, and this seems essential when actors strive to improve knowledge mediation, especially via TKM.

Based on TKM, the role of the coordinator has also shown to be crucial. When a coordinator lacks adequate regulative characteristics, this is a hindrance, while adequate regulative characteristics facilitate TKM. Furthermore, the degree of
transparency of actors’ knowledge in their actions and action results has shown to be significant, not least for RKM.

In sum, this work has verified several suggestions of prior KM research concerning circumstances influencing knowledge mediation, and it has also given some counter-evidence to some of the suggestions of prior research. This work has also acknowledged some additional circumstances that might influence knowledge mediation. The identified influencing circumstances, including facilitating and hindering characteristics, help to explain under which circumstances knowledge mediation works and under which circumstances knowledge mediation might not work.

12.2.3 Information Systems as Mediating Instruments

The aim of this work involves an interest in both IT-based and none IT-based knowledge mediation. This ‘broad’ interest has been critical in order to clarify the contexts in which knowledge mediation occurs. Such a clarification is needed as the KM literature tends to lack adequate recognition and consideration of the contexts in which knowledge is communicated and used (see section 1.2). Three basic types of knowledge mediation, their variants and characteristics have been identified, and the variants represent both IT-based and none IT-based knowledge mediation (see section 10.2). The identification of the three basic types of knowledge mediation, including their variants, does not only help to better understand when and how knowledge mediation occurs. They also contribute to the understanding of IS as suitable instruments for knowledge mediation.

Whether knowledge mediation is IT-based or not is a matter of what mediating instruments (Vygotsky 1986) are used to communicate knowledge. In principal, there are three basic modes to communicate knowledge: pure observation, oral communication and written communication (see section 10.1.2). Concerning the two latter modes, both oral communication and written communication involve ‘codification’ of knowledge by the use of language, or what I prefer to talk about in terms of ‘sense-giving’ (Polanyi 1969). Sense-giving is accomplished by using language (signs) to articulate and express human knowledge.

Depending on the degree of accessibility, preservation and detachment of signs used to communicate knowledge two basic communication strategies have been identified: the personalisation strategy and the publication strategy (see section 10.1.2). These two strategies and underlying ideas are suggested as an alternative to the ‘personalisation strategy’ and ‘codification strategy’ proposed by Hansen et al. (1999). The personalisation strategy and the publication strategy are also a contribution to the field of KM as part of the informatics discipline. Furthermore, instead of choosing one main strategy as suggested by Hansen et al., the empirical data of this work have shown that both strategies are needed and do complement each other. Hereby, the overall communication strategy should rather be a blended strategy including both the personalisation strategy and the publication strategy.

Both the personalisation strategy and the publication strategy might involve written signs and the use of technology. The personalisation strategy might, for example, involve the use of e-mail or telephone but not necessarily as organised information systems (IS). Quite the reverse, knowledge mediation by the use of e-
mail and telephone are commonly ad hoc based and unstructured. However, technology also offers possibilities of organised, systematised and institutionalised knowledge mediation via pre-designed IS. The use of IS as organised and formalised instruments for knowledge mediation has shown to be significant in the publication strategy, which is enabled via TKM.

In general, actors tend to prefer the personalisation strategy via face-to-face communication. It seems like actors want to talk with each other, and the face-to-face conversation is commonly regarded as more efficient and reliable than the publication strategy. Thus, some of the hindrances to the publication strategy concern information systems as unreliable mediating instruments and that IS are roundabout and time-consuming to use. Consequently, one risk is that IS degenerate as mediating instruments because of a lack of IS use. That is, if actors do not rely on the content of IS or consider the IS to be difficult to use, they might disregard IS as mediating instruments.

The use of IS as mediating instruments also offers several benefits. The use of IS offers high accessibility and preservation of signs (the IS content) representing actors’ knowledge, repetitive use of signs by many actors and communication independence of geographical locations and timeliness restrictions. The use of IS also enables institutionalisation of IT-based knowledge mediation, which is a significant characteristic of IS that has not been enough emphasised in prior KM research.

The institutionalisation of knowledge mediation is crucial; organisations need to systemise and formalise knowledge mediation and thereby prepare actors for different situations that they will face in their work. In this regard, information systems represent arranged ways to communicate knowledge; as such, the use of information systems facilitates SKM and TKM. The use of information systems also enhances the opportunities of serendipity via RKM, which is an additional field of application of IS as mediating instruments (see also Stenmark 2003).

Furthermore, in comparison with prior KM research, this work does not make any distinction between knowledge management systems (KMS) and other kinds of information systems. Instead, all organised and systemised IT-based information systems are seen as IS for communication (see Langefors 1966). As such, we need to acknowledge all IS as mediating instruments used for and part of knowledge mediation and not try to make a specialty of KMS as the KM literature tends to do.

Still, we cannot only pay regard to IS as instruments or feel satisfied when having designed and implemented IS in organisations. Doing that, there is a high risk that we fail in implementing KMI (see McDermott 1999; Walsham 2001). We need to pay regard to and understand the contexts of knowledge mediation, including sense-reading and sense-giving activities of the communicating actors and the usefulness of the knowledge that is supposed to be mediated. These issues are important for IT-based as well as none IT-based knowledge mediation.

12.3 Practical Implications of this Work

Having summarised the main theoretical implications of the contributions of this work, there is a need to reflect on the practical implications of the view of
knowledge mediation suggested in this work. Doing that, I will focus on the following question: What should the reflective practitioner think about and do when having read this dissertation?

12.3.1 Enhancing Actors’ Knowledgeability for Action

One essential idea of this work concerns the headline of this dissertation ‘Knowledge Demanded for Action’. Knowledge mediation is about contributing to actors’ knowledgeability, which, in turn, aims to enhance actors’ capability of knowledgeable actions. Even if knowledge mediation between actors does not necessary result in the creation of new knowledge, the organisation will benefit when individual actors improve their capability of skilful actions. However, organisations will not benefit of knowledge mediation if the knowledge being communicated is not actionable to the actors in their respective organisational roles. Hence, when striving to enhance communication to share and reuse knowledge the reflective practitioner needs to ask himself: What knowledge which actors need for what actions?

Knowledge should make a difference. Otherwise there is no point in putting efforts into mediating knowledge. Thus, the reflective practitioner needs to clarify the intended practical consequences of knowledge mediation; he needs to be clear about the purposes and intentions of knowledge mediation and KMI. The need to define what knowledge which actors need for what actions is not only an issue relating to the use of IS as mediating instruments (see Langefors 1966; Nurminen 1976). These ideas are highly valid no matter what mediating instruments are used.

The clarification of the practical consequences of knowledge mediation initiatives also needs to be grounded in the needs of the practice. Consequently, the reflective practitioner needs to identify what is regarded as important and useful knowledge in the practice, what this knowledge concern and what it is needed for. Being faithful to the view of knowledge as a actionable knowledge and actions as knowledgeable actions will help the reflective practitioner to clarify what knowledge needs to be mediated and for what purposes.

Furthermore, the reflective practitioner needs to acknowledge all IS as instruments for knowledge mediation. In other words, the distinction between ‘knowledge management systems’ (KMS) and other kinds of IS implied by the KM literature is not really meaningful. From this follows that the reflective practitioner needs to recognise the interdependence between the content of IS and how that can inform actors to accomplish knowledgeable action. These are not any new insights. Similar ideas have been stressed by Langefors (1966) and Nurminen (1976) since about thirty years back. Still, these basic views of IS seem to have ‘slipped away’ and been replaced by other ideas such as the distinction between KMS and other kinds of IS.

Understanding the types and variants of knowledge mediation presented in this work, the reflective practitioner can use that as a basis for evaluating how knowledge mediation works in a practice. This helps the practitioner to identify which variants of knowledge mediation need to be improved and also to get ideas concerning how to develop them. The reflective practitioner should also try to
identify specific problems (and SKM) that might be a basis of initiating TKM, and reflect on how TKM can be designed and used to facilitate SKM and RKM.

The reflective practitioner should also consider the possibilities of organising and institutionalising knowledge mediation by the use of IS, which represents a critical part of TKM via the publication strategy. When planning to use IS as mediating instrument, the reflective practitioner needs to request an IS developer to design an IS and decide how the content will be updated and who will be responsible for this. The reflective practitioner also needs to request, and perhaps also support, intended knowledge providers to articulate their knowledge, clarify what it is for and store the signs in the IS. The intended IS users (knowledge receiver) also need to be identified in order to motivate them to use the IS as mediating instruments.

When planning for knowledge mediation initiatives, the reflective practitioner will likely make use of both a personalisation strategy and a publication strategy. Sometimes a knowledge mediation initiative might even involve a blended communication strategy, that is, a combination of a personalisation strategy and a publication strategy. In sum, this dissertation helps the reflective practitioner to avoid putting efforts in unclear KMI generated via ‘trendy’ KM ideas.

12.3.2 Acknowledging Influencing Circumstances

In general, humans are pragmatic. However, the reflective practitioner – not least in the role of being a coordinator – needs to support the work of making knowledge demanded for action available to himself as well as to other actors. Doing that, the reflective practitioner needs to understand what circumstances might hinder and facilitate knowledge mediation.

The reflective practitioner needs to clarify the usefulness of knowledge and acknowledge the fact that knowledge might be less useful, or even useless, when shared. If the usefulness of knowledge decreases when it is shared, this is a rational argument for actors not to share their knowledge. Thus, instead of defining actors as unwilling to share their knowledge, the reflective practitioner needs to investigate the underlying reason for not sharing and then reflect on what to do. The reflective practitioner also needs to evaluate the consequential effects of knowledge mediation in relation to the costs of required mediation initiatives.

Concerning norms, such as reward and career systems, the reflective practitioner needs to investigate whether there are any prevailing norms that might conflict knowledge mediation. If established norms are in conflict with knowledge mediation those norms might need to be modified or changed to support, rather than hinder, knowledge mediation. The norms might also be left unchanged, but in such case the reflective practitioner needs to be aware of the consequences. That means we cannot expect knowledge mediation initiatives to automatically function if they are in conflict with prevailing norm systems.

Furthermore, actors have dual roles including their organisational role and their more personal identity, which might be conflicting. For example, actors might be reluctant to expose their knowledge for a fear of being evaluated as ignorant. This kind of prestige relates to actors’ individual roles, which might clash with their organisational roles. The reflective practitioner needs to be aware of potential conflicts between these two roles and try to balance them. One way to reduce
prestige as a hindrance is to strengthen relationships between actors. Relationships facilitate knowledge mediation as actors get to know each other, and enhance their understanding of what their colleagues are working with.

Another influencing circumstance concerns problem setting. When the reflective practitioner recognises a need for knowledge mediation, it is important that the problem is well-defined in order for knowledge providers to know what knowledge to communicate. The more concrete and limited requests are, the easier it is for the provider to give proper support. On the contrary, abstract and complex requests make it difficult for knowledge providers to understand what knowledge to share. Hence, when initiating knowledge mediation, the reflective practitioner should be as concrete as possible and clarify intended practical consequences of mediating knowledge.

When planning for TKM, the reflective practitioner needs to consider the time for knowledge utilisation. The longer time between the mediation and the use of the knowledge being mediated, the greater is the risk of reducing intended effects of the mediation. Hence, the reflective practitioner should try to plan for and accomplish knowledge mediation in close connection with intended knowledge utilisation.

The reflective practitioner should also try to enhance the transparency of actors’ knowledge, actions and action results as a way to facilitate knowledge mediation, in particular via RKM. The transparency can be increased via open office designs and teamwork.

In sum, based on an understanding of the three basic types of knowledge mediation, their variants, characteristics and influencing circumstances, the reflective practitioner will be better prepared to 1) initiate the ‘right’ efforts to facilitate knowledge mediation, 2) avoid pitfalls and circumstances that might hinder knowledge mediation and 3) make conscious choices concerning (1) and (2) and take the consequences of his decisions and actions.

12.4 The Work in Retrospect and Prospect

Doing research is about saying something about the world and to have good reasons for statements and testimonies (Goldkuhl 1998). Hence, the primary role of the researcher is to develop knowledge and to be rigorous in order for the work to be considered reliable and credible by other people (see Lincoln & Guba 1985; Föllesdal et al. 1993; Molander 1996). In the end, the quality of this dissertation will be evaluated by the readers. However, I will present some final reflections concerning the research approach applied in this work. I will also reflect on the prospects of this work by presenting some suggestions for future research.

12.4.1 Reflections on the Research Approach

As described in section 4.1, this work started out with an intention to investigate knowledge management initiatives (KMI). However, along the research process I realised that it was not really fruitful to investigate KMI without a clear idea of what KMI concerns and aims to achieve. The concept of KMI was unclear, not only from a theoretical but also from a practical perspective. It was hard to specify the problem and formulate proper and interesting research questions (in other words, I
had difficulties in ‘problem setting’, Schön 1983; see also Dewey 1938). Consequently, it was also difficult to identify interesting knowledge that could contribute to the field of KM, both as part of informatics and as an interdisciplinary area of research.

To use KMI as the analytical entity was problematic. But this did not become clear until I had performed some steps in the research process. It was a result of conscious reflections on and comparison between my presumptions, existing KM theories and empirical findings (as a kind of ‘dialogical reasoning’, Klein & Myers 1999). This led to a development and modification of my research focus, and ‘knowledge mediation’ became the new and basic phenomenon of inquiry. In retrospect, this was a proper and good decision that has resulted in a much deeper understanding than would have been possible with the first formulated research focus.

The initial research focus was not fully disregarded. KMI turned out to be highly related to typical knowledge mediation (TKM) as one type of knowledge mediation identified in this work. However, the modified research focus did also make it possible to identify specific knowledge mediation (SKM) and random knowledge mediation (RKM), which would not have been identified in the initial research focus. Instead of focusing on the concept of KMI, I applied a broader focus by investigating ‘knowledge mediation’. Looking into the whole as well as the parts and their relations (see ‘the principle of the hermeneutics circle’, Klein & Myers 1999), this work contributes with a both broader and deeper understanding of knowledge mediation between actors in organisations.

One benefit of this work was the use of multiple methods and sources of data (see section 4.4). Interviews represented the main method for data collection. However, I do not believe this work would have gained such a rich picture of different variants of knowledge mediation without the use of observation, including observation of IS use, as a complementary method. The use of multiple methods did also make it possible to follow up statements. This was important as some statements seemed to contradict each other. For example, a respondent could say something that contradicted his behaviour or the statement of another respondent. In such cases, I formulated additional questions to the respondents and asked for concrete examples, I asked similar questions to other respondents and I followed up statements by observing the actors in action (see ‘the principle of multiple interpretations’ and ‘the principle of suspicion’, Klein & Myers 1999).

The fact that I have worked with the three cases – Energy, Publish and Architect – during an extended period of time facilitated my understanding of each practice. I also believe that it contributed to an openness and trust among the respondents towards my work and questions. One limitation was that I had difficulties in getting access to Publish during the second data collection, that is, after having modified my research focus. I cannot say whether additional data collection at Publish would have altered the result of this work. However, it would have been interesting to further investigate if there were any more specific circumstances that influenced knowledge mediation at Publish. Based on the data generated from the three cases, the data from Publish mainly verified the findings of the other two cases rather than generated any significant evidence of their own.
One idea behind selecting cases that differed concerning their products and practices was to investigate if they could offer any varying findings (see section 4.2.3). Based on the empirical data collected, there were no major differences between the cases. I thought, for example, that Architect would be more dependent on IS as instruments to mediate knowledge as its offices were geographically dispersed. However, the architects, the operators as well as the editors did all need and use IS as mediating instruments. The operators did actually seem to be the actors who really had institutionalised IT-based knowledge mediation as a natural part of their practice. Perhaps the practice of the operators was more adequate for the SKM push approach via publication strategy. However, the other variants of SKM, TKM and RKM publication strategy were just as valid for Architect and Publish as for Energy.

The question to what degree the research contributions of this work can be generalised is a problematic issue within social science (Bryman 2001). What can be said is that the findings of each case have been abstracted, condensed and conceptualised to form a theory on knowledge mediation between actors in organisations (see generalisation in terms of generation of theory, Walsham 1995). Of course, the findings derive from certain organisational contexts and other contexts might show other findings. Still, comparing the cases used in this study they differ in nature, which implies that the findings of this work might likely be valid not only for these specific cases but also for other organisations.

12.4.2 Suggestions for Future Research

I would like to propose four main suggestions for future research. First, this work contributes to an enhanced understanding of knowledge mediation partly by outlining basic types and variants of knowledge mediation. It has also been argued that on the basis of a proper understanding of knowledge mediation, the reflective practitioner will be better prepared to improve knowledge mediation and thereby enhance actors’ knowledgeability to perform so-called informed actions. In this regard, it would be interesting to use the contribution of this work as a framework for planning, implementing and evaluating knowledge management initiatives in organisations. The aim of such an investigation would be to test whether the ideas suggested in this work are valid and might result in more successful KMI. An additional aim could be to further develop the ideas suggested in this work.

Another issue that would be interesting to further investigate is the potential difficulties in utilising knowledge as a result of knowledge mediation. That would involve a focus on knowledge utilisation rather than on knowledge mediation, which has been the primary focus of this work. In such an investigation, it would be interesting to focus on the ‘translation problem’ in terms of potential difficulties in applying mediated knowledge in specific problems and tasks. This is particularly critical in the publication strategy when using IS as mediating instruments. One interesting question is: How to facilitate the translation and utilisation of knowledge as a result of knowledge mediation via publication strategy by the use of information systems as mediating instruments?

It would also be interesting to further look into which actions are performed when using IS as mediating instruments. Such an investigation would focus on
identifying common and typical actions performed in IT-based knowledge mediation. Having knowledge of action patterns concerning knowledge mediation by the use of IS would be useful in order to specify the action repertoire of IS, which, in turn, would facilitate the design of IS to secure successful knowledge mediation by the use of IS. A suggested research question would be: How to design IS to secure successful IT-based knowledge mediation? A similar research focus is suggested by Hall et al. (2003) who argue that there is so far rather little published research in design theory for information systems.

A fourth suggestion for future research is to investigate how organisational politics influence knowledge mediation. This is an interesting issue, and during this work I have observed that there are a lot of political games going on in organisations and some of those related to individuals’ attitudes towards knowledge mediation. For example, in Energy one of the reasons for implementing the Personnel Process was that it was a requirement from the owner and the top management of Energy Group. Energy was chosen as a pilot organisation for the implementation of this process. Hence, Energy was expected to show that it did introduce new ways of simulating and consciously work with knowledge development and learning. Another main reason for implementing the Personnel Process was to give the employees some more attention (see further discussions and quotations of the president at Energy in section 5.1.3). Based on these two reasons, the main intention was not to develop the practice of Energy but to fulfil an expectation of the owner and to satisfy the employees. This kind of political behaviour would be highly interesting to look further into.
References


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Appendix 1: The characteristics of identified variants of the three basic types of knowledge mediation

<table>
<thead>
<tr>
<th>Variant process</th>
<th>Communication strategy</th>
<th>Approach</th>
<th>Initiator</th>
<th>Knowledge provider</th>
<th>Mediating instrument</th>
<th>Knowledge receiver</th>
<th>Degree of interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) SKM pull approach via written signs and limited interaction</td>
<td>Publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Knower(s), often unknown to the receiver</td>
<td>Written signs often mediated via IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>2) SKM pull approach via written signs and limited interaction</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Specific knower</td>
<td>Written signs often mediated via IS, e.g. e-mail</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>3) SKM pull approach via oral request and limited interaction</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Specific knower</td>
<td>Oral signs</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>4) SKM pull approach via multiple instruments and limited interaction</td>
<td>Often a combination of personalisation and publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Knower(s), often both specific, known and unknown to the receiver</td>
<td>Oral and written signs with or without the use of IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>5) SKM pull approach via high interaction</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Specific knower</td>
<td>Oral signs</td>
<td>Same as initiator</td>
<td>High</td>
</tr>
<tr>
<td>6) SKM pull approach via multiple instruments and high interaction</td>
<td>Often a combination of personalisation and publication</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Knower(s), often both specific, known and unknown to the receiver</td>
<td>Oral and written signs with or without the use of IS</td>
<td>Same as initiator</td>
<td>High</td>
</tr>
<tr>
<td>7) SKM pull approach via joint creation</td>
<td>Personalisation (complemented with publication)</td>
<td>Pull</td>
<td>Specific knowledge seeker (needer)</td>
<td>Knower(s), often both specific, known</td>
<td>Oral and written signs with or without the use</td>
<td>Initiator and the other specific</td>
<td>High</td>
</tr>
<tr>
<td>Variant process</td>
<td>Communication strategy</td>
<td>Approach</td>
<td>Initiator</td>
<td>Knowledge provider</td>
<td>Mediating instrument</td>
<td>Knowledge receiver</td>
<td>Degree of interaction</td>
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<tr>
<td>8) SKM push approach via routines and limited interaction</td>
<td>Personalisation</td>
<td>Push</td>
<td>Specific knower</td>
<td>Specific knower</td>
<td>Oral signs</td>
<td>Specific receiver (needer)</td>
<td>Limited</td>
</tr>
<tr>
<td>9) SKM push approach via routines and high interaction</td>
<td>Personalisation</td>
<td>Push</td>
<td>Specific knower</td>
<td>Specific knower</td>
<td>Oral signs</td>
<td>Specific receiver (needer)</td>
<td>High</td>
</tr>
<tr>
<td>10) SKM push approach via IS</td>
<td>Publication</td>
<td>Push</td>
<td>IS, based on own pre-defined functionality, or in interaction with knower</td>
<td>Signs produced by IS, or by knower(s), often unknown to the receiver</td>
<td>Written signs and IS</td>
<td>IS users, sometimes unspecified</td>
<td>Limited</td>
</tr>
<tr>
<td>11) TKM push approach to specific receiver(s)</td>
<td>Personalisation (complemented with publication)</td>
<td>Push</td>
<td>Coordinator (via knowers)</td>
<td>Specific knower(s)</td>
<td>Oral signs, (complemented with written signs)</td>
<td>Specific receiver(s)</td>
<td>High</td>
</tr>
<tr>
<td>12) TKM push approach to unspecified receivers via oral speech</td>
<td>Personalisation (complemented with publication)</td>
<td>Push</td>
<td>Coordinator (via knowers)</td>
<td>Specific knower(s)</td>
<td>Oral signs, (complemented with written signs)</td>
<td>Intended, often unspecified, receivers</td>
<td>Limited</td>
</tr>
<tr>
<td>13) TKM push approach to unspecified receivers via IS</td>
<td>Publication</td>
<td>Push followed by pull</td>
<td>Coordinator (via knowers and system designer)</td>
<td>Knower(s), often unknown to the receiver</td>
<td>Written signs and IS</td>
<td>Intended, often unspecified, receivers</td>
<td>Limited</td>
</tr>
<tr>
<td>14) TKM pull approach via oral speech</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Knowledge seeker</td>
<td>Specific knower</td>
<td>Oral signs</td>
<td>Same as initiator</td>
<td>High or Limited (depending on the problem)</td>
</tr>
<tr>
<td>Variant process</td>
<td>Communication strategy</td>
<td>Approach</td>
<td>Initiator</td>
<td>Knowledge provider</td>
<td>Mediating instrument</td>
<td>Knowledge receiver</td>
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<tr>
<td>15) TKM pull approach via IS</td>
<td>Publication</td>
<td>Pull</td>
<td>Knowledge seeker</td>
<td>Knower(s), unknown to the receiver</td>
<td>Written signs and IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>16) RKM via observation and overhearing</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Observing, specific actor</td>
<td>Observed, specific actors</td>
<td>Action, action results and signs</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
<tr>
<td>17) RKM via conversation via pull approach</td>
<td>Personalisation</td>
<td>Pull</td>
<td>Potential knowledge receiver</td>
<td>Potential knowledge provider</td>
<td>Oral signs</td>
<td>Same as initiator (perhaps also the provider)</td>
<td>High or Limited (depending on the issue)</td>
</tr>
<tr>
<td>18) RKM via conversation via push approach</td>
<td>Personalisation</td>
<td>Push</td>
<td>Potential knowledge provider</td>
<td>Same as initiator</td>
<td>Oral signs</td>
<td>Specific receiver (perhaps also the provider)</td>
<td>High or Limited (depending on the issue)</td>
</tr>
<tr>
<td>19) RKM via written signs and IS</td>
<td>Publication</td>
<td>Pull</td>
<td>User of written signs and IS</td>
<td>Knower(s), often unknown to the receiver</td>
<td>Written signs and IS</td>
<td>Same as initiator</td>
<td>Limited</td>
</tr>
</tbody>
</table>