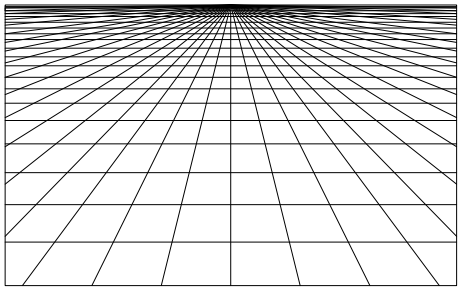
UNIVERSITY OF OSLO

FACULTY OF SOCIAL SCIENCES

TIK

Bureau d'economie theorique et appliquee (BETA)

Centre for technology, innovation and culture
P.O. BOX 1108 Blindern
N-0317 OSLO
Norway
http://www.tik.uio.no



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Knowledge Management: What happens to management when knowledge goes mobile?

Espen Aasen
University of Oslo/University Louis Pasteur
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Abstract

There is a drive towards a more mobile society. Some factors are slowing us down, and other factors are pulling us ahead, but we are moving forward. Alvesson and Kärreman's (2001) theories are used to discuss a shift in organizing, and in the foundations for management in professional, knowledge intensive environments going mobile. Evidence indicates that a manager experiencing a shift towards a more mobile workforce should change communication routines. When an increasing share of the communication becomes electronic, a larger part of the available face to face time should be prioritized to personal communication and community building activities. The administrative communication can be transferred to electronic channels, which seem to handle such communication well. It also appears that mobile technology has a potential in improving efficiency by providing mobile workers the ability to merge work tasks that previously have been separated by time and place. Efficiency in networking and instant access to resources are other consequences from implementation of mobile solutions.

The theories of Von Krogh, Ichijo and Nonaka (2000) are applied in order to show that the mentioned shift could be a step in the right direction to a more creative work environment. Managers must contribute *in* the new communication channels, and also have the ability of building trusting relationship with their employees. Mobility appears to be an underlying function of the social interaction in a working situation, and it can be seen as an amplifier for some of the preconditions Von Krogh, Ichijo and Nonaka (2000) mentions that are necessary for enabling knowledge creation. Mobile technology becomes an enabler for the enablers.

Keywords

Knowledge management, knowledge creation, mobile technology, mobile workers, mobile workforce, working mobile, mobility

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Introduction

"Good times at work: The software company 24Seven Office moved its entire office outdoor". "Sitting indoor when the weather is as good as this is demoralizing", says the CEO to the newspaper.

A Norwegian nation wide covering newspaper gave an excellent example of working mobile in their recent article, and the article was published just after a period of particularly bad weather in Norway, in the summer of 2005. Further in the article, several of the employees state the advantages by working mobile, and the fact that they can do just the same on the beach, or on the move, as they can do from the office (Egeberg, Dagbladet, 18.07.2005).

I have always let myself be fascinated from watching technology's rapid development. New devices and services bring forth enthusiasm and beliefs about its impact on our lives and businesses. Quite often you see stories in the media about people or firms using new technology, presented as news or actualities. Some are negative, especially about security and the possibilities of using technology in people's and society's harm, but my impression is that the majority of publications reflect some kind of optimism about the possibilities of use, or the "look what is possible to do now" approach. Others are of course skeptical to the importance of these implications, wondering what all the fuss is about, and believes quite firmly that these new gadgets will not matter at all. They could all be right.

The concept of being able to work mobile is particularly interesting, and this thesis is an excellent opportunity to look deeper into the topic in a more scientific way. With my background in engineering and organizational psychology, and experience in project management in a knowledge intense environment, I want to look into what happens to management when the knowledge, that is supposed to be managed, goes mobile. In particular, I seek to put Nonaka's theories about knowledge creation up against the new arenas that are rising as a consequence of new mobile technologies, and to explore how managers can nurture the creation of knowledge by using these channels. Finally, by looking at the results of this research, I hope to be able to address issues within Knowledge Management that managers and researchers of mobile knowledge could, or should, pay a little closer attention to.

Working mobile

The main arena for interpersonal knowledge-work relations has traditionally been the face to face communication and text on a paper. In most cases it required physical closeness to other people with the necessary competence. Also in the information technology companies of the nineties was physical presence the norm for exchanging and developing knowledge among the employees in the process of producing and developing products for the market. And it still might be the norm, in terms of hours spent on this activity, but the last decade has shown us another growing arena of communication for knowledge workers; the electronic channels. There is now an enormous amount of knowledge that has been codified and made available on the internet or in corporate

information databases. Technology now allows people to communicate from everywhere anytime, and new working patterns that now emerge, goes in the direction of mobility and flexibility. Two colleagues working on the same project may live in different countries in different time zones. Tasks that earlier required that a worker was physically in hers or his office, is now possible to process from other locations. Good examples are access to applications running on corporate servers, access to files on personal job computers and corporate servers, and the administrative services required to run an organization's computer network. All these tasks that earlier required a physical presence is now possible to accomplish from almost anywhere. And if there is a need for discussing an issue with a colleague, a client, or even a group of contacts, this can in theory be done through telephone, telephone conferences or instant messaging systems. Files can be downloaded to laptops and PDAs and brought anywhere, and later be synchronized with the files at work when connected to a wireless LAN or through a telecom network. In other words, we are not so bound to the organizations' physical locations in doing our job, this with some limitations regarding the kind of work to be done, of course.

Most knowledge intensive organizations build information systems that function as the organization's knowledge-base. This can be systems ranging from an electronic archive for job related documents to sophisticated systems combining archives with client history in projects and sales, human resource systems, logistic data, economic systems, and information systems dealing with best-case-practices, topic handbooks, and ongoing projects and cases. In advanced systems these are linked together by certain criteria. By

using these systems for solving day-to-day tasks and challenges, knowledge workers are getting increasingly accustomed to use electronic channels for acquiring and using knowledge.

Software using the features of Internet and smartphones has established new arenas for communications by combining voice, video, text and imaging. The most basic form is the SMS in mobile phones, and one of the most advanced solutions is video conference systems with support for sharing objects (for instance documents) in real time. Such systems are also referred to as rich media collaboration systems (RMC), and a good example is the software Marratech (www.marratech.com).

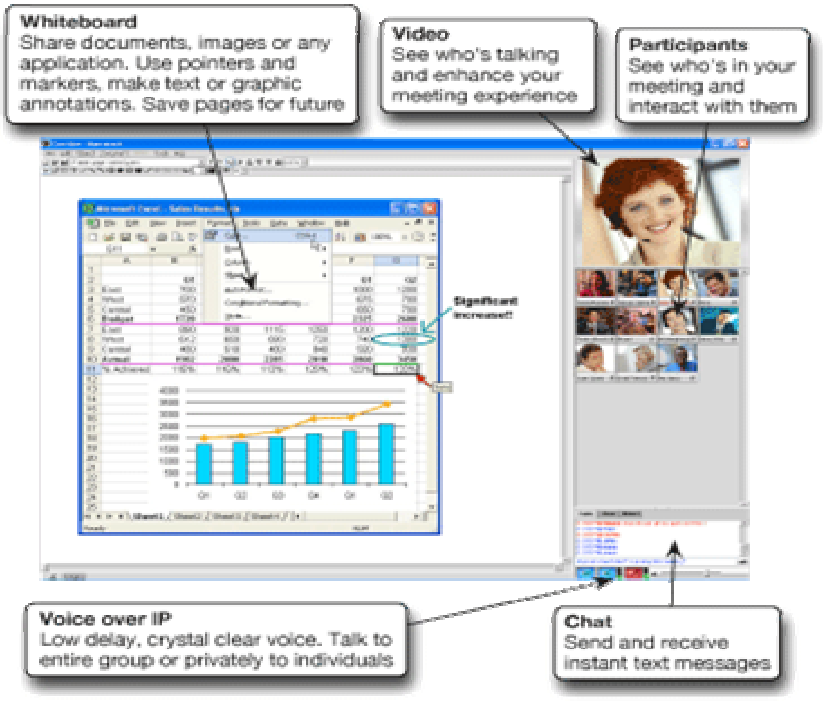

Figure 1: Virtual Office software from Marratech.

Such systems have most of the “functions” as a physical meeting, except from actually being present. You can see the participants, talk to the participants, even “whisper in someone’s ear” without anybody else hearing it, present documents, comment on the presentations, and even point at details when commenting them. And you can have your coffee. Another popular online functionality is the use of discussion databases, or forums. In these shared electronic notebooks it is possible to post a question, a comment, a tip, or just about any kind of statement. There are of course different forums for different topics, and an organization can have its own private forums for employees, and perhaps clients, only.

All these features make a stronger online presence for the individuals and groups using them. An organization’s computer network can be administrated on a laptop from a café with wireless LAN access, and the research rapport can be written on the mountain lodge terrace and then discussed online with the other project participants through a system like Marratech’s as long as there is a telecom network available. And the fast development of bandwidth for telecom networks, and the processing power and usability for mobile devices, are strong indicators for an increasing mobility in the workforce in the years to come.

Mobile knowledge workers are knowledge workers who have moved to a new set of tools for conducting their work. These tools have advantages as well as disadvantages, and in my opinion do the advantages by far exceed the disadvantages. It is important in this

discussion to be aware of the fact that being mobile also includes being mobile together with colleagues within the organization's physical space, as well as being externally mobile. It is not necessarily so that a mobile knowledge worker becomes less social by not being present. The ability to be mobile and flexible can be a driving force and a possibility to expand both the physical social network, and to make available time for being social. Being mobile within the organization's physical space is an important asset of mobile technology. This allows workers to form ad hoc meetings and collaboration by bringing their electronic content and sketches, and work jointly on this material. In addition to this collaborative way of using mobility internally, there is of course what most people think of when the discussion of working mobile is up; being able to work while traveling or working in locations other than your office. The latter form of mobility is probably what can be considered a challenge and a threat from a manager's point of view. Employees are spending more time away from the physical locations of the organization, and by that are more difficult to manage, motivate and to provide an enabling context for knowledge creation.

To understand the discussion of mobility, it is important to separate the between external mobility and internal mobility mentioned above. This phenomenon is also referred to as macro and micro perspectives of mobility in this thesis. Internal mobility is the mobility occurring within an organization's physical frames, the flexibility of work when a worker can experience the same accessibility and support from information technology, regardless of space through wireless communication. External mobility, or macro mobility, is the term used to describe what probably the majority of people will associate

with mobile working and mobile technology; being able, through technological solutions, to gather, process, and distribute information, to have access to corporate business applications, and being able to communicate through electronic channels when not being in the office. Being mobile is not the same as having a home-office, but this could of course be one of the places a mobile worker chooses to work from.

Mobile technology

The term mobile technology is simple as long as we are talking only about the physical, technological objects, or hardware. Most people have a relation to mobile technology in terms of mobile phones, laptops and personal data assistants (PDA). But in a broader and more professional perspective, the backbone-technology that actually makes these devices work is at lest as important. This includes the infrastructure that makes the devices communicate, and the systems that allow us, the users, to make and distribute content through this technology.

The use of the term *mobile technology* in this thesis also includes systems that make the devices operate in a functional way, and the systems that allow users to use and produce content. A good example to mobile technology is the devices, infrastructure, services and the software that would let me access and work on a document on my personal data assistant (PDA) from the library at PEGE in the University of Luis Pasteur in Strasbourg, trough their wireless LAN with connection to the internet, and trough a virtual private network (VPN) access my account on the University of Oslo. Here we can see a set of actors in a relative simple case: The hardware device (PDA), the device's software for

handling the data, wireless LAN at the university, the university's computer network, the university's internet provider, the internet providers infrastructure and roaming agreements with a Norwegian internet provider, the Norwegian internet providers connection to the University of Oslo, the University of Oslo's computer network infrastructure, and the common protocol of data transferring (VPN) between the university and the device. This is a quite complex technological system, and these variables are all important factors in what I refer to as mobile technology, and, amongst other factors, necessary preconditions for what I refer to as *mobile* knowledge workers.

Other important elements are software systems that allow collaboration and communication. An example is the case of managing resources, where the data put into the system from organization members for managing calendar and tasks, has to be compatible all the way through the system. A central system has to be able to gather and to distribute this information between the different actors. If the systems and the format of the data are not compatible, this collaboration and communication is not possible, or it at least requires third party functionality or even specially developed solutions. The channels of communication are mentioned in previous paragraphs, and are in most cases preconditions for the exchange of information. Exceptions are of course that mobile knowledge workers, in the sense of being mobile, quite often are face-to-face with their collaborator or manager. This is also a factor that systems supporting mobile knowledge-work must handle.

These examples are mentioned to show the fact that working mobile is not just an individual choice of buying a laptop and decide to start working mobile. When using mobile technology a worker is a part of a large and complex technological system. This system limits strongly the individual's options, and it includes both social and technological constraints. Roaming agreements between telecommunication actors, and technology strategy at the different universities, are examples belonging to the social dimension. The computer network bandwidth, processing power and supported communication protocols in the mobile computing device are technological constraints. The combination of these constraints is forming what could be referred to as the users' available mobility space. Still, there are other constraints that limit the penetration of mobile working. Most of today's mobile telephones can connect to the internet, and the growing numbers of smartphones can run the same internet browsers as a laptop. But it is not the same. It doesn't feel the same, and it doesn't look the same. Most of the information accessible on the internet today is adjusted to the most common graphical user interface, which is a 4:3 screen with 1024x768 pixels. The constraint is the format of how the information is presented, and it is about the same thing

Figure 2, Social or technological constraints?

as watching a widescreen format movie on an old TV set. It is possible, but it feels like a decrease in functionality, usability, and experience. As long as the information is not format-independent, the shift from a "standard" computer format to a "mobile" computer format, will take time. From a technological viewpoint, this is a matter of not adjusting information to a certain format, but rather to store and build the information with a set of meta-information. This is a deconstruction of the elements of the information into a lower and more format independent form, which can more easily be applied to different formats (in software developing for different web formats, this is referred to as style sheets).

The state of Workforce Mobility

Much of my reasoning in this thesis is about mobility in the workforce. Some of my ideas are based on a research done by Simpson Carpenter (2005), a global research company, on behalf of Nokia Enterprise Solutions. It is a global survey, conducted for the purpose of making a map of the enterprise mobility market. The research involved surveying 2700 enterprise mobility decision makers and 3000 employees for gaining insight into mobile technology usage and behavior. Respondents were from the United States, China and Germany, and both small, medium and large businesses were included in the survey.

In this study of the enterprise mobility market, Simpson Carpenter segmented the sample unit into employees and business decision makers. In their conclusions they report that it is basically the employees that are embracing the mobile technologies, and thereby is driving the deployment of mobile technology into the organizations, but also that this trend is changing, and more decision makes now recognize the benefits from a mobile

infrastructure. However, Simpson Carpenter claims, because of the employees' increasing reap of the benefits of mobile technology, there is now a gap between the perceived use of mobile technology by decision makers, and the actual use reported by the employees. "*The result is a workforce that continues to drive mobile technology adoption (...) in order to profit from increased productivity and connectivity"* (Simpson Carpenter, 2005).

This is quite in accordance with the general image of the growing mobility in the workforce. This view is also supported in MIT's Technology Review, claiming that there has been an increase in the market of what they call "converged mobile devices", also referred to as "Smartphones", of 134 percent from the first quarter of 2004 to the same quarter in 2005 (Roush, 2005). These devices can do much of the same operations as a larger computer, even if the user interface is not as rich as a laptop's, and that much of existing information and codified knowledge are not optimized for this format.

Preliminary reflections on mobile knowledge

From personal experience and various articles and presentations in the media, I have an impression that people are working more mobile today than ever before. Technology is developing fast in areas such as mobile devices, network infrastructure, software, and services. The apparent demand from users wanting to be mobile (Simpson Carpenter, 2005), give the producers a strong incentive for keeping up the rapid development of more convenient, more powerful, and more functional solutions, devices, and systems.

Mobile technology provides options and possibilities for changing our working habits through new ways and means of accessing and processing information.

One point of entry, and perhaps the most important one, is my expectations of finding some effect of the loss of face to face time between managers and their employees as a result of employees becoming more mobile. On the other hand, new mobile technology allows employees and managers to communicate and interact through alternative channels. A loss of direct face to face time could have an effect on how a manager distribute and prioritize different aspects of managing hers or his employees' communications; delegating tasks, measuring work progress, coordinating work, social issues, specific meetings, motivation, and care, to mention some.

My most vivid preliminary reflection is the fact that it is now possible to connect to a knowledge intensive firm's systems from almost anywhere. The same applies for possibilities of communicating with other people, with live video and document sharing, also from almost anywhere. In theory this allows a knowledge worker to perform most of the tasks assigned also when he or she is not physically present in the firm's office. It also appears to me that flexibility in where and when an employee should perform hers or his duties, are becoming more and more normal, and that many now starts using these possibilities in their professional life. The first thoughts about an increasing mobility among knowledge workers are that this is a major challenge for the managers of these resources. How do you manage people that are not present? And as most researchers in knowledge management points out (Alvesson and Kärreman, 2001; Von Krogh, Ichijo

and Nonaka 2000), it is not about management per se, but it is about inspiring and nurturing the existing knowledge among the employees in order to create new knowledge. How can this be done in a mobile environment?

Less time face to face with hers or his employees can be a challenge for a manager or leader trying to impose care as a foundation for knowledge creation and innovation. This could be a problem, but there is also a possibility of spending a higher share of the time face to face with employees in care-promoting activities if other issues as delegating and reporting can be done through alternative channels, even if the total face to face time decreases.

Methodical issues

"Strictly speaking there are no such things as facts, pure and simple. All facts are from the outset of facts selected from a universal context by the activities of our mind. They are, therefore, always interpreted facts, either facts looked at as detached from their context by an artificial abstraction or facts considered in their particular setting. In either case, they carry their interpretational inner and outer horizons."

Schütz (1962)

Research Approach

One could perhaps say that the process of defining, researching, and writing this thesis started in my mind even before I applied for the ESST program. Trough several years in working with technological solutions for people and organizations, you build a set of experiences and knowledge about people, about technology, and about people and technology. This is knowledge I cannot forget, nor disregard, when I start working with the thesis, and my reflections and conclusions will be influenced by this knowledge.

As a technique for getting started, I begun writing down thoughts and ideas about mobile technology, ways of working mobile, and issues managers would have to deal with in a mobile workforce. Some of these preliminary reflections are now parts of the introductory material of the thesis. This approach is inspired by Karl-Erik Sveiby's doctorial thesis from 1994. He describes a method referred to as *Phenomenological*

reflection, which is a heuristic method (Douglas and Moustakas, 1985, in Sveiby 1994). Phenomenological reflection is an introspective technique that is first and foremost applied to the introductory work with the thesis – basically in preliminary thoughts about what I expect to find in my research, and in the descriptive analysis of the present situation. The basic problems with introspective techniques are of course the reliability and how general the findings can be regarded to be (Sveiby, 1994). This effect is tried limited by using this method only as a preparation for the research, and all ideas and hypothesis reached by this technique is verified trough either established theories from related fields, or by data from qualitative interviews, in other words verified by the method of triangulation (Flick, 2002).

Reviewing my writings from this early period gave me ideas and insight into what I had on my mind and what it was that I wanted to look further into in my thesis. In retrospect, I can now say that it was a rather deterministic point of view, which also one of my supervisors, Patrick Llerena, pointed out in an early stage of my thesis. The sub question from my research question, "is technology laying down new premises for managerial behavior" is one result from this work. I guess that was also my point of view when I sat out to search literature and theory in order to confirm, broaden or cross-link my assumptions about the thesis' topic. However, this view has altered along the way of studying, and especially from summarizing and analyzing my data from interviews with managers in information technology firms. The results are found in my chapters of discussion and analysis.

Ethnographic approach

In search of an appropriate method for my gathering of data, the Ethnographic approach is the closest match to how I want to conduct my work. This method let me link observations and interviews, and it is regarded as a method applicable for interpreting and describing *"everyday life worlds"* (Flick, 2002). Its features are, amongst others, a strong emphasis on exploring the nature of a particular social phenomenon, and the method wield support for working with unstructured data (Atkinson and Hammersley, 1998: 110, in Flick, 2002). Ethnographic research investigates a small number of cases, and typically a small group of subjects (Flick, 2002). I see this method to be suitable both for the matter of describing the situation as is, and in the matter of being interpretative, in allowing the researcher to determine the significance of what is observed. This is also connected to involving theories from Polanyi (1958) in interpreting the construction of knowledge in later chapters. The selection of topics for the interviews, and the codifying of these data for my analysis, is based on my interpretation of what is important and relevant, and this is necessarily (Polanyi 1958) based on prior and prevailing experiences and knowledge.

Gender neutrality

When referring to third person singular, I refer to this person as "he and/or she" and as "her and/or him". This is my approach for making the text gender neutral, even if I feel it to some degree reduces the pace and the "flow" of the reading. The order he/she and her/him is alphabetical.

Aims and objectives

As mentioned in the introduction, this thesis is a research into factors varying with the possibilities and properties of emerging mobile technology. I hope to be able to discuss and highlight topics regarding the management of knowledge in this setting, and to describe a shift in managerial focus based on established theories of knowledge management.

This thesis is an attempt to contribute to a stronger focus on the consequences of what I perceive to be a significant altering in technological regime. The growth and rapid development of mobile technology have the potential of change the way people interact, both socially and professionally. In this study, I focus on the professional aspect of managing a mobile workforce, but I also believe that much of these challenges have an origin in more general social processes. By looking into what happens to management when knowledge goes mobile, from a knowledge management perspective, I seek to prepare for what I believe we will experience in the professional life in the years to come.

Further, it is important for me to look into what such a transition could do to the process of creating knowledge in an organization. If what we now see is the beginning of a shift towards a more mobile workforce, and increasing mobility has an implication for our ability to create knowledge, this could have implications for organizations' abilities in maintaining and developing their competitive advantage.

Research question

My thesis will be an attempt to explore the relations between mobile technology, mobile working behavior, and the management of mobile knowledge. Technological trajectories are explored together with mobile working behavior, and are further held up against empirical material from managers of knowledge intensive firms, regarding their understanding of the management of mobile workers. A key issue is the different communication channels now available through mobile technology, and how these can be used for the different managerial purposes in an organization.

An important part of this thesis is for me to look into how workers actually work mobile, and if this could have an effect on knowledge creation. I apply the theories of Alvesson and Kärreman (2001) for analyzing the managerial situation in some knowledge intensive firms, and further to apply Von Krogh, Ichijo and Nonaka's (2000) theories to analyze the effect of a potential shift towards a more mobile workforce.

By looking into these issues, I hope to be able to explain some new areas for managerial attention in mobile environments, and to be able to suggest some managerial strategies in order to maintain and to develop an organization's knowledge, and thereby its competitive advantage.

Research question:

- Are mobile knowledge workers challenging established theories of Knowledge Management?
    - Are von Krogh, Ichijo and Nonaka's theories for knowledge creation and innovation applicable also to employees with a high level of mobility?
    - To what extent are new mobile technologies laying down premises for knowledge management?

Delimitations

Property rights of moving data, information and knowledge between the firm and the employees, are not discussed in this thesis.

The interview data is collected from information technology businesses only. These firms are basically working with technology and business consulting, and this can possibly cause a bias regarding to the abilities of managers and employees to handle and to adopt to new mobile technology.

Research methods

Grounding theories

I decided to use g*rounding theories* in analyzing and interpreting the data from the interviews in my research. This procedure developed by Glaser and Strauss (1967) points out the importance of an open attitude to the data collected, and that the researcher enters

the codification process without predispositions, or at least are aware of ones predispositions (Flick, 2002). I can probably not claim to be completely free of any predispositions, but I am aware of this possible source of bias, and try to take into account those I believe can bias my interpretation the most (see also chapter on Research Approach above). The Grounded theory approach is also recognized by Miller & Crabtree (1992) as the Editing approach to analyzing qualitative data (King, 1994), and they describe the process as an editor who produces a reduced summary from the data that reveals the interpretative truth in the text (King, 1994: 121). In order to keep biases to a minimum, I have tried to verify my grounding attempts and conclusions up against Miles and Huberman's (1984) list of the most frequent shortcomings in qualitative analysis.

Interviews

My initial intention was to target managers in different sectors of knowledge intensive environments. As the work progressed, I realized that these ambitions had to be reduced, and the target group became managers and project managers in information technology firms. These are in the text referred to as the *informants*.

According to King (1994), the *qualitative research interview* is preferred to *structured* or *structured open-response* interviews where the study focuses on the meaning of particular phenomena to the participants, their individual perceptions of processes within a social unit, or development of a phenomenon over time, are important (King, 1994: 111-112). The qualitative research interview is a relatively open interview, not far from what Flick

(2002) refers to as a semi-structured interview. The background for this approach is to be able to reconstruct the informant's subjective viewpoints (Flick, 2002). In order to get honest and reflective responses from the informant, the interviews were not conducted by following an interview guide bureaucratically (Hopf, 1978, in Flick 2002), but rather as a way of directing the conversation towards the desired topics.

Looking into Knowledge Management

Alvesson and Kärreman (2001) provide an interesting framework for analyzing managerial intervention. They define a typology for describing medium of interaction in relation to mode of managerial intervention. I wish to use this framework as a tool for analyzing data from my interviews, and will for that reason describe these typologies briefly here.

	Modes of managerial intervention	
	Co-ordination	Control
Social **Medium of interaction** Technostructural	Community	Normative control
	Extended library	Enacted blueprints

Figure 3: Typology of knowledge management approaches.

Alvesson and Kärreman claims four distinctive orientations in an attempt to categorize knowledge management, and bases this on how people in the field of knowledge management define and reason around knowledge, management, and knowledge management (Alvesson and Kärreman, 2001: 1004). These four orientations are

visualized in figure 3, and are arranged along the dimensions of ‘’medium of interaction’ and ‘mode of managerial interaction’.

The “Extended Library” type of knowledge management involves extensive use of available technology, and that knowledge management is basically a centralized process which integrates more or less idiosyncratic work and project experiences for the development of general knowledge. The forms of this knowledge are as methodologies or solutions guiding further work. A goal is to turn a company’s internal and external information into actionable knowledge via a technology platform (Alvesson and Kärreman, 2001).

Community oriented knowledge management is less technocratic and encourages knowledge sharing through influencing workplace climate. And in this perspective you could say that management is a relative small part of the knowledge management, since it is more a question of providing and nursing the context and ba of the working organization. It is an organic, social quality, associated background, long-term commitments, downplayed hierarchy and considerable space.

A higher degree of control is found in the Normative Control orientation of knowledge management. Normative control is an attempt to elicit and direct the required efforts of members by controlling the underlying experience, thoughts, and feeling that guide their actions (Kunda, 1992). In this respect normative control can be viewed as a way of actively building organizational culture and cultivating community tendencies.

Enacted blueprints do, as well as the normative control type of knowledge management, also involve active intervention from a manager. The difference lies in the focus on the behavioral level, rather than values and ideas. Enacted blueprints knowledge management provides templates and guidelines that produce a wanted action, and the idea is that organizational knowledge can be extracted from individuals and converted into a database through codification, for later reuse by other employees. This form of knowledge management is closer to classical scientific management (Alvesson and Kärreman, 2001), but with an important difference in that enacted blueprints basically target intellectual work.

Retrospective remarks

All of my interview objects talked quite a lot about the individual differences, that different people had to be managed and led in different ways and with different means, and that different situations require different approaches and strategies. Answers about specific issues were not necessarily unambiguous and easy to recollect, or at least, so was my impression. In retrospect, I see that my theories about management probably should have included Contingency theories (Fiedler, 1967, Fiedler and Garcia 1987, in Northouse 1997) and theories from a Situational Management Approach (Hersey and Blanchard, 1977, 1988, in Northouse 1997). These have not been discussed in this thesis.

It would have been interesting to test the more qualitative results from this thesis in a quantitative study. Especially the effect of loss of face to face time, and how this affect

the relationship between manager and employees. This could of course be done as a comparative study between two or more actors, but I imagine that a study analyzing an organization or a group in a process of implementing mobile solutions would give the most precise results. Another interesting quantitative approach would have been an analyze of creativity in organizations compared with workers level of mobility.

Challenging established Knowledge Management theories

"We can know more than we can tell"

M. Polanyi (Polanyi, 1958)

Managing knowledge

The theories about how to manage knowledge, or Knowledge Management, are many and diverse. According to Alvesson and Kärreman (2001) there is a divide in Knowledge Management with those interested in technological aspects, and those emphasizing the "people side" (Alvesson and Kärreman, 2001: 996). The technology side focuses basically on systems for codifying knowledge and searching explicit knowledge, and systems for enhancing collaboration in an organization. The focus of the "people side" of knowledge management is harder to grasp. Alvesson and Kärreman bring forth academic orientations like organizational learning, strategic management and innovation, but they also states that management of knowledge is inherently problematic as a concept (Alvesson and Kärreman, 2001: 996). *"Put bluntly, the more management, the less knowledge to 'manage', and the more 'knowledge' matters, the less space there is for management to make a difference"* (Alvesson and Kärreman, 2001: 996). The phenomenon is also mentioned in Von Krogh, Ichijo and Nonaka' literature about knowledge creation, where they point out that the term management implies control of processes that may be inherently uncontrollable (Von Krogh, Ichijo and Nonaka, 2000:4). Still, both Alvesson and Kärreman, and Von Krogh, Ichijo and Nonaka goes on

elaborating the concepts of knowledge management, and as Alvesson and Kärreman (2001) says; the idea that management somehow can be managed has a great appeal. Von Krogh, Ichijo and Nonaka's approach is more in the direction of knowledge creation than to knowledge management, and thus indicating a view of a manager more as someone who can provide an enabling context more than planning and control the employees work.

When referring to knowledge in the thesis, it is based on a constructivist viewpoint. The subject constructs the knowledge from active participation and experiences from the surroundings, and is not passively receiving absolute or "true" information (Sveiby, 1994). In this perspective one could say that it is not possible to transfer knowledge, as the individual it self has to experience and learn the knowledge (Sveiby, 1994). This view is based on the philosopher Michael Polanyi's works on knowledge, and especially his definition of the term "tacit knowledge" (Polanyi, 1958). He often described knowledge as the "process of knowing", and in his interpretations, knowledge is either tacit or rooted in tacit knowledge (Sveiby, 1994). Nonaka takes the term tacit knowledge further in his article "The Knowledge-Creating Company" (Nonaka, 1991), and here Nonaka seeks out to explain how knowledge *can* be transferred. Nonaka refers to this basically as *creating* knowledge, and describes four distinct patterns of knowledge-creation in an organization: Tacit to tacit, explicit to explicit, tacit to explicit, and explicit to tacit. Further, he stresses the value of redundancy in an organization, as it encourages frequent dialogs and communication, which again is essential for the transfer of tacit knowledge (Nonaka, 1991).

Von Krogh, Ichijo and Nonaka: Enabling Knowledge Creation

Organizational actors in the knowledge economy reach for supremacy in their fields. They hire the right people with the right knowledge and the right skills, they motivate their employees to share their knowledge, they build systems for managing and codifying knowledge, and they seek to enable the creation of new and competitive knowledge. Von Krogh, Ichijo and Nonaka in "Enabling Knowledge Creation" (2000) stress the importance of care in an organization as a foundation for what they regard as the enabling factors for knowledge creation. This reflects the view upon the individual as the carrier of value, and that enabling knowledge creation is based on a positive drive among people in an organization.

Von Krogh, Ichijo and Nonaka take a step further from the theories of managing knowledge, and discuss what it takes to enable knowledge in an organization in order to create new knowledge. They bring up several levels and arenas for the interplay between knowledge actors, and also mention the more virtual spaces for knowledge interaction, and amongst them the phenomenon referred to as ba. This thesis will discuss if an organization can use these theories to enable knowledge creation in an organization with to a higher extent base their human resources on mobile knowledge workers.

Enabling knowledge creation

Knowledge management is in quite a few articles described as self contradictory, vague, black-boxing knowledge, not really about knowledge, that knowledge cannot be managed, and that it should be approached with some skepticism (Alvesson and

Kärreman, 2001). In 1991 Ikujiro Nonaka makes a genius twist in his much sited work "The Knowledge-creating Company" in Harvard Business Review on Knowledge Management, where he claims it's not as much about managing knowledge as it is to create knowledge. The only sure source of lasting competitive advantage is knowledge, and the only successful companies are those that constantly create new knowledge, disseminate it throughout the organization, and embody it in new technologies and products (Nonaka, 1991). Nonaka followed up his work in the book "The knowledge-creating company" with Takeuchi in 1995, and "Enabling Knowledge Creation" with Von Krogh and Ichijo in 2000. Much of the theoretical background for this thesis is based on these works.

In "Enabling Knowledge Creation", Von Krogh, Ichijo and Nonaka (2000) discusses and put forward what it takes to create knowledge in an organization. They define five so-called *knowledge enablers*, they stress the importance of *microcommunities of knowledge,* and they emphasize the importance of *care* in organizations.

Care

At first thought, there should not be too many differences in how managers care for their employees, or how the manger tries to develop the company's or the department's culture of caring for each other, in a mobile working society versus a stationary one. There are however some important aspects of interest for managing a mobile workforce, both from a theoretical perspective, and as an issue to discuss in my interviews.

Not necessarily all mobile knowledge workers spend less time in the office, but for those that do, their manager could potentially experience a loss of time in face to face communication with hers or his employees. I don't believe this is the reality for most research and development departments or production workers, but for instance in a consulting businesses or in academic communities, this can be a highly relevant challenge. How can a manager assure that the caring dimensions Von Krogh, Ichijo and Nonaka (2000) stresses to be so important for enabling knowledge creation is present at the same level for a mobile workforce as for a more stationary one? If these dimensions are not maintained, this could mean a decrease in comparative advantage for a knowledge intensive company, if its knowledge workers adapt to a more mobile way of working. Arenas for building and maintaining such caring environment change from the traditional office environment to virtual environments, existing only in computer servers and in people's minds.

Care as a foundation for knowledge creation is described as five dimensions: Mutual trust, active empathy, access to help, lenience in judgment, and courage. Tacit knowledge is difficult to exchange when care is low, and the knowledge would first have to be made explicit before a transaction partner could assess its value and decide what it is worth. Further, they define four different paths in knowledge creation based on the level of care, again based on the five dimensions of care mentioned above, and divided into social and individual knowledge (Von Krogh, Ichijo and Nonaka, 2000).

Knowledge creation when care is high or low

	Individual knowledge	Social knowledge
Low care	SEIZING Everyone out for himself	TRANSACTING Swapping documents or other explicit knowledge
High care	BESTOWING Helping by sharing insights	INDWELLING Living together with a concept

Figure 4: Paths of knowledge creation (Von Krogh, Ichijo and Nonaka, 2000: 55)

According to Von Krogh, Ichijo and Nonaka (2000) individual members in the organization experiences an enabling context when care runs high in an organization. The individual member can trust colleagues, get access to expertise when required, and is free to experiment without fearing social sanctions. In this setting is tacit knowledge shared, using metaphors and analogies, and the knowledge can be used and refined by the organization and its individuals.

High care in a social knowledge perspective is also said to enable a shift in how individuals experience a concept. Dwelling in a concept becomes a matter of looking *with* a concept instead at looking *at* a concept (Polanyi & Prosch, 1975), and thus, that indwelling is about commitment to an idea, an experience, a concept, or to a human being (Von Krogh, Ichijo and Nonaka, 2000: 58).

In building this caring foundation in an organization, Von Krogh, Ichijo and Nonaka (2000) emphasizes the need for creating trust. They refer to Smith and Berg's (1987) work which states that a group can function only if members are able to depend on each

other, and that it is this mutual dependency that makes the group a group. A company should therefore emphasize the role of trust in their communication, both internal and external. Maps of expectations and a form of measuring reliability are also mentioned as factors for building trust in an organization. These means help to give participants greater knowledge of each other, and might contribute to a more predictable working environment (Von Krogh, Ichijo and Nonaka, 2000: 62).

Further, fostering of helping behavior is stressed as an important factor in generating trust. This is basically training in pedagogical skills, training in intervention techniques, making accessible help an element of performance appraisals, and sharing stories of helping behavior. The last factors are lenience, courage, and mentorship, and in the authors' opinion, a mentoring system in an organization would support all these dimensions of care (Von Krogh, Ichijo and Nonaka, 2000).

Two-focus strategy

Von Krogh, Ichijo and Nonaka (2000) divide corporate strategy into two different focuses. This is based on a suggestion that a company define its strategy in two dimensions; survival strategy and advancement strategy (Von Krogh, Roos and Slocum, 1994, in Von Krogh, Ichijo and Nonaka, 2000). A company has both operational issues, which is the mastering of the company's current business environment, and issues regarding the company's future performance and profitability (Von Krogh, Ichijo and Nonaka, 2000). This principle involves a balancing between survival and advancement strategies. It appears that managers have a tendency to prioritize survival strategy, and

that this can be explained from the influence of stakeholders, customers, employees and so on, that wants their returns, services, products and paychecks now, and not sometime in the future. Advancement strategies, on the other hand, are vital for the company's future competitive advantage, and depend heavily on the creation of new knowledge. According to Von Krogh, Ichijo and Nonaka (2000), the organizational knowledge creation consists of five steps, referred to as sharing tacit knowledge, creating concepts, justifying concepts, building a prototype, and cross-leveling knowledge (Von Krogh, Ichijo and Nonaka, 2000: 82-92).

Knowledge Enablers

To ***Instill a Knowledge Vision*** is giving the company's strategy more substance. It should provide direction, and encompass the types and contents of knowledge to be created. The Knowledge Vision is tightly coupled with the advancement strategy, but it is important that the vision also has a component visualizing the company's present situation. In a constructivist perspective, knowledge is socially constructed (Polanyi, 1958) and for this reason is it important to investigate and reinvestigate beliefs and justifications (Von Krogh, Ichijo and Nonaka, 2000). The knowledge vision of a specific company would basically be a formulation of a company mission statement or other manifestations that lead to wanted actions.

Managing Conversations is the second knowledge enabler. *"Good conversations are the cradle of social knowledge in any organization"* (Von Krogh, Ichijo and Nonaka, 2000: 125). Conversations are central in communicating beliefs, ideas, sanctions to unwanted

actions or ideas, feedback and appraisals for good ideas and results, and in general a tool for building communities and sharing tacit knowledge. In a group, these conversations have a purpose of either confirming knowledge or an aim to create new knowledge. Examples can be experienced group members explaining a routine or specific task, or it can be the explorative discussion flowing back and forth in a group trying to solve an unforeseen problem in a prototype (Von Krogh, Ichijo and Nonaka, 2000).

The third enabler is ***Mobilizing Knowledge Activists***. A Knowledge Activist is a mediator of the processes of creating knowledge, and thus helping to establish the right enabling context. This process can be explained as three different roles: The catalyst, the coordinator, and the merchant of foresight. The catalyst role is the one who can inhabit an overview of the company, its functions, competence, research and production. This information, or knowledge, is spread to the developing micro community along with the promotion of the "knowledge spaces", often referred to as "ba" (Von Krogh, Ichijo and Nonaka, 2000; Creplet, 2000). I find the coordinator role to be quite close to the catalyst role. The coordinator is described as the facilitator of the network of corporate paths of knowledge and solutions. In being a Merchant of Foresight, the knowledge activist provides the direction in the creation of knowledge. This involves having some sort of supervision with the different microcommunities and the company's knowledge creating activities. It is also emphasized that knowledge activism is about enabling, and not about controlling (Von Krogh, Ichijo and Nonaka, 2000).

Create the Right Context. According to Von Krogh, Ichijo and Nonaka (2000) this is about creating the organizational structures that fosters relationships and collaboration in the company. In order to create new knowledge it is important to make existing knowledge grow. This comes true when tacit knowledge is shared in a microcommunity, new concepts are created and communicated, and the concepts' prototypes are being built.

In generating an enabling context, or what Von Krogh, Ichijo and Nonaka (2000) refer to as "***ba***", there are several dimensions involved. The authors describe ba as a shared place, defined by a network of relations, and a unified place of physical, virtual and mental spaces involved in creating knowledge. It appears to be a kind of a foundation for the creation of knowledge, and can be seen as an intermediary state in constant evolution (Nonaka and Konno, 1998, in Creplet, 2000). Still, even if this is a Japanese term, it is important to remember that the term includes several mechanisms described in theories within learning, organization and even Knowledge Management (Creplet, 2000).

The last enabler, ***Globalize Local Knowledge***, refers to the transfer of knowledge under collaborative arrangements. The Globalize Local Knowledge enabler has as its most important task, to spread knowledge organizationally. This knowledge has to be "translated" according to the actual organizations' (or part of organizations') social conditions or culture. It is about breaking down physical, cultural, organizational and managerial barriers in order to transfer knowledge across corporations (Von Krogh,

Ichijo and Nonaka, 2000). According to Sveiby (Sveiby, 2001), it is essential in order to transfer and creating knowledge, that knowledge must be used in order to make it grow.

Technological trajectories forming mobile technology

Peter Drucker wrote already in 1987 that there was an ongoing shift from command-and control organization to an information based organization form – an organization of knowledge specialists (Drucker, 1998). The information age started its domain some time in the eighties (Dodgson, 2000), so we have been living with it and in it for about twenty years. Some even indicates that the information age is almost over, and that new paradigms are about to take over (Jensen, 1999) For a little more then ten years ago, we heard about working mobile, technologically speaking, for the first times. This was about being able to work on a portable computer, and being able to do some of the tasks that you normally would do in the office, while actually being out of office. This involved a significant insight in computer communication, and an extremely limited access to any kind of core business systems. That is, if the company had anything that could be called a core business system at that time. Working mobile, from a technological perspective, in the early nineties was primarily about downloading, editing and uploading documents through a modem connected to a cell phone, by the use of file transfer protocols (FTP).

There are many conditions that have laid down the foundation for today's mobile technology. The most important are the convergence of hardware for processing and hardware for communication, the development of broader communication lines and

belonging protocols, and the business software and their client graphic user interfaces (GUI).

The major development in mobile technology is perhaps not the “mobile” technology itself as in mobile devices or gadgets. New mobile technology is theoretically capable of transmitting, downloading, uploading, processing and collaborating, but this functionality is not fully utilized till a lower threshold of number of users is reached. If you buy a 3G mobile telephone with possibilities for videoconference, it will not be of much use until your colleagues or collaborators also have purchased and adopted the knowledge necessary for using these new functions. When it comes to the possibilities of individual work, like downloading and processing documents, this is also a service that must be supported from the employer; setting up file servers for internet access, and apply a satisfying level of security. For more complex information processing, like the example mentioned in my introduction (24Seven Office), this would also include full access to core business software as customer databases, sales systems, logistics systems, and in their specific case, full access to their product development servers and source codes. For most companies today, this level of mobility is not possible to achieve. It would not be a matter of purchasing some new mobile devices and start working mobile. Preparing the companies business systems would be a far more advanced and costly task, and on top of this comes the reengineering of business processes, routines and even the organization it self. Most of the solutions we see today are semi-mobile solutions where the employees organize and make mobile their own documents, and have possibilities for connecting to their work email through an internet browser.

When we look at the technological development, we find convergence between existing technologies. The converged technologies form new products and services which again converge with other new technologies (Wicken, 2005). Examples are many and diverse. One is to look at how the development of business applications were developers started using HTML based user interfaces (code readable in web browsers: DHTML, HTMLS, XML). The original thought was a broader and easier access for users basically running stationary computers in the organizations offices. The side-effect of this technological choice was that when it became possible (and common) to connect to the company's computer systems from the internet, these business applications did not need to upgrade their front-end software because the technology already supported the presentation of information in an internet browser. Now, we see the development of smartphones with the ability of running internet browser software, and in this matter providing access to business applications for mobile workers through mobile devices. In this example we see two separate converging paths, eventually converge with each other. There are also converging tendencies in telephone- and computer communication, where the telephone networks now is run through computer communication protocols. From a hardware perspective, we see a convergence in portable computing devices and communication devices as mention in the example above. The result of this convergence is that these devices requires a much lower level of technological knowledge from the consumer, and thereby becomes more accessible. If we look at the effects of these convergences, the result is a simplification of the use of mobile technologies, and thereby an improved accessibility for users wanting to work mobile. Technology provides today the possibility

to access corporate information, corporate applications, and extended communication with colleagues and clients, even as a videoconference, by the use of a device that fits in your pocket.

The efficiency in being mobile

By being more flexible regarding place and time of working, a mobile worker has access to a greater arena for social interaction, and can enjoy the possibilities of a broadened network of potential actors. This is first and foremost a result of the development and the increasing distribution that Davenport and Prusak (Davenport and Prusak, 2000, in Gottschalk, 2002) refers to as knowledge repositories, which also includes human resource management knowledge (systems for resource planning and coordinating). And these systems are even further enhanced by the increase in accessibility provided by mobile technologies. Such solutions provide a more instant access to people outside their own department, and even people outside their own organization (Gottschalk, 2002). By being able to work mobile, a knowledge worker frees up time to do more of what is hers or his job's core tasks.

Example 1: A consultant working on a rapport about a new solution for a customer runs into trouble when coming to the question of transferring old data to the new system. The consultant search the client history database, finds the one of the consultants who worked on the old system, and that is available in his office at this time, bring the laptop and knock on hers or his door. During this ad hoc meeting, the consultant has all hers or his

electronic resources available, and is able to write on the rapport while discussing with the other consultant.

Example 2: An advisor travels to a meeting with a potential new client. In the taxi, the advisor goes trough data about the client from the internet, and the last product paper from the advisor's company's new information handling system. He or she can also check the client history database for earlier encounters with this particular client, find out who had contact with the client, and perhaps call up this resource and ask about details. In the meeting, the advisor can make notes on his laptop or PDA and actually approve this with the client and send a report to the clients email before he leaves the meeting. If the client decides to go for the project of implementing the new information handling system, the advisor can search for available resources and book them online during the meeting. When the meeting is over, there is very little after-work required, and the advisor can go on to the next client or to participate in other projects or communities.

Mobile technology enables knowledge workers to merge work tasks that previously have been separated by time and place.

The reasons for reflecting on these topics are my question about new mobile technology as a factor imposing premises on the management of knowledge. So far, there are few variables indicating that new technology forces a change in how managers have to manage their employees, at least not as a direct reason. However, when the technology is there, there will always be marketing activities, early users, and the media giving us

glimpses of what is possible to do. And, of course, the accessibility and simplification mentioned above is also a strong factor regarding a user driven change. In the article about 24Seven Office, the newspaper published images of people working on the beach with online portable computers on their laps, but did not mention the systems and servers running in the background, or the organizational foundations that enabled the company to work in this setting. But the image of mobility or being flexible and dynamic, caused by this kind of technological prevalence, is a factor not to be overlooked.

Empirical findings

"The more virtual, the more important to meet in person"

Handy, 1995

The people and the firms

Informants recruited for this research on knowledge management and mobility, are basically managers from the information technology business in Oslo, Norway. My informants have been three general managers, one project manager, and one product manager (of virtual office software, Marratech). The response to my inquiry about being interviewed was quite high, and the interviews have been both informative and pleasant. The interviews were held at the companies' locations during august 2005.

The informants are presented with full name and background. The companies where they work are also presented with key information. Hopefully, this provides the readers with a better picture of the organizations and the managers interviewed. Names of the managers and company names are not mentioned directly, or referred to, in the text of the thesis.

Triangel AS

Triangel is a company working with both consulting and software development. Terje Åshamar is head of Triangel Software AS, and is responsible for 10 of Triangel's 18

employees. Triangel Software's' products are basically internet applications for controlling time and resources in different settings. Triangel Software's employees have, according to their manager, full access to all corporate applications and data from any internet access point. They are also fully flexible according to work time, as long as the job is done.

Terje Åshamar has an engineering degree in opto-electronics from The Norwegian University of Science and Technology (NTNU), 10 years experience with information technology, and has the last 6 years been working as a full time manager.

Blueprint AS

Blueprint is a small consulting company with five employees, run by general manager Svein Ola Egseth. The consultants are information technology experts, working with different clients. Blueprint does not execute any administrative control over the personnel themselves, but offers administrative services to the consultants, like accounting, billing and taxes.

Svein Ola is Master of Information Management, and has 15 years experience from the information technology business, mainly as a business and technology advisor.

Egroup ASA

Egroup is a significant actor in the information technology business in Norway. The company has 200 employees, where 170 are consultants. Egroup is the manufacturer of

eWay, an award winning ebusiness tool, for information- and knowledge management. Chief Development Officer (CDO) is Torbjørn Pedersen.

Torbjørn Pedersen has his formal background from Informatics at the University of Oslo, and has 20 years experience from the information technology business in Oslo. Former positions are CEO Egroup Eon AS, and CEO Cinet Consulting AS.

daVinci Consulting AS

daVinci provides business-, process-, and technology consulting services for Norwegian industry and the Norwegian public sector. It is an independent consulting company, and does not produce or resell any software to its clients. daVinci has about 60 employees (approximately 50 consultants).

Dorothy Olsen is Master of Science in Business Information Technology Systems, and work primarily as an advisor or a project manager, in purchase and implementation of information technology solutions for daVinci's clients.

Office line AS

Office line is an information technology corporation with 140 employees in Norway, Sweden, Denmark and Finland. Their main office is in Oslo. The company describes themselves to be an information technology entrepreneur, delivering all services in the information technology supply chain, ranging from hardware to consulting services. Office line is distributor of Marratech's software in Norway.

Erik Lie has a background in economics, and 14 years experience in the information technology and media businesses. He is today Product Manager for Marratech's virtual office software in the Norwegian market.

Comparison and discussion of theoretical and empirical data

Looking into Knowledge Management II

To place the interview object's companies into Alvesson and Kärreman's (2001) Knowledge Management categories without really studying the companies' processes and strategies, are not in my interest. I will however try to use this model in describing the interviewed leader's approach to how he or she manages knowledge in hers or his organization (The Product Manager from Office line is not managing human resources, and is therefore not included in this categorization).

First I want to point out that this is not an unambiguous classification of management style. All managers will probably, at least to some extent, operate in all the four categories from time to time. It is however of interest to look into which category, or categories, that sticks out. Another factor is that I have been interviewing managers basically with an information technology background, which will probably bias my findings in a technostructural direction.

Especially the managers with a high number of full time employees expressed a feeling of not having control of the workers as they gain more of a macro mobility. This mode of

mobility involves less time in the office, and less face to face time between employee and manager, and between employee and other employees. As managers, they underlined the importance to build trust between themselves and the employees. Another of the managers responded that this is not a problem for his way of managing, and the manager explained this with high levels of trust, and in knowing the employees personally. Over time, with a stable organization, it is reasonable to believe that this is measured against the employee's results, and with satisfactory results, the level of trust will rise.

The same arguments of trust as being a crucial part of a manager – employee relationship, came up in all interviews. When probing the topic, it appeared that several of these managers responded that when a trusting relationship was in place, and that they "knew" their employees, it was easier for them to accept that employees were more externally mobile.

I also found different viewpoints of how employees should spend time "at work". The project manager argued that as long as the employee did her or his work, it should perhaps not matter how much time was actually spent on work. And my impression is that this is a relatively widespread attitude in the consulting business. But from managers in research and development departments in a firm, this was not accepted in the same way. The argument here was that a person is employed for working eight hours a day, and everything less than that is seen as not utilizing the resource's full capacity, and that it would not be good for the moral amongst the other workers. However, this statement indicates a possible conflict, and is perhaps a little contradictory, to the phenomenon

“going mobile”. Managers want to be in control of their employees, and these feelings are perhaps the same feelings as in loosing control when an employee becomes more mobile, or at least moving towards macro mobility. In the consulting business are the performance indicators to a larger degree economic variables, and as long as a consultant meets the periods goals, the manager is satisfied. The factor numbers-of-hours-worked is not so important.

Face to face time

Some of my informants have talked about less face to face time with their employees, as a result of employees working mobile. This can have several implications. First it is important to be aware of the fact that managers use much of the time face to face with their employees to keep control of more than the mere technical status of work progression. Face to face communication includes of course formal meetings, but also the informal meetings; a talk in the hallway, at the coffee machine and for lunch. These conversations are, in addition to administrative issues, also about social issues and happenings, the employee's motivations and goals, plans and thoughts for the future, and corporate life in general. These aspects come in addition to formal discussions like delegating tasks, following up on projects, measuring progress, technical meetings, and other administrative issues. I refer later to these two different communication contents as administrative and personal conversations. The decrease in face to face time is experienced as somewhat problematic for the manager, in "loosing control of the employees", as one said. "You don’t know what the employee does, or the motivations, for working at home one day". If you look to the Knowledge Management categorization

from Alvesson and Kärreman (2001), this would appear as a decrease in ”normative control” over employees, and perhaps an increase in what they refer to as a more “community” based management climate. And this shift, it appears, is employee driven, not management strategy driven.

From the management side, and in particular in the development environments, it is perhaps the manager that is the one becoming more externally mobile. This position often includes external meetings with clients and potential clients, and to a certain degree conferences. Activities like this is not in any way new for a CDO interviewed, or in any way triggered from new mobile technology, but new communication solutions allow this CDO to communicate with employees and involve in ongoing projects and issues also when away from the office. Even if the time face to face with his employees might decrease as a consequence of mobility, the total sum of manager – employee communication is the same or higher. In this way it can be argued that mobile technology increase efficiency in management, and thereby allow a manager to, for instance, attend to more external meetings and conferences.

In managing mobile resources the choice of what to prioritize in different communication channels is of importance. Several of my informants mention the loss of face to face time with their employees as a challenge. On questions about what kind of communication that "works out" in the electronic medium, it is mostly administrative communication, or what I refer to as *hard communication*: delegating, reporting, follow-up on projects and so forth. The solution of putting a higher priority to the informal communication in the face

to face time available would be a logical choice. Informal communication is what I sometimes refer to as *soft communication*, and is close to the form of communication described in Von Krogh, Ichijo and Nonaka's (2000) caring dimension, and as relation-building communication. A focus on this kind of communication in the face to face time, could also be a way of enhancing the bonds that would normally diminish when communication goes from face to face to electronic, which is a less rich format (Grenness, 1999). From a strategic perspective, this could have an effect on the balance between survival and advancement strategies discussed in the chapter "Two-focus strategy".

What I suggest here are some new priorities in the communication content of managers managing mobile workers. The percentage vise distribution of hard versus soft communication should not stay unaltered if there is a decrease in face to face time between manager and employee. A reduction of face to face time should result in a higher percentage of soft communication distributed through this channel, and a transfer of hard communication to electronic channels.

A shift in modes of managerial intervention

The companies I have looked into are relatively different. It would of course have been better to talk to more managers from a bigger selection of companies, and from that maybe have been able to categorize different styles among the managers based on the research. Now, however, I focus on trying to link these four companies into the model from Alvesson and Kärreman (2001).

As I have mentioned earlier, a manager or a company does not belong in one category, and one category alone. I find elements from all categories in the management I have looked into. In the ***technostructural dimension***, it is my impression that all of my interview objects more or less practice the extended library type of knowledge management. The choice of information system is of course a strategic choice from the management, or the corporate IT department. According to several of the managers interviewed, there has been a significant development in information management tools and communication tools that now enables employees to turn information, internal and external, into actionable knowledge (DiMattia and Oder, in Alvesson and Kärreman, 2001). There are defined roles (or in one case, defined a project to put this into place) that manages these systems, and the information and knowledge in the system. It also appears that the companies working with research and development probably have a higher level of coordination in the managerial intervention mode, and thus is closer to "information exchange" compared with the consultant companies. This is a little surprising, but can be explained from the size of one of the companies, and the operational practices in the other. The smaller company has not invested in large comprehensive systems for information management, but do have close to the same possibilities, due to the better overview of the colleagues and their projects, and that they then can use lighter versions of collaboration software. The bigger company has a relative individualistic philosophy for organizing their consultants, but they are now working on a new knowledge-repository information system. Apparently, it is in the companies where the manager is

the one becoming more mobile, that I seem to find those information systems that are best integrated with the day to day operations.

Another factor that is important here is the increase in the use of communication possibilities in mobile technology. In the case of managers and employees becoming more mobile or using mobile technology, communication is a significant part, and this is also a factor driving “information exchange” more than “templates for action”. For electronic channels, one of the managers described the communication as “the messages are becoming shorter and shorter”. The same manager also stated that electronic channels increase the frequency of messages, and that this kind of channel is a well suited medium both for short and fast administrative communication, and also for the transferring of codified knowledge, and especially in real-time when working on specific cases.

New electronic channels are to a large degree new possibilities for communication. Instant messaging, SMS, electronic forums, email (accessible from mobile devices), video conferences, and virtual office applications are channels that when available provide a broader platform for discussing and sharing information and knowledge. But if employees actually spend more time communicating, amongst themselves or between employees and their manager, is not quantitatively explored in this research. This has also been a question that the managers interviewed not have been able to answer, even if some answers that the communication in electronic channels has been increasing. Based on these results, I cannot draw conclusions in the direction of more and easier accessible communication channels improve, or even increase communication in an organization.

But, based on discussions with managers, it is a tendency that a larger part of communication between a manager and hers or his employees now can be conducted electronically, and that this allows the organization members a higher degree of mobility. This mobility can in some cases cause less face to face time between employee and manager (and between employees), and is a factor for decreased direct control of employees from a managers perspective. When we look to Alvesson and Kärreman's (2001) typology for Knowledge Management, I interpret these organizational conditions as a tendency towards a shift from ***normative control*** to a higher level of ***community*** along the social dimension of "medium of interaction".

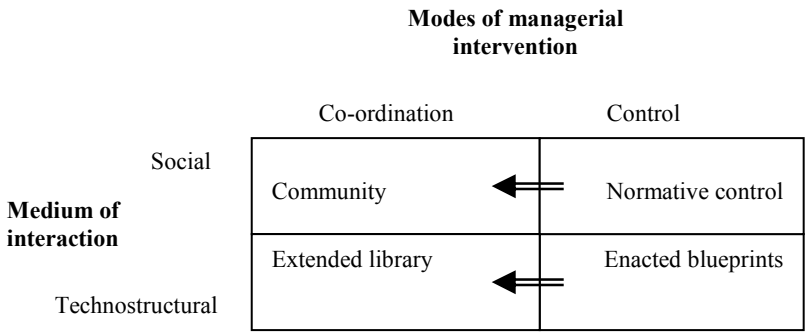

Figure 5: A shift in Knowledge Management approach as a result of increasing mobility in a work force.

What I am indicating here is a mere shift in modes of managerial intervention. Managers can still exercise control over their employees, also in mobile environments, but my general impression from the interviews are that knowledge workers have a high level of freedom in how they perform their jobs. It is further worth noticing that this shift in level of control is basically happening in face to face communication. In electronic channels,

the communication is more often of an administrative (hard) nature, and thereby more controlling. If the result of such a shift is that more of the face to face communication now turns to a more personal (soft) form of communication with a more community-based managerial intervention, this might lead to a better foundation for knowledge creating activities in organizations.

Trust

It is said that people build trust faster in face to face situations than in distributed virtual situations (Loughran 2000), and this is basically because people build trust by identifying with each other. A group can only function if its members are able to depend on each other (Smith and Berg, 1987, in Von Krogh, Ichijo and Nonaka 2000). A distributed virtual team is normally not as homogenous as a physical in-house team put together of colleagues, and thus the chances for cultural differences are correspondingly higher. But if it is so that cultural differences are an obstacle for building trust, we could perhaps think of virtual teams to have an advantage to face to face teams by not displaying the differences in such a vivid way. Even if a video conference is a relatively rich format, it is not as rich as face to face communication.

Almost all informants mentioned individual differences, and states that some people just are easier to manage than others. This is not something that is valid only for mobile resources, and it is referred to more as a general trait for an individual. Communication between to people who know each other are never referred to as a challenge in managing a mobile resource, but also here is a limiting factor in the kind of communication that the

manager whishes to conduct electronically. Issues with a potential to evolve into a conflict, or issues with a high level of risk or implications (for instance negotiations about wages), or straight forward disagreements, appears to be issues that have to wait for face to face communication, even if the participants know each other quite well and have a high level of trust.

Creating knowledge in a mobile environment

As Nonaka and Takeuchi (1995) point out in "The Knowledge-Creating Company", that knowledge management is not really about managing the knowledge, as much as it is about preparing a foundation for the creation of knowledge. And this is a widely accepted notion in the knowledge management literature (Alvesson, 2001; Nonaka, 1991; Sveiby, 2001; Von Krogh, 2000).

Again, I will point out that drawing unambiguous conclusions from as wide an issue as knowledge management is, is not my intentions. However, I will point to interesting connections that are likely to have an impact on certain areas within the field. The modes of managerial intervention in Alvesson and Kärreman's Knowledge Management typology, is interesting in the perspective of knowledge creation. In my interpretation, much of Von Krogh, Ichijo and Nonaka's foundations for creating knowledge is based on what I so far have referred to as personal or soft communication, and perhaps also to physical presence. If a larger part of the administrative communication is transferred to electronic channels, and as a result of this, a larger part of face to face time is used for soft communication, this last part is to a higher extent coinciding with Von Krogh, Ichijo

and Nonaka's theories for knowledge creation. In this respect, an increase in mobility in a workforce *could* support or substantiate an organization's ability for knowledge creation. This requires of course that the management strategy and the implementation of this strategy are arranged with this theory in mind.

If we look back to the two-focus strategy, Von Krogh, Ichijo and Nonaka (2000) claims that managers have a tendency to prioritize the survival strategy to the advancement strategy. The issue has been discussed in my interviews, but so far I can not find any direct evidence in my material, or even indications, that mobility or mobile technology can alter this balance. If more of the face to face time is freed from administrative issues, it could perhaps promote organizational creativity, and thereby also build a broader foundation for the reflections about advancement strategies, but this is merely speculations. These speculations are based on the idea that a shift in the mode of managerial intervention, from a mode of control to a mode of coordinating, theoretically could adjust this bias towards the advancement strategy by being a stronger enabling context for knowledge creation. Especially the initial steps in the knowledge creation are based on rich channels for interaction: Sharing Tacit Knowledge, Creating Concepts and Justifying Concepts (Von Krogh, Ichijo and Nonaka, 2000).

Enable the enablers

A manager trying to identify and gather participants for the process of developing a knowledge vision has to participate in all arenas where the employees interact. According to Von Krogh, Ichijo and Nonaka (2000), participants should be recruited from various

microcommunities, departments, and organizational levels. If there are active electronic platforms for communication and social interactions, these need to be understood in order to learn the roles in these communities. If a strategically important area of the business is relatively highly represented in electronic channels, it is important that these electronic communities are looked upon and handled as any other, and perhaps more physically represented community. In an organization it is possible to imagine resources being more active in a virtual arena than in face to face situations. These resources should be represented in a group instilling a knowledge vision, and if these resources are more comfortable communicating their beliefs and justifications in virtual arenas, this is perhaps where the conversations should be held. Some of the most successful software business ideas the last decade are concepts that have evolved primarily in virtual arenas, such as the development of the solutions behind Amazon, Yahoo, Google, or eBay.

Managing conversations for enabling knowledge creation is an activity as important in electronic channels as it is face to face. In a mobile workforce with a relatively higher presence in these channels, a manager wanting to manage conversations needs to be present in the same channels. This might sound obvious, but it is my impression that the employees in most cases are still ahead, which is also what Simpson Carpenter says in their research "The State of Workforce Mobility". The use of mobile technology is still employee driven (Simpson Carpenter, 2005). However, how a manager should manage conversations is also a question of efficiency. Von Krogh, Ichijo and Nonaka (2000) refer to a CEO stating that codified knowledge stored in computers are efficient only in 20 percent of the time, and gives the example of how to understand the operating

instructions of your new video recorder. “You can read the manual for an hour, or talk to someone with this knowledge for five minutes to find out how it works” (Von Krogh, Ichijo and Nonaka 2000: 131). It should definitely be a managerial issue, in putting down a framework for conversations in an organization. Sometimes it can be a little too easy to coordinate a meeting with 10 SMSs instead of a one minute telephone conversation. Efficiency in communicating with colleagues can be better in the latest mobile technology systems, where a rapid increase in bandwidth opens up for richer electronic channels for communication, for instance video conferences and virtual office applications. Making sure that conversations in the organization are efficient, is a growing challenge as the pressure on efficiency per employee also is growing. Ira M. Weinstein (Weinstein, 2005) in Wainhouse Research claims that the pressure on employer and employees has never been stronger, and explains this with the following factors:

- Pressure to increase sales and profits has forced organizations to do more with fewer resources
- Global competition has changed the competitive landscape for many firms, forcing price reductions and service enhancements
- An ever-expanding marketplace has increased the footprint of many organizations, creating a “follow-the-sun” work environment
- Global deployment of resources has resulted in geographically dispersed work teams operating in different time zones
- Ever-increasing employee-benefit costs means workers must provide greater value to their organizations every year
- Fear of corporate downsizing, mass layoffs, or outsourcing of work to other countries or external resources has affected the tenor and spirit of the workplace

This emphasizes the need for developing more efficient communication and information processing methods and tools.

When we look to the research from Simpson Carpenter (2005), we see that the penetration of mobile solutions are high, and if we hold this up against the seemingly technological path towards better conditions for rich media collaboration systems, especially through mobile solutions, there is a significant potential in enhancing the efficiency per employee, but also a correspondingly high potential for reducing efficiency if corporations fail to manage their conversations by using the wrong medium for the wrong conversations, as in the example of the video-recorder above. With the right focus on managing conversations, and knowledge about when to use codified knowledge from a database and when to use a more direct and personal transfer of tacit knowledge, this potential can be utilized to improve efficiency in an organization's conversations.

It appears that socially conveyed rules and norms are not very different in a mobile environment than in a static, physically present environment. When referring to knowledge activists, some of the informants instantly knew what I meant without further explanation. There are in most cases one, or perhaps a few, members of the different microcommunities that are considered to be driving the activities, and especially the knowledge activities. In some situations, and in some knowledge fields, the manager reported that driving the knowledge activities was hers or his responsibility. The mobilizing of knowledge activists was however not a strategic issue, but referred to as something that just happened or initiated on its own. Some employees were for some

reason more inclined or disposed for taking or ending up in this role. For this reason it has been hard to try to reflect around specific differences in the mobilizing of knowledge activists in mobile versus less mobile environments. But, where these roles are described from the managers point of view, it seems that the three roles of the catalyst, coordinator and merchant of foresight often are taken of a senior employee with a relative broad internal and external network, which is in accordance with Von Krogh, Ichijo and Nonaka's (2000) theories in the respect of being able to inhabit an overview of the company's competence and collective experiences, and to be able to connect the company's different microcommunities. From a mobility perspective, the knowledge activist has access to a relatively rich medium for communication and collaboration in a larger specter of communication and interaction arenas than a less mobile community has. If routines and conversations are managed toward an efficiency-optimized level, this can provide the knowledge activist a broader and easier accessible knowledge space, or ba, to operate within. This is, of course, only as a broadening of one or a few of the dimensions of ba.

Mobile workers may have less physical face to face time with their manager and colleagues, but in the companies I have visited this does not seem to have a negative effect on the creation of knowledge. They are all quite successful, and some are working with product development and client software development every day. The right enabling context is apparently present, and according to one manager, the instant availability of resources and the extended possibilities of discussing and working with specific tasks is a significant improvement of the working space area. The same manager underlines the

importance of building information technology systems that helps workers, both managers and employees, to minimize administrative tasks. The functionality of such systems are basically striving to cut down on time to coordinate and plan activities, to build meta-information about the information in the company's information databases, and to visualize connections between related information, competence, tasks and roles. This provides a greater transparency in the organization and how the organization works, and it thereby enhances the organization members' abilities to navigate within it. In a mobile context these abilities are even further extended by providing access to this information, and making the worker able to process and collaborate also when he or she is away from office. A virtual office application with possibilities for video conference is probably not as good as meeting up for solving a problem in a product development group, but it can be a better solution than postponing the meeting because some of the key competence is at a conference abroad. Learning to use these new arenas for gathering information, processing information, collaborating with colleagues, and for communication in general, is a process evolving over time. It becomes a natural place to interact and it works as a shared place for the organization's members in terms of being a part of the organization's ba (Von Krogh, Ichijo and Nonaka, 2000).

The informants in this research are basically from small and medium sized companies. The largest is Egroup with about 200 employees. Von Krogh, Ichijo and Nonaka (2000) discuss the globalization of Local knowledge as the last of their enabler, and claims that midsized and large firms continuous globalizing their operations, and that they are no long contained within national borders (Von Krogh, Ichijo and Nonaka, 2000: 207). The

informants interviewed, reports that their company basically operates locally, and that the challenge is to spread knowledge internally, and to cross-level existing knowledge in the organization. By using information technology systems it is possible to store codified knowledge for a later retrieval and reuse of the information. The challenge for these kinds of systems is, as one manager so strikingly put it: “crap in is crap out”. First of all, the time and effort necessary for codifying relevant knowledge takes time. Time is as scarce resource in business, and it is apparently not common to include knowledge codification, even if it is for the benefit of the organization, into an incentive system. Second, a dedicated role for maintaining the organization’s knowledge repository was not, or at least not yet, implemented at my informant’s organizations. An only one had immediate plans for such a role. An increase in mobility in a workforce does not necessarily improve the codifying process in an organization. But what is certain is that the time-span for access to such a knowledge base increases when opening up for access from mobile devices, which should at least not be a drawback for the diffusion of knowledge in an organization. Only one of the companies in this research has a system as described above, and the information is fully accessible from mobile devices. According to the manager this system has improved efficiency both in terms of providing employees an overview of relevant information and available competence, but also enabled more inexperienced employees to be able to work more independently.

The mobile technology’s asset is that it can support and make stronger the individuals’ abilities to perform, both individual, in microcommunities and in larger social settings. Human beings have always used, reused, and created new knowledge. New mobile

technology can in this perspective be seen as an enabler for Von Krogh, Ichijo and Nonaka's (2000) knowledge enablers. If these tools allow workers to improve efficiency in administrative tasks, it has a potential to free up time for physical meetings where the focus for instance can be on creative topics or discussions around an advancement strategy. Mobile technology is a tool for amplifying individual's availability and presence in a microcommunity, and in the same manner amplifying the availability and presence of a community and the working space for the individual. And in amplifying is also the possibility of amplifying negative signals and unwanted presence in a microcommunity or in an individual's personal space. Silence, can for instance be a very strong negative signal, if active participation is expected, and in this manner, having adopted mobile technology could be a threat to knowledge creating activities in a firm if used in the wrong ways or just neglected.

Knowledge and new technology

One of the persons interviewed described an organization with individualists. Consultants in this firm were primarily working on their own, and the sharing of knowledge was limited to some social (but not obligatory) events, or alternatively, to random meetings or situations. This kind of mobility is not contributing much to the creation of new knowledge. However, this company is running a project where they aim to codify relevant information from the consultant's project work into a searchable information database, which again is made available for the rest of the consultants. A normal procedure in a project like this would be to produce a database interface for the consultants, and let them codify project related knowledge and information as the projects

(or milestones) are completed. The challenge, in many cases, is that this is experienced as an increase in workload for the individual consultant, and the work is not always understood to be of much use for oneself. Thus, it can be hard to motivate the employee for this kind of work. In this specific project, the company considered to define a dedicated position or role, which actually interviewed the employees and codified the knowledge for posting to the searchable database. This codified knowledge would in the end be accessible for consultants in various projects, in-house or on the move. The consultants who master the use of mobile technology can access this information from everywhere, and those who do not must log on to a terminal at the office. This exemplifies how management or a manager can make use of technology, and especially mobile technology, in order to improve efficiency in the reuse of knowledge. By introducing mobile technology into an organization, and motivate and teach the employees to use these new tools, management can improve efficiency in terms of easier, faster, and "just-when-needed" access to both resources and corporate knowledge.

It also seems to me that people with a technological background are more open to, and used to, communicate through electronic channels. From some of my informants, I hear that their employees in periods have en extensive use of electronic channels in communicating with both the manager, with colleagues, and with clients. There are probably several explanations for this, but it is not unreasonable to believe that working with this technology on a daily basis is an extremely strong factor in the adoption process. These new arenas of searching, finding, processing and collaborating are solutions these resources use every day, and it is in fact an important part of their job to

look for ways these solutions can improve efficiency in their client's organizations. If we look to special environments as for instance hacker-communities, they share, learn, and organize knowledge purely on electronic arenas, and in some cases, never meeting up in real life.

Technological Adoption

In some corporations there exists a culture for creating knowledge. Von Krogh, Ichijo and Nonaka (2000) mentions Gemini Consulting as an example of an organization that refines project information and makes this available for future projects. The employees in the organization know about the system and know how to use it. It becomes a process that the employees are familiar with, both in giving codified knowledge into the system, and to retrieve and reuse information and knowledge in similar cases and situations at a later time. In the case of Gemini Consulting, the company's information technology- and communication systems are referred to as an electronic knowledge space, or a cyber ba, for the firm (Von Krogh, Ichijo and Nonaka, 2000: 246).

Some of my interview objects tell me that a similar techno-cultural change is arising in the general use of mobile technology as well. As people get more used to communicating through electronic channels and using mobile devices for processing information, the threshold of establishing common ground (Nonaka, 1991) in the use of technological solutions is lowering. A gap between generations was mentioned, but more as something they could see in their client's organizations, and not in their own. This difference between technology-consultant and client can, as I have mentioned earlier, be explained

by the fact that technologists are more up to date and more conversant with technological solutions and devices than people with non-technological backgrounds. This does, on the other hand, indicate that the culture of using new technologies and new forms of communication is evolving in the society, and that people will have a higher tendency of working through electronic channels in the future (Roush, 2005; Simpson Carpenter, 2005). But, as we can see in the case of Gemini Consulting, this is also something that an organization can learn (Von Krogh, Ichijo and Nonaka, 2000). It is than a matter of using specific applications and routines, and not just using mobile technology in general, even if this for some systems will be an implicit condition.

Conclusions

Managing mobile knowledge

Mobile knowledge workers are challenging established theories of knowledge management in the way that these theories grow even more important. The growth of information technology systems drove a shift in management from a control based intervention mode to a more coordinative intervention mode. The increase in mobility in the workforce is now driving this even further, and enhancing the effect this already has to managing knowledge. The information systems themselves are a part of driving the technostructural dimension from control mode to coordinative mode, by systems evolving from enacted blueprints to extended libraries. The concept of extended libraries is a new way of organizing information- and support systems, and these systems also include the "blueprints" in previous systems. In this respect, we could say that the technological development is a factor and a determinant for the management of knowledge, but on the other hand, the systems are both developed and used by humans. Information technology systems are built upon specifications developed by organizations or corporations, and it is in this perspective a social construction and an individual construction by system architects.

The challenge in managing mobile knowledge is especially evident in a couple of areas discussed in the thesis. A decrease in face to face time with employees has to be compensated through other channels of communication. This has implications for the balance between hard and soft communication between manager and employees. How

this balance is distributed in the first place is normally an individual matter based on what the manager find appropriate, or what is necessary to get the job done. If this situation is seen as a fixed starting point, and the employees increase their macro mobility, the manager has to consider a shift in how the communication with hers or his employees is distributed. The practical implications in this shift are that a larger share of the soft communication is prioritized in the face to face time available with the employees.

Individual differences are another important issue in a mobile workforce. Most of the informants agreed on the fact that some people handle the flexibility provided by mobility better than others. It is important to be aware of the fact that this is not a consequence or a trait of the mobile technology per se, but more an effect of the social dimension of mobility. With a higher level of mobility, follow in most cases a higher level of independency in terms of not being controlled or managed. And a manager may not always benefit from an increase in employee productivity from such conditions. Statements from the interviews indicate that this is more a case of personal traits, and that this would probably also be a determining factor of productivity in a different non-mobile, and low-control-level environment.

All managers reported further a need for knowing the persons they managed. If this criterion was present, management through electronic channels was an option. Getting to know a resource from scratch would include spending time face to face. The exception from this was the manager working partly through a rich media collaboration (RMC) tool, who reported a relative low threshold of getting to know a person from scratch

through an electronic channel, though not as low as in a face to face situation. Managers do not find the electronic channels email, SMS, instant messaging, and in most cases also the phone, good, or rich enough, channels for getting to know new resources. Only one of the informants knew rich media collaboration systems, and this manager reported that this communication channel feels rich enough to actually getting to know people through an electronic channel, people that this manager never had met in person. I will not draw conclusions based on only one informant, but as this technology is relatively new, and also rapidly growing, it could be an indication of the fact that this form of communication could spread in companies with a drive towards a higher level of mobility. And when looking towards the path of technological development, mobile technology is today very close to support the functionality needed to run these systems in a mobile setting. Mobile technology could in this sense be an enhancing factor for the diffusion of management in electronic channels, and further in mobile environments.

One of the more general conclusions in this research is the effect of several of these factors. Given the fact that a manager does adjust the balance of communication towards a higher level of soft communication in face to face situations (typically in office), this could mean a significant improvement in building trust, motivate, transferring identity and visions, and building teams and microcommunities amongst the employees. In addition, the employees benefit from the increasing efficiency in using rich media collaboration systems, and the possibilities of gathering information, processing information, and distributing information even when working mobile. In this case,

management will appear more as a coordinating factor to the employees, and a firm's physical locations could be perceived more as a social institution.

Premises of technology

In the question if mobile technology is laying down premises for knowledge management, there are indications both ways. As I have just mentioned, new mobile technology allows employees (and managers) to work in a slightly different way. Rich media collaboration has not been a possibility until about now, neither infrastructure, end-user devices, nor the software has been available on the market (or technologically). Or at lest not all of them together. On the other hand are the informants surprisingly consistent in their opinion about the technology's impact on their management of their employees: The choice of technological solution is not important. But still, I interpret this as referring to a solution that fulfill the firm's, or the management's demands, and that this is not about technology as a changing factor in strategy, but more as a static glimpse of the technological status of the company. Not many companies or managers would claim that not installing telephone lines or email would not matter for the efficiency in the organization. But which company delivers the service, on the other hand, is not important as long as it satisfies the user's needs.

Working mobile leads to a number of changes in working behavior, and it is the sum of these changes that sometimes have implications big enough to actually have an impact of how knowledge are handled and created in an organization. From a micro perspective it is tempting to say that the technology enables these changes, and that the organizational

actor itself does not have the power or the occasion of influencing the developmental path of the technology. In this respect one could argue that the technology is the cause of the changes in the working behavior, and thereby is deterministic in its nature. On the other hand, it can of course be argued that it is social factors that guides or determines the choice of action and direction in the technology sector, and thus indicate that the mobile technology is more a result of social factors, and thereby is socially constructed. In my opinion, none of these arguments are exactly right. Or, perhaps, that both has some correctness, but does not tell the whole truth. Yes, the corporations of mobile technology do of course have to choose the strategy based on their beliefs about the market and the consumers experienced needs, but these choices are again bound both by the technological constraints of the selected, available, and compatible technology.

When a certain standard are established in a technological branch, it has gained a momentum that makes it harder for other alternative standards, and thereby also solutions that depends on the alternative standard, to compete on the market. Such technological lock-ins are a major challenge to technological innovation, and it is not only what the marked wants that actually determines the technological solutions we see. In the perspective of mobile technology, there are for the technological dimension several constraints regulating what is possible to achieve, but on the other hand it seems that it is the society that is craving for these devices of possibilities. Mobile technology are laying down premises for managers of knowledge, but whether it is the technology it self, or if it is the society embracing the technology, is harder to tell.

Creating Knowledge

There are no indications that mobile knowledge workers are less creative and knowledge producing than workers not working mobile (or to a lesser degree working mobile). It is rather the contrary if certain conditions are present. This research does not include any quantitative measuring of creativity or productivity, but some of the informants had the impression that when the organization adopted mobility and experience in the use of mobile technology, the efficiency in the organization increased. The preconditions here are of course that the number of users in the specific segment exceeds a lower threshold value, and that the infrastructure for mobility is present.

In the creation of knowledge Von Krogh, Ichijo and Nonaka (2000) primarily point towards what I refer to as soft communication in creating knowledge. It is about nurturing an organization and about providing an enabling context for the individuals and the microcommunities of the organization. These are to a large extent social preconditions, and in both mobile environments and in electronic channels, this requires an active presence from management. In practical terms this means that a manager experiencing a shift towards a more mobile workforce first of all has to change some of the traditional command channels, and second, to improve efficiency in order to ensure a competitive advantage by redistribute the balance of soft and hard communications in face to face communication versus electronic channels. A manager cannot manage a mobile workforce without being confident with the channels mobile technology provides for mobile workers. It is not necessarily so that a manager also has to be a mobile worker, but in order to manage employees with less face to face time, it is necessary to be present in

channels that can compensate for this loss. The face to face time should to a larger extent be reserved for softer communication, and thereby create a context better serving knowledge creation.

In some of the organizations in this research it seems that electronic channels are a significant media in communication and collaboration. Still, most of an organization's information and codification work is performed within the walls of the office. Mobility in these companies' workforce are present, but not typical – at least not for the majority of the workers.

Mobility appears to be an underlying function of the social interaction in a working situation. It is not a knowledge enabler in itself, but it seems to have a strong asset in its ability to enhance people's means of interacting. It is a tool for amplifying an individual's availability and presence in a microcommunity, and in the same manner amplifying the availability and presence of a community and the ba for the individual. In this respect I see mobile technology as an enabler for Von Krogh, Ichijo and Nonaka's (2000) knowledge enablers.

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