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# Managing Organisational Change and Technology

The Case of Introducing Electronic Patient Records in Hospitals

Thesis for the degree of philosophiae doctor

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Norwegian University of  
Science and Technology  
Faculty of Social Sciences and Technology Management  
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## **Preface**

This PhD project was carried out as a part of the research program “Effective Introduction of Information and Communication Technologies in Hospitals” at the Department of Industrial Economics and Technology Management (IOT) in the Norwegian University of Science and Technology (NTNU). The PhD project and the research program were funded by St. Olavs Hospital, the Hospital Development Project of Central Norway and the Central Norway Regional Health Authority. In addition, IOT funded an additional year for my PhD project with teaching, tutoring and administrative work at the Department. The visit to the London School of Economics was funded by the International Section at the NTNU and the Norwegian Electronic Health Record Research Centre (NSEP).

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## Summary

Projects to develop and introduce information and communication technologies (ICT) are one particular instance of organisational change enterprise that are increasingly important for organisations to initiate and carry out. This thesis builds on lines of development within research on organisational change in general and in relation to technology in particular that acknowledge the complexity and unpredictability of these processes. The research aims are to study how organisational change in relation to ICT can be understood and managed.

To do this, I develop a theoretical perspective using, in particular, symbolic interaction and complexity theories where organisational change is understood from a process perspective of organisations. Here, patterns emerge unpredictably from interaction embedded within a micro- and macro-level environment. ICT enables organisations to change cooperative work practices, because the technology mediates cooperation and interaction between actors both in and across time and space in the organisation. However, ICT needs to be integrated into a cooperative work practice in a process of users making sense of the technology in their local situation in relation to their work practice and the context of which the technology is introduced. Managing change within this perspective is about managers making sense of the patterns they and others participate in, and how they act in relation to the constructed meanings.

With this theoretical perspective the research aims are developed into three research questions which guided the empirical studies:

1. How can technology in use be described at the micro-level where actors need to cooperate both in and across time and space?
2. How is technology in use at the micro-level connected to the phenomenon of organisational change?
3. What is the role of managing organisational change when ICT needs to be integrated in the micro-level work practice of interacting individuals?

The methodological position is interpretive and contextual. This means understanding reality through the meanings which actors construct in the unfolding interaction. Furthermore, it means studying this sensemaking and interaction within contexts as a part of an unfolding process. Following this position, the research strategy was to use case studies in order to gain

a rich picture of the studied phenomena, using techniques of interviews, observation and various documents as sources of data. The empirical studies were carried out within the context of the introduction of electronic patient records (EPR) in hospitals in Norway, which is one example of employing ICT in organisations.

In the study addressing the first research question (Paper I) I found that nurses accomplished the routine of nursing handovers in a process where they continuously were taking other actors into account, either face-to-face or mediated by patient records. Therefore, the in-depth understanding of this interpretive process made it possible to consider whether patient records could support practice or if the technology would fail to do so. Specifically, the findings indicated that patient records needed to continue to be complemented by face-to-face interaction.

In the study addressing the second research question (Paper II) I demonstrated how actors modified the ways in which they were taking each other into account in nursing handovers following the introduction of ‘nearly silent’ handovers, where less time was spent face-to-face and more emphasis were put on patient records in the routine. Furthermore, it was shown how changes in practice emerged as patterns, with the tendency of nurses sometimes failing to complement use of patient records with sufficient face-to-face customisation. This was necessary because even if the nurses put more emphasis into documentation as a mediator of interaction, patient records had certain limitations in terms of enabling nurses to take into account the particular needs of the next nurse.

In the study addressing the third research question (Paper III) I showed how change as a process resulted from both planned intentions and emerging aspects. This was possible through studying patterns of how actors at different levels in the organisation made sense of the project goal of becoming paperless in the project of introducing electronic nurse care plans, and how these were embedded in a micro- and macro-level environment. In the project, the project goal ended up being interpreted as an empty slogan, but still imperative to fulfil in practice independent of what this meant in terms of actual benefits.

In this thesis, I address interpretative processes of interaction embedded in a multi-level context where change emerges unpredictably in the shape of patterns. This challenges some of the core premises of how the role of managing change is traditionally understood, and

therefore needs to be reframed appropriately. Managing change should focus on making sense of patterns of interaction and the factors that influence the interaction from which these patterns emerge. This implies being more reflective about how actors are acting in relation to each other, and being more attentive to the actual influence when participating in the interaction. In this way, the role of managing change is both balanced and empowered.

## List of Papers

Engesmo, J. and Tjora, A. Hn. (2006) *"Documenting for whom? A symbolic interactionist analysis of technologically induced changes of nursing handovers"*. *New Technology, Work and Employment* 21:2.

Engesmo, J. *"Nursing handovers as a heedful process supporting patient care reliability: the case of 'nearly silent handovers'"*. Under revision.

Engesmo, J. and Mitleton-Kelly, E. *"The Coevolution of Project Goal Meanings: Becoming Paperless through the Introduction of Electronic Nurse Care Plans"*. Submitted.

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# 1 Introduction

In our society today, the capacity of organisations to change is seen as increasingly important. Companies compete in a marketplace where customers have more diverse and shifting interests and demands, and where there is a more compound competition of local and global actors with strategies that continuously shift and intersect. In addition, technological innovations, and the rapid advance of information and communication technologies (ICT) in particular, have been a catalyst in this development, mediating changes in the conditions of the environment in which the organisations are embedded. It is clear that the dynamics of the environment are increasingly complex and shifting. Unpredictability is recognised as being an inevitable part of this picture. Within this context organisations undertake projects of organisational change in order to respond to and shape their competitive environment. The success of these endeavours is of great concern to managers.

This thesis is about organisational change in relation to the introduction of ICT, and the management of such projects. Investments in ICT have shown ambiguous relationship to productivity, referred to as the “productivity paradox” (Brynjolfsson 1993). One problem with this paradox is that measures of productivity is too limited to cover the potential benefits of investing in ICT as these can include intangible benefits, for example in relation to quality, and innovations that not necessarily show on productivity measures (Brynjolfsson and Hitt 1998). However, the degree of success to which organisations are able to change has been suggested as a possible resolution to the paradox (Brynjolfsson and Hitt 1998, Stratopoulos and Dehning 2000). The critical question for managers is then no longer whether ICT pay off, but how ICT can be best used. In other words, exploiting the potential of how ICT enable organisations to organise their work in new and improved ways. Accordingly, it has become important for organisations to initiate and manage ICT projects, which involve managing organisational change. By studying organisational change in relation to the introduction of ICT and the management of such projects, this thesis will contribute producing knowledge that inform managers to spend resources on ICT that result in appropriate benefits. These benefits are not limited to quantitative measures, but also include qualitative results.

From research on organisational change in general and organisational change in relation to technology in particular, there are certain shared lines of development of which this thesis builds. At the core of this thinking is acknowledging the complexity of the processes of

organisational change (Burke 2002, Maguire and McKelvey 1999, Shaw 2002, Tsoukas and Chia 2002, Van de Ven and Poole 2005) and how technologies are integrated into organisational practice (Barley 1986, Berg 1999, Heath and Luff 2000, Orlikowski 1996, 2000, Suchman 1987). Within both fields, this involves striving to obtain an in-depth understanding of how these processes actually unfold. Unpredictability is here an inherent part. Further, when acknowledging complexity and unpredictability the role of managing change needs to be considered (Caldwell 2005). This is because such a perspective challenges more traditional notions of managing change where management plan and control change (Weick and Quinn 1999). This thesis has two research aims. First, to study organisational change in relation to ICT when employing a perspective that acknowledges the complexity and unpredictability of the processes that constitute organisational change in relation to ICT. Second, within this perspective, to consider the role of managing organisational change in the carrying out of ICT projects.

To do this, I develop a theoretical perspective building on the lines of development presented above. The theoretical perspective follows in the next chapter (2). Then, I present the research questions when developing the research aims of the thesis using the adopted theoretical perspective to research questions that enable me to carry out the empirical studies (3). The empirical studies were carried out within the context of the introduction of electronic patient records (EPR) in hospitals in Norway, which is one example of employing ICT in organisations. My focus was on nurses and the use of EPR in nursing practice. This group was in the midst of an ongoing introduction of EPR replacing their paper-based practice with the use of computers. The approach to carry out the empirical studies and how this was done are presented in the method chapter (4). The main findings are then presented based on the empirical studies carried out which resulted in the individual papers (5). These findings are discussed in order to make a coherent argument of how this research contributes to the issue of how to understand and manage ICT projects, coping with the inherent complexity whilst increasing the chance of realising benefits (6). This is followed by concluding remarks, paying particular attention to implications for theory and practice (7).

## 2 Theory

The overall aim of this chapter is to develop a theoretical perspective from which to approach the study of organisational change in relation to introduction of ICT and the management of such projects. This perspective is based on a conscious ontological position about organisational reality and life. The meta-theoretical position which constitutes the premise of this thesis is explicated at the outset of this chapter (2.1). Next, in three sections about organisational change (2.2), technology and organisational change (2.3), and management of organisational change (2.4) contributions that challenge some of the core premises of traditional approaches are presented. A theoretical perspective is developed which relates these lines of development to the meta-theoretical position of this thesis. Hence, throughout these sections the thesis is also situated within the field of organisational change research in general, and in relation to technology in particular. The theoretical perspective is summarised in the last section (2.5).

### ***2.1 Meta-theoretical position***

In the study of organisational life, this thesis builds on the premise that reality needs to be understood from social interaction where the dialectics between the individual and the environment are continuously enacted. This premise is based on the social psychology of George Herbert Mead (Mead 1934) and Blumer's theory and methodology of symbolic interaction which is heavily based on Mead (Blumer 1969, Blumer 2004). Blumer presents three premises on which symbolic interaction rests (Blumer 1969, p.2):

1. Human beings act toward things on the basis of the meanings that the things have for them.
2. Meaning of such things is derived from, or arises out of, the social interaction that one has with one's fellows.
3. These meanings are handled in, and modified through, an interpretative process used by the person in dealing with the things he or she encounters.

'Things' is a broad term and cover physical objects, other human beings, activities of other human beings, institutions or situations. In social interaction encountering these 'things', the process of interpretation is ongoing. Mead use the concepts of the acting 'I' and the reflecting 'me' to conceptualise how the individual in every situation that he or she encounters, takes the

attitude of others into account and acts in relation to this. As the situation unfolds, the trajectories of acting are adjusted efficiently to each other through the conversation of the 'I' and the 'me', where the acts of the 'I' and the emerging attitudes from the others enters the 'me' (Mead 1934). This process is what enables efficient intelligent human interrelations and joint action. The act is experienced and enters the 'me' continuously, and hence the acting trajectory is always to some degree adjusted. However, the 'I' is not determined but continuously guided by the 'me', leading the individual to experience initiative in the situation. Therefore, uncertainty is always there as to how the individual acts in the situation, and hence, how the situation of social interaction unfolds.

Symbolic interaction takes into account the dialectic relationship of agency and structure, multiple levels of analysis, the self and the other, and the individual and the environment (Snow 2001). Furthermore, it is in the process of interaction of which these dialectics are enacted. As Mihata (2002) argues, symbolic interactionists hold to a complex meta-theory, which sceptics may query for being too inclusive:

*“While explaining everything [italics] may be impossible, this pursuit of explanations that incorporate the complexity traditional approaches leave out represents the distinguishing characteristics and the great potential of symbolic interactionism” (Mihata 2002, p. 572).*

With the taking into account of the complexity of social interaction, comes the ability to see how these processes unfold in patterns that are dynamic and able to change and adapt in unpredictable ways. This is fundamental to enable intelligent and efficient social interaction. Snow (2001) puts forward the principle of emergence to extend the three premises of Blumer, in order to bring attention to how changes emerge out of the processes of interaction potentially transforming everyday practices, routines or perspectives. Emergence is a central notion in complexity theories - the idea that patterns emerge from interactions without any blueprint and which are not reducible to the sum of the parts (Waldrop 1992). Complexity theories provide a rich set of concepts that can fruitfully be employed to make sense of unfolding patterns of interaction, and therefore I draw on this strand of thinking to complement symbolic interaction. Unpredictability is also here seen as an inherent part of the picture, but paying attention to patterns makes it possible to study a phenomenon without simplifying away this feature because they display order while at the same time being on the edge of turning chaotic. In this way, patterns are dynamic and changing in relation to the

environment of which these patterns are embedded. Coevolution refers to the reciprocal relationship between unfolding patterns within one system, and the environment of which this system is embedded (Mitleton-Kelly 2003). Hence, complexity theories consider the world as complex and interconnected, and provide a language for talking about the patterns that unfold and emerge taking into account influences on multiple levels both within and outside the organisation.

To sum up, the meta-theoretical position constitutes, as stated above, the premise for this thesis. This means that it is the basis for understanding and approaching the phenomena I seek to address, and also for how I understand prior research on organisational change in relation to ICT and the management of such projects. In the following three sections (2.2-2.4) I discuss developments within relevant strands of thinking in relation to my meta-theoretical position, in order to develop a theoretical perspective summarised in the last section (2.5). Following this theoretical perspective research questions are outlined in the next chapter.

## **2.2 Organisational change**

In this chapter, I draw up some important lines of development within organisational change research, where the core premises of traditional approaches to organisational change are challenged. This forms the perspective from which I choose to approach the phenomenon of organisational change, and in this way the thesis is situated within this branch of organisational research. In addition, I will relate this perspective to the adopted meta-theoretical position.

### **2.2.1 Extending traditional understandings of organisational change**

There are different ways of approaching the phenomenon of organisational change, and there have been certain developments that address the limitations and challenge some core premises of ‘traditional’ approaches. At times, these are rooted in deep conflicts between different ontological positions. However, it can also be a matter of a different angle of incidence and focus, where the perspectives are complementary rather than in conflict. As Morgan argues, organisations afford different perspectives or metaphors, but this implies a paradox of that a way of seeing is also a way of *not* seeing (Morgan 1997). In other words, a particular perspective illuminates certain aspects of a phenomenon, but leaves others unexplored. In this section, I present my perspective for understanding organisational change, as well as making explicit the associated ontological position.

Traditional approaches to organisational change invite comparison to those contributions providing alternative perspectives in a number of dimensions that have been given increased attention recently. I want to draw attention to three issues which together extend traditional understandings of organisational change, in that some of the core premises of these are challenged.

These issues are organisation as process, continuous change and micro-level approaches, and unpredictability in change (left column in Table 1). I understand ‘traditional’ perspectives to be characterised by focusing on organisations as having respectively: variations in organisational variables, episodic change and synoptic accounts and predictability in change (right column in Table 1). The first and last have emerged through ontological differences where the alternative perspectives contrast the traditional perspectives, while the second issue represent different focuses where perspectives can be nonetheless complementary.

Traditional perspectives	Alternative perspectives
<ul style="list-style-type: none"> <li>• variations in organisational variables</li> <li>• episodic change and synoptic accounts</li> <li>• predictability in change</li> </ul>	<ul style="list-style-type: none"> <li>• organisation as process</li> <li>• continuous change and micro-level approaches</li> <li>• unpredictability in change</li> </ul>

**Table 1 Traditional and alternative perspectives on organisational change**

In the following sections I look at these three issues in more depth, and also consider these lines of development to the adopted meta-theoretical position.

**2.2.1.1 Process perspective**

The most common approach to study organisational change has traditionally been using so-called variance methods (Van de Ven and Poole 2005). These are cross-sectional studies where certain variables are operationalised and measured before and after. For example, Porras and Silvers (1991) argue that a planned change effort is an intervention altering key

target variables leading to behavioral changes that bring about the desired organisational outcomes. Key target variables consist of vision and work settings variables (Porras and Silvers 1991). Work setting variables consist of organising arrangements, social factors, technology and physical setting. This is what Armenakis and Bedeian (1999) characterise as content research. As Van de Ven and Poole (2005) argue, this approach builds on a specific ontological perspective of viewing organisations as a ‘thing’. In this way change is a variance in organisational variables representing the entities of which the organisation consists. Tsoukas and Chia (2002) argue that this perspective is limited because it leaves the process out of the picture. Not only is it unknown what happens in between these two points in time, but more fundamentally on the ontological level process is not accounted for. To fully understand how change happens and hence study it as appropriate, they argue, there is a need to stop giving ontological primacy to organisations, and to acknowledge the processes constituting the organisation. Furthermore, they argue that organisation as a ‘thing’ represents a reification of the processes in the organisation. This implies appreciating change as pervasive and indivisible.

It is worth stressing that viewing *change* as a process is not itself new. Armenakis and Bedeian (1999) argue that research on implementing change as a process has strong roots from Lewin’s notion of change as unfreezing, moving and refreezing. In particular, the contributions present change as occurring in phases, starting with creating a sense of urgency or communicating a need for change, and culminating with the institutionalisation of the change. Change as a process is acknowledged in that it is necessary to deal with the challenges in the process of implementing change. In organisational development (OD) this is one of the main concerns. As French et al. (2005) argue that a definition of OD involves “a prescription for a process of planned change in organizations” (French et al. 2005, p. 2). However, OD is a narrower concept than organisational change because it is concerned with the effective implementation of planned change managed from the top (Cummings and Worley 2005). Still, seeing change as a process where the implementation is a central concern is not the same as taking a process ontological position on organisations. Quite the opposite, the organisation is seen as a ‘thing’ on which the management initiates a process leading to certain changes, and hence can be managed and controlled.

Therefore, what is needed is a more reflective and explicit position towards organisations as processes and not only organisational change as a process. To do this, I draw on the adopted

theoretical perspective focusing on processes of interaction and emerging patterns, and sensemaking theory based on the work of Weick where symbolic interaction is applied to organisation theory (Weick 1995). Weick (1979) argued for adopting the term 'organising' instead of 'organisation' so as to a greater degree acknowledge the ongoing character of organisational life, and to promote a mindset to focus on process. Interaction is at the core of this concept of organising, where actions are interdependent and behavior interlocked. Actors notice and act upon the environmental cues which enable them to act in sensible ways to solve the tasks at hand. Drawing on Mead, Weick argues:

*"[...] people notice stimuli that permit them to do what they want to/or need to do" (Weick 1979, p. 32).*

The active role which human actors play in relation to the environment means that they enact the environment and in this way construct it noticing some things and not noticing others. The aspects of the environment which are noticed and enacted become real to the actors, but reality is still a product of construction. Therefore, Weick argues for focusing on not only action but on attention. Further, he suggests asking the question:

*"How are the processes and contents of attention influenced by the conditions of task-based interdependency found in those settings we conventionally designate as organizations?" (Weick 1979, p. 32).*

Here, we see the relevance of using Mead's conceptions of the 'I' and the 'me' and the notion of meaning of symbolic interaction to understand the continuous interplay between attention and action in organisational settings. Furthermore, it is necessary to look at the patterns in which this interaction unfold. Therefore, organisations are in this thesis understood as processes of interaction where action and reflection continuously play together, and where patterns emerge from this interaction. In addition, complexity theories may prove useful to make sense of these patterns.

### **2.2.1.2 Continuous change and micro-level focus**

In this section I focus on the contributions of taking a micro-level approach in organisational change research. I then consider how the adopted meta-theoretical position can be used to

build on these contributions, at the same time as considering the macro-level in which the micro-level is embedded.

Weick and Quinn (1999) argue that there has emerged a contrast in research on organisational change between change as episodic, discontinuous and intermittent, and change as continuous, evolving and incremental. This contrast is much rooted in the taking of different perspectives on the level of inquiry (Weick and Quinn 1999). In one way, viewing change as continuous is related to taking a process perspective towards organisations. However, here I want to draw attention to how this continuous change is related to a micro-level focus and not ontological differences. Focusing on continuous change on the micro-level entails different results than focusing on episodic change at an overall organisational level (macro-level). At the micro-level there are repetitions, breakdowns, experimentation, adaptations, learning, while at the macro-level the picture can look more stable with changes occurring only once in a while.

With the acknowledgment of change as continuous, comes the appreciation of the micro-level internal dynamics as a source of change in organisations (Feldman 2000):

*“People who engage in routines adjust their actions as they develop new understandings of what they can do and of the consequences of their actions. This adjustment does not necessarily constitute movement to a new equilibrium” (Feldman 2000, p. 613).*

Hence, the potential for change lies inherent in the continuous accomplishment at the micro-level in organisations. However, whether changes at the micro-level result in larger scale organisational change is not given. As Tsoukas and Chia argues:

*“Whether the reweaving of individual webs of beliefs and habits of action leads to microscopic changes becoming organizational [italic] is a different issue. It may or may not happen, or, to be more precise, the extent of which it happens is an interesting topic for empirical research and further theoretical development” (Tsoukas and Chia 2002, p. 580).*

This relationship between changes at the micro-level and at the macro-level is interesting. For example Gersick (1991) employs a punctuated equilibrium model to understand change on different levels. At periods where the system is in a state of equilibrium there are adaptations and incremental change (“game in play”), but this is replaced by periods of disequilibrium

where the “rules of the game” are changed. More radically, complexity theories draw attention to understanding change from a perspective of looking at organisations continuously being in a position between order and chaos (“the edge of chaos”) (Maguire and McKelvey 1999). This acknowledges the potential for small order changes at the micro-level to propagate through the system and cause large-order change at the macro-level in organisations (Anderson 1999). This creation of new order without any blueprint is an inherent quality of complex systems of interacting agents (Mitleton-Kelly 2003). Here, change is seen as when patterns emerging from the local interactions are qualitatively different from previous patterns. Complexity theories are suggested as a key paradigm to understand organisation from the metaphor of flux or transformation and change (Morgan 1997, Burke 2002).

However, it is wrong to believe that it is possible to trace the origin of change. Continuous change on the micro-level has led to the appreciation of routines and the actions of individuals as one source of change. However, environmental influences are also a part of the picture, as are initiatives from management. Complexity theory in general and coevolution as a part of this theory provides a way to consider both micro- and macro-level, taking into account that interactions are embedded within a multi-level environment reciprocally influencing each other (Lewin et al. 1999, Lewin and Volberda 1999, Volberda and Lewin 2003).

### **2.2.1.3 Unpredictability in change**

Unpredictability and uncertainty are fundamental features of the adopted meta-theoretical position in relation to how actors act locally based on a process of interpretation and how patterns emerge from the interactions of actors. In the previous sections I have shown how taking a process perspective considering multi-level continuous change implies a compound complexity of interacting factors. Following this, it is not possible to trace the origin and predict the consequences of actions at one place in the system. Reciprocal relationships of agents at multiple levels as advocated in complexity theories imply that unpredictability is inevitable (Anderson 1999). Patterns emerge from the interactions in a system, not reducible to the sum of the interacting agents. Beeson and Davies (1999) argue that emergence is central to understanding change as it is accomplished in organisations without any blueprint. The notion of being able to predict and control is presented in this perspective as mistaken

and not beneficial because change is associated with dynamics in a state outside equilibrium (Stacey 2003). Here, unpredictability needs to be embraced, nurtured and not reduced.

While most theorists about organisational change see the limitations to predictability, unpredictability on the other hand tends to be the subject of reduction and avoidance. A common critique of planned change is that in practice change is much more disorderly and emergent. However, a common answer to this critique is that there is a need to consider situational contingencies, and that change still is something that needs to be made predictable by planning and controlling (Cummings and Worley 2005). In this way, an underlying assumption is that it is possible to establish a cause-effect relationship. Most theorists and practitioners today see the limitations of organisational change from the metaphor of organisation as a machine, and there exists a great variety of theories and perspectives that both challenge and complement such a metaphor. However, as Morgan points out (1997, p. 13):

*“It is thus important to understand how and when we are engaging in mechanistic thinking and how so many popular theories and taken-for-granted ideas about organization support this thinking.”*

This is an important point to stress. The heritage of Isaac Newton is significant, even today, and this does not limit itself to organisations but to many aspects in society. With Newton, the idea of rational explanation became an axiom. With the meta-theoretical position adopted in this thesis, together with taking a process perspective on organisational change as well as considering multi-level influences, unpredictability is an inevitable part of the organisational phenomena.

### **2.3 Technology and organisational change**

One instance of organisational change projects are projects of developing and introducing ICT in organisations. In this section I try to avoid two interrelated traps. First, to avoid treating the technology as a black-box, and not taking into account the particularities of different technological solutions and systems. Second, to avoid seeing the technology as a magic bullet, where change is a consequence or effect resulting from technology as a cause. To do this, I first consider ICT and the kind of technologies that are usually referred to in studies of ICT and change, as well as the presented and promoted potential and properties (2.3.1). Then, I

move on to discuss the relationship between technology and organisation not as a one-way causal relationship, but how the complexity of this relationship is dealt with in the literature. Here, we will see that the increased sophistication of how the relationship between technology and organisations is understood coincides with approaches to organisational change presented in the previous section as focusing on process, continuous change and micro-level, and embracing unpredictability (2.3.2). Lastly, I draw on my meta-theoretical perspective to address the potential of ICT building on an emergent understanding of the relationship between technology and organisation (2.3.3).

### **2.3.1 The potential of ICT**

Although information and communication technologies (ICT) is a recent term in organisational life, and innovations and developments are made with increasing speed, there is a basis to these technologies which has been around for several decades. In the core of ICT is the ability to collect, store, process and present data electronically. Another important aspect is the speed at which this can be done and the amount of data that can be handled. These have from the start been the particular advances of computer or information technologies that have driven the motivation for developing and employing the technologies to assist or automate data processing that previously had to be done manually. The power and capacity to do this has increased exponentially. Also, the sophistication with which it is used and the breadth of application has increased, and includes more and more areas of organisational life and the society in general. “Communication technologies” have been added to information technologies (IT) due to the particular advance of these technologies which have changed the conditions and ways in which data can be shared across sites almost independent of ordinary constraints of time and space.

Information systems (IS) are ICT solutions that exploit the ability to collect, store, process, present and distribute data for the benefit of the organisation. This varies from automation of data processing work processes to informing workers in their practice (Zuboff 1988). After the advance of IS in the 1980s, most organisations used a set of different IS. Soon, many organisations had a patchwork of IS, to be called ‘legacy systems’. Enterprise Resource Planning (ERP) in the 1990s, accelerated by the proposed year 2000 issue, was one kind of IS which integrated all data in the organisation into one system. Even if the term had its origin in a manufacturing environment, its application is now much wider. Now, there is a large industry of IS suppliers, as well as consultancy companies offering their support during the

process of developing and introducing these system. Also, IS is a research field, covering the wide range of topics that emerge when IS are, and are to be, employed in different ways in different organisations.

Within the health domain in general and hospitals in particular, the application of ICT and IS have been less rapid. In a survey in 2001 from 32 hospitals in Norway, the results reported of the continued use of paper-based technologies for collecting, storing, processing, presenting and distributing data in the across the organisation, side by side with the limited use of IS solutions (Lærum et al. 2001). Electronic medical record (EMR) or electronic patient records (EPR) are the collective terms that is used to picture the one large IS that hospitals need to integrate their information needs. EPR is then not only limited to the patient records, but to the integration with patient administrative system (PAS), laboratory system, picture archiving and communications system (PACS), and other ward or professional branch specific IS. As mentioned in the introduction, the empirical studies were carried out within the context of the introduction of electronic patient records (EPR) in hospitals in Norway as one example of employing ICT in organisations.

IS in general and EPR have the potential to influence how organisations organise and carry out their work. The technology enables information that is put in by one actor to be processed, assembled, manipulated, distributed and presented instantaneously to targeted actors in the organisation. Based on the premise that information is crucial to the carrying out of individual work tasks and the cooperation over task that require interaction, the technology has the potential of influencing an essential feature of the basis for how work is organised and carried out. The movement of business process reengineering (BPR) thrives on this potential of Enterprise Resource Planning (ERP) systems in particular. Here, ERP enable work to be organised by work processes, which are defined as a set of tasks that needs to be carried out in order to achieve a business outcome which has customers (Davenport and Short 1990). This contrasts the former organisation of work as a sequence of tasks, each within the functional unit boundaries, as a business process crossing these boundaries. As Hammer (1990, p. 111) proclaim:

*“Information technology can capture and process data, and expert systems can to some extent supply knowledge, enabling people to make their own decisions. As the doers become self-*

*managing and self-controlling, hierarchy – and the slowness and bureaucracy associated with it – disappears.”*

We can see that the potential of ICT is exploited to provide information to the worker that enable him or her to act in a way that promote some organisational targets, such as customer satisfaction, because this information informs the worker enabling him or her to do so. While the BPR perspective has been much criticised for exaggerating the promised results, it is useful to see how this perspective strives to exploit the potential that ICT have for working in different ways.

As for EPR, Berg and Toussaint (2003) argue that a patient record system, paper-based or electronic fills two functions. First, it represents an ‘external memory’. Second, it coordinates activities and events in the organisation. In a way, these two functions are interrelated, but the latter points to the ability of information to influence and support actors in their work and their organisation of work. EPR with the properties of ICT, has a capacity that is beyond paper-based patient records, particularly in terms of filling the function of coordinating actors. Svehngsen (2002) points to the same thing when she argues that EPR function in two dimensions. First, EPR function in the sequential dimension, which is in a specific situation and an individual course of action. Second, they function in the orthogonal dimension, which is across different situation and individual courses of action.

I have now indicated the potential that IS in general and EPR in particular offer organisations in terms of altering the conditions of how they can collect, process and distribute information to influence the carrying out of and organisation of work. The argument shows how moving deeper into the potential IS provides for organisations, also involves moving deeper into the organisational processes of which this technology is meant to play a role. The task of this thesis is to study and understand organisational change in relation to ICT projects. Therefore, I need to look at the relationship between technology and organisational processes, which have been a concern for organisational and IS researchers for decades.

### **2.3.2 The relationship between organisation and technology**

The relationship between organisation and technology has a history that goes back to before ICT was a common concern in organisations. Here, technology meant machines mostly used in production settings. With the industrial revolution the use of machines demanded

organisational work to be adapted to the technology (Morgan 1997). This led to a mechanical perspective on organisations, and with Taylor's Scientific Management the separation of planning and doing of work, workers became cogs on a wheel (Taylor 1967). Hence, change in work practice was determined by a detailed design of work.

Trist and Bamforth's (1951) study of the longwall method of coal-getting showed how the introduction of a new method using new technology in a particular way did not result in the intended benefits because it hampered the fine-tuned social system that had been established. This led to the start of the human factors school of thought in and around the Tavistock Institute, which also had a significant influence on the emergence of the socio-technical tradition. In the socio-technical perspective both the social and technical system need to be optimised and seen as working together towards a whole which together decide the organisational and production outcomes. Through the connection made between Fred Emery at the Tavistock Institute and Einar Thorsrud at the Institute for Industrial Environment Research at the Norwegian Technical University College, these principles were tested in practice in a large research project (Norwegian Industrial Democracy Project) in cooperation between the Confederation of Norwegian Business and Industry and Norwegian Confederation of Employers in the 1960s and 1970s (Greenwood and Levin 1998). In Norway, this project has had a significant influence in terms of democracy being an integral part of working life, illustrated by the fact that the set of psychological job demands that was created during the project constitutes §12 in the Norwegian Working Environment Act from 1977. Together with the milieu around the Survey feedback studies and in particular Kurt Lewin, the OD movement emerged building on values of democracy and participation reconciling the needs of the individual workers and production efficiency (Cummings and Worley 2005).

As for ICT and IS, the socio-technical tradition was embraced by the work of Bostrom and Heinen as early as in 1977 in two papers in the leading IS journal of MIS Quarterly (Bostrom and Heinen 1977a, Bostrom and Heinen 1977b). Here is how they start out in the abstract in the first paper:

*“Many of the problems and failures of Management Information Systems (MIS) and Management Science/Operations Research (MS/OR) projects have been attributed to organizational behavioral problems. The millions of dollars organizations spend on MIS and*

*MS/OR development are of little benefit because systems continue to fail” (Bostrom and Heinen 1977a, p. 17).*

Here, they argue that the system designers have been predominantly thinking of the technical systems and not acknowledging the importance of the social systems in the process of adopting the new technology. STS as an OD approach is the way to move forward, they argue, taking into account that every change, or ‘design’ as the term they use, of a work setting has to deal with both the social and the technical system.

The quote from above could have been repeated, and is often repeated, even today. Markus and Benjamin (1997) ask themselves why practitioners still think they do change work when they design and implement a new IS in the organisation, particularly when there is an increasing body of knowledge of what managing change is about. Since 1977 there have been numerous contributions in leading journals about technology not simply leading to change. Of course, technology as everything else can cause things to change in the organisation. However, as Kling (1980) points out, it is not the technology that causes this change, as the technology itself does not “do” anything. Further, when speaking about the social “impact” of technology, they stress that:

*“Each of these ‘impacts’ happens because of some underlying patterned social process, and speaking about the ‘impact of technology’ often distracts attention from the social processes by which they are developed, adopted and used” (Kling 1980, p. 100).*

Hence, the actors designing the system encapsulate intentions, conscious or not, into the system, which then “cause” the actors using the system to change. The social construction of technology (SCOT) is a perspective that understands technology as shaped by human action. Latour provides a thorough discussion of these dynamic processes of technological development, employing the cybernetic concept of black boxes: (Latour 1987, p2-3):

*“The word black box is used by cyberneticians whenever a piece of machinery or a set of commands is too complex. In its place they draw a little box about which they need to know nothing but its input and output.”*

This is illuminating in understanding how technology as a black box is not something that is, but something that humans have defined together. Furthermore, it shows how “opening” the black box will reveal a complex set of human processes, processes which have defined and constructed reality in the shape of a technological artefact. Therefore, it can be said that the process of technological development is one of social construction (Pinch and Bijker 1987, Hughes 1987). Also, when this technology is adopted and used, the black box carries some degree of interpretive flexibility, in that different groups of people will understand the technology differently in various situations. However, as MacKenzie and Wajcman (1999) argue, the perspective of SCOT or as they suggest, the social shaping of technology, is fully compatible with materiality and the fact that technology matters. The danger is to see the technology as a “magic-bullet” (Markus and Benjamin 1997) which is a path towards passivity in society, where the focus is on adapting to technology rather than shaping it, no matter what human actors do. The SCOT perspective is one perspective that illuminates and raises the awareness of this process. It is worth stressing that ‘social’ involves both societal and local relations (MacKenzie and Wajcman 1999).

Based on a meta-analysis of the structure of theory on which different approaches of looking at IT and organisational change build, Markus and Robey (1988) present three imperatives which differ in their assumptions of the nature of causality. First, in the technology imperative the causal direction is from IT to organisational structure. Approaches building on the technology imperative have shown contradictory empirical results on different dimensions of organisational impact, Markus and Robey argue. Second, in the organisational imperative, management uses IT, taking contingencies of both organisational and technological character into account, to change the organisation. Markus and Robey argue that approaches building on the organisational imperative lack empirical support, because most studies fail to assess the intentions of designers. Thirdly, the emergent perspective is about use of technology and change in the organisation emerging from social interactions. Due to the complexity of these interactions, what emerges is unpredictable. One important development that builds on an emergent perspective is the adoption of Giddens’ theory of structuration for analysing use of technology in organisations. Barley (1986) studied the introduction and use of CT scanners in radiology departments, and found that identical technologies can result in different structural outcomes. This was explained by the influence of the context. Hence, action embedded in the local context constitutes and is constituted by structure, hence follows the concept “duality of

structure”. Adopting this perspective enables researchers to focus on longitudinal process in a particular context, and in this way improve our understanding of technology in organisation:

*“Structuring theory thus departs from previous approaches to the study of technology by postulating that technologies are social objects capable of triggering dynamics whose unintended and unanticipated consequences may nevertheless follow a contextual logic. Technologies do influence organizational structures in orderly ways, but their influence depends on the specific historical process in which they are embedded” (Barley 1986).*

The technology which Barley studied did not have the ability of physically being modified after implementation, which IS can. Orlikowski (1992) and DeSanctis and Poole (1994) developed the application of structuration theory further on understanding the relationship between ICT and organisation. Orlikowski (1992) argue that this makes it possible to take into account the reciprocal interaction between technology and organisation, and hence achieve a deeper understanding of this relationship. She uses ”duality of technology” to reconceptualise the role of technology overcoming the dichotomy of technology as either a physical or a social product by considering technology as both influencing actors interpretively and physically. Furthermore, technology continues to be socially and physically constructed during use, but where the opportunities for this are vary from context to context. Technology in this perspective, does not determine but conditions social practices both constraining and enabling actors to act. Through this process, institutional properties are enacted usually reinforcing them, but always carrying the potential of transforming them.

In the further work of Orlikowski, she draws on practice-based thinking and Weick’s notion of improvisation, in addition to the theory of structuration. Here, she develops an approach to study technology in action so as to understand organisational change as emerging from the micro-level changes that users enact over time using technology in their practice (Orlikowski 1996, 2000). In this, the practice-based arguments, lacking in IS literature, become more and more important. Focusing on the processes in the micro-level was therefore a central contribution, with roots from anthropology and ethnomethodological approaches. For example, Suchman, also concerned with technology, uses the notion of situated actions to point to how structure emerges from the local and situated actions of individuals using the technology (Suchman 1987). Also addressing the relationship between collective work practices and technology is the interdisciplinary field of computer-supported cooperative

work (CSCW). In particular, this field brings attention to how actors interact using technology, carrying out detailed studies of how technology is used to mediate cooperative practices of interaction. The agenda within CSCW is to contribute to the development of technology that actually supports users in their practice (Bannon 1998). This builds on the assumption that technology development should be informed by a detailed understanding of the practice of which this technology is to support. Ethnographic approaches and naturalistic inquiries are dominating the field.

Moving from the technological and organisational imperative to the emergent perspective, implies moving from variance to process theory, and from macro level of analysis to micro-level or mixed level analysis (Markus and Robey 1988). Here, we see the same trends as we saw in last chapter about organisation and change. This is the growing awareness of looking at process when understanding the relationship between organisation and technology evolves, and that change in the organisation emerges from this process. Furthermore, in order to understand change in relation to ICT in organisations, in the same way as understanding change in general, it is necessary to follow this process longitudinally. We also see that there is an emerging focus on the context to follow the process embedded locally, that is, on the micro-level. Lastly, unpredictability is increasingly acknowledged as being a property of these emergent perspectives.

### **2.3.3 Using an emergent perspective to address the potential of IS**

One of the most important properties of IS in general and EPR in particular is to mediate interaction between actors in the organisation in and across time and space through the collecting, storing, processing, distributing and presenting of information. Building on the insights of processual and interactional perspective on organisations and change, it is therefore crucial to address how IS mediate these processes which actors create in relation to each other. The strand of thinking which Orlikowski represents put heavy emphasis on change as emerging from the recurrent enactment of certain practices constrained and enabled by new technology. Hence, this represents the relationship between organisation and technology as an essentially dialectical relationship. However, the relationship between individuals is only indirectly addressed through the structures that emerge from recurrent acts in which all participate. The field of CSCW focuses on collective interaction mediated and supported by technology. However, here, the main focus is the synchronous interaction where actors are distributed in space, but not time. As Berg suggest, it is also an asynchronous dimension to,

for example, EPR (Berg 1999). Heath and Luff (2000) also address this point, but continue their work primarily on real-time cooperation.

In CSCW the concept of awareness has been applied to understand how actors are aware and pay attention to each other in the process of acting. However, this has had a focus on actors in synchronous cooperation settings (Chalmers 2002, Heath et al. 2002, Schmidt 2002). As mentioned, Berg (1999) addresses the fact that EPR coordinate activities also across time and space through accumulating information that influence actors in their practice. Here, he also points to the fact the benefits are distributed. Because benefits are not only emerging in the local situation, but also across time and space, investments are also distributed. This means that at one point investment in terms of carrying out extra work in the IS for the sake of other purposes than that of one's own has to be carried out (Berg and Goorman 1999). Grudin (1988) argues that one of the most important factors of why CSCW applications fail is the disparity between those who benefit from the application and those who are bound to do additional work to support the realisation of this. For example, for EPR systems an essential principle is to put in information once. The quality of this information decides how other actors are supported in their work tasks at another point in time and space in the organisation. The question is if the users in the first point in time are "aware" of this. Furthermore, there is a question of how this awareness shapes the emergent change and the achieved benefits.

In order to address these questions, I adopt the meta-theoretical perspective to consider how actors act in relation to each other, both where the others are present and where they are not, that is, distributed in time and/or space. Here, Mead's conceptions of the 'I' and the 'me' mediated by ICT are highly relevant, ensuring interaction as a central issue (Mead 1934). In addition, actors acting in relation to constructed meanings incorporate not only other actors, but also factors in the greater context of which the individual is embedded (Blumer 1969). Hence, as with the SCOT and the structuralist perspective both local and macro aspects are included. Complexity theories can be used to make sense of the patterns in these meanings emerging from interaction embedded in a multi-level environment. Therefore building on the emergent perspective from research on ICT and organisation, and combining it with the developed perspective of looking at organisational change and the adopted meta-theoretical position, provides a promising avenue of approaching organisational change in relation to ICT.

## **2.4 Management of organisational change**

As mentioned in the introduction of this thesis, in an organisational context a central concern is that ICT projects result in some benefits which stand in relation to the investments made. To do this, ICT projects should not be left to themselves but need to be managed in some way. In this section, I look at the issue of management of change as an inherent part of ICT projects in organisations, within the context of the developed perspectives of organisational change in general and in relation to ICT in particular. This involves considering a process perspective on organisations focusing on interactions, how these interpretative processes are embedded in a multi-level context and viewing unpredictability as inevitable, and how these issues create some challenges in relation to how managing change is understood traditionally.

The role of human agency is a central issue in the study of organisational change in general and in relation to management of change in particular (Poole 2004). In organisational change research there is a debate around agency as centralised or decentralised, that is, if it resides mainly with management or with the other actors in the organisation. Caldwell (2005) argues that the rationalist discourse coincides with the notions of planned change and expertise residing with management which is central in the OD tradition. Here, change is intentional and the prime initiator and mover of change is the change agent usually in a managerial role (Weick and Quinn 1999). In this perspective, challenges have emerged through the exploration of bounded rationality and environmental conditions (Caldwell 2005, Poole 2004). However, they are now more fundamentally challenged by other discourses of change theories taking a process perspective, focusing on multi-level embeddedness and acknowledging unpredictability as inevitable. There is therefore a need to reconceptualise the role of managing change. However, a danger lies in not taking a position of how to manage change at all. Caldwell points to this when discussing the contextualist discourse that focus on understanding organisational processes embedded in a multi-level context:

*“Paradoxically, by emphasizing difference, contextualism is in danger of becoming simply antisystem, anti-structure, anti-planning and, therefore, the antithesis of both systematic theoretical analysis and strategic change interventions” (Caldwell 2005, p. 96).*

The main contribution of the contextualist discourse has been to increase our understanding of the nature of organisational change from a process perspective. However, Caldwell stresses

the need for developing a theory of agency to complement this. In a dispersalist discourse, where agency is decentralised, Caldwell points to the fact that it is still unclear how change should be managed, controlled and developed in organisations. However, we should be cautious of criticising these discourses from a frame of reference where managing change resembles what these strands try to oppose. Manage and control may take new and different meanings altogether. However, as Dunphy (1996) argues, it is still important to make the normative position clear, emphasising that a theory of organisational change should include:

- A basic metaphor
- An analytical framework or diagnostical model
- An ideal model of an effectively functioning organization
- An intervention theory
- A definition of the role of the change agent

Weick and Quinn (1999) adopt this framework to present the two contrasting perspectives of organizational change of “episodic change” as planned and top-down, and “continuous change” as emergent and bottom-up. The theory of intervention for the latter, they argue, needs to have a different focus than for the former perspective:

*“An important new means of rebalancing continuous change is the use of a logic of attraction, which is the counterpart of the logic of replacement in episodic change” (Weick and Quinn 1999, p. 380).*

Here, they draw attention to the change by attraction, the power to pull change and the role of change agent as redirecting what is already on the way. This does not necessarily mean that the role of management is not important, as these actors just as much as other actors in the organisations are able to make sense and interpret the patterns of change that evolve (Weick 1995). As Stacey (2003) argues, they are usually connected to more parts of the organisations, and in this way are able to interpret and see patterns which other employees may not be able to see. Hence, managers should exploit their capacity to make sense of the evolving patterns in which they take part to understand what goes on and act intelligently in relation to this.

However, the success of this depends on whether the managers are connected to the informal organisation and conversations which take part or if the managers’ involvement is limited to

the formal organisations. Ford and Ford (1995) advocate the role of conversations to produce change, arguing that communication is the context of which change occurs. Likewise, Shaw (1997, 2002) stresses that any manager or consultant who has some intent as to what changes should result needs to participate and enmesh into the conversations that go on in the organisation to influence the actual change. However, the change is still unpredictably emerging from these communicative practices. Balogun and Johnson (2005) found that in a change project the interaction between managers and recipients was mostly formal, interaction in between middle-managers was much more informal. This reflects the fact that many organisations continue to carry out change projects as top-down endeavours, overlooking the role of informal interaction. Hence, approaches to management of change need to be more “relational” and participant-oriented than traditional models specify. However, as Balogun and Johnson (2005) suggest, managing change should be less about detailed direction and control and more about facilitating recipient sensemaking and the context within which these processes occur.

Poole (2004) argues that when viewing agency as distributed among disparate agents, it is necessary to consider the interaction of these in the production of organisational change. Furthermore, he suggests that structuration theory and symbolic interaction are suitable approaches to capture interaction as interpretative processes. In this thesis, I draw on symbolic interaction and complexity theories to understand the role of managing organisational change when adopting a perspective of organisational change where change emerges as patterns from the interaction of actors at and in between multiple levels in the organisation.

As for the relationship between organisation and technology, we see some of the same challenges in relation to the normative position and the role of managerial agency. Markus and Robey (1988) argue that within the “emergent perspective” on IT and change, the normative posture is less clear than that of the technology and organisational imperative. Here, outcomes emerge unpredictably from the interaction of technological features and actors’ intentions. For example, the situational change perspective focuses on the critical role of users enacting change to their situated practice (Orlikowski and Barley 2001). This, they argue, is something that has been overlooked. The danger is to become too descriptive of the local evolving relationship between organisation and technology, without gaining any prescriptive insights which would be relevant across contexts. However, again, we need to be cautious of not criticising this strand of thinking from the “traditional” frame of reference of which they

opposite in the first place. Rather, we need to search for reconciliation and complementary paths.

Hirschheim et al. (1991) argue that, from the perspective of IT development as emergent social action, the strength lies in these accounts' ability to make sense of the process:

*“It must be stated that our perspective is more of a descriptive tool than a prescriptive one. Its strength lies in its ability to describe and “make sense” of the system development process” (Hirschheim et al. 1991, p. 602).*

As argued above, managing change is about making sense of what goes on. For ICT projects, the emergent perspective of technology and organisation should therefore be exploited in order for actors, including managers, to better be able to make sense of the process and in this way manage change appropriately.

So, from the emergent perspective of different theoretical strands presented in last chapter, much insight can be gained from how the process of development, introduction and use evolves. Dery et al. (2006) may be correct when arguing that too much burden is placed on the agency of the users in the technologies-in-practice perspective. Furthermore, it is possible that too little attention and acknowledgement is put on managers' roles. Here, I try to lay out a perspective of managing change that build on the insights of studies of technologies in practice, which acknowledges the importance of understanding the process and exploits this in the attempt to carry out projects that pay off.

Orlikowski et al. explicitly try to incorporate mediating activities which played an important role in the structuration process of incorporating the technology into the practice, which do not only involve use of technology:

*“[...] analyses of the technology structuring have tended to focus on users as the key agents whose actions shape and are shaped by their technological and institutional contexts. Yet our study found that others routinely and deliberately intervene in users' structuring activities by influencing users' understandings, altering technological features to ease use, modifying institutional policies to promote particular kinds of communicative practices, and facilitating access to and operation of communication technologies. As such intervening actions are not*

*captured by our current understandings of technology structuring (see Figure 1), an extension of this understanding would be useful” (Orlikowski et al. 1995, p. 437).*

This process of “meta-structuring” is always occurring, they argue, but by whom and in what situations as well as the intended and unintended consequences are important empirical questions. However, it is indicated that these actors will act more reflectively and proactively than users whose actions will be more unplanned and emergent. Orlikowski and Hofman (1997) argue for an improvisational approach to change management where unpredictability is taken into account as playing an inevitable part of the picture, building on the basis of change as ongoing accomplishments. Opportunity-based changes are used to make sense of changes that are intentionally introduced during the project progress as a response to unexpected situations.

So, building on the emergent perspective, the fundamental role of the agency of users in bringing change about needs to be acknowledged. However, the role of managers also needs to be appreciated and included, and should be seen in relation to their formal and informal interaction with users as well as with middle-managers. This process of interaction is shaped by actors, at all levels in the organisation, making sense and constructing meaning in their local situation. In addition, there are external influences outside the organisation, which also need to be incorporated as the context within which sensemaking processes within organisations occur (Volberda and Lewin 2003). Caldwell argues for the need of synergy of perspectives:

*“[...] this will require much more research work on multiple levels and micro-units of analysis of conjoint change agency, while not losing sight of the macro or structural dimensions of organisations, including the ubiquitous counterforces of control” (Caldwell 2005, p. 107).*

Coevolutionary theory, as a part of complexity theory, is one way to take into account these multi-level influences which are reciprocal (Lewin et al. 1999, Lewin and Volberda 1999). Organisational change is here not either planned or emergent, but planned and emergent at the same time. This should be combined with the interpretative theories of sensemaking and symbolic interactionism to incorporate how actors in the organisations in their interrelating act in relation to meaning, and hence understand how actors translate intentions in their local

contexts (Balogun and Johnson 2005, Poole 2004). This approach entails following the interaction processes longitudinally. This, I argue, is a promising avenue to understand the role of managing change within the perspective of organisational change in general, and in relation to technology in particular.

## **2.5 Summary**

The overall aim of this chapter was to develop a theoretical perspective from which to approach the study of organisational change in relation to introduction of ICT and the management of such projects. This is a prerequisite for developing the research aims to research questions which I present in the following chapter. At the same time, this chapter has situated my approach within the relevant field of organisational change in general and in relation to ICT in particular.

Organisational change is understood from a process perspective of organisations. Change emerges unpredictably through a continuous interplay of micro- and macro-level factors. This perspective is closely related to the adopted meta-theoretical position where patterns of change emerge interaction where the dialectics between the individual and the environment are continuously enacted. I employ symbolic interaction, Mead's conception of the 'I' and the 'me' and complexity theories in laying out the ontological position on which this thesis is based.

From the relationship between technology and organisation, an emergent perspective coincides with the appreciation of process, continuity and multiple levels and unpredictability. This thesis builds on the emergent perspective which implies acknowledging the importance of users making sense in their local situation integrating the technology into their work practice. Changes in work practice emerge from this process. In relation to the potential of ICT to mediate cooperation and interaction between actors both in and across time and space in the organisation, I suggested that a promising avenue of approaching organisational change in relation to ICT is to address the interaction processes between users. In this way, it is possible to increase our understanding of how actors incorporate technology into a cooperative practice and how organisational change occurs in practice.

The role of managing change, within the context of the presented perspectives about organisational change in general and in relation to technology in particular, also needs to be

understood as a process of interaction between actors at multiple levels in the organisations. Here, actors make sense of the patterns they participate in, construct meanings, and act in relation to this. To study how managers actually manage change, it is necessary to address the interactive practices where sensemaking occurs, and in this way to take into account that change is both planned and emergent at the same time.

### **3 Research questions**

The research aims presented in the introduction (1) is here developed into three research questions which guided this research:

The first research question is: How can technology in use be described at the micro-level where actors need to cooperate both in and across time and space? Here, I focus on micro-level work practice using a process perspective of organisations as consisting of interacting actors to study how ICT is integrated in this practice. Following the property of ICT which enables the sharing of information between actors independent of time and space, I consider how actors interact using ICT to accomplish work tasks where actors need to cooperate both in and across time and space.

The second research question is: How is technology in use at the micro-level connected to the phenomenon of organisational change? Here, I address how organisational change can be understood in relation to how interaction in a micro-level work practice changes during the introduction of ICT. When ICT are introduced to support work tasks where actors need to cooperate, I consider how actors adjust how they act in relation to each other ensuring the accomplishment of these work tasks. Furthermore, how work practice changes following these adjustments.

The third research question is: What is the role of managing organisational change when ICT need to be integrated in the micro-level work practice of interacting individuals? Here, I take into account that actors are embedded within the macro-environment of the project, the organisation and the environment of which the organisation is embedded. In this way, change is understood to be a dynamic interplay between management deliberation and emergent aspects in the practical implementation of IS projects.

## **4 Method**

In this chapter I first present the methodological position following the adopted theoretical perspective, and the research strategy and methods for data collection employed to address the presented research questions. Second, I account for how the empirical studies of this thesis were carried out together with the challenges and ethical considerations that I experienced. Lastly, I give a broad overview of how the data was analysed. Throughout this chapter I try to acknowledge and reflect on methodological practices and epistemological commitments following the need to reflect on research practice in general and qualitative research in particular (Symon and Cassell 2004).

### **4.1 Methodology**

The methodological position is related to the adopted meta-theoretical position particularly in relation to the perspective of symbolic interaction. Using symbolic interaction as a theory of human interaction to understand organisational life also has epistemological implications for how knowledge can be produced.

The first important implication is that the process of carrying out research is a process of interpretation. Actors in the organisation construct reality through interaction in their social relations, and in the same way the researcher “collects” data through his or her interaction with the field. Hence, data is socially constructed in the relationship between researcher and research context through the interaction that takes place (Berger and Luckmann 1966, Blumer 1969). In this thesis, ‘data collection’ is used to refer to this process. So, the researcher needs to use him or herself as an instrument to construct an emergent understanding of organisational life as it occurs. Actors in organisations construct meaning through a process of interpretation which enables them to act in sensible ways, and this is also the very essence of how we as researchers make sense in the field. To be able to make sense of the enormous amount of stimuli that is available in a situation, we need to draw on our frames of reference and experiences to be able to construct meaning (Weick 1995).

Blumer (1969) stressed that the study should start out with exploration which involves studying the chosen area of social life with a high degree of flexibility and openness. However, as the enquiry progresses, this should be followed by a sharper focus which he calls “inspection” where the researcher moves beyond the descriptive phase and brings in

analytical elements examining them in relation to the empirical world. These analytical elements are brought in by researchers in relation to theory or previous studies used to make sense and understand the phenomena in a way that also moves towards the creation of theory. Through the empirical scrutiny of these analytical elements in relation to the empirical world in study, they can be refined, modified or possibly abandoned. In this way a central concept of symbolic interaction is the simultaneous involvement of the researcher in both data collection and data analysis. This means that the analysis which emerges is continuously tested to the empirical world ensuring a high degree of closeness of the concepts used to explain the phenomenon and the phenomenon itself.

A second epistemological implication of the meta-theoretical perspective adopted in this thesis is the need to consider the phenomena in study within their contexts and as a part of an unfolding process. From a symbolic interactionist perspective individuals are viewed as acting in different situations based on a continuous process of interpretation of different aspects in the context of which the individual is embedded (Blumer 1969). Hence, the reality of organisational life needs to be understood through the meanings of participating actors, and considering how these are created within a specific context. Furthermore, because these meanings emerge out of ongoing social interaction, it is necessary to approach these meanings in relation to the process into which they are inextricably interwoven.

Interpretive approaches in IS research endeavour to understand how actors create meaning in their local context in order to act in sensible ways:

*“The aim of all interpretive research is to understand how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meanings, beliefs and intentions of the members help to constitute their social action” (Orlikowski and Baroudi 1991, p. 14).*

Therefore, striving to follow the processes of interaction in the workplace at the micro-level is done in order to understand organisational life as it occurs through the meanings that actors assign to them (Orlikowski and Baroudi 1991). Also, interpretive approaches advocate considering that the processes unfold within a context of multi-level influences (Walsham 1993). This includes managerial and institutional influences, which can be part of the creation of meanings on the local level. Walsham builds on the contextual approach within

organisational change research developed by Pettigrew. At the core of this approach is a focus on changing, and exploring this process embedded in its context (Pettigrew 1990). Here, the challenge is exploring multiple levels of analysis in the study of context and process reciprocally changing (Pettigrew et al. 2001). According to Pettigrew (1987) a wholly contextualist analysis should include the following properties:

1. A clearly delineated set of theoretically and empirically connectable levels of analysis
2. A description of the processes under examination
3. A specification of theories that are used to understand the process including the underlying model of human behaviour
4. A description of how the contextual variables are linked to the processes under observation.

(Adopted from Pettigrew 1987, p. 656)

This shows the importance of the meta-theoretical position adopted in this thesis, where symbolic interaction is used to understand human interaction and complexity theories to illuminate the patterns that emerge from this processes. The connections between context and process need to done in relation to the specific studies at hand, where the processes under examination are described.

The methodological position I adopt in this thesis, guided by symbolic interactionism, is interpretive and contextual. This also contributes by counterbalancing the dominating approaches in the fields of organisational change research and IS research. In organisational change research, approaches using cross-sectional analyses of static states are dominant (Pettigrew et al. 2001, Van de Ven and Poole 2005). In IS research, positivist approaches are dominant. Positivism is contrasted with interpretivism in assuming that knowledge is assumed to exist independent of the observer and can be collected to test a priori hypothesis (Walsham 1995). Orlikowski and Baroudi (1991) found that between 1983 and 1988 96.8% of the studies adopted a positivistic epistemology against 3.2% interpretive approaches. Investigating studies between 1991 and 2001, Chen and Hirschheim (2004) found that 81% were positivist studies and 19% interpretive studies. Within this period, mainstream and leading IS journals had also modified their editorial policy to appraise interpretive contributions (Walsham 1995), and had developed criteria to assess the quality of contributions which were not from a positivistic approach (Klein and Myers 1999).

#### **4.1.1 Research strategy and methods for data collection**

Following the adopted methodological position, I present my approach of how the empirical studies should be carried out and what methods for data collection should be employed.

In accordance with taking a contextualist approach, I use the case study method. Yin (2003) argues that this is an approach which is contextual in nature, focusing on empirical inquiry that answer how- and why-questions. Therefore, this research strategy will focus on understanding processes, and how they are influenced by and influence context (Hartley 2004). However, the term ‘case study’ is debated and can be variously defined as a methodology, a method or a choice of what is to be studied (Stake 2005). In this thesis, I refer to the case study as a research strategy of studying in-depth the process and context of a phenomenon in line with Hartley (2004). It builds on a contextualist methodology, and methods for data collection are applied in order to get a rich picture of the studied phenomenon. This means combining techniques of interview, observation and using strategic documents, e-mails, minutes and other documents as sources of data.

An example of interpretive approaches in IS are workplace studies of technologies in practice. Here, the central tenet is to study the practice of technology use within its natural context (e.g. Suchman 1987, Heath and Luff 2000, Orlikowski 2000). This usually involves detailed studies of how actors interact and use technology in their interaction, providing important insights of how organisational practice actually unfolds. Workplace studies are deductive in nature, oriented towards the empirical world and towards giving detailed descriptions of the accomplishment of organisational activities. This builds on the assumption that there are complex arrays of practices, often habitual and tacit, which underlie even mundane workplace activities (Heath and Luff 2000). As Suchman argues:

*“One objective in studying situated action is to consider just those fleeting circumstances that our interpretations of action systematically ignore” (Suchman 1987, p. 109).*

Hence, these approaches “zoom in” on the workplace in order to gain increased knowledge of what goes on. I find it necessary and very useful to build on the idea of technology embedded within a micro-level work practice. This is highly relevant when studying how actors use ICT in their work practice on the micro-level following the research questions in this thesis.

Furthermore, one should consider the importance of paying attention to how actors act in order to accomplish their work tasks. Studying organisational change should not distance itself from these processes. However, following my methodological approach I find it interesting to complement this approach by considering how actors make sense in this micro-level work practice, and in this way understand process within its context which is not only limited to the micro-level work practice, but which include a multi-level environment both within and outside the organisation.

Following the maxim of symbolic interaction, methods for data collection were to use methods that enable the researcher to understand what goes on in the chosen area of social life (Blumer 1969). Workplace studies of technologies in practice advocate the need to study what actually goes on usually through observations of practice. Also, video-based recordings are used for their power of capturing richness and detail of work practice which is not feasible otherwise (Suchman 1987). However, accounts of practice as it occurs in its natural setting can be collected through both observations and interviews (Dingwall 1997). In particular, in order to understand the meanings which actors construct and act in relation to, it is necessary to allow actors to reflect on their practice, in addition to observing actors when acting in their actual work practice. This is stressed by interpretive approaches. However, interviews have been the dominant method in interpretive research. In these studies, it has been endeavoured to use not only interviews, but to use observations and participative observation to be able to follow change as a process. This allows for scrutinising emerging accounts and concepts used by informants and researcher to the empirical domain in the natural setting (Nandhakumar and Jones 1997). Blumer (1969) argues that it is through empirical scrutiny by direct observation that the used analytical elements can be refined.

Interviews were also useful to allow the participants to reflect on their practice without constant interruptions which was usually the case in the informal discussions when carrying out participative observations (Kvale 1996). Observations also enabled the asking of more context-sensitive questions and being able to follow up cues more sensitively, as well as letting the informants reflect on concrete episodes to avoid reflections only in general terms (King 2004).

## **4.2 The studies**

The context in which this research took place was the ongoing introduction of Electronic Patient Records in hospitals. My focus was limited to the EPR project in relation to nursing practice. Here, a significant share of nursing documentation was still paper-based, and nurses were awaiting EPR to computerise their practice more and more and to affect their everyday work practice accordingly.

Initially, I spent four weeks working as a nurse assistant in one ward at a hospital (Ward A). This also included some time following the head nurse, physicians, medical secretaries and ergonomists in the ward in order to gain a holistic perspective of the practice in a hospital ward. However, the most of the time was spent with the nurses, and all the time I was wearing a nurse uniform. During this time I went from a total outsider to participating worker, that is, participant-as-observer (Gold 1958). This enabled me to get first hand experience in nursing, within a holistic understanding of ward practice with different professions. Also, it worked as an entrance into the empirical domain, where my contacts in the ward management became gatekeepers for later empirical studies. Also, it helped me to crystallize my research questions as well as providing important clues for what aspects of hospital practice on which I would carry out my empirical study as well as how this could and should be done.

### **4.2.1 The project of nursing handovers**

Through discussions that took place during the introductory participative observation with the research nurse, the teaching nurse and the head nurse in particular, a project was established which sought to both allow me to carry out two empirical studies according to the first two of my research questions, and the ward to do a project on something which they had been concerned. The project was about nursing handovers. Hospital wards are organised so that each 24-hour period is divided into three shifts, day-, evening- and night-shifts, where nurses are changed between each shift. To ensure continuity across the shifts, nursing handovers are carried out between nurses ending their shift and nurses coming onto their shift. Nursing handovers are defined as all verbal and written information sharing between shifts. Thus, continuity across shifts is mediated by both synchronous and asynchronous communication, in face-to-face overlaps and the patient records. Patient records included both EPR and paper-based patient records, because the hospitals in Norway used both at the time when the study was carried out.

It had been a recurrent problem that handovers, in particular between day- and evening handovers, went overtime and were stressful affairs for all nurses, sometimes being quite chaotic. The aim according to the ward management was to assess the quality of nursing handovers and consider whether improvements could be made one way or another. In addition, an interest in investigating the potential of the patient records to function as a mediator in handovers emerged. This was because of the current attention of EPR, of which also I was connected because I had a connection to the national centre of electronic health record (NSEP). The project of nursing handovers was established inspired by action research methodology in which my research would become a part of a democratic change process where nurses themselves were to consider the potential of improving the routine by making certain changes. Another ward also became interested in this issue through the gatekeeper in Ward A, the research nurse knowing the research nurse in the other ward (Ward B), and joined the project.

For me the motivation behind this study was twofold. First, to investigate whether employing patient records to greater degree could replace the face-to-face overlaps in nursing handovers. Second, to explore the symbolic interactionist perspective to understand how IS are integrated into a work practice of interacting individuals. In this way the project of nursing handovers enabled me to address the first research question of this thesis.

First, I assessed the initial nursing handovers, mainly focusing on my first research question but allowing space a more general evaluation and assessment of the routine today. This was not problematic for me because my approach was explorative and holistic allowing for emerging themes, while also trying to become more focused during the data collection (Blumer 1969). The study resulted in Paper I.

Then the results were presented in the wards in order to inform the process of finding and choosing a solution to new nursing handovers. Following discussions in the wards, project groups consisting of nurses from the ward where chosen. In these groups, they worked out a proposal for alternative solutions for new nursing handovers. These were then presented on plenary meetings in the ward, followed by new discussions. It was then decided to try out one of the proposed solutions in the wards for some time, followed by an evaluation after three months where I once again would carry out a data collection. Here, the second research question was addressed.

The chosen solution of “nearly silent handovers” involved replacing two-third of the former fully verbal overlap between day- and evening handovers to nurses coming onto their shift reading in patient records. This was followed by a short face-to-face overlap providing space for questions and discussion among nurses across shifts. Hence, patient records were employed to greater degree in nursing handovers. Following the implementation of this routine, my motivation for carrying out an empirical study was also here twofold. Firstly, it was to investigate the changes that resulted from the implementation of “nearly silent handovers” in order to consider the implications for patient care reliability, of which nursing handovers play a pivotal role to ensure. Second, it was to explore the symbolic interactionist perspective to make sense and understand the changes that happened in and around the work task of nursing handovers. This study resulted in Paper II.

#### **4.2.2 The project of electronic nurse care plans (ENCP)**

During the time of carrying out two empirical studies from the project of nursing handovers, another project emerged in the hospital in relation to the EPR. Here, I was able to carry out another empirical study to address the third and final research question. The project was the pending introduction of electronic nurse care plans (ENCP), a module of nursing documentation in the EPR, in the hospital and the region of which the hospital was a part. ENCP consisted of three parts, that is, problems, action and evaluation. Nurses were supposed to identify problems and the expected result of dealing with the problem, plan actions and evaluate the progress towards achieving the expected result. As a process-supporting tool, ENCP was thought to replace existing continuous documenting, which was paper-based and narrative. There were a range of intentions connected with the ENCP as a project. One of these was for nurses to become paperless in their work practice.

Through the research programme of which my PhD project was a part, the hospital EPR project group was a point of contact. The project manager also worked as a gatekeeper in this regards. Further, in Ward A there was an interest in becoming a pilot ward in starting to use the ENCP. The project was established and the other PhD student who had carried out the introductory participative observation in Ward A and I were allowed to follow the project and use this as an empirical study for our PhD projects. In addition, through the project manager in the hospital, we expanded our data sample to two other hospitals in the region which also were in the midst of introducing the ENCP. Because of the geographical proximity to ward A

this ward was followed with much care. Here, in line with Pettigrews' (1987) multi-level approach, the study aimed at collecting rich longitudinal data at multiple levels also trying to study the interconnections between the level of ward, hospital and regional health enterprise.

The motivation behind this study was to investigate how this managerial intention was influencing the practical implementation of the project. To do this, a framework combining sensemaking and coevolutionary theory was applied in order to make sense of unfolding patterns as a dynamic interplay of management deliberation and emergent change where actors were embedded within a multi-level environment. This study resulted in Paper III.

### 4.2.3 Data collection

The data collection activities are presented in three tables below (Table 1, 2 and 3). The first table summarises the introductory data collection activities carried out. The second and the third table give an overview over data collection activities related to respectively the project of nursing handovers and electronic nurse care plans. In Table 2 it is specified which data from this project was used for the research questions one (Paper I) and two (Paper II). All data from Table 3 was used to address the third research question (Paper III). Detailed presentations of how the data collections were carried out within each study is given in the individual papers.

Time	Activity
Feb-Mar 2004	Various meetings with EPR project workers in Hospital A
Mar-Apr 2004	Participant observation at Ward A1 (4 weeks)

**Table 2 Introductory data collection activities**

Time	Activity	rq 1	rq 2
Aug-Sept 2004	Interviews with nurses Ward A1 (5)		
	Interviews with nurses Ward A2 (5)		
Sept 2004	Observation of nursing handovers in Ward A1 (2)		
	Observation of nursing handovers in Ward A2 (3)		
	Participant observation at nurse meeting in Ward A1 presenting results from interviews, plenary discussion and project group selection		
Oct 2004	Observation of nursing handover in Ward A1		
	Participant observation of project group meeting in Ward A1		

	Participant observation at nurse meeting in Ward A2 presenting results from interviews, plenary discussion and project group selection		
Nov 2004	Participant observation of project group meetings in Ward A1 (2)		
	Participant observation of project group meeting in Ward A2		
Dec 2004	Observation of nursing handover in Ward A1		
	Participant observation at nurse meetings in Ward A1 (2) where the recommendations from the project groups were discussed		
	Participant observation of project group meetings in Ward A2 (2)		
Jan 2005	Participant observation of project group meeting in Ward A1 between project groups representatives and ward management discussing a solution of new nursing handovers		
	Observation of nursing handovers in Ward A1 (2)		
	Observation of nursing handovers in Ward A2 (4)		
Apr-May 2004	Observation of nursing handovers in Ward A1 (8)		
	Observation of nursing handovers in Ward A2 (12)		
	Interviews with nurses Ward A1 (6)		
	Interviews with nurses Ward A2 (6)		
May 2005	Participant observation at nurse meeting in Ward A2 evaluating the new routine of nursing handovers		

**Table 3 Data collection activities in the project of nursing handovers**

<b>Time</b>	<b>Activity</b>
Nov 2004	Interview with EPR project manager in Hospital A
	Interview with EPR project worker in Hospital A
	Interview with the head nurse in Ward A1
	Observation of EPR plenary information meeting in the RHA
	Observation of pilot project meeting in Ward A1
	Observation in Ward A1 (2)
Dec 2004	Interview with EPR project worker in the RHA
	Observation of ENCP pilot project meeting in Ward A1
	Observation of ENCP pilot project presentation meetings in Ward A1 (2)
	Interviews with nurses in Ward A1 (9)
Jan 2005	Observation of ENCP pilot project meetings in Ward A1 (2)
	Observation of nurse meeting in Ward A1 solving ENCP case
Feb 2005	Interview with ENCP project manager in Hospital B
	Interview with ENCP project manager in Hospital C
	Interview with head nurse in Ward B1
	Interview with assistant head nurse in Ward C1
	Interview with nurses in Ward C1 (2)

	Observations in Ward A1 (2)
	Observations in Ward B1 (2)
	Observations in Ward C1 (2)
Apr 2005	Observation of ENCP pilot project meeting in Ward A1
	Observation of nurse meetings in Ward A1 solving ENCP case (2)
	Observation in Ward A1
May 2005	Interview with EPR project group in Hospital A
	Interview with research nurse in Ward A1
	Interview with nurse in Ward A1
	Observation of nurse meetings in Ward A1 solving ENCP case (2)
	Observations in Ward A1 (3)
June 2005	Interview with ENCP supplier
	Interview with EPR project worker in the RHA
	Interview with EPR project manager in the RHA
	Observation of ENCP pilot project meeting in Ward A1
	Observation of meeting in ENCP project in the hospital trust
	Observations in Ward A1 (4)
July 2005	Observations in Ward A1 (2)
Aug 2005	Interview with ENCP project group in Hospital B
	Interviews with ENCP project manager in Hospital C (2)
	Interview with assistant head nurse in Ward B1
	Interviews with nurses in Ward B1 (2)
	Interview with nurse in Ward B2
	Interview with assistant head nurse in Ward C1
	Observations in Ward A1 (3)
	Observation in Ward B1
	Observation in Ward B2
	Observations in Ward C1 (2)

**Table 4 Data collection activities in the project of electronic nurse care plans**

For both the project of nursing handovers and electronic nurse care plans, informal discussions and talks with nurses, the ward management were carried out. Furthermore, documents, emails, minutes, guidelines and procedures were additional data sources. This is not included in the tables above, but was carried out to collect rich data of the context.

#### **4.2.4 Challenges**

Data collection was not without challenges. I will address two challenges below. First, there was a specific issue emerging during the practical carrying out of data collection within the

project of electronic nurse care plans. Here, using ENCP became a problematic issue for the nurses resulting in most nurses not using the system at all. This made our planned observations of the practice of using ENCP difficult to carry out. The other challenges relate to more general issues in a methodological discourse, but which nevertheless were experienced in this project as practical challenges when carrying out data collection. First, it was the difficulties of grasping, representing and presenting the empirical world in study as processes. Second, it was the role and use of theory and theoretical concepts during data collection.

#### **4.2.4.1 A problematic project**

At the outset of the decision and allowance of following the ENCP project I wanted to follow the progress of how the nurses started to use the system as well as the management of the project. The former would then involve participant observation in the ward following nurses in their daily practice finding ways of using ENCP in their practice. However, already in the first presentation of the ENCP in the ward it was clear that it was not straightforward how to use the system in practice. Other studies have shown the ambiguities in the rationale behind this system building on a rather idealistic way of working (e.g. Allen 1998). In addition to documenting in another way, the ENCP also would involve nurses using the computer to a greater degree than before. The ward addressed this with buying more computers to increase computer availability. However, there were issues of slow response-time and down-time as well as low confidence in general computer skills which made the issue of using computers to a greater degree in practice complicated and problematic. The ward management also saw the ambiguities and difficulties and chose to let the nurses start to use the ENCP in a gradual manner. In practice, this resulted in most nurses not starting to use the ENCP at all.

We were there as researchers to follow the use of ENCP, of which the nurses had been informed. At the same time, many nurses clearly experienced a great tension of continuing as usual, but knowing that at one point they would start use ENCP because they were all becoming paperless no matter what. Because most nurses were not using it, it was a practical consequence that it would be difficult to carry out the intended observation of the practice of using it. However, this was also an ethical choice of not bothering the nurses unnecessarily. As Giaver (2007) found, also using ENCP as a case, the anticipation of change involved significant emotional experiences.

The challenge was solved by doing some participant observations with nurses who were particularly engaged with care plans and ENCP, focusing more on the management of the project and how nurses experienced this.

#### **4.2.4.2 Capturing the process**

It is not easy to study processes. First, there is the challenge of grasping it and in some way representing it. Second there is the challenge of presenting it that does justice to the complexity and dynamic nature of organisational processes which occurs in a context of multi-level influences.

The two main methods for data collection were interviews and (participative) observation. In the interviews it was useful to answer how-questions and get the participants to tell stories about what happened in a specific routine or project. This would then constitute the main process of which I was trying to understand, and a structure in the interviews of which emerging issues could be related to this process. Furthermore, it was sought to either bring in concrete examples from observations, or to ask the participants themselves to explicate their answers and reflections with examples from practice.

As for the observations the greatest challenge was to make sense and take field notes from a process perspective on the phenomena, or in other words, choosing what to observe and how to make field notes (Tjora 2006). Tjora argues that on a theoretical level, it is easy to say what to observe, but:

*“However, because of constraints in any observer’s ability to observe, a more or less tacit ‘significance filter’ is applied, by which some events in a setting are noted while others are not” (Tjora 2006, p. 433).*

It is impossible to take notes of everything. In addition, from a process perspective, every note that is taken is a reification of a process that never settles down but which is ongoing and never-ending. Verbs are crucial to be able to describe processes, because the use of nouns impose stability into what is being observed which is exactly the opposite of what a process perspective on organisations assume (Weick 1979). As Weick argues:

*“If students of organizations become stingy in their use of nouns, generous in their use of verbs, and extravagant in their use of gerunds, then more attention would be paid to process and we’d learn about how to see it and manage it” (Weick 1979, p. 44).*

As for presenting the data there was a challenge of both form and space in the writing of academic papers for scientific journals which have preset constraints of length and presentation. While diagrams could be of help, it is not straightforward to explain a process with “boxes and arrows”:

*“The structure of such theories cannot be easily depicted pictorially by boxes and arrows, and includes many more circles and loops in the midst of a timeline with critical events depicted. In fact, a static pictorial representation just does not do justice to this type of theory and it requires much more animation. I vividly remember the elaborate and deft hand gestures that Wanda Orlikowski skilfully used at an ICIS session in the 1990s to explain structuration” Sawy (2003, p. 593).*

In this thesis I lean on the textual format to present the result which builds on the assumption that the phenomena in study are of processual nature. Here, I describe patterns of the processes in study as suggested by Weick (1995). As for the studies of nursing handovers, this involved looking at how these tended to unfold in similar ways as a process of interaction, but nevertheless being different each time in order to fit the specific situation. In the project of electronic nurse care plans, the processes in study were not a routine of work practice, but of processes of making sense of the project as it unfolded. These processes were described as patterns coevolving within a multi-level environment.

To avoid descriptions that were too lengthy, I had to focus on certain aspects of the process while other aspects constituted the dynamic context in which this process was embedded. In this way I tried to balance the tension of making simplifications while preserving the complexities of the phenomena. The description of patterns helped me to do this. I also exploited the symbolic interactionist notion of enquiries becoming more focused while remaining open to emerging issues and continuing to be holistic.

#### **4.2.5 Ethical considerations**

Ethical considerations need to be an integrated part of any research project. During my PhD-project I experienced some ethical issues which I needed to deal with in a reflexive way. I want here to discuss three matters of which were particularly important in this project. These were the management-employee tension, the anonymity of participants and the confidentiality of patients.

First, the management-employee tension was about the tension between practising nurses and their management in the ward and hospital. Both the projects of which my empirical studies were a part were “change projects” with one or more goals. Both projects had some intentions that were related to increasing quality and efficiency of work practice. Furthermore, the initiative for both projects was from management. Also, I was accepted into the field by management. In this way, my presence and involvement was related to what the nurses believed management intended to accomplish with the projects. Particularly in the project of nursing handovers, this was counteracted by stressing that it was supposed to be a democratic work project where the nurses themselves would be involved in the discussions and decisions of what to do with the routine. Still, I got reactions from some nurses that, when observing handovers, asked “so you are going to see how much we jabber now?”, not in a hostile way but more in an insecure way. I had to continuously point out, in the field when observing handovers, that I had the perspective that the handovers filled many functions and it was important to take time to discuss and talk together, and that I was critical towards making changes for efficiency alone. Furthermore, that my aim was to understand how *they* solved their tasks and in this way acknowledge that nursing is about quality and not only efficiency. Further, when I was taking notes from the handover and the conversation turned informal about social themes that were not related to the patient care, I would put down my notebook, overtly shifting my attention away from the chat or sometimes join the talk. Managing identity and self-image is crucial throughout the involvement in the field (Waddington 2004). This is to avoid uncomfortable and obtrusive situations for the participants as well as to mediate informative and open participants.

Related to the issue of management-employee tension was the issue of intervention. In both projects I agreed to contribute with my view and reflections in discussions at the wards and in the hospital. This was a motivation for me in that I could contribute to challenging both nurses

and management around the different aspects of this project. Through my involvement in this the reactions to were very positive, and it was expressed from both nurses and management that they too had learned from us and started to think about things they hadn't thought about that way before. Nandhakumar and Jones (2002) argue that participant observation may influence the phenomena he or she is studying, and that by behaving as any ordinary member may reduce the implications of this problem. However, my approach was that I would not reduce my influence per se, but to remain reflexive about it, and stress having a neutral role of mainly trying to understand what went on. Furthermore, my contribution in the discussion would be mainly asking questions and telling others about how I understand how things were happening.

Written approvals to conduct both projects were obtained from the wards, where anonymity and confidentiality of the respective wards and participants were promised. The anonymity of the participants was pointed out in the outset of the field involvement and prior to interviews. Here, it was also stated what the results would be used for. Any signs of the identity of participants and facilities were eliminated from interview transcripts and recordings were deleted after they had been transcribed. Participants could withdraw at any time during the interviews or if they said or would say something which they would have recorded they could ask me to delete this from the transcript or turn off the recorder. This did not happen.

Prior to this research project the hospitals' patient confidentiality form was signed. Confidentiality of patients was guaranteed through not recording any signs of the identity of these. In the introductory participant observation, when I followed nurses in the wards, patients were informed that I was an assistant to them. Here, I also helped with what I could and what the nurse told me that I could do. Further, in the later observations, patients were informed that I was a researcher following nurses in their work and the role of EPR in this. In this way, the patients did not experience that I was studying them. However, both the nurses and I were continuously assessing the appropriateness of not causing the patients any unnecessary stress. In some situations I would wait outside the patient room because the patient was having a particular hard time psychologically or physically. However, it is worth to stress that this part of the observations played a contextual role in my studies, and the field notes were taken in order to illuminate the work of the nurses, as examples that would not threaten the anonymity of patients.

### **4.3 Data analysis**

Following that little was known in advance of how nursing handovers could be understood when carrying out the first study addressing the first research question, a Grounded Theory-inspired data analysis technique was applied in order to explore and capture the richness of the data. Here, data was coded by content, moving from open coding to axial coding (Strauss and Corbin 1998, Charmaz 2003). Here, I categorised actors which nurses were taking into account when reporting verbally and documenting in the patient records, and how taking these into account constituted the practical accomplishment of nursing handovers. For example, nurses took into account the patient both when reporting verbally and documenting in the patient records. To accomplish the sharing of pertinent information, which sometimes included uncertain information about a possible diagnosis, this was discussed verbally with the next nurse in the handover and not documented because the patient could ask to read his or her record. Knowing about an uncertain diagnosis would only inflict the patient with unnecessary concerns. Through this analysis I tried to understand patterns of how nurses tended to construct their acts in similar ways across different handovers. In Paper I the data analysis are presented in more detail.

For the second study, it was possible to start the data collection with more focus and analyse data continuously to understand at an early point what seemed to be the critical changes in play. At the same time, also here it was aimed to remain open to emerging issues. Addressing the second research question, changes to nursing handovers as a process of interaction following the new routine of “nearly silent handovers” was considered in the data analysis. In the data analysis, the “nearly silent handovers” were analysed as a process of interaction between nurses coming onto their shift and nurses ending their shift similar to the first study. However, I paid particular attention to how the work practice of nursing handovers changed from the adjustments in the processes of interaction that actors carried out. The data analysis is presented in more detail in Paper II.

As for the third study, the data analysis was somewhat different than for the first two studies. Here, addressing the third research question, I sought to understand how the change progressed as processes of interaction within a period of time and on different levels influencing each other. To understand this, it was necessary to understand and make sense of how the overall patterns that emerged from the interaction shifted into new patterns which

were qualitatively different from the old patterns. Here, I employed the theoretical framework of complexity theories, because it provided a rich set of concepts to make sense of patterns and change. In this process, intuition played an important role:

*“ [...] it [Intuition] is a universally recognised subjective component of scientific discovery. It is the intuitive faculty that makes sense of diverse data and brings them into a coherent pattern of meaning and intelligibility, though of course the analytical intellect is also involved in sorting out the logic of the intuitive insight. What is not practised in science is the systematic cultivation of the intuitive faculty, the capacity to recognise the coherent wholes that emerge from the related parts. However, the study of emergent properties in the science of complexity clearly requires use of the intuition in high degree” (Reason and Goodwin 1999, p. 288).*

In the analysis I identified actors' meanings around the intention of becoming paperless in relation to the ENCP projects at different levels in the organisation. The process of how these meanings evolved was then followed, embedded within a multi-level context. Patterns of these meanings were identified, which constituted the main structure of the findings which sought to give a detailed account of how these patterns emerged. The data analysis for this study is presented in more detail in Paper III.

## 5 Findings

In this chapter, the main findings from each paper are presented.

### ***5.1 Findings from Paper I***

The symbolic interactionist perspective contributed to understanding the implicit process of how actors are constructing their lines of action in relation to each other using the notion of the 'I' and 'me' (Mead 1934). While these interpretative processes were evident in face-to-face interaction, they were also influential when using patient records to create texts that were made available to other actors across time and space. Analysing what comprised the 'me' when documenting in patient records illuminated the fact that other actors both constrained and enabled the act of documenting. It was constrained in that because patient records were potentially read by many different actors, actors left out certain information. It was enabled in that a perception of the audience formed what was perceived as necessary to include. In relating this analysis to the accomplishment of the work tasks of nursing handovers, we were able to consider if patient records could support the practice or whether it would fail to do so.

When reporting face-to-face and documenting in patient records, nurses were taking into account patients, nurse colleagues, the court of law and physicians, where the first two were the most essential in relation to accomplishing nursing handovers. The findings did not indicate differences in how these were taken into account when using the EPR and the paper-based part of the patient records, but important differences were found between interaction face-to-face and using the patient records, both electronic and paper-based.

First, this was related to taking nurse colleagues into account in nursing handovers. In face-to-face overlaps the next nurse taking over responsibility for the topical patient could be identified and be available for continuous feedback ensuring customisation of the content. Pertinent information needed to be constructed in this process where the next nurse in particular entered the 'me' of the reporting nurse, guiding the acting 'I' continuously. When documenting in patient records the next nurse was distributed in time and space and was not available for continuous feedback.

Second, the other important difference was related to taking the patient into account in nursing handovers. When documenting it was taken into account that the patient could read

the patient record if he or she requested this. Therefore, nurses did not document information that was subjective or uncertain. However, because this information could be crucial for further observation, nurses shared this in the face-to-face overlaps.

The findings indicated that patient records alone would hamper the accomplishment of nursing handovers. Hence, there was still a need to complement interaction mediated by patient records by face-to-face interaction.

## **5.2 Findings from Paper II**

Using a symbolic interactionist perspective to study how the interaction processes had changed, it was possible to understand changes in and around the work task of nursing handovers. Particular attention was paid to how a heedful practice was supported, employing the notion of 'heed' related to the degree of awareness of the interaction patterns of which the actions are a part (Weick and Roberts 1993). In this way, implications for patient care reliability were assessed following the implementation of "nearly silent handovers".

In the new routine nurses used patient records to greater degree in day-to-evening nursing handovers, but continued to complement this with use of face-to-face overlaps. However, nurses expressed that they tried to convince themselves that what they had documented would be understood. From a symbolic interactionist perspective, the findings showed that nurses were now more aware of the next nurse when documenting, and striving accordingly to include what they believed was necessary for the next nurse to know. However, nurses had particular needs in relation to their general experience, experience with the clinical picture at hand and familiarity about the topical patient. Therefore, information was not customised in the same efficient way as in face-to-face handovers where the particular next nurse gave continuous feedback of his or her particular needs. There were occasions where the nurse ending his or her shift left before the nurse coming onto his or her shift had the chance to talk him or her. The nurse who had left then chose to be content with what was documented trusting this as being what was pertinent for the next nurse to know. However, sometimes the next nurse in particular had needs that were not foreseen at the time of documenting. This undermined a heedful practice and threatened patient care reliability.

Although the new routine reduced overtime, which had been a recurrent problem for day-to-evening handovers, efficiency in total was not clear for two reasons. First, nurses spent more

time documenting because when patient records now suddenly were used for two thirds of the overlap, they put more emphasis in trying to include what was necessary for the next nurse to know. Second, a nurse coming onto their shift that was not familiar with the patient was less efficiently brought up to date. This was because it was more difficult and time-consuming to get a sufficient overview reading in the patient record than it was compared to the customised résumé possible in face-to-face handovers.

In addition to continue providing space to ask questions and repeat important information, verbal overlaps continued to be essential to communicate certain kinds of information. This was for example tentative information in relation to psychosocial matters. Although nurses now tried to document also this kind of information in patient records, using positive formulations and avoiding subjective statements (“The patients says..” rather than “I believe..”), it was both easier and more appropriate to discuss this face-to-face. Actually, nurses expressed that the new routine made it easier to discuss sensitive matters because now only the next nurse was listening and not the whole next shift. Furthermore, it was easier to make sure that the nuances and importance of this information was understood by the next nurse.

Hence, to ensure that nursing handovers continued to maintain patient care reliability across shifts, nurses still needed to balance their use of patient records with face-to-face overlaps. Leaning too much on patient records would threaten the successful communication of pertinent information which needed to be constructed in a process of continuous feedback from the next nurse.

### ***5.3 Findings from Paper III***

By adopting a perspective of sensemaking we were able to see how the actors at different levels in the organisation constructed meanings of the project goal of becoming paperless by connecting this to cues and frames in the micro- and macro-environment (Weick 1979). Using coevolutionary theory we were provided with a language of looking at patterns coevolving, and in this way understanding change as a process where planned intentions and emerging aspects influenced each other in a reciprocal way (Lewin and Volberda 1999, Volberda and Lewin 2003). Furthermore, we understood that the project goal of becoming paperless did influence the actual progress of the project and the resulting organisational change, but that the goal itself changed during this time. Hence, managerial deliberation did affect how local

managers and users made sense and acted in relation to the project and the ENCP itself, but this again affected how project managers understood this project goal and how they acted in relation to managing the project. Still, on a fundamental level, the coevolution of project goal meanings is unpredictable and no one alone is in control. In addition, factors outside of the organisation influence the sensemaking, and in this study this strengthened the connection to efficiency and obligation rather than to professional arguments.

Four patterns of the meanings of the project goal of becoming paperless were identified as emerging during the implementation of the ENCP project. These were ‘choosing ENCP in a paperless future’, ‘no choice but to become paperless’, ‘on the way to becoming paperless’ and ‘just have to do it’. These patterns were connected to different aspects in the micro- and macro-environment. While the project started out with clear arguments about benefits for quality and efficiency, eventually, users, mid-management and project managers, were mainly concerned with “throwing away the papers” as an empty slogan that would solve all other practical problems which was experienced and lead to benefits in practice. However, it was not clear how this would happen, and it became important for the wards to present oneself as being successful of becoming paperless as well as experiencing that this was something good for ward practice. The ultimate reason for ENCP was a number of intentions regarding improved quality and efficiency, while the proximate reason was to become paperless. However, during the carrying out of the project the proximate reason supplanted to ultimate reason. In this way, the actual benefits of implementing the ENCP were left to chance.

First, at the time of developing the ENCP, ‘choosing ENCP in paperless future’ indicated that ENCP was chosen as a solution for electronic nursing documentation within the context of new legal requirements of documentation and future paperless hospitals. In addition, there were professional arguments for choosing this solution in particular. Secondly, at the time of starting up the introduction projects in the hospitals, ‘no choice but to start using ENCP and become paperless’ reflected the fact that ENCP became a part of the EPR project. The strong focus on EPR as a mean to become paperless put the professional arguments in the background. The ENCP projects came to be strongly associated with the mandatory transition from paper to electronic documentation, and the nurses were not whole-hearted in engaging in the professional benefits of using ENCP, suspecting that they had to use it because it was available and that they had to, and not because it would benefit them in their practice. Benefits were more connected to efficiency of which received much attention in this period in

the health sector in particular and in society in general. This was related to technology as a mean towards progress and modernisation, as well as New Public Management in applying business economical principles in public organisations.

The third pattern, 'on the way to becoming paperless' was evident in the first time of starting to use the ENCP in practice. However, many did not start using it, and problems were experienced on how to use it and whether it would be useful in practice or just a lot more work in front of the computer. This caused local managers in particular to relax the ambition of becoming paperless and allow a 'phase of transition' where nurses were given time to figure out to use the ENCP in suitable ways in their practice. The fourth pattern, 'just have to do it', resulted from increased pressure from project managers that now nurses just had to start using it in practice. Still, there were many ambiguities regarding how to use it and how it would benefit nursing practice. These difficult issues disappeared into the background when nurses and local managers now were mainly concerned about starting to use it to present oneself as having started to use it and having "thrown away the papers" rather than what this meant in terms of practical benefits.

It was argued that a greater sensitivity of the coevolutionary processes of the project goal meanings would enable managers to take corrective actions so as to not leave the actual benefits to chance. Being aware of these patterns would facilitate an environment in which one could to a greater degree appreciate and make use of influence moving back and forth from management intentions and practical implementation in the wards.

## **6 Discussion**

In this chapter I discuss the findings in relation to the research aims presented in the introduction of this thesis (1): To study organisational change in relation to ICT and consider the role of managing organisational change in the carrying out of ICT projects. The goal of this chapter is then to make a coherent argument of how to understand and manage organisational change in relation to ICT from the adopted theoretical perspective of this thesis, which acknowledges the complexity and unpredictability of the processes that constitute organisational change in relation to ICT.

What permeates this discussion is how the role managing change needs to be reframed within the adopted theoretical perspective. Following this perspective, I address interpretative processes of interaction embedded in a multi-level context where change emerges unpredictably in the shape of patterns which are qualitatively different from previous patterns. Focusing on process, multiple levels and unpredictability challenge some of the core premises of how the role of managing change is traditionally understood. When acknowledging this complexity of organisational change in relation to ICT, the role of managing change needs to be more about understanding change.

First, I discuss the importance of understanding interaction at the micro-level and the implications for how to manage change (6.1). Then I discuss the importance of paying attention to and understanding how interaction at the micro-level is embedded in a multi-level macro-environment as well as what this means for the role of managing change (6.2). Then, theoretical contributions are pointed out (6.3). Lastly, limitations are considered (6.4).

### ***6.1 Making sense of the micro-level***

The strength of descriptive accounts of technologies in practice is their ability to provide a detailed understanding of how the technology is actually used and how it supports work practice, and how changes emerge from the reciprocal influence of technology and organisational processes. In this section, I discuss how managers can make sense of the unfolding process at the micro-level, and consider the implications for the role of managing change. The main argument is that managers need to continuously address how the technology supports work practice based on an actual understanding of the emergent process of change. This implies analysis of work practice prior to developing and introducing

technology, so that initial ambitions are realistic. However, it also implies continuing to focus on, during and subsequent to the process of introduction, how the technology is integrated into practice in ways resulting in the realisation of benefits. This approach implies a role of managing change that builds on closeness to the micro-level, and that managers and users cooperate to inform each other to find ways of proceeding which facilitate the realisation of benefits, intended or unintended.

In this thesis, I have addressed one way of investigating how technologies are an integral part of interactive work practices, using a symbolic interactionist perspective to understand how actors take each other into account in work tasks which require interaction and cooperation in and across time and space. This follows the need of considering interaction mediated by ICT where benefits in one place are dependent on a joint accomplishment where other actors also contribute. In this thesis, I am concerned with projects that exploit this potential of ICT to collect, store, process, present and distribute data across time and space to inform actors, enabling them to interact and cooperate in new ways that benefit the organisation. For example, projects of implementing Enterprise Resource Planning systems (ERP) in organisations are usually accompanied by intentions of how the information system (IS) should be used in order to achieve changes in practice that result in some benefits for the organisation. For many users, this implies that they need to modify how they carry out their tasks, for example by having to enter new information or information in new ways into the system so that other users can use this information in order to carry out *their* tasks. Because IS projects usually involve purposes that depend on the interaction of actors across different sites, it is essential to address the ways of which awareness of this is a part of the local sensemaking. This is because actors act in relation to how they take each other into account, i.e. the reflecting 'me' is guiding the acting 'I' (Mead 1934). To accomplish the joint work task of two actors, it is crucial that the first actor is aware of the needs of the other actor, so that he or she can take this into account and put in information that supports the next actor in his or her part of the joint task. This point is made by Berg and Goorman (1999) in that extra work needs to be invested one place in order to serve a purpose which extends this local situation.

Nursing handovers were examples of a work routine that required cooperation of actors across time and space. This routine extended the two local situations of nurses ending their shift and nurses coming onto their shift, and required participation from both to solve the task. The first study of nursing handovers involved looking at face-to-face communication and the use of

patient records to accomplish the routine. In this way, it was possible to consider the way in which how employing Electronic Patient Records (EPR) to a greater degree, possibly replacing face-to-face communication, could support the accomplishment of the task in practice. EPR are information systems (IS) that exploit the potential in various ways to coordinate actors in the organisations both in and across time and space are (Berg and Toussaint 2003, Svehnigsen 2002). Using a symbolic interactionist perspective proved to be a useful perspective for obtaining a detailed understanding of how the “taking into account of others” worked as a premise for the interaction from which the nursing handovers emerged. The handovers were never equal, and each nursing handover unfolded adapting to the particular issues at hand. Therefore they were inherently unpredictable in detail, but notwithstanding tending to unfold in patterns showing similar qualities to previous handovers. In this way, it was feasible to study the patterns of what constituted the ‘me’ in nursing handovers when using patient records and when reporting verbally, that guided the acting ‘I’ in a way that promoted the accomplishment of the task. It is also worth to point out that the fact that the findings did not indicate major differences between paper-based and electronic IS was because electronic patient records in terms of nursing documentation was mere a mirror of the paper-based version. This indicates that more important than the technology itself is how it is embedded within the organisational practice where actors take each other into account in order to solve their practical work tasks.

So, thinking about how the technology needs to be integrated into an interactive work practice is necessary when developing new technology and deciding how the technology can support work practice in beneficial and realistic ways. In order to understand what actually goes on, the practical work context needs to be addressed. This follows the argument of for example contributions from CSCW where the agenda is to design technology that actually supports the users in their practice, building on a detailed understanding of the work practice (Bannon 1998). The first empirical study is an example of using an understanding of the micro-level to make decisions of how technology should be introduced to support actors in accomplishing joint tasks. Here, the decision of choosing a “nearly silent handover” in the wards was informed by the argument of the need to complement the use of patient records with informal and face-to-face practices to ensure the accomplishment of the task.

Considering the awareness of actors who need to cooperate using the ICT in and across time and space is one way of addressing a fundamental premise of what guides interaction. Hence,

this is a way of bringing focus to important forces that “pull” action, at the same time as acknowledging that actions are allowed to emerge in the local context through actors taking other actors into account to solve the tasks at hand. So, using the symbolic interactionist perspective to analyse and understand a work practice provides important insights for how to manage change acknowledging the need for change in practice to emerge unpredictably. Furthermore, focusing on “why” complements focusing on “how”, where the latter implies the implementation of a prior plan or blueprint of how the technology will be used in practice. This stands in danger of ignoring the need for plans to be situated and adapted to the local situation (Suchman 1987). Furthermore, a main focus on “how” to use technology in ICT projects implies an approach towards change that is more of “pushing” rather than “pulling” change in practice. Focusing on “why” through analysis of how actors take each other into account to solve work tasks is one way of considering how change in practice can be allowed to emerge, without straining an established and well-functioning interactive practice with predefined instructions. Lastly, when focusing on *why* actors need to use the technology in certain ways to support other actors across time and space, benefits that are dependent on the actions of these actors being carried out in cooperation are more likely to be realised.

However, having explored the patterns of the interactive processes that constitute the cooperative work practice and used this to indicate how technology may support this practice, it is necessary to take into account that the actual implementation of technologies in organisations is an emergent process with inherent unpredictability. Here, users experiment with different ways of using the technology and make sense of how this supports their work practice. Managers need to contribute maintaining a focus on “why” complementing “how” to use the technology, exploiting the potential of how actors understanding why can pull change in how actors act. In this way, the realisation of benefits is not left to chance alone but continue to be monitored and evaluated. Following the introduction of “nearly silent handovers” in the second empirical study, it was evident that nurses became aware of the next nurse being more dependent on the information in the patient records, and therefore put more emphasis into constructing the information. An important factor in building this awareness emerged from the fact that nurses were switching between taking the role of ending their shift and coming onto their shift in nursing handovers. Here, nurses experienced themselves the importance of accuracy and completeness to what was documented, and in this way strived to fulfil this when they themselves were documenting. This feedback mechanism which entailed awareness of actors distributed in time and space is not always present in the same way in

other settings, and hence needs to be addressed with more care here. Mechanisms of feedback should be considered both to establish but also to maintain the appropriate awareness guiding behaviour that facilitate the accomplishment of work tasks mediated by ICT where actors are distributed in time and space. Hence, how the project progresses according to the initial plan and intentions is no longer the central issue, because both plans and intentions need to change during the process.

In the study of the ENCP project, problems in how to find ways using the ENCP to support actors in their work practice during the implementation only resulted in “how” to use the ENCP becoming disentangled from “why” this would support actors in their practice. In other words, the rationale of having the technology put into use faded away with the main concern being to have the system put into usage without no clear picture of either rationale nor benefits. Managing change is then about instructing users to use the technology, with too much focus on “how” and too little focus on “why”. To avoid leaving the realisation of benefits to chance, managers should have exploited an actual understanding of the local processes of using ENCP in practice to make sense of how they could deal with this. Managers informed by these patterns can act in ways in which is not experienced by users as far away or remote from where the shoe pinches in practice. In the ENCP project the lack of this led the project rationale to end up empty other than becoming paperless in terms of achieving a computerised practice. Still, what is often seen in practice are ICT projects carried out without anyone knowing whether it paid off or not.

## ***6.2 Making sense of the micro- and macro-level***

In the previous chapter it was argued that managing change needs to be about focusing on mechanisms of awareness which guide or pull interaction in the micro-level work practice. In this chapter I discuss how interaction at the micro-level is embedded in a multi-level macro-environment, and how the role of managing change needs to incorporate this. In this thesis, I focus on change within the implementation of ICT projects in the organisation which constitutes the proximate context of the unfolding changes. Furthermore, these projects are embedded within a wider context. Hence, the acts of both users and managers need to be understood in relation to the environment of which they are embedded.

From implementing “nearly silent handovers” it was evident that alongside nurses being more aware of the next nurse when documenting, they were trying to convince themselves that

patient records were now the most important mediator in handovers from day-to-evening handovers, and that what they had written would be understood by the next nurse, not having to repeat everything. This was an emerging issue in this study, and it was indicated that this change was related to nurses making sense of the changes in relation to a managerial or professional logic of maximising information content and minimising time spent on information exchange to improve the quality and efficiency of nursing handovers. This is suggested to be a dominant logic in a nursing discourse (Hopkinson 2002). These issues seemed to be an important part of actors' sensemaking during the period of which the patterns of awareness in nursing handovers were changing. Hence, it is necessary to consider not only micro-level influences, but factors from the macro-level enacted in the micro-level sensemaking.

An important aspect of these macro-issues for users are project goals and intentions which were studied in depth in the case of the ENCP project. Here it was found that project goals were a part of the meanings which the actors constructed in relation to the project and the technology. Therefore, users were influenced by managerial intentions in the process of trying to incorporate the technology into their work practice. This answers the criticism of bottom-up and decentralised perspectives of organisational change not considering the role of the change agent and the normative implications of how to manage change (Caldwell 2005, Dery et al. 2006). Change emerges out of the unfolding patterns of interaction (Snow 2001). However, in this thesis I have considered how the actions of managers, for example project goals communicated in various ways, are a part of the context of which the creation of meanings which is forming the unfolding interaction. This also constitutes a path bridging the gap between planned and emergent change, acknowledging that change is both planned and emergent at the same time.

It is crucial to stress that the influence of managerial intention is dynamic and changes as the project unfolds, because the meanings coevolve with other aspects of the macro-environment and the micro-level processes of using the technology in practice. Through studying patterns in the meanings of for example project goals, it is possible to understand how these goals change in the ways of which they are made sense of by actors in the organisations. In this way managerial deliberation and emergent change reciprocally influence each other. Managers influence the project, but they are not in control of how they influence. However, this does not mean that it is not possible to make sense of the patterns which are unfolding. Hence,

managing change, taking into account that change emerges unpredictably through the processes of interaction, is about paying attention to the unfolding patterns and exploiting this to be better informed when, as Weick and Quinn (1999) argue, redirecting what is already under way.

Actually, in the carrying out of ICT projects, the proximate context in which managers were embedded is the project itself and associated imperative of having the project carried out. In the study of ENCP, this included becoming paperless and putting the system into use. It was evident that this influenced managers during the ENCP project implementation, and in particular as the project proceeded with more extensive use pending. This can explain to some degree why the managers focused so strongly in the wards starting to use the ENCP even though the benefits for practice were unclear. While managers initially focused on issues of “why”, they did not pay sufficient attention to how this needed to be adapted according to the unfolding process.

To understand how the change evolved in practice we also need to see the local sensemaking in relation to the wider context in which this change is embedded. This means that there are issues influencing in the macro-environment which are outside the project and also the organisation. Blumer refer to “others” as covering not only other actors, but abstract and concrete social and physical objects (Blumer 1969). Gopal and Prasad (2000) and Prasad (1993) use the symbolic interactionist perspective addressing meanings in the more general and all-encompassing way to investigate how symbolic meanings of technologies influenced the adoption of the technology in practice, for example in terms of professionalisation. In the local processes of making sense of the project and the ENCP in relation to the micro-level practical work situation, nurses made connections to different aspects in the context of which they were embedded. This was in relation to the computerisation of hospitals, the professional nursing context, New Public Management in the health sector, the role of technology in society and legal concerns. This influenced how they acted in relation to the project, and hence how changes in practice evolved. How this happened was not a concern of managers. In the ENCP project an awareness of this would have enabled managers to address the fact that nurses became more concerned about the ENCP as something they had to do independent of whether it benefited practice which eventually left this to chance. In the case of “nearly silent handovers” an awareness of how nurses seemed to adopt a logic where verbal overlaps eventually would be abandoned altogether, would enable managers to redress verbal overlaps

as a necessary complement to using patient records in nursing handovers. Therefore, it is argued that managers need to increase their awareness of how they explicitly or implicitly communicate a rationale for carrying out the project and introducing the system, which also extends beyond the project itself, because this will influence how actors elsewhere in the organisations act in relation to it and therefore how the change unfolds.

In fact, managers themselves are also embedded within a larger context. Initially, choosing the ENCP as a methodology on which to base nursing documentation the sensemaking was influenced by an idealistic image of nursing from a school of thought within the nursing profession concerned with improving the status of the profession by making their work and knowledge visible (e.g. Allen 1998). As Gosain (2004) suggests, the technological solutions may make more cosmopolitan than local sense due to institutional influences. Furthermore, there is a need for decision-makers to be more aware of these significant institutional pressures. Examples of such influences are technology as representing progress and modernisation and in this regard being inevitable. Furthermore, there was a belief in technology itself to solve problems and “cause” change. Markus and Benjamin (1997) showed that this way of thinking still seemed to be the case for the majority of practitioners. Hence, the belief in technology as a “magic bullet” is surprisingly prevalent. In the ENCP project, the belief in technology as means to modernisation and progress was a part of the context in which the project was initiated and implemented, but this was combined with the influence of new public management (NPM) in health care, where the application of business economical principles force a focus on costs and efficiency, legal requirements for documentation where health personnel, including nurses, are obliged to document patient care (Health Personnel Act 2001), as well as professional arguments for how information and communication technologies (ICT) can be employed for the benefit of professional development and patient care (Moen et al. 2002). Becoming more aware of the wider contextual influences in which managers are embedded should be seen together with how other actors are influenced by this.

Following the argument of managers needing to increase their awareness of their own as well as other actors’ sensemaking in relation to micro- and macro- issues during the project, the role of managing change is both empowering and balanced. It is empowering in the sense of becoming aware of how one’s own and others’ actions are influenced by the context in which one is embedded, and how one’s own and others’ actions are influencing other actors in that it becomes a part of the context of which they make sense and act in relation to. Of course, not

only managers, but actors elsewhere in the organisation are also empowered and participate in the unfolding change and in constructing their own work situation (Beeson and Davies 2000). However, the role of managers should not be downplayed due to this reason, but made more balanced and realistic. Change is not either planned or emergent but both planned and emergent at the same time. In this way, managerial acts take on a different meaning than traditional top-down instructions as they themselves participate in a process of interaction from where changes emerge. As Weick and Quinn (1999) suggest, change can be about redirecting what is already on the way. This implies realising that the project unfolds in patterns that emerge from interaction of agents at multiple levels in the organisations. No one is control, yet everybody contributes and influence. However, increasing the awareness of these patterns of which acts of managing change is a part of, enables managers to be more attentive to how the project actually progresses and can use this to continuously take action that addresses important issues that emerge as the project unfolds. In this way, unpredictability is no longer a threat but acknowledged as an inherent part of the process. The intentions and goals need to coevolve with the unfolding implementation, so that the central issue is to follow the process as it emerges and address “why” the technology is implemented to ensure the realisation of benefits in practice, even if these are different than initially proposed.

### **6.3 Theoretical contributions**

The symbolic interactionist perspective was useful to consider how technologies are integrated in a work practice of interacting individuals distributed in and across time and space, and how new technologies or altered use of existing technologies may support work practice. In particular, this thesis has demonstrated the relevance of applying the symbolic interactionist perspective in general (Blumer 1969, 2004) and Mead’s concepts of the ‘I’ and the ‘me’ in particular (Mead 1934). This made it possible to address a fundamental premise of interaction in terms of how the “taking others into account” guides behaviour, and how cooperative interaction in organisations are dependent on the quality of these interpretive processes.

Furthermore, because the symbolic interactionist perspective entails the consideration of asynchronous as well as synchronous interaction, this complements the notion of ‘awareness’ mostly addressed in synchronous computer-supported cooperative settings (Heath et al. 2002). Following the central property of ICT to collect, store, process, present and distribute data

across time and space, enabling actors to change they way the cooperate to accomplish joint work routines, considering asynchronous awareness through a symbolic interactionist perspective can be employed to address important considerations in understanding how ICT is integrated into organisations.

In addition, this thesis has demonstrated how a symbolic interactionist perspective is in accordance with the developments in organisational change in general, in terms of acknowledging organisations as processes, micro- and macro-level influences and unpredictability, and organisational change in relation to technology in particular, in terms of an emergent perspective of the relationship between technology and organisational practice.

Coevolutionary theory (Lewin and Volberda 1999, Lewin et al. 1999, Volberda and Lewin (2003) combined with a sensemaking perspective (Weick 1979, 1995) contributed to understanding change as a dynamic interplay between planned and emergent aspects. In particular, this was useful to consider to role of managing change when acknowledging the complexity and unpredictability of the processes which constitute organisational change in relation to ICT. By studying the patterns of how project goal meanings unfolded during the project, we were able to consider how actors made sense of the project and the technology in relation to aspects in the micro- and macro-level. The approach built on the basis of organisations as consisting of processes, multiple levels of influence and unpredictability as a part of the picture. Furthermore, it built on emergent perspectives of technologies in practice, expanding this to also include influences in the macro-context.

I have demonstrated that complexity theories and symbolic interaction are complementary perspectives. First, complexity theories provided important concepts to pay attention to and make sense patterns that unfold from interaction. Second, symbolic interaction and related theories of sensemaking (Weick 1995) made it possible to capture meaning of action and its consequences for agents as a part of the interpretive process of interaction which Poole (2004) emphasises. This is a contribution in the process of adopting complexity theories, which originate from the natural sciences, in social science.

#### **6.4 Limitations**

Neither of the empirical studies of nursing handovers and the ENCP project linked the sensemaking processes to other actors and project goals systematically to organisational

outcomes. Considering the implications for patient care reliability (Paper II) was achieved through considering whether nurses experienced getting sufficient information during nursing handovers. However, this could have been extended by following the nurses during the whole shift, and maybe also considering how patients experienced the provided care. The reason why this was not carried out in this thesis were limitations in time and scope, in that this would be a time consuming task resulting in a much greater amount of data needing to be analysed. In addition, in accordance with the meta-theoretical and methodological position adopted in this thesis, it is not possible to trace a link of cause and effect in terms of how changes in the handovers affect patient care reliability. There are a vast amount of factors at play which affect patient care, many not having anything to do with changed handovers. Rather, it is here argued for an approach of looking at how some mechanisms can take part in influencing patterns that tend to repeat themselves in similar ways, and how they can have an influence such that these patterns display some new qualities and thereby change in some ways. Lastly, involving the patient directly in the empirical studies would involve many ethical considerations and made the whole project more complex and time-consuming.

Another limitation is that in following changing patterns of interaction, longitudinal approaches are usually argued for. For example, Lewin and Volberda (1999) argue that coevolutionary enquiries should span over longer periods of time. In the studying the ENCP project a longitudinal approach was taken. It can of course always be argued that the process should have been followed in longer periods of time in that ICT projects usually have an interesting history that goes back past the actual start up, as well as when ICT projects end there are still much more time that users continue to find ways of making the use of ICT work in practice. However, again time and scope of this PhD project put limitations to how long the project could be followed. As for the project of nursing handovers, studying the changes in the routine, most of the empirical data was gathered three months following the implementation of “nearly silent handovers”. However, here, I did not leave the field, and paid attention to how the handovers progressed before making the main part of the data collection. The reason for this was that the main ambition here was not to study how the change unfolded, but how nursing handovers were changed from a symbolic interactionist perspective.

## 7 Conclusion

This thesis builds on a theoretical perspective where change is understood as emerging from interpretative processes of interaction among actors, including managers, in the organisation. Within this perspective, managing change in ICT projects needs to be reframed.

Managers should exploit the potential of making sense of both macro- and micro-issues when managing the unfolding change in the projects. Here, managers need to consider with more care how they themselves and other actors make sense of the project in relation to issues ranging from actual work practice to institutional influences. This implies a role of managing change which is both empowered and balanced. It is empowered in the sense that managers need to realise that they have influence and pay attention to how this actually works. Hence, this empowerment goes hand in hand with balancing and being realistic about the role managers can play in change in practice. In other words, unpredictability should be acknowledged as being inevitable, as well as the incontestable fact that actors elsewhere in the organisations, both including middle management and users, take part in influencing the interaction patterns from where changes emerge. In other words, unpredictability needs to be thrived on in that managers can make sense of the unfolding patterns, and how they themselves as well as other actors in the organisation all take part in the interaction from which these patterns emerge. This will ensure that managers do not lose sight in how the actual change is progressing, and increases the likelihood of being able to take corrective acts in order to achieve benefits, planned or unplanned.

As for the micro-context, managers should exploit the potential of descriptive accounts and actual understandings of how technology is and is to be integrated into a cooperative practice of interacting individuals. Making sense of the patterns that emerge from these processes needs to continuously inform managers in managing the change. In particular, I have argued for the importance of addressing issues of “why” to complement “how” in that the former addresses fundamental forces that guides interaction forming the patterns which comprise the actual change. More specifically, this needs to be a central aspect in an approach to managing change taking into account that ICT needs to be integrated into a work practice of interacting individuals distributed in and across time and space from which change emerges unpredictably. Furthermore, it is necessary to address issues of “why” continuously through the implementation of the project, in order to promote the realisation of benefits, intended or

unintended. One way to do this is to focus on mechanisms of feedback between actors distributed across time and space, to facilitate awareness of how acts mediated by ICT are interdependent and require cooperation where acts are carried out in relation to others.

As for the macro-context, managers should be more attentive to how their own and others' sensemaking of "why" the project is carried out is influenced by the context in which actors are embedded. First, this involves acknowledging that users make sense of the project in relation to the reasons for why it is carried out and how it is supposed to benefit the organisation. This also includes factors outside the project and the organisation. Hence, managers influence the emerging change, and as the project progresses managers need to continue pay attention to how this influence evolves. One way to do this is to make sense of unfolding patterns of meanings among actors. Second, managers need to be more reflective about how their own sensemaking is embedded in the organisation and the wider environment. This means being aware of institutional influences at the outset of projects, ensuring that decisions are also based on an understanding of micro-level work practice. Furthermore, as the project progresses it is crucial to be aware of macro-level contextual factors influencing managers to carry out projects which may end up disentangled from the realisation of actual benefits, if managers lose sight of what is happening at the micro-level. Hence, managers need to ensure that during the implementation of the project, managing change should continue to have a basis in an understanding of the actual progress. This also implies that abandoning the project altogether should be an available alternative.

Managing change should focus on making sense of patterns of interaction and the factors that influence the interaction from which these patterns emerge. This implies being more reflective about how actors are acting in relation to each other, and be more attentive to the actual influence when participating in the interaction. Furthermore, it implies being more participative and more oriented towards interacting with the micro-level in the organisation. The realisation of benefits is then not dependent on the success of implementing the plan alone, but also on the quality of how the plan is continuously modified and realised to the emerging process, informed by the actual progress of the micro-level being aware of how this is embedded within a multi-level environment.

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## Papers

### *Paper I*

Engesmo, J. and Tjora, A. Hn. (2006) "*Documenting for whom? A symbolic interactionist analysis of technologically induced changes of nursing handovers*". *New Technology, Work and Employment* 21:2.

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## **Paper II**

Engesmo, J. "*Nursing handovers as a heedful process supporting patient care reliability: the case of 'nearly silent handovers'*". Under revision.

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### ***Paper III***

Engesmo, J. and Mitleton-Kelly, E. “*The Coevolution of Project Goal Meanings: Becoming Paperless through the Introduction of Electronic Nurse Care Plans*”. Submitted.

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## Appendix

## Appendix 1 Letter from co-author of Paper I

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Dated:  
2007-10-16

Our ref.:

Your letter dated:

Your ref.:

### Collaboration on article "Documenting for whom? A symbolic interactionist analysis of technologically induced changes of nursing handovers"

The work of writing the paper "Documenting for whom? A symbolic interactionist analysis of technologically induced changes of nursing handovers", published in *New Technology, Work and Employment*, was carried out by Jostein Engesmo in collaboration with Aksel Hn Tjora (co-supervisor of Engesmo).

Jostein Engesmo is main author of the article and has conducted the empirical work, analysis of data and writing the article. Aksel Hn Tjora has contributed in discussions and with assistant co-writing the article.

Yours sincerely,

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## **Appendix 2 Letter from co-author of Paper III**

To Whom It May Concern:

The work of writing the paper "The Coevolution of Project Goal Meanings: Becoming Paperless through the Introduction of Electronic Nurse Care Plans" was carried out by Jostein Engesmo. Prof. Eve Mitleton-Kelly contributed to this process through oral discussions and feedback on the different versions.



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