

DUPLICATE SYSTEMS  
INVESTIGATING UNINTENDED CONSEQUENCES OF INFORMATION  
TECHNOLOGY IN ORGANIZATIONS

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## ABSTRACT

The organizational consequences of information technology (IT) constitute a core focus in information systems (IS) research. The relationship between organizations and IT has received considerable attention by IS researchers in order to develop knowledge related to how and why organizations and IT are related. While organizational use of IT continues to increase in practice, previous research has shown that the effects of IT at best are difficult to predict. Consequently, the adoption and assimilation of IT in organizational settings must be recognized as complex and challenging processes, which makes the production of knowledge related to such processes important and pressing.

This dissertation identifies, characterizes and explains a paradoxical outcome of the adoption and assimilation of an enterprise content management (ECM) system in a context of organizational information management. The outcome, labeled the duplicate systems paradox, is constituted by a situation in which an organization continuously allows multiple, overlapping, partially competing and largely incompatible information systems to persist and continue to evolve over time, despite continued awareness of the adverse consequences on organizational information management capabilities. A qualitative case study approach was used as the primary means for data collection. The case study was conducted in the administrative divisions of HealthOrg, a large organization in the medical- and health care sector. To this end, the main objective of this dissertation is to investigate how this paradox was formed, and furthermore, how and why it was able to persist. In order to do this, dialectical theory is combined with contextualism and theory on organizational information processing to form a comprehensive theoretical perspective used to inform the analytical efforts.

By using a dialectical approach, the analysis presents empirical evidence of the existence and composition of three overarching contradictions found to affect the formation and persistence of the duplicate systems paradox. More specifically, the resulting explanatory model demonstrates how three pairs of opposites, *control versus support* at the requirements level, *options versus practices* at the solutions level, and *top-down versus bottom-up* approaches at the transformations level, along with contextual tensions, were essential components in the formation and persistence of the paradox.

Thus, the duplicate systems paradox could form and continue to evolve due to contradictory forces present at, and interconnected between, different vertical and horizontal levels within the organization. Through the identification and explanation of the duplicate systems paradox, this study provides a detailed example of how, and why, unintended consequences of IT in organizations may emerge and continue over time.

In terms of implications for research and practice, the findings of this dissertation point to six important observations. First, this research suggests that understanding and characterizing the context in which IT is to be implemented is crucial and challenging. Thus, organizations should pay careful attention to the practical side of context, rather than to the somewhat theoretical boundaries of organizations. It is suggested that the concepts of 'inner' and 'outer' context may be useful in analyzing and understanding context. Second, this research suggests that organizations should attempt to identify potentially conflicting requirements, and devise clear strategies to decide how to prioritize between such requirements as the identification and explication of requirements present at different levels in the organization may reveal problems that need to be considered when choosing information system (IS). Third, organizations need to pay careful attention to what the adoption of a new IS means in terms of adaptation and/or realignment, and to what extent organizational activities, technological functionalities, or both, should be adapted. Organizations should furthermore be aware that the adoption of systems that can also be used as development platforms may cause a cascade of effects and dependencies that are difficult to manage. Fourth, the findings of this research suggest that organizations faced with the challenge of adopting complex IT solutions need to take into account their previous strategies and planned new ones in order to devise a comprehensive strategic approach since the coexistence of radically different strategies may cause uncertainty and inertia within the overall assimilation process. Fifth, this research indicates that IT management and information management (IM) are highly interrelated activities, but are not mutually exclusive. Thus, organizations adopting technologies that are specifically focused on information management may benefit from developing distinct areas of responsibility and clear communication channels between the involved organizational units. Furthermore, these findings suggest that future research should pay careful attention to, and specifically investigate, the exact nature of the relationship between information management and IT management. Finally, this research demonstrates how a dialectical approach may be used to adequately investigate organizational information management, specifically in relation to the adoption and assimilation of IT.

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## 1. RESEARCH BACKGROUND AND INTRODUCTION

### 1.1. INTRODUCTION

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The organizational consequences of information technology (IT) have for decades constituted a core interest and focus for research carried out in the academic discipline of information systems (IS) (Markus & Robey, 1988). To this end, IT has been described as an external force that can determine constraints on the behavior of individuals and organizations (Scott Morton, 1991), as socially constructed by humans (Grint & Woolgar, 1997), and as part of emergent processes of reciprocal adaptation (Leonard-Barton, 1988). Diversified accounts of the role and effect of IT on organizations continue to be produced, indicating that the organizational consequences of IT remain contradictory (Robey & Boudreau, 1999). The IS field has developed, adopted and adapted a multitude of theoretical orientations in attempts to clarify the relationship between IT and organizations, for example through the use of web models (Kling & Scacchi, 1982), structuration theory (Giddens, 1984; Orlikowski, 1992; Orlikowski & Robey, 1991), actor network theory (ANT) (Holmström, 2000; Holmström & Robey, 2005; Latour, 1987; Walsham & Sahay, 1999), adaptive structuration theory (DeSanctis & Poole, 1994), and institutional theory (Barley & Tolbert, 1997). The result, however, remains the same: the effects of IT are at best difficult to predict.

The use of IT in organizational settings nevertheless continues to increase, and so the production of knowledge relating to the effects and consequences of IT remains important. The research presented in this dissertation attempts to contribute to this overarching body of knowledge through exploring and analyzing the adoption and assimilation of an enterprise content management (ECM) system in a context of organizational information management. To this end, this research is concerned with historically pivotal issues and challenges within IS, namely the manipulation and management of information through the use of computer-based information systems.

In more detail, the research presented here examines the process of adoption and assimilation of an ECM system within the administration of a single politically governed organization in Sweden, HealthOrg. At the time of writing, the administrative division of HealthOrg consisted of seven units responsible for the provision of administrative support to the other divisions of the organization.

Although they had different specific task responsibilities, the units were all chiefly concerned with the production, distribution, accessibility, and general management of information. Because HealthOrg is a politically governed organization, the information management activities performed by its administration were subject to a number of specific regulations. For example, much of the information produced was subject to formal recordkeeping, which meant that the creation, storage, distribution and access to information had to function flawlessly. In the beginning of 2000, however, this was not the case within HealthOrg. The administration had at this time been experiencing problems related to information management in general, and recordkeeping in particular, and it was therefore decided that a new ECM system should be acquired in order to resolve these problems. The adoption and assimilation of the new system, however, led to a surprising outcome in that the information management problems that had been experienced and articulated worsened rather than improved. Furthermore, this negative effect was persistent, creating a situation that had a negative impact on HealthOrg's organizational performance. In this dissertation, this situation is discussed in terms of a duplicate systems paradox. The development of a rich description of this paradox, along with the development of a theoretically guided and empirically grounded explanation of how and why such a situation could arise and persist, is thus the main point of departure of this dissertation.

## 1.2. THE DUPLICATE SYSTEMS PARADOX AT HEALTHORG

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Some one and a half years after HealthOrg had adopted and implemented the new ECM system, representatives from the organization contacted the author of this dissertation. The expected benefits from using the ECM system had not been realized owing to what seemed to be a lack of interest in the system from employees, which was causing problems for HealthOrg. The organization had invested heavily in a new technological system without receiving the envisioned benefits, which had left them puzzled. Consequently, a collaboration was established between the author of this dissertation and HealthOrg, in the form of a research project that began early in the autumn of 2005.

At that point in time, the research project took the form of a broad investigation into why the ECM system had had only a limited impact on the organization. Whilst a number of specific observations came out of that phase of the project, the main conclusion was that the ECM system had come to assume an unclear role in the organization. In

particular, it was demonstrated that there existed several functionally overlapping, partially competing and largely incompatible information systems in the administration of HealthOrg. That is, the new ECM system had become one option for managing information, but other previously-established tools for this purpose were also in use. This situation involving the co-existence of multiple functionally overlapping systems had begun to affect the organization in a negative way, causing problems related to redundant work and information integrity. The findings in general, and the issue of co-existence of functionally overlapping systems in particular, were communicated and discussed with representatives from HealthOrg and were, by and large, considered to be temporal in character. Thus, it was at that point assumed that the identified problems could be solved through the means of better communication and by making the roles and functions of the various systems in the organization clearer.

The author of this dissertation kept in contact with representatives from HealthOrg in order to track interesting developments and potential resolutions to the problems that had been identified. In the context of such a contact, an interesting observation was made in early 2009. The problem of overlapping, competing and incompatible systems had persisted, a situation that was now causing harm to the overall performance of the administration in HealthOrg. More than three years had passed since the first observation of this situation had been made; however, HealthOrg had been incapable of resolving the situation. Thus, the adoption and assimilation of a new ECM system intended to facilitate and improve the efficiency of the management of information had instead led to a surprising outcome with a negative impact on the organizational performance, and, moreover was persisting in time. That is, the outcome was a paradoxical phenomenon related to duplicate systems usage. The concept of paradox is, in this context, used to denote a puzzling outcome of technology adoption and assimilation manifested as persistent negative impacts as a result of duplicate systems usage. The interrelated components of the duplicate systems paradox are thus made up of the use of duplicate systems, which caused adverse effects on the performance of the organization, and the organization's awareness and intent to resolve the situation. For three years, HealthOrg had been aware of, and adversely affected by, this situation, so the fact that the situation remained was, indeed, a paradox. Understanding how HealthOrg ended up in this particular situation, and why they seemed incapable of resolving the paradox, thus came to constitute the overarching research agenda. Given this background, the main research question investigated in this dissertation is:

*“Why do organizations allow multiple, overlapping, partially competing and largely incompatible information systems to persist and continue to evolve over time, despite continued awareness of the adverse consequences on organizational information management capabilities?”*

An answer to this question is needed for two reasons. First, it will provide additional insight into the contradictory consequences of IT in organizations and will thus shed light on a core issue within the academic discipline of IS. Second, it will detail and explain the formation and persistence of an identified and potentially unique paradox related to the organizational adoption and assimilation of IT.

### 1.3. ORGANIZATIONAL ADOPTION AND ASSIMILATION OF IT

As discussed in the preceding sections, this research examined the adoption and assimilation of an ECM system in the organizational context of information management. Broadly speaking, then, this dissertation describes an investigation into the relationship between an organization and computer-based information systems, as it played out over time. Thus, the research reported here is related to, and part of, the wide array of research within the IS discipline that focuses on the organizational consequences of computer-based information systems. Specifically, this research focused on an identified outcome of the processes of adoption and assimilation, formulated as a paradox related to the use of duplicate systems. To this end, a phenomenon-centric approach was adopted when identifying relevant and related research pertaining to the research question, as opposed to an approach investigating specific streams of research.

The search for related research resulted in the identification of three related but distinct phenomena, or contributions, that were considered to be particularly relevant to the research at hand. These are: (1) *the assimilation gap*, (2) *shadow systems*, and (3) *workarounds*. The research described in this dissertation is therefore primarily contextualized against these phenomena and their associated explanatory frameworks. The adoption of a phenomenon-centric approach to the identification of related research provided a clear focus with a broad range. However, a limitation of this approach is that research results are not necessarily articulated in the form of phenomena. During the work of investigating related and relevant phenomena, several explanatory frameworks that do not explicitly conceptualize their findings as phenomena were identified. Such explanatory frameworks were therefore also

considered in order to further contextualize the findings presented in this dissertation.

#### 1.4. DIALECTICAL THEORY AND ANALYSIS

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The research described in this dissertation focused on a paradoxical phenomenon that arose as a consequence of the information management efforts of an organization, namely the adoption and assimilation of a new ECM system. Pertaining to this, three key observations can be made: (1) that this research deals with a paradoxical phenomenon persisting in time, (2) that this phenomenon is related to activities and efforts associated with information management, and (3) that this phenomenon exists in an organizational context. In order to comprehensively address and investigate each of the above-mentioned areas, theoretical guidance was sought. In particular, three theoretical perspectives were combined into a comprehensive analytical framework: (1) a dialectical perspective on social change in general, (2) a contextualist approach to the study of organizational change in particular, and (3) theory on organizational information processing. In this context, dialectics was chosen as the main theoretical (or analytical) vehicle for two reasons: (1) dialectics provides a theoretical perspective explicitly focusing the process of change, which is important given that the research here attempts to explain a phenomenon over time drawing on empirical data from a longitudinal case study, and (2) dialectical theory proposes that contradictions are essential parts of social life and that it is by understanding how such contradictions play out over time that knowledge about the content, context and process at hand may be generated. Since the research reported in this dissertation was prompted by an empirical observation of a contradictory and paradoxical situation, it was considered appropriate to use a theoretical perspective that acknowledges the existence of contradictions and provides tools for analyzing and understanding them.

These three theoretical frameworks provide distinct but complementary perspectives that make available a comprehensive set of tools to approach the empirical material of this research. The main assumptions made in selecting and combining these theoretical frameworks were the following. Phenomena that persist in time can be investigated by employing theoretical perspectives that focus on processes of change, because analysis of factors and dynamics that drive change can also be used to reveal why change does not occur (for example, inertia, persistence or stability). In this context, the use of dialectics provides the means for identifying the opposing

factors (“opposites”) and struggles that give rise to contradictions. By examining the relative balance and power between opposites, and by articulating and investigating the struggles that occur over time between such opposites, persistent phenomena may be explained. The inclusion of contextualism as an analytical device provided the dialectical approach with a comprehensive framework related to organizational change. In this respect, the view on organizations adopted in this research involves treating organizations as continuing systems (Pettigrew, 1987), in which processes shape structures and context over time, but where the opposite also is true – context and structure contribute to the shaping of processes. Thus, three key factors were identified as being important when investigating change, namely the content, process, and context of the change. Furthermore, theory of organizational information processing provides an analytical lens that is explicitly focused on the content undergoing change. In this particular case, the content of the change was conceptualized as information management (or, put differently, information processing). Because the overarching purpose of adopting and assimilating a new ECM system within HealthOrg was to improve information management activities and make them more efficient, contemporary theories of organizational information management provided appropriate theoretical constructs with which to address and conceptualize the content of change.

## 1.5 STRUCTURE OF THE DISSERTATION

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This dissertation has three parts. Part one details the theoretical foundations of this research (chapters 2, 3 and 4); part two details the empirical investigation (chapters 5, 6 and 7); and part three articulates and contextualizes the research contributions (chapters 8 and 9). In more detail, chapter 2 provides an overview of the academic discipline within which the work described was conducted, namely IS. This is done in order to articulate the standpoint assumed in this research in relation to perspectives on causal agency and subject matter within IS research. Chapter 3 consists of a literature review in which related research is outlined and discussed. This is primarily done from a phenomenon-centric starting point. Chapter 4 continues by presenting and discussing the analytical framework adopted in this research, including dialectics, contextualism and theories of organizational information management. Chapter 5 presents the research design and its philosophical underpinnings, the qualitative case study as the chosen method, the research site, the data collection, and the data analysis process. Chapter 6 provides

a detailed account and description of the duplicate systems paradox that is grounded in the empirical material. Chapter 7 presents the dialectical analysis of the empirical material by discussing three overarching contradictions along with their interrelated contextualized dynamics. In chapter 8, the main findings are presented and contextualized against related phenomena and explanatory frameworks as identified in the literature review. Chapter 9 describes the conclusions of this research.



## THEORETICAL FOUNDATIONS

This chapter provides an introduction to and a discussion of the academic discipline in which this research was undertaken, namely information systems (IS). IS is a young and multifaceted research field enclosing numerous individual but interrelated research streams, sometimes referred to as subfields or informal clusters (Barki *et al.*, 1988; Culnan, 1986). Such streams of research indicate different interests and directions in the field and demonstrate the wide array of theories and models currently in use. This dynamic character makes it an interesting but also challenging field to which to contribute, which in turn makes it important to clarify the author's particular perspective and position within the discipline of IS. In addition to being a multifaceted academic discipline, in the IS field there is an overarching and longstanding debate regarding its academic legitimacy, in which scholars have been, and still are, debating the nature of the discipline and its potential relation and contribution to other academic disciplines as well as to practice (see e.g. King & Lyytinen, 2006). To delve into that debate in depth would be to go outside of the scope of this dissertation. However, there is a need to provide at least an overview of the current opinions and debates in the field in order to be able to make clear the position assumed in this dissertation.

### 2.1 INFORMATION SYSTEMS AS AN ACADEMIC DISCIPLINE

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The origins of IS as an academic field can be traced back to the late 1960s, when a relatively small number of academic scholars from diverse disciplines such as accounting, organizational behavior, management and economics began to take an interest in the use of computers for the storage and processing of data in organizations (Davis, 2006). Thus, to some extent, the field grew out of an increasing realization that computer-based information systems were becoming important parts of the lives of organizations and firms, and that no then-existing research field could fully capture, analyze, understand and provide education on the complexities of the relationships between computer-based information systems and organizations and firms.

In its early stages, IS, or management information systems (MIS) as it was frequently called, was often discussed as a theme, rather than as a fully matured academic discipline. For example, as noted

by Culnan (1986), one of the main topics of the First International Conference on Information Systems held in 1980 was related to questions on the structure of the field and its relation to other academic disciplines. IS was also commonly viewed as an applied field, drawing on a number of more mature and developed academic reference-disciplines in order to borrow theories, methods and models of good research (Baskerville & Myers, 2002). Such reference disciplines were considered to be more mature and of essential value for IS. There was, however, no consensus on exactly which disciplines could or should be viewed as reference disciplines for MIS. For example, Davis (1980) argued that MIS was the junction between six fields of knowledge: computer science, behavioral science, decision science, organization and management, organizational function, and management accounting, whilst other scholars subsequently argued for other disciplines or categorizations. For example, Culnan (1987), instead identified and argued for five intellectual subfields within MIS: foundations, psychological approaches to MIS design and use, MIS management, organizational approaches to MIS design and use, and curriculum. A large number of subsequent papers have since been published on this topic (see for example Burton Swanson & Ramiller, 1993; Davis, 2000). However, regardless of the specifics of these types of categorizations, it is clear that information systems originated from and was influenced by multiple academic disciplines brought together by a shared interest in computer-based information systems in organizations.

From a Scandinavian perspective this history is, to a large extent, shared with our American colleagues, albeit with some important differences. Scandinavian IS history started with the work of Börje Langefors (see e.g. 1973). In 1965, Langefors introduced the concept of 'information systems' while visiting the third International Conference on Information Processing and Computer Science, thus emphasizing his interest in and devotion to the relationship between information, data and knowledge in the context of systems development (AIS, 2010). To a large extent, Langefors' work broke new grounds and fundamentally contributed to the shaping and development of Scandinavian IS research. One example is his differentiation between data and information through the concepts of infological and datalogical work. In principle, the so called infological equation of Langefors postulates that information is created from data and existing knowledge through a process of interpretation, which implies that conveyed information will be interpreted differently because of, for example, the diverse life experiences of the recipients. Such insights greatly affected the core focus and direction of Scan-

dinavian IS research as it touched upon matters related to information systems, knowledge creation and human interpretation. Early Scandinavian IS research additionally emphasized democracy in information systems development and use (e.g. Ehn, 1988), in particular focusing on articulating the role of users in development projects. For example, user participation was a core interest of many Scandinavian IS researchers (e.g. Bjercknes *et al.*, 1987), an interest that later evolved into research projects that had the aim of involving workers in the development of tools (Bansler, 1989; Bjercknes & Bratteteig, 1995; Ehn, 1988; Grønæk, 1990).

The Scandinavian approach to IS has been a key inspiration for “the Umeå school of informatics” too:

*“Rooted in Langefors’ early definition of information systems to include people interpreting the data of the computer systems turning data into information (Langefors 1995) the Umeå school of informatics has explored the ways in which information technology and people interact. A key issue adapted early on by informatics researchers was how the technology would not necessarily bring about the advantages intended by designers.” (Holmström *et al.*, 2010, p. 3)*

Thus, to some extent, the Scandinavian IS tradition as well as the Umeå school of informatics may be characterized as having embraced a more political as opposed to managerial perspective on information systems research, in comparison with the American IS tradition. However, at the very core, the history is a shared one.

As is evident from the short historical outline above, IS is still a young academic discipline with approximately 40 years on its shoulders. It therefore comes as no surprise that some of the overarching and persisting discussions within the field deal with matters such as its relationship to reference disciplines, its potential uniqueness (that is, its identity), the contributions of the field, and the subject matter of the field *per se* (Truex *et al.*, 2006). Over the years, these discussions have taken many forms. However, fundamentally, they all concern the academic legitimacy of the field. A good example of this is the discussion on diversity by Benbasat and Weber (1996). The authors claim that three types of diversity are prominent within the IS discipline: (1) diversity in the problems that the field addresses, (2) diversity in the theoretical foundations and reference disciplines that guide research within the field, and (3) diversity in the methods that are used to collect, analyze, and interpret data. The authors acknowledge that some positive outcomes of diversity can

be identified (for example the strengthening of rigor in the conduct of research), but argue that diversity is, foremost, highly problematic in academic disciplines. The authors articulate two categories of threats related to diversity: (1) that diversity makes it more difficult to distinguish IS from other more powerful disciplines, and (2) that its intellectual contributions are, at best, viewed as problematic by colleagues in other disciplines (Benbasat & Weber, 1996, p. 397).

The diversity of reference disciplines described above is one of the major topics in the discussion of academic legitimacy and has from time to time been framed in terms of a potential identity crisis within the IS discipline. In 2003, Benbasat and Zmud published a thought-provoking paper called "*The Identity Crisis Within the IS Discipline: Defining and Communicating the Discipline's Core Properties*" in *MIS Quarterly* (Benbasat & Zmud, 2003). In short, the authors argued that the IS research community was under-investigating phenomena associated with IT-based systems, and instead over-investigating phenomena only distantly associated with IT-based systems, and that this was making the identity of the IS field unclear in relation to other disciplines (ibid., p184). One of the main causes of this, according to the authors, was that IS was borrowing too much from reference disciplines. However, other scholars have promoted fundamentally different perspectives of the IS field and its relation to other disciplines. One such perspective is the idea proposed by Baskerville and Myers that IS has in fact come of age, and that it is time for IS to become a reference discipline for others (Baskerville & Myers, 2002). The authors build their arguments on a number of factors such as the IS field having a long-established international society (the Association for Information Systems), major and well-respected academic journals (such as the *MIS Quarterly*) and a distinct subject matter. The authors promote the concept of 'knowledge networks' and argue that instead of focusing on reference disciplines, we should understand information systems in terms of being part of multidirectional, knowledge-creation networks of equal value.

Despite this, the debate amongst IS scholars on the discipline's supposed identity crisis has continued. A good overview of the debate is provided in the book "Information Systems, the state of the field", edited by King & Lyytinen (2006). The book contains a collection of previously published articles along with commentaries by the authors on their views of the debate. These articles and commentaries make it clear that there is no unanimous perspective on the field and no consensus on whether or not there is a crisis within the discipline. For example, Galliers (2003) argues that the IS discipline is

not experiencing a crisis and that the interdisciplinary nature of the field is in fact necessary for its future development, while Lyytinen and King (2004) argue that the idea that the academic legitimacy of the field depends on the presence or absence of a core theory is

“[...] *logically weak and empirically refutable*” (ibid., p. 234).

Instead the authors argue that academic legitimacy should be measured by three factors: (1) the salience of the subjects studied; (2) the strength of the results generated by studies conducted within the discipline; and (3) the plasticity of the field with respect to changing circumstances (ibid., p. 240). As stated in the introduction to this chapter, a thorough presentation and analysis of the various aspects of this debate and its connotations would be outside the scope of this research. However, when writing a dissertation intended to contribute to the field of IS, it is important to articulate a clear point of view in order to be able to better motivate the object of study of this dissertation, the identification of research relevant to this dissertation, and subsequently the choice of analytical lens.

Analysis of the nature of the IS discipline and the debate on the potential identity crisis is however not a trivial endeavor. The debate is complex; in the sense that the interconnectedness of the various aspects that are discussed is high, which makes it difficult, or perhaps even impossible, to separately analyze the different perspectives and arguments. However, my starting point here is grounded in a discussion of the subject matter (i.e., the object of study) of IS *per se* since it constitutes a fundamental point of departure. However, the identity of the subject matter is necessarily also closely related to the nature of the research perspective one assumes to study and understand it.

## 2.2 SUBJECT MATTER AND PERSPECTIVES

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As in many academic disciplines, the core subject matter in IS is not a constant. Several factors make the subject matter dynamic, for example the rapid development of IT, the interdisciplinary nature of the IS field, and the pluralistic perspectives on methodology. Consequently, the definition of the subject matter may vary somewhat depending on whom you ask and when you ask; this is one of the reasons why the debate on the discipline's academic legitimacy continues. To identify and describe a universally accepted core subject matter of the field of IS is therefore most likely both unrealistic and naive. Nevertheless, in the following sections, some notable discus-

sions and perspectives on the subject matter of IS are outlined and discussed. This is then followed by an articulation of the specific stance that was assumed in this research.

A commonly raised criticism within the field of IS is that researchers attend too little to IT artifacts and computer-based information systems. For example, Orlikowski and Iacono (2001) argued that although a premise of IS is that IT is central, the field has not engaged with its core subject matter. The core subject matter, as argued by Orlikowski and Iacono, is the IT artifact. The authors argue that the IT artifact tends to be taken for granted or presumed to be unproblematic and that scholars within IS instead tend to focus their theoretical attention elsewhere (Orlikowski & Iacono, 2001, p. 121). A consequence, as claimed by the authors, of this way of conducting studies within IS is that our understanding of, and knowledge about, the implications of IT artifacts for individuals, groups, organizations and society is severely limited. In a similar vein, Benbasat and Zmud state that:

*“IS researchers should avoid treating IT artifacts or IS systems either as a ‘black box’ or as being synonymous with a more generic entity (e.g., innovation, investment, or Internet). Instead, the IS aspects of the phenomena being examined should be brought to the forefront to make clear the unique, specific contributions of IS scholarship”* (Benbasat & Zmud, 2003, p. 193)

Arguments such as the ones made by Orlikowski and Iacono and by Benbasat and Zmud are related to more general ideas concerning problems related to the conceptualization of information systems and computerization. For example, Kling argues that research related to computerization frequently fails to describe and theorize the specific nuances of technologies and instead makes use of broad and overarching concepts that at best can be characterized as “convenient fiction” (Kling, 1991a, p. 365). Perspectives on the subject matter of IS such as those exemplified above share the underlying idea that IT is the fundamental focal point for information systems research, and that a failure to specifically address IT weakens the distinct character of the discipline itself. Other researchers, however, promote more inclusive perspectives on the subject matter and argue that a strict centralization of IT could lead to an excessive and undesirable limitation of IS. For example, Lyytinen and King (2004) state that it would be a mistake to exclusively predicate the identity of the IS field on the IT artifact since such a focus could lead to an unnecessary narrowness of the field, which in turn might have

the effect of weakening one of the strengths of the field, that is, its boundary-spanning ability (Lyytinen & King, 2004, p. 234).

When discussing what constitutes the core subject matter of IS, one cannot avoid also discussing perspectives on what drives change in the context in which IT is deployed and used. This is because such ideas are closely related to, and promote differing perspectives on, the role of IT in the process of change. Thus, depending on what perspective the researcher assumes in this context, that perspective will most likely also affect how the object of study is chosen and articulated. An excellent account of the mechanisms inherent in this relationship can be found in the works by Markus and Robey (1988). In their discussion on causal structure in theory and research on IT and organizational change, the authors present an aggregated categorization of the causal agencies present in the literature. The authors explain causal agency as:

*“[...] the analyst’s beliefs about the identity of the causal agent, the nature of causal action and the direction of causal influence among the elements in a theory”* (Markus & Robey, 1988, p. 585).

The categorization includes three conceptions of causal agency: (1) the technological imperative, (2) the organizational imperative and, (3) the emergent imperative. In short, the technological imperative views technology as an external force, which determines constraints of the behavior of individuals and organizations. Put differently, this view on technology and change assumes a technological, deterministic stance where available choices regarding human action are at best very limited. On the other hand, the second conception, the organizational imperative, assumes that human influence over technology is almost unlimited. This viewpoint can be characterized as social determinism, in which social aspects govern technology instead of vice versa. The third imperative, as argued by Markus and Robey, is based on the notion of emergence. This is the perspective that the consequences of IT emerge unpredictably from complex interactions between technological features and social actors. This categorization clearly displays radically different perspectives on the drivers of change in organizations and technology. Such perspectives by necessity affect which phenomena are studied and how researchers approach and study such phenomena within the field of IS. That is, researchers adhering to the technological imperative would be more focused on addressing, investigating and analyzing the technology itself; since it is presumed to be the primary driver of

change. An example of this would be creating knowledge specifically related to the technology at hand, such as how to design a computer-based information system in order to achieve a predicted effect in the given context. On the other hand, researchers adhering to the organizational imperative would focus less on the specifics of the technology and focus more on the personnel, structures and politics in order to develop theoretical accounts to explain the consequences and potentials of using technology in the given organization. Finally, researchers assuming the perspective of emergence would not focus on either technological or social aspects alone, but rather on the interactions between the two, since they would be seen as affecting each other. That is, the object of study would be a complex socio-technical entity.

When examining the body of research within the IS discipline it can be noted that all three of the above exemplified perspectives are active, in the sense that research is being carried out in all of them. An increasing concern with the lack of explanatory power of strictly deterministic perspectives has, however, been voiced during the past few years. For example, as noted by Robey and Boudreau (1999), empirical studies have revealed findings that are inconsistent with strictly deterministic accounts of organizational change. Several additional scholars have followed a similar line of thought and argued for perspectives that move beyond deterministic accounts of the role of technology in organizations (e.g. DeSanctis & Poole, 1994; Hirschheim, 1985; Holmström, 2000; Kling & Iacono, 1989; Monteiro & Hanseth, 1996; Walsham, 1997). An articulation of the guiding perspective of any piece of research is important, since it increases the transparency of the research process, the choice of the object of study, and the selection of the specific theoretical perspectives. Following the background provided here, the next section details the position that this research assumes.

### 2.3

### POSITIONING OF THE RESEARCH

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Here, in line with, amongst others, Markus and Robey (1988), and Robey and Boudreau (1999), I argue, and take as my basic starting point, that the relationship between IT and organizational change is a fundamental concern in the field of IS. That is, I assume that the core activities of IS research are to investigate, analyze and create knowledge about the complex relationships between IT-based information systems and organizations. Whilst I also agree with the essence of arguments stating that researchers within the field of IS need to pay careful attention to, and strive towards illuminat-

ing the character of IT-based information systems (e.g. Benbasat & Zmud, 2003; Orlikowski & Iacono, 2001), I argue that this should not be done at the expense of related and equally important factors. In this respect, I agree with Lyytinen and King (2004) that it would be a mistake to exclusively predicate the identity of the IS field on the IT artifact. Furthermore, I align myself with the stream of thought that promotes an emergent perspective and thus argue that instead of adopting a deterministic view of the relationships between organizations and IT-based information systems, a more constructive and nuanced way to describe, analyze and understand such relationships is through a process of mutual shaping. An excellent articulation of what this means and how such a perspective can help mitigate the risk of becoming too narrow in theoretical conceptualizations can be found in Lee (1999, 2001). Lee states that:

*“[...] research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact. This embodies both a research perspective and a subject matter that differentiate the academic field of information systems from other disciplines. In this regard, our field’s so-called “reference disciplines” are actually poor models for our own field. They focus on the behavioral or the technological, but not on the emergent socio-technical phenomena that set our field apart” (Lee, 2001, p. iii).*

This articulation of the core subject matter and research perspective provides a starting point with several strengths. Firstly, it provides a core subject matter for IS that makes clear the unique character of IS research compared with other related disciplines. It does so, however, without the restrictive narrowness of a strictly technology-oriented subject matter (the IT artifact *per se*). Secondly, it effectively avoids over-simplistic assumptions about, and perspectives on, the role of technology or, for that matter, the role of social aspects in the relationship between the two. By putting focus on the complex socio-technical phenomena that emerge from the interaction between IT-based information systems and organizations, this broad perspective acknowledges that technological and social actors affect each other.

To clarify the assumptions from the field of IS on which this dissertation builds, two important distinctions are made: (1) that the complex relationships between organizations and IT-based information systems are the core subject matter and, (2) that such re-

relationships can be understood in terms of an ongoing process of mutual shaping from which emergent properties arise. Whilst this was the overarching perspective assumed in this research, two important components have yet to be addressed: research pertaining to the question under investigation, and the specific theoretical lens adopted. The following chapter therefore presents an overview of research related to the research question presented in chapter one. Chapter four then returns to the specific theoretical (or analytical) perspectives that were used to analyze the case study data. It takes as its starting point the understanding that the relationships between organizations and technology are processes of mutual shaping, and further details the available theoretical directions given that stance and presents the ones adopted in this work.

Broadly speaking, this dissertation investigates the relationship between an organization and a computer-based information system and its evolution over time. More specifically, it examines a seemingly paradoxical outcome of the adoption and assimilation process of an enterprise content management (ECM) system intended to facilitate and improve information management in an organizational context. In this respect, the research reported here is related to and is a part of the wide array of research within IS that focuses on the organizational consequences of computer-based information systems. It also connects to, from a historical perspective, pivotal issues within the IS discipline concerning the manipulation and management of information through the use of computer-based systems. Specifically, however, this dissertation seeks to answer the following research question:

*“Why do organizations allow multiple, overlapping, partially competing and largely incompatible information systems to persist and continue to evolve over time, despite continued awareness of the adverse consequences on organizational information management capabilities?”*

The paradoxical aspects of these situations stem from the fact that the various information systems were all introduced to improve organizational performance, but their incompatibilities ultimately hamper organizational information management. The paradox is illustrated by two striking observations. First, organizations typically introduce new IT systems with the aim of improving or increasing the efficiency of some aspect of their operations (Attewell & Rule, 1984). Investments in technology are often costly for organizations and firms. One would therefore assume that they would be adopted and managed so as to benefit rather than impede organizational performance; surprisingly, this is not so in the situation examined in this dissertation. Second, research on the organizational adaptation of IT has shown that the full advantages of information technologies frequently depend on a process of gradual tailoring of the technology at hand in order to fit a given organizational context. This process of adaptation has been described in many ways, however it is frequently viewed as a process in which the technology on

the one hand and organizational skills, procedures and assumptions on the other, need to adapt to each other (Tyre & Orlikowski, 1994). Here, however, we are confronted with a situation in which an organization makes the decision to invest in a particular technology, deploys that technology, but then finds itself in a deteriorating situation in which successful adaptation and assimilation of the new technology is non-existent. While unsuccessful or failed implementation, deployment and assimilation (e.g. Keil & Montealegre, 2000; Mähring *et al.*, 2004; Montealegre & Keil, 2000; Sauer, 1993) of computer-based information systems is not an unusual phenomenon in practice or as reported in IS research, the argument here is that this situation is unique in that it persists over an extended period of time and is allowed to continue despite its deleterious effects on organizational performance. Thus, a distinguishing feature of the phenomenon examined in this dissertation is that it can be described as an ongoing paradoxical process involving organizations and computer-based information systems.

Seeking to produce knowledge about this empirically observed situation and thus providing an answer to the research question articulated above requires not only a detailed exposition and analysis of the empirical data collected, but also a thorough review of existing research. Reviews of this kind are important because they help define the contributions that can be made by the planned research and because they identify previous reports and analyses (if any) of similar phenomena and situations. When conducting a literature review, however, several approaches are available (Webster & Watson, 2002). The following section therefore describes the procedure adopted in this dissertation, qualifies the choices that were made, and outlines relevant research. It is followed by four sections containing detailed discussions of research specifically related to the research question addressed in this dissertation.

### 3.1

#### LITERATURE REVIEW PROCESS

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When conducting a literature review, one could, for example, focus on a specific stream of research, such as implementation research, within the overarching research discipline in order to obtain a detailed overview of the body of knowledge within that stream. While this approach has the advantage of defining clear boundaries on the review's scope, it also has a major limitation in that it is blind to potentially important and related streams of research, and in the extreme case, related disciplines. In their excellent paper on the role of literature reviews in IS research, Webster and Watson (2002)

provide the following advice on identifying relevant source material for a review:

*“Because IS is an interdisciplinary field straddling other disciplines, you often must look not only within the IS discipline when reviewing and developing theory but also outside the field” (Webster & Watson, 2002, p. 4).*

The purpose of the literature review undertaken here is twofold, (1) to explore and describe potentially related phenomena reported in IS research, and (2) to investigate the explanatory frameworks related to such phenomena in order to explicate potential explanations to the research question addressed here. In this respect, a too narrow focus would indeed be unconstructive. Therefore, a wide approach was adopted when conducting the literature review, as recommended by Webster and Watson. This approach is also motivated by the previous observation (see chapter two) that the IS discipline contains a multitude of interrelated and partially overlapping streams of research, which would make the selection of only one or a few of these streams problematic. Put differently, the approach adopted here is phenomenon-centric in the sense that it takes as its starting point the observed paradoxical situation expressed in the research question.

The literature review was conducted as follows. Starting from the paradoxical situation observed in the empirical material and expressed in the research question, and bearing in mind the need for a wide approach when reviewing related research, leading journals within the IS discipline were scanned for relevant and related research. This approach was chosen because major contributions are most likely to be published in leading journals, as noted by Webster and Watson (2002, p. 4). The journals surveyed were selected on the basis of their inclusion in the ranking list (i.e. the senior scholars' basket of journals) published by the Association for Information Systems (AIS). This list includes eight journals: the European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of MIS, MIS Quarterly, Journal of Strategic Information Systems and Journal of Information Technology. A keyword search for key terms such as 'duplicate systems', 'duplicate systems paradox', 'paradox', 'organizational change', 'organizational adoption', 'organizational adaptation', 'organizational use', 'implementation', 'diffusion', and 'assimilation' was performed. The abstracts and keywords of the publications found by each search were examined; publications identified as being potentially relevant

to the subject matter of this dissertation were downloaded for detailed analysis. These publications were read carefully, and significant citations and references within them were identified and were also acquired and analyzed. Since much research within the IS field builds on or extends research carried out within other related disciplines, citations to papers published outside of the main stream of IS journals were frequently encountered in this step, widening the scope of the review as required by the guiding principle stated above. In principle, a literature review conducted in this way could have a near-infinite scope, which makes it difficult to guarantee that no relevant literature is disregarded in the process. Most literature reviews are subject to this limitation in some way, and this particular review is no exception. To the best of the author's knowledge, however, the review identified all of the major contributions of specific relevance to the research question under investigation. A short overview of the results of the literature review is provided below.

From the literature review, three related but distinct phenomena or contributions were identified as being particularly relevant to the research question: (1) *the assimilation gap*, (2) *shadow systems*, and (3) *workarounds*. These three phenomena all describe paradoxical situations having to do with the relationship between organizations and computer-based information systems, albeit at different stages and levels. The concept of the *assimilation gap* concerns a seemingly paradoxical situation related to the diffusion and assimilation of computer-based innovations. It builds on the observation that a computer-based innovation might diffuse rapidly within a population of potential adopters but simultaneously be subject to slow deployment in the organizations that adopt the innovation. The assimilation gap concept thus targets a paradoxical situation where organizations adopt an innovation but do not deploy and use it to any considerable extent. In this respect, the concept is related to the subject matter of this dissertation, and the explanatory frameworks that are used to explain its occurrence, namely *increasing returns* and *knowledge barriers*, merit consideration. 'Shadow systems' is a term primarily used in research focused on the implementation of enterprise resource planning (ERP) systems, to denote archaic alternative systems that remain in use despite the implementation of an ERP system. Since one of the main objectives of ERP systems is to provide integration (in terms of replacing a multitude of legacy systems), the existence of shadow systems outside of the ERP system is problematic and somewhat paradoxical in relation to the overall objectives of implementation. Clearly, this concept and its related theoretical explanations are related to, and relevant for the subject

matter of this research. Finally, *workarounds* is a concept used in the wide array of research targeting organizational use of information systems. Specific definitions of the concept vary, but the common connotation is that the concept describes a situation where users of information systems find other, alternative ways of conducting work, outside of the main systems intended for that particular purpose. Understanding why and how users find and devise workarounds, and how such workarounds relate to the main system is important, and clearly related to the object of study here.

These three phenomena, or concepts, all offer distinct perspectives on and explanations to paradoxical aspects of the relationship between organizations and IT/IS, and are clearly related to the phenomenon studied here. In the next section, the results of the literature review are described in detail. For the sake of clarity, each phenomenon is described in three parts; the first introduces the general theoretical context in which the phenomenon is situated, the second outlines and describes the phenomenon itself, and the third presents related theoretical frameworks pertaining to the specific phenomenon.

### 3.2

#### THE ASSIMILATION GAP

Assimilation as a concept has been used in various ways in a multitude of academic disciplines such as anthropology, philosophy, sociology and information systems. The particular meaning of the concept differs depending on in which specific context it is used. However, a common connotation is that assimilation is related to absorption or merging in some context. For example, in immigration research, Alba and Nee (1997) define assimilation as the decline or disappearance of an ethnic and/or racial distinction along with the cultural and social differences that express it. This way of defining assimilation thus describes a dynamic social process that may be unidirectional or mutual.

In the context of IS research, assimilation has received considerable attention during the past decades, with a specific focus on the assimilation of new technology into firms and organizations (Fichman, 2000). As expected, however, several different perspectives on and definitions of IT assimilation exist. For example, Purvis et al define assimilation as:

*“[...] the extent to which the use of technology diffuses across the organizational projects or work processes and becomes routinized in the activities of those projects and processes” (Purvis et al., 2001, p. 121),*

while Fichman defines assimilation as

*“[...] the process within organizations stretching from initial awareness of the innovation, to potentially, formal adoption and full-scale deployment”* (Fichman, 2000, p. 1).

Further, Armstrong and Sambamurthy note that IT assimilation in fact is a principal outcome of adoption and implementation efforts and further state that:

*“IT assimilation refers to the success achieved by firms in utilizing the capabilities of IT to enhance their business performance. Not only does it refer to the extent to which IT has been infused into specific business activities, but also how effectively IT is enabling the conduct of those activities relative to rivals”* (Armstrong & Sambamurthy, 1999, p. 305).

As is evident in the above conceptualizations, IT assimilation can be viewed as involving adoption activities, or as a post-adoption process that begins after formal adoption has been achieved. Common to both perspectives is a central observation that the value of investments in IT depends on how well the technology is absorbed by the organizations and on the fit between strategy, work processes and technology over time. Thus, in order for IT to have a positive impact, it needs to become a natural part of the work processes in the adopting organization. A central concern in research addressing IT assimilation is therefore to identify and explain impediments to and facilitators of successful assimilation. For example, strategy (Chan *et al.*, 1997; King & Teo, 1997; Ragu-Nathan *et al.*, 2001) is frequently discussed as an important factor in facilitating the assimilation of IS in organizations, and successful assimilation is considered to be dependent on the development of strategies for assimilating IS resources into business operations. Other researchers assume a perspective focusing on knowledge structures and have amongst other things explored and articulated the importance of senior management on successful IT assimilation. For example, Armstrong and Sambamurthy (1999) argue that the business and IT knowledge of CIOs represent key influences on a firm's ability to successfully assimilate IT. Further, successful implementation and use of IS has also been described as a process of mutual adaptation, that is,

*“[...] the re-invention of the technology and the simultaneous adaptation of the organization”* (Leonard-Barton, 1988, p. 253).

Such a view suggests that changes to either the technology or to the organization alone are not sufficient for successful implementation and assimilation to occur. In a similar vein, authors addressing the assimilation of CSCW technologies have proposed that assimilation processes can be described in terms of the successive alignment of three main variable types: group, task and technology (Applegate, 1991). Furthermore, organizational culture has been promoted as a frequently overlooked influence on IT assimilation. For example, building on the framework on organizational culture developed by Goffee and Jones (1996), Hoffman and Klepper (2000) articulate four stereotypes of cultures (communal, fragmented, networked and mercenary) that can be used as guides for identifying the current organizational culture in organizations. In particular, the authors argue that two dimensions, sociability and solidarity, can be used in order to understand challenges and opportunities related to the various cultures that organizations face when attempting to assimilate new technology. Moreover, other researchers have pointed to the importance of understanding the character of the particular technology being adopted and assimilated. For example, Zhu et al (2006) note that assimilation of e-business necessitates what they label as coevolutionary changes to prevailing systems along with the new Internet technologies related to e-business.

It is thus evident that a multitude of theoretical perspectives and models exist that attempt to illuminate and explain the complex process of IT assimilation. Within this broad stream of research, one particularly interesting observation in relation to the research carried out here is that organizations and firms sometimes choose to invest in and thus formally adopt a particular technology, only to then fail in deploying and assimilating that technology into the organization. This phenomenon has been noted by several researchers; one of the most articulate accounts of the phenomenon is that produced by Fichman and Kemerer (1999), in which they identify and explain the concept of the assimilation gap. In short, this concept addresses a central paradox in the adoption and assimilation activities of organizations and firms, and is therefore of importance for the research carried out here. I discuss the phenomenon of the assimilation gap in more detail below, and then move on to examine the explanatory frameworks used by the authors in order to explain the phenomenon.

The assimilation gap concept, as identified and explained by Fichman and Kemerer (1999), describes a situation where an IT-based innovation enjoys widespread and rapid diffusion amongst organizations, but nevertheless fails to become thoroughly deployed and assimilated into the adopting organizations. Thus, some technologies tend to exhibit a lag between their formal adoption and full-scale deployment, hence the notion of an assimilation gap. This situation is paradoxical since one would expect that organizations invest in IT-based innovations in order to attain some beneficial effect, whatever that effect may be. Since successful deployment and assimilation are typically considered to be necessary prerequisites for an innovation to positively transform or otherwise affect an organization, the assimilation gap indeed captures a paradoxical situation. The assimilation gap concept is thus an attempt to move beyond overly simplistic models of macro diffusion patterns in relation to innovations, and further represents an effort to explain why some technologies are more prone to exhibit an assimilation gap than others.

A common way of modeling the aggregated diffusion patterns of innovations is to focus on a single adoption event, often defined as the physical acquisition of the innovation at hand. In this respect, the aggregated pattern for the diffusion process is often described in a cumulative adoption curve, which provides information on the percentage of a population that has adopted a particular innovation at any given point. Such macro level diffusion patterns are important for researchers as well as practitioners since they provide insight into for example what technological innovations that are currently being adopted and at what rate. However, a problem in this type of modeling, where the aggregated diffusion pattern is dependent on a single adoption event (such as physical acquisition) is the explanatory range of the resulting model. For example, when attempting to predict the long-term impact of an IT-based innovation in some context, stating that a particular innovation is diffusing rapidly based on a single adoption event might in fact lead to erroneous conclusions. As argued by Fichman and Kemerer, some technological innovations tend to exhibit a lag between cumulative adoption and cumulative deployment, which implies that successful diffusion is not necessarily followed by successful deployment. In this context, two assimilation events are used and compared; (1) cumulative adoption, and (2) cumulative deployment. An assimilation gap thus exists when the pattern of cumulative deployment does not closely follow the pattern for cumulative adoption.

In more precise terms, the authors define an assimilation gap as:

*“the difference between the pattern of cumulative acquisitions and cumulative deployments of an innovation across a population of potential adopters”*,

and propose an operational measure for such a gap as

*“the area between the cumulative acquisition and cumulative deployment curves at time  $T$  as a proportion of the area under the cumulative acquisition curve at time  $T$ ”* (ibid, p. 258).

The authors also operationalize the assimilation gap through the use of survival analysis and in particular the survivor function. The survivor function is primarily used in order to enable statistical inference, and in this respect, it can be viewed as a measure of the length of time that existing competing technologies can be expected to survive after an organization has invested in and thus formally adopted a new technology. The above definitions and operationalizations formalize the paradoxical phenomenon of the assimilation gap and provide a means to conceptualize and measure such gaps at the level of the technology. This is useful because it enables researchers to, in more precise terms, identify and investigate whether a specific technology exhibits an assimilation gap. An equally important task related to assimilation gaps is to explain why some technologies are more likely to exhibit assimilation gaps than others. The authors build on previous work in innovation research in order to provide two distinct but complementary explanations in the form of increasing returns and knowledge barriers. These theoretical constructs are presented in the following section.

### 3.2.2 Explanation

Explaining why some technologies exhibit assimilation gaps represents a key challenge since such knowledge can provide practitioners and researchers with tools for analyzing and identifying technologies prone to assimilation gaps in advance of their acquisition. Additionally, and perhaps more importantly, such knowledge would shed light on the paradoxical situation itself. Fichman and Kemerer note that since assimilation gaps occur at the level of technology, potential explanations should be sought after in the technology itself and in the environment supporting it, that is, by understanding the character of the technology at hand and the character of the

institutional context. This focus by necessity limits the number of potential explanations, which the authors acknowledge. However, it must be pointed out that they did not examine individual organizations in order to produce explanations, choosing instead to focus on explaining the aggregate pattern of assimilation gaps in a population of adopters. In particular, a specific class of technologies, software process innovations (SPIs), is used to exemplify potential explanations for the existence of assimilation gaps. SPIs are defined as technologies that by necessity change an organization's process for developing software applications once deployed. In this respect, they may be described as complex organizational technologies. In analyzing assimilation gaps for SPIs, Fichman and Kemerer note that these technologies have two distinct characteristics that make them prone to assimilation gaps, (1) increasing returns, and (2) knowledge barriers. These constructs thus represent the two main vehicles for explaining why assimilation gaps exist.

Building on the work of Arthur (1988, 1996), Fichman and Kemerer explain increasing returns as a situation where some technologies become more valuable as time passes, provided that they are adopted by other potential adopters. The net value added when additional organizations choose to adopt a technology is explained through five key factors: (1) positive network externalities, whereby a technology such as for example a telephone becomes increasingly valuable as the number of adopters increases; (2) learning-by-using among adopters, that is, taking advantage of the experiences of other users of the technology; (3) economies of scale in production and learning-by-using among producers, that is, decreased costs of producing and implementing knowledge gained through using the technology in a production environment; (4) general industry knowledge about the innovation; and (5) a rapidly-maturing technological infrastructure. Thus, when a technology exhibits increasing returns, a differentiation is made between the initial performance of a technology and its networked potential. Here, networked potential refers to the imagined future potential of the technology. As argued by the authors, the difference between these two states implies two potential theoretical explanations for assimilation gaps. First, since the future potential of a technology is difficult to estimate at the time of acquisition but at the same time, there is a real possibility that it could prove valuable, managers might in fact make conscious risk decisions to invest in technologies. Second, various stakeholders and vendors might describe some technologies as if they were already networked and mature, which could affect adopting organizations. This phenomenon is described as signaling (Attewell, 1992).

The second theoretical vehicle used to explain why some technologies exhibit assimilation gaps involves the concept of knowledge barriers, originally developed by Attewell (1992). This concept is centered on learning processes and posits that it can be difficult to obtain the level of organizational knowledge of the technology at hand that is required for a successful deployment. Thus, when knowledge barriers exist in relation to a technology, deployment and assimilation might be hindered to a large extent. In particular, some technologies, here referred to as complex organizational technologies, are considered more likely than others to create knowledge barriers for organizations. A central challenge in relation to knowledge barriers is that such barriers often are difficult to anticipate. It is unsurprisingly common for organizations to have limited knowledge of genuinely new technologies and to thus also lack knowledge about the potential difficulties associated with their implementation and deployment.

In summary, the authors conclude that increasing returns in combination with knowledge barriers are useful for explaining why some technologies exhibit assimilation gaps. Increasing returns are seen as driving rapid acquisition, while knowledge barriers impede deployment, thus potentially causing a significant assimilation gap. It should be noted, however, that Fichman and Kemerer also state that other factors such as structural, managerial, political and social factors might affect assimilation within specific organizations, but that such explanations relate to a different level of abstraction.

### 3.3

#### SHADOW SYSTEMS

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The concept of shadow systems has been used in various streams of research to describe the existence of systems (social or technological) that exist outside of any main legitimate system. For example, within research on organizational development, Shaw (1997) notes that organizations tend to incorporate shadow systems that coexist in tension with legitimate systems. Such shadow systems typically involve covert interactions between social, political and psychodynamic systems, among others. The concept of shadow systems is, however, also used within IS research to denote technological systems that exist in spite of the presence of other formally sanctioned systems (Boudreau & Robey, 2005; Liang *et al.*, 2007; Oliver & Romm, 2002). The existence of technological shadow systems does not by necessity constitute a paradoxical or problematic situation for organizations. However, in relation to some classes of technology they do represent a major and somewhat paradoxical challenge. This

is particularly true in relation to the implementation, deployment and assimilation of large IT-based information systems intended to function as single-system solutions for the adopting organization. One such class of technology is that of enterprise resource planning (ERP) systems. In the following sections, the phenomenon of shadow systems is articulated and defined in the context of research on ERP systems, followed by an examination of existing theoretical explanations.

### 3.3.1 Characterization

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ERP systems primarily serve the purpose of mitigating problems related to fragmented and incompatible proprietary systems (Robey *et al.*, 2002), and have been defined as

*“[...] packaged software for integrating a firm’s business processes across functions in real-time”* (Hirt & Swanson, 2001, p. 373).

Thus, ERP systems are intended to support all the functional and operational requirements of an organization, and in this respect constitute single-system solutions (Davenport, 1998). As such, ERP systems represent complex technologies that, once implemented, require changes to organizational structures, business processes and skill requirements (Robey *et al.*, 2002). Further, the acquisition, implementation and assimilation of ERP systems are associated with large economical costs and long-term commitments, a combination that makes it difficult to reverse the implementation process once started (Bingi *et al.*, 1999). There is thus a great deal of risk involved in attempting to implement an ERP system. However, the potential benefits of having a single-system solution for all of the functional and business needs of the organization or firm frequently outweigh the associated risks. Considering the high degree of complexity involved in implementing ERP systems and the frequent failure of many commercial projects (see for example Barker & Frolick, 2003), it is not surprising that much of the research on ERP systems has traditionally had two primary focuses: (1) the identification of critical success factors, and (2) the investigation of ERP’s effects (Robey *et al.*, 2002).

While research on ERP has been criticized for being mostly descriptive and thus lacking in theoretical explanatory power (*ibid.*, p. 21), one observation in particular stands out as being interesting in relation to the research question addressed in this dissertation. This observation is concerned with the phenomenon of shadow sys-

tems, that is, systems that continue to exist even though the explicit purpose of ERP systems is the complete replacement of preceding systems. In this respect, the existence of shadow systems is a surprising and somewhat paradoxical phenomenon. Behrens and Sedera (2004, p. 1713) define shadow systems as

*“[...] systems which replicate in full or in part data and/or functionality of the legitimate systems of the organization”.*

Here, a legitimate system is viewed as a system that formally has been designed and implemented in order to carry out the primary purpose of the organization. Thus, shadow systems are seen as systems that replicate data or functionality of a sanctioned system and have been described as informal systems with little supporting documentation (Behrens, 2009). Further, shadow systems are frequently considered to cause negative effects in relation to the legitimate system and the organization itself (Strong & Volkoff, 2004). Such negative effects may include redundant workloads and problems related to data integrity (Behrens & Sedera, 2004). However, as noted by Harley et al (2010), shadow systems are sometimes used to overcome limitations related to the rigidity of ERP systems. Moreover, as argued by Oliver and Romm (2002), the removal of shadow systems that contain functionality that is non-existent in the ERP system might in fact degrade organizational performance.

While the existence of shadow systems as a phenomenon has been noted and described in several studies, little research has focused on developing explanations for why such systems exist and how they are used. However, some studies have been conducted; the following section outlines and explains existing theoretical attempts to address shadow systems.

### 3.3.2 Explanation

Behrens and Sedera (2004, p. 1714) note that little, if any, research has focused on developing theoretical explanations for the existence of shadow systems in organizations using ERP systems. Against this background, the authors set out to develop a theoretical framework intended to fill that gap by investigating an organization using an ERP implementation along with multiple shadow systems. Adopting a grounded theory approach to data coding, the authors develop a theoretical explanation for the existence of shadow systems that centers on the concept of “gaps”. A gap, in this respect, is explained as

*“[...] the gulf between the requirements of various stakeholders within the organization and what the ERP system implementation provided” (ibid, p. 1724).*

The distance, or magnitude, of such a gap is theorized to be affected by the configuration of the contextual conditions existing at any given time in the organization. Two types of contextual conditions are articulated: causal conditions and intervening conditions. Causal conditions are defined in terms of organizational, technological, business process, and people factors. Intervening conditions, on the other hand, are defined in terms of available resources and support within the organization. In this context, resources are considered important since they refer to the wealth (monetary, people, skill or time) available for the development of shadow systems. Support is also considered essential; it refers to the amount of formal and informal encouragement given to the development of shadow systems. Taken together, the authors argue that the existence of a sufficiently large gap will result in the creation of shadow systems to fill that gap, causal and intervening conditions allowing. More to the point, the authors note that, in this particular case, shadow systems frequently provided elements that were missing or lacking in the ERP system implementation.

Behrens (2009) extended this line of thinking and addressed a different aspect of shadow systems by studying how a particular shadow system was built, used and implemented in the context of a higher education institution. In particular, people's experiences were examined in order to provide more nuanced perspectives on shadow systems. As above, the effects of shadow systems are often described in terms their potentially negative consequences for the host organization. As argued by Behrens, however, shadow systems can also be characterized as “diamonds in the rough” from which organizations might in fact benefit. On the basis of her study, Behrens outlines five central lessons for successful organizational use of shadow systems, and concludes that most organizations will have shadow systems of one form or another and that these systems are often important for the organization's overall functionality. Thus, one approach to shadow systems is to acknowledge them as functional parts of the organization. However, this is not seen as detracting from the importance of asking why shadow systems exist in any given organization, since the answers to this question could provide learning opportunities. As stated by the author, not all shadow systems are entirely beneficial, but neither are all shadow systems entirely detrimental. Asking questions in order to learn about the underlying

reasons for the existence of a shadow system might in this respect reveal fundamentally important aspects of the organization. Another lesson that is articulated is that the very nature of shadow systems makes them difficult to control. Shadow systems are seen as existing in the informal side of the organization, which is considered to be a place where creativity and innovation are spurred. Thus, attempting to control a shadow system developed in this context might lead to a deteriorating situation for the system. Instead, good shadow systems should be encouraged without uprooting them from their original context. These suggestions for the successful organizational use of shadow systems deviate from the conventional idea that such systems pose a threat to the performance of organizations using ERP systems but are nevertheless interesting in the context of the duplicate systems examined in this dissertation. It should be noted that other theoretical attempts to explain the existence and workings of shadow systems have also been published. Once such attempt makes use of theories of organizational learning.

Although Robey et al (2002) do not use the term ‘shadow systems’, they argue that implementation and assimilation of ERP systems can be viewed as a dialectic between old memory and new knowledge. In this respect, when an ERP system is brought into an organization, members of that organization must not only engage in a complex learning process in relation to the ERP system, but also unlearn existing knowledge. The authors state that such a dialectic learning process may be challenging and note that users at times might have difficulties in learning to work effectively with the new system, a situation that might result in the development of

*“[...] improvised practices and reinventions of the technology”*  
(ibid, p. 22).

Here, I argue that such reinventions can involve the development of shadow systems. If so, it would follow that the general perspective of dialectics (and specifically, the perspective of organizational learning) could be useful theoretical approaches for understanding shadow systems.

In summary, the phenomenon of shadow systems may or may not be considered paradoxical depending on the context in which the relevant systems are being discussed. There is less ambiguity in the context of ERP systems – these are intended to function as single-system solutions, and so make the presence of coexisting shadow systems particularly challenging and paradoxical. However, it is noteworthy that the definitions of and explanations for shadow

systems tend to differ to some extent. For example, shadow systems have been defined as systems that to some extent replicate data or functionality of a formally adopted legitimate system. When examining available theoretical explanations of such systems, the concept of “gap” has been promoted as an underlying reason for their existence. The gap concept, however, posits that there is a difference between the requirements of stakeholders and the functionalities of the ERP system, and that this difference (depending on specific contextual configurations) drives the development of shadow systems. From this perspective, then, a shadow system offers additional information and/or functionality, rather than simply replicating that present in the ERP system. As have been shown, other perspectives caution against framing shadow systems as purely negative entities and suggest that they should instead be viewed as being potentially essential for organizations. An interesting approach to understanding the existence of shadow systems and the challenges involved in implementing complex technologies such as ERP systems can be found in the use of dialectics and organizational learning. In such theoretical perspectives, the implementation and assimilation of complex technologies can be understood as a dialectic of learning, where knowledge barriers need to be overcome.

The concept of workarounds is closely related to the phenomenon of shadow systems, and is the third and final concept identified in the literature search as being relevant to the research question addressed in this dissertation. The following sections thus describe workarounds and place the concept in its research context.

### 3.4

### WORKAROUNDS

The concept of workarounds is used within several different streams of research, including workflow research (Kobayashi *et al.*, 2005), health information systems (HIS) research (Azad & King, 2008), patient care information systems (PCIS) research (Ash *et al.*, 2004), implementation research (Boudreau & Robey, 2005; Ignatiadis & Nandhakumar, 2009; Vogelsmeier *et al.*, 2008), user resistance research (Alvarez, 2008; Ferneley & Sobreperéz, 2006), information systems evolution (ISE) research (McGann & Lyytinen, 2005), and research focusing on the organizational use of information technology in general (Gasser, 1986; Orlikowski, 1996; Tyre & Orlikowski, 1994). However, although it is a frequently used concept, workarounds has received comparably modest theoretical attention; this has caused several scholars to argue that there is a need for a broader and deeper understanding of what workarounds are, how

and why they are formed and enacted, and their overall implications for the organizations and firms in which they are embedded (see for example Azad & King, 2008; Orlikowski & Iacono, 2001). At a basic level, however, ‘workarounds’ is generally understood to refer to ways of achieving tasks that in some way break with intended and/or specified practices and technologies. For example, in the context of workflow research, workarounds have been defined as

“[...] *informal temporary practices for handling exceptions to normal workflow*” (Kobayashi *et al.*, 2005, p. 1561).

This definition clearly illustrates a rather straightforward perspective on workarounds in that it specifies that workarounds are temporary practices or solutions that exist outside of what is perceived to be the standard or expected workflow. Such workarounds are frequently explained as being developed and enacted due to unexpected events taking place in the workflow at hand. Thus, this way of conceptualizing workarounds posits that workarounds are natural and to some extent necessary in complex workflows as a means of managing unusual circumstances. From this perspective, workarounds are not a paradoxical phenomenon; rather, they are pragmatic problem-solving activities undertaken in response to specific problem situations occurring in a workflow. Nevertheless workarounds may, as noted by Kobayashi *et al.* (2005), cause cascading effects in organizations in the sense that the implementation of a single workaround can initiate a series of related workarounds that may introduce instabilities into the overall organization.

From the perspective of this dissertation, an even more interesting observation is that workarounds may constitute more complex and at times paradoxical phenomena for the organizations and firms in which they are embedded when developed and enacted in relation to the introduction and use of IT. This conceptualization of workarounds is presented and discussed in the following sections.

#### 3.4.1 Characterization

The concept of workarounds, when used in relation to IT, was first articulated by Gasser (1986) in his work investigating the integration of computing and routine work. Gasser noted that the effects of computing technologies varied over time depending on the context within which they were used. He was therefore interested in exploring why some problems related to computing tended to persist in some settings but were eliminated quickly in others. In general,

Gasser argued that users of computing technologies were regularly faced with contingencies that he labeled 'computing slips', that is, inaccurate data or technical inadequacies. Gasser identified and categorized three overarching ways of dealing with computing slips: fitting, augmenting and working around. In this context, 'fitting' refers to changing the computing or work context to accommodate slips. 'Augmenting', on the other hand, refers to the undertaking of additional work to make up for misfits, and working around (i.e. the implementation of workarounds) is defined as

*"[...] intentionally using computing in ways for which it was not designed or avoiding its use and relying on an alternative means of accomplishing work"* (ibid, p. 216).

Gasser identified different types of working around: (1) data adjustment, (2) procedural adjustment, and (3) backup systems. Users engaged in data adjustment enter false or fabricated data into the system in order to get it to produce a desired response. Procedural adjustment refers to the adjustment of organizational procedures, while backup systems are systems that are not part of the main system. In general, the definition and explanation of workarounds as provided by Gasser highlights an interesting and important aspect of the use of computers, that is, that users tend to engage in adaptation work in order to overcome limitations or inadequacies of computer systems. This perspective on workarounds essentially assumes that workarounds are products of necessity, created to deal with inadequacies within computing systems. While this might be true in some cases, Gasser's research also, and perhaps more importantly, highlights adaptation as a key factor in the use of computer systems. Workarounds thus constitute examples of user adaptation, which may or may not be good (or paradoxical) in relation to the overall purpose of the system.

Within the area of health information systems (HIS), for example, a key concern is to improve the overall quality and stability of organizational processes in order to secure the provision of adequate health- and medical care (Azad & King, 2008). One way of attempting to achieve such stability is to reduce the variation in organizational processes and thus standardizing processes through the adoption and implementation of various forms of IT systems. As noted by Azad and King (2008), however, increased computerization also tends to involve the implementation of an increased number of workarounds which may result in persistence of, or even an increase, in process variation, potentially hampering the original

objectives of HIS. Workarounds are in this context defined as

”[...] *non-compliant user behaviors vis-à-vis the intended system design, which may go so far as to bypass the formal systems entirely*” (ibid, p. 264).

Following this line of reasoning, the introduction of IT into an organizational context includes the specific objectives of reducing process variation and increasing patient safety and process quality. Given these objectives, workarounds represent a paradoxical outcome whose effects may ultimately be opposed to those that were originally sought. The definition presented above nevertheless builds on the assumption that the adopted system is adequate, an assumption visible in the use of the words ‘non-compliant’ in relation to user behavior. Consequently, it is possible to identify a key difference between this way of describing workarounds, and the account provided by Gasser; while Gasser assumes inadequacies present *within systems* to be a major cause of workarounds, Azad and King highlight inadequate *use of systems* (it should, however, be acknowledged that Azad and King go on to further develop the concept of workarounds as situated practices). The paradoxical quality of workarounds can therefore be seen as being dependent on the intended purpose of a system along with its technological characteristics. To this end, as with the previously-described phenomenon of shadow systems, workarounds can be considered paradoxical phenomena when used in the context of technologies that were originally acquired to increase standardization and control. Many of the computer-based information systems adopted within the medical care sector are implemented for this purpose (see for example Ash *et al.*, 2004; Vogelsmeier *et al.*, 2008), as are large-scale ERP systems (Alvarez, 2008) and enterprise content management (ECM) systems.

This also relates to the debate on whether workarounds are good or bad for organizations. A good example of the complexities and dynamic character of workarounds can be found in the work by Tyre and Orlikowski (1994), who describe how actors in an organization effectively devised workarounds to successfully manage the problems associated with the integration of a new technology. When the initial integration problems were subsequently formally addressed and managed, users nevertheless continued to use the workaround, which led to a situation in which the full capacity of the new technology was not realized. In this particular case, then, the workaround initially constituted a necessary and successful solution to technological problems but later had a negative impact on

the effects of the technology. Thus, while workarounds may involve temporal adjustments to systems, their character and effects can vary over time. This quality of workarounds thus further increases the complexity and unpredictability of the phenomenon.

Workarounds have also been described and theorized in relation to user resistance of technology. While much research on user resistance assumes resistance to be a negative phenomenon (see for example Kossek *et al.*, 1994) in relation to the introduction of new technology, Ferneley and Sobreperéz (2006) associate resistance with workarounds but distinguish between positive and negative resistance. The authors argue that behaviors resulting from positive and negative resistance may generate three types of workaround activities; harmless workarounds, hindrance workarounds, and essential workarounds. Harmless workarounds are described as workarounds that do not affect workflow and/or data accuracy and may result from both positive and negative resistance. Hindrance workarounds are conceptualized as actions where procedures are avoided and may be the result of positive as well as negative resistance. Finally, essential workarounds are defined as workarounds that are necessary in order to complete a certain task and are described as the outcome of positive resistance. While this view provides a more detailed description of the various types of workarounds, the positive or negative nature of a given workaround is nevertheless dependent on one's perspective. For example, workarounds identified as being 'essential' by the authors are likely to have a positive effect on the feasibility or ease of completing a certain task or operation. However, the design and purpose of the system might call for a different approach to completing those tasks. User resistance leading to the creation of workarounds is also related to issues of identity, role, power, deskilling and reskilling. For example, in a paper on the implementation of an enterprise system (ES), Alvarez (2008) noted that users of the technology devised workarounds in order to overcome experienced lacks of role and power in the organization. As the ES affected structures and power relations, users felt deskilled and as a consequence engaged in the development of various types of workarounds to counteract the deskilling process. As a result, users manipulated and reshaped the technology (i.e. created workarounds), which in itself produced a sense of reskilling.

#### 3.4.2

#### Explanation

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The characterizations of workarounds described above provide several perspectives on what workarounds are and how their existence

can be explained. In the simplest form, workarounds may be considered as temporary adjustments to either technology or organizational procedures due to inadequacies in the technology, or due to a misalignment between technology and practice. However, there are other explanations for their existence that provide greater insights into their complexity and situational nature.

Within the broad stream of research targeting organizational change in relation to IT, workarounds have been described and explained in the context of improvisation. For instance, McGann and Lyytinen (2005) examined the dynamic interactions between IT change and organizational change during information systems evolution (ISE). They propose a model involving four different kinds of ISE-related changes: (1) planned, (2) improvised, (3) organizational, and (4) IT-related. They also identify and describe four types of improvisations: configured process improvisations, configured IT improvisations, IT workarounds, and process workarounds. Thus, workarounds are defined in terms of what they are applied to (i.e. to a technology or a process), and are treated as components of an overarching socio-technical change process. In this respect, workarounds are regarded as a form of improvisation; the creation of workarounds is one of two ways (the other being planned change) in which organizational and IT-related changes evolve dynamically. In some cases, improvisations (and thus workarounds) are shown to become institutionalized and to generate new IT designs and new organizational routines over time. This way of describing and relating workarounds to organizational change provides a perspective that illuminates the importance of workarounds in the sense that while improvisations may initially be temporary measures, they can ultimately come to play important roles in shaping ongoing transformational processes.

In a similar vein, Orlikowski (1996, 2000) argues that organizations are enacted and that change is thus primarily through action. According to Orlikowski, change should thus be understood as something that is enacted through situated practices and is thus emergent, occurring at the micro-level of organizations as organizational actors engage in local innovation, opportunistic structural shifts, and responses to unanticipated events. Workarounds can be seen as examples of such local innovations or adjustments to events and can thus arguably play important roles in organizational change. This classification of workarounds as examples of situated improvisational practices suggests that workarounds occurring at the micro-level of organizations are potentially important practices that, taken together, can lead to significant organizational and/or technological changes.

Interpretive flexibility is another important theoretical account that is related to workarounds (Bijker, 1987; Orlikowski, 1992). As explained by Orlikowski, in technological contexts, interpretive flexibility posits that technologies carry certain characteristics and 'ideas' about how they should be used, as defined by their designers. However, human agents who actually use the technology may assign their own or shared meanings to it, which may or may not be consistent with the designer's intended interpretive scheme. Technology thus exhibits interpretive flexibility; it is argued that this flexibility depends on the characteristics of the material artifact, the characteristics of the human agents who use it, and the nature of the context in which it is used. From this perspective, workarounds are a consequence of the interpretive flexibility present in the design and use of IT in organizations. Importantly, Orlikowski also argues that:

*"While the notion of interpretive flexibility recognizes that there is flexibility in the design, use, and interpretation of technology, the factors influencing it allow us to acknowledge that the interpretive flexibility of any given technology is not infinite"* (ibid, p. 409).

Thus, different technologies and contexts can generate different degrees of interpretive flexibility, which might affect when and how workarounds are created and enacted. However, as discussed below, even comparatively rigid and large systems such as ERP implementations may be subject to workarounds.

Workarounds have also been explained and contextualized from a learning perspective. In their work on human agency and technology enactment in relation to an ERP system, Boudreau and Robey (2005) describe two different types of enactment; inertia and reinvention. In this context, inertia refers to how users at first avoided direct interaction with the ERP system due to factors such as its high level of complexity, while reinvention refers to the process in which users worked around the constraints and limitations of the technology, and in so doing created

*"[...] unintended patterns of technology use"* (ibid, p. 14).

The authors explain the transition between the two forms of enactment as a process of improvised learning that was motivated by social influence from various stakeholders in the organization. To this end, the authors show that even comparably rigid technologies such as ERP systems may be reinvented (i.e. worked around) through

improvised learning processes. In essence, the work of Boudreau and Robey suggests that the use and enactment of IT is difficult to predict and control, and that workarounds may be related to improvised learning processes affected by social actors acting and reacting reflexively due to changes in their environment.

In summary, workarounds have been defined and explained in a number of different ways and within a large number of research streams. As with the phenomenon of shadow systems, workarounds may or may not represent a paradoxical phenomenon dependent on the purpose of the technology and the practice in which it is situated. Most information systems nevertheless serve some specific purpose against which workarounds represents a new or simply different way of achieving a task. To this end, workarounds may be explained as anomalies that break with prescribed procedures and structures, or as natural and unavoidable components of change processes related to IT and organizations. The latter position indicates that even in the face of rigid systems such as ERP implementations, use interpretations and use patterns may be difficult to predict and control.

### 3.5

#### OTHER RELEVANT RESEARCH

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As previously discussed, this phenomenon-centric literature review aimed to accomplish two separate but highly interrelated tasks: to identify and describe previously-reported and similar phenomena that may be relevant to the duplicate systems paradox, and to investigate the explanatory frameworks developed for the analysis of such phenomena in order to identify potentially useful explanations for answering the research question addressed in this dissertation.

A phenomenon-centric approach was chosen because of the nature of the subject of the research question – a seemingly novel, paradoxical, and persisting outcome of efforts to adopt and assimilate an ECM system, which exemplifies the duplicate systems paradox. Limiting the scope of the literature review by focusing on the identification of similar phenomena gave this part of the project a clear focus. However, one limitation of this approach is that not all research results are articulated in the form of phenomena. Put differently, the line between what constitutes a phenomenon and what constitutes an explanation is not always crisp and clear. Thus, the search for related phenomena identified several well-established explanatory frameworks for analyzing the adoption, assimilation, use, and adaptation of technology that do not explicitly conceptualize their findings as phenomena. These explanatory frameworks could potentially be a source of relevant theoretical insights into

the research question addressed here. The remainder of this chapter therefore outlines and discusses five well-established and frequently adopted theoretical frameworks in order to extend the base of related research pertaining to this dissertation. These frameworks are institutional theory, structuration theory, theory on infrastructures, ANT and escalation theory. In essence, all of these frameworks attempt to address and explain change or persistence in relation to organizations, human actors and technology, and are thus relevant considering that this dissertation is concerned with a persisting paradoxical outcome of technology adoption and assimilation.

As previously discussed, the relationship between organizations and technology is a central concern within the IS research discipline. As discussed in chapter two, and as exemplified previously in this chapter, a multitude of ontological and theoretical perspectives on this relationship have been described. Institutional theory represents one such perspective that explicitly attempts to explore why and how organizational structures tend to endure even when faced with deliberate attempts to introduce change (Robey & Boudreau, 1999). This is particularly interesting from the point of view of the research question addressed here, since it targets a persisting phenomenon occurring within the context of an organization. However, there are many variants of institutional theory (equivalently, there are multiple different institutional approaches). Originally, building on the works of Berger and Luckmann (1967), institutional theory<sup>1</sup> was proposed and developed by authors such as Zucker (1977), who defined institutionalization as

*“[...] both a process and a property variable. It is the process by which individual actors transmit what is socially defined as real, and at the same time, at any point in the process the meaning of an act can be defined as more or less a taken-for-granted part of this social reality”* (Zucker, 1977, p. 728).

In principle, early institutional theory suggested that institutions arose from social action, but that social action also was constrained by institutions (Barley & Tolbert, 1997). Institutions<sup>2</sup>, thus, may be understood as

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1. Institutional theory is here concerned with ‘new’ institutionalism emerging from its start in the late 1960, as opposed to earlier conceptualizations (see for example Avgerou, 2000; Powell & DiMaggio, 1991).

2. Institutions have however been defined in a variety of ways by different institutional approaches. For further discussions, see for example Barley and Tolbert (1997).

*“[...] any standing, social entity that exerts influence and regulation over other social entities as a persistent feature of social life, outlasting the social entities it influences and regulates, and surviving upheaval in the social order” (King et al., 1994, p. 141)*

Thus, early institutional theory illuminated cultural influences on decision-making and formal structures in the sense that organizations and human actors were seen as conforming to larger institutions in order to be legitimated. For example, as argued by DiMaggio and Powell (1983, p. 147),

*“[...] we will contend, bureaucratization and other forms of organizational change occur as the result of processes that make organizations more similar without necessarily making them more efficient”.*

DiMaggio and Powell posited that three mechanisms in the form of coercive, mimetic and normative isomorphism could adequately account for the increasing similarities between organizations. In this context, coercive isomorphism refers to the cultural expectations of the society in which an organization is situated along with formal and informal pressures exerted by other organizations. Mimetic isomorphism, on the other hand, involves imitating other similar organizations in the face of uncertainty. It has been argued that imitation is closely related to legitimization because imitating another established organization could potentially yield a higher level of legitimacy, for example. The third form of institutional isomorphism proposed by DiMaggio and Powell, normative isomorphism, refers to increased professionalization, meaning that workers in a given field experience a collective need to clarify and formalize the methods and conditions of their collective work. Differently stated,

*“[...] organizational action reflects a pattern of doing things that evolves over time and becomes legitimated within an organization and an environment” (Eisenhardt, 1988, p. 492).*

Although providing interesting perspectives on persistence and institutional processes, institutional theory has, also been criticized for not attending to the types of strategic behaviors that organizations exhibit in response to the institutional processes that affect them (Oliver, 1991). In their work investigating institutional influences on information systems outsourcing, Ang and Cummings (1997) argue that when applied to hypercompetitive environments, insti-

tutional theory must examine the strategic responses of individual organizations in order to produce a complete understanding of the total environment and its dynamics.

Within the field of IS, institutional approaches have been adopted by several scholars for a variety of purposes, including identifying and explaining factors that enable adoption of interorganizational systems (Teo *et al.*, 2003), sources of influence on individual beliefs about technology (Lewis *et al.*, 2003), and information technology innovation (King *et al.*, 1994). Nevertheless, some scholars have also argued that a major limitation of institutional approaches is their lack of explicit focus on technology and change (Holmström, 2000). The work of Aygerou (2000) is a notable exception in this context; this author explicitly targets and describes the relationship between IT and organizational change as a dual process of institutionalization of IT and de-institutionalization of established organizational structures and practices. From the perspective of the research question addressed in this dissertation, institutional theory reminds us that organizations may be subject to different forms of institutional isomorphism and that organizational structures may constitute considerable inertia in terms of pace of change.

The theory of structuration, originally developed by Giddens (1976, 1979, 1984), provides a theoretical perspective closely related to that of institutionalism, and is one of the most influential theoretical frameworks in IS research. In principle, the theory of structuration posits that human agency (and thus action) is both constrained and enabled by structures. In this context, structures are things such as rules, resources, strategies, cultures, and communication patterns. As individuals act, they are affected by such structures, but they can choose to act in ways that either change or reinforce the structures. Human actors thus draw on existing structures in order to accomplish tasks, and their actions recursively produce and reproduce institutional structures. The relationship between human action and structure thus constitutes what Giddens terms a duality.

Within the field of IS research, the work of Orlikowski and Robey (1991) and Orlikowski (1992) extends the structurational perspective proposed by Giddens by explicitly articulating technology as a structural property in organizations. This is done using a structurational model of technology (Orlikowski, 1992, pp. 409–410) that attempts to move beyond strictly subjective and/or objective perspectives on the relationship between technology and organizations (*ibid.*, p. 403). The structurational model of technology has three main components: human agents, technology, and the institutional properties of the organization. These components are proposed to

influence each other in four distinct but related ways. First, technology is considered to be a product of human action in the construction (design) and use of technology. Second, technology is viewed as mediating human action in the sense of both constraining and facilitating action via things such as interpretive schemes and specific capabilities. According to Orlikowski, the duality of technology relates to its capacity to both restrain and enable actions undertaken by human actors. Third, institutional properties are proposed to influence human actors in the interaction with technology through for example norms, materials, organizational requirements, and standards. Fourth, the interactions between human actors and technology in turn influence the institutional properties of organizations through reinforcement or transformation of structures.

In essence, the model provides a powerful theoretical lens that attempts to move beyond deterministic (technological or social) accounts of the relationship between organizations and technology. To this end, the structurational model of technology represents an important theoretical advance within the IS field. However, several scholars have criticized the model in general and its conception of technology in particular. For example, as noted by Rose and Jones (2005), Orlikowski's model assigns a material existence to structures in organizations since human actors are seen to sustain institutional structures when conforming to the embedded rules, resources and interpretive schemes of technology. Giddens, on the other hand, explicitly denies the material existence of such structures. Further, as argued by Berg (1998, p. 466) and others, the model highlights social structuring (human action) and downplays technology since materiality is considered to be realized only through human action. Similarly, Monteiro and Hanseth (1996) argue that the model conceptualizes technology in an excessively abstract way, omitting potentially relevant details of for example how and where specific functions and/or capabilities of technologies restrict and enable action. These criticisms notwithstanding, the structurational model of technology is an influential theoretical framework that has received considerable attention within the IS field (see for example Jones & Karsten, 2008) as a way of explaining the emergent relationship between technology and organizations<sup>3</sup>. To this end, the model constitutes an interesting theoretical perspective in relation to the research question investigated in this dissertation because it highlights the

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3. Structuration theory was also the source of inspiration for the adaptive structuration theory proposed by DeSanctis and Poole (1994) as a means of explicitly addressing the technology-action relationship.

point that effects of technology may emerge rather unpredictably through complex patterns of influences between social aspects (human agents), materiality (technology), and institutional properties (structures).

The theory of information infrastructures provides a theoretical perspective that focuses explicitly on IT and its role and function in relation to organizations and firms. Information infrastructure theory builds on the idea that the character of IT solutions today is changing in the sense of becoming increasingly interconnected, interdependent and complex (Hanseth, 2010). Thus, it is argued that it is becoming increasingly difficult to discuss and analyze independent information systems. Rather, the term information infrastructure is promoted as concept better equipped to capture and describe the escalating dynamics and interconnectedness between systems and artifacts.

Like many other concepts, the concept of information infrastructure is difficult to define precisely because it has many different connotations. For example, Star and Ruhleder (1996) argue that infrastructure is a relational concept, since an infrastructure can only be defined as such in relation to organized practices. The authors also propose that infrastructures may be characterized through eight dimensions: embeddedness, transparency, reach or scope, learned as part of membership, as including links with conventions of practice, embodiment of standards, as being built on an installed base, and as becoming visible upon breakdown. Hanseth and Lyytinen (2010) contextualized the concept of information infrastructure in relation to classes of IT solutions with increasing complexity. These authors articulate four classes of technology: (1) IT capabilities, (2) applications, (3) platforms, and (4) information infrastructures. IT capabilities are seen as the possibilities of users to perform actions on computational objects or processes, such as for example the use of a simple text editor. Applications are conceptualized as groups of IT capabilities that may increase in complexity over time. Platforms are described as semi-closed highly complex suites of IT capabilities that differ from applications by targeting a heterogeneous and growing user base. Finally, an information infrastructure<sup>4</sup>, which is the most complex class of technology, is defined as

*“[...] a shared, open (and unbounded), heterogeneous and evolving socio-technical system (which we call installed base) consist-*

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4. A detailed elaboration on information infrastructures may be found in Hanseth and Monteiro (1998).

*ing of a set of IT capabilities and their user, operations and design communities” (ibid, p. 4).*

This definition conceptualizes information infrastructures as socio-technical systems, which are seen as constituting both outcomes and conditions of design. To this end, the control dimension associated with information infrastructures is described as being distributed and episodic, and dependent on negotiations and agreements between its component parts. Information infrastructures are furthermore argued to be open and shared, meaning that no clear boundaries may be drawn, and that new components and users may be added at any time. It is argued that this quality enables technological and social heterogeneity, and that both of these increase over time in information infrastructures. Moreover, information infrastructures are considered to evolve continually, implying that they may attain new (adapted) forms. Such progress, or evolution, is nevertheless postulated to be highly enabled and constrained by the installed base, being a function of the existing information infrastructure components. Thus, changing an information infrastructure requires adaptation of new elements to already existing elements, meaning that integration and compatibility issues will arise. In essence, this implies some level of path dependence related to information infrastructure evolution. In this context, standards are also promoted as essential elements in the design and evolution of information infrastructures. For example, in their work on challenges related to change in information infrastructures, Hanseth et al (1996) explicitly investigated the tension between standardization and the need for flexibility.

Overall, theory on information infrastructure highlights the complexity and interconnectedness of modern networked IT solutions and, from the viewpoint of this dissertation, provides an interesting perspective on challenges related to assimilation of new IT solutions. A particularly important idea taken from this theory is the conceptualization of an installed base as being important (and to some extent contributing to path dependence) in the evolution of information infrastructures.

Theory on information infrastructures represents an attempt to carefully describe, characterize and understand contemporary (and evolving) IT solutions. Another theoretical perspective that has often been adopted by IS researchers over the last decade as a means of articulating and addressing the role and impact of technology in social settings is the Actor-network theory (ANT) (Callon, 1986; Callon & Latour, 1981; Latour, 1987). At its core, ANT is based on the idea that social contexts can be described and understood

in terms of complex networks of aligned interests. Such networks, frequently called actor-networks (Callon, 1986, p. 142), may incorporate actors<sup>5</sup> that are both human and non-human (i.e. artifacts). Unlike structuration theory, ANT does not discriminate between human and non-human agency; instead, both humans and artifacts (in this context, IT) are treated as actors that can affect social change (Callon, 1986; Callon & Latour, 1981). The process of achieving alignment (or equivalently, of creating stabile actor-networks), is described as a process of translation that involves

*“[...] a translator, something that is translated, and a medium in which that translation is inscribed”* (Callon, 1986, p. 143).

In this context, a medium can be any form of material, including discussions, texts and technical objects. The concept of translation thus describes a complex process in which actors with initially different interests and agendas attempt to achieve stability and alignment (or put differently, social order) via negotiation and influence. The translation process is described as involving four distinct but related stages (or sub-processes): problematization, intersement, enrollment and mobilization (Callon, 1986). The four sub-processes of translation each describe distinct stages in which actors take on different roles and strive for specific objectives such as defining problems and articulating solutions, finding and creating allies, employing strategies to enroll and motivate new actors, and attempting to control and safeguard specific interests. Translation is also closely related to another key process as described by ANT, namely that of inscription. In general, inscription is articulated as the embedding of ideas, interests and social agendas into material artifacts such technology (Latour, 1987) and is described as a way of achieving stability in actor-networks. Through inscription, material artifacts may consequently come to affect human actors over time. Hence, ANT postulates that technology may affect change in social networks not only through human interpretation (action) but also in their own right. Thus, even though ANT describes actor-networks as socio-technical networks (where interpretation takes place), inscriptions in material artifacts may come to constitute elements in such networks that become unquestioned and unchallenged. To this end, inscriptions may vary in strength. However, because inscriptions are stabilized within an actor-network, their contribution to

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5. The term actant is regularly used within ANT as a way of signifying that actors may be both human and non-human (Hanseth *et al.*, 2004)

its stability tends to increase. In ANT, this is described in terms of the concept of irreversibility, which refers to the fact that actor-networks can reach a 'point of no return' (in relation to other possible courses of action) by accumulating material inscriptions and thereby becoming increasingly stable.

Within the field of IS research, ANT has been used in a large variety of contexts as a theoretical means of addressing and investigating business process change failure (Sarker *et al.*, 2006), e-Government projects (Heeks & Stanforth, 2007) health information systems implementation (Cho *et al.*, 2008), standard setting (Lee & Oh, 2006), strategy formulation (Gao, 2005), information technology change (Holmström & Stalder, 2001), information technology escalation (Mähring *et al.*, 2004), and geographical information systems development (Walsham & Sahay, 1999), and other such processes. As argued by Hanseth *et al.* (2004), ANT provides an interesting and relevant conceptual vocabulary for addressing the specifics of how IT relates to organizations and change. A particularly interesting example of the application of ANT to the study of organizations and IT can in this context be found in the works of Holmström and Robey (2005). These authors investigated the introduction of an OLAP tool in a municipal organization; their work shows how the IT application came to function as an active actor, amplifying specific interests and simultaneously regulating certain actions of human actors.

It should, however, also be acknowledged that it is possible to distinguish between (or at least discuss) early versions of ANT and what is frequently labeled post-ANT (see for example Law & Hassard, 1999; Mol & Law, 2002). In general, however, the focus on practice in ANT is tied to its performative orientation related to the contingency of actions that may involve non-human agency. To bring ANT to bear on the research question addressed in this dissertation, it would be necessary to adopt an analytical focus on the enactment of experiences and on how the observed paradox might be affected by and dependent on role played by non-humans, i.e. the associated technologies and documents.

The fifth and final theoretical framework that will be addressed as interesting from the point of view of the research question under investigation in this dissertation is escalation theory. In general, escalation theory investigates why individuals and organizations continue to engage in failing courses of action despite being faced with negative feedback (Harrison & Harrell, 1993; Staw & Fox, 1977; Whyte, 1986). The process of continued engagement in a failing course of action is conceptualized as escalation, and may

be described as a contradictory process since, as noted by Staw,

*“Intuitively, one would expect individuals to reverse decisions or to change behaviors which result in negative consequences. [...] Specifically, when a person’s behavior leads to negative consequences we may find that the individual will, instead of changing his behavior, cognitively distort the negative consequences to more positively valenced outcomes”* (Staw, 1976, p. 27).

Consequently, a central objective within escalation research is to identify and explain the mechanisms that underlie escalating commitment. Historically, a large part of the escalation research has examined individual decision-making processes and offered explanations to escalation based on either expectancy theory or self-justification theory (Brockner, 1992). For example, expectancy theory posits that decision makers may commit to a course of action even when faced with negative feedback provided that the goal is highly valued or is calculated to be achievable in the near future. Thus, this way of explaining escalation builds on the idea that decision makers rationally assess the relationship between added resources and the value of goal achievement. Decision makers are thus considered to calculate the probability that added resources will lead to goal achievement, and subsequently compare that with the expected value of the goal (ibid, p. 40). Self-justification theory, on the other hand, posits that actors making decisions may maintain a negative course of action simply because they are unwilling to admit (to themselves or others) that previous actions and decisions were flawed. In this respect, self-justification is conceptualized to be both psychological and social (Keil *et al.*, 2000, p. 639). These theoretical explanations clearly illustrate two very different positions regarding the underlying mechanisms of escalation: one treats decision makers as rational actors, while the other sees them as actors governed by psychological and/or social justification needs. Further research on escalation has, however, generated a large number of theoretical explanations such as prospect theory, agency theory, and approach avoidance theory, suggesting that escalation is a highly complex phenomenon (Keil *et al.*, 2000). Taken together, these theoretical perspectives present a multitude of factors that may promote escalation, and offer a number of more or less interrelated explanatory accounts.

In this context, the framework developed by Staw and Ross (1987) provides a meta-taxonomy that clusters factors considered to promote escalation into broader categories. In more detail, Staw

and Ross explicate four generic categories; (1) project factors, (2) psychological factors, (3) social factors, and (4) structural factors. Factors related to projects are typically explained as the objective elements of a project and how such elements are perceived by decision makers (Ross & Staw, 1993). Psychological factors are related to things such as self-justification, as discussed above, and thus concern factors that cause decision-makers to convince themselves that a current course of action is acceptable. Social factors are related to the social context in which decision-makers exist and relate to the need for external justification of, and competing forces within, a project. Finally, structural factors are defined as political and organizational forces both within and external to a given project. This outline of the taxonomy is admittedly brief, but it serves its purpose by exemplifying key factors in escalation and explaining something of their nature.

Within the IS discipline, several scholars have adopted escalation theory as a means to study and illuminate why and how IT projects escalate. As noted by Keil (1995), IT projects seem particularly prone to failure, a characteristic traditionally explained in terms of a lack of adequate management (*ibid*, p. 422). However, using the framework of Staw and Ross (1987), Keil demonstrates that IT project failure can be explained in more depth in terms of project escalation. In fact, Keil not only found support for the four categories of escalation factors as proposed by Staw and Ross, but also identified and articulated three additional factors: emotional attachment to a project, empire building, and slack resources and loose management controls (Keil, 1995, p. 436). Several other scholars within the IS discipline have also relied on escalation theory in order to study IT- and IS projects. For example, Newman and Sabherwal (1996) used escalation theory to study determinants of commitment to an information systems development project, while Mähring et al. (2004) combined escalation theory with ANT to create a theoretical option that explains the occurrence of runaway IT projects. IS researchers have furthermore broadened the perspective on escalation by demonstrating that project continuation in escalating situations is not exclusively linked to illogical or flawed decision making. In this context, Tiwana et al. (2006), demonstrates that real options theory may complement other explanatory models related to escalation by showing that projects may include real options that generate rational responses by decision makers and promote project continuation. The IS field has also focused attention on factors that may promote deescalation, i.e. the abandonment or successful turning-around of failing projects. For example, Keil and Robey

(1999) demonstrates that deescalation may be triggered by specific key actors such as senior managers, internal auditors and external consultants, and by actions such as redefining a project or changing the leadership of a project.

To summarize, escalation theory targets a situation where actors continue to engage in failing courses of action despite being faced with negative feedback. While there are a multitude of explanatory models that attempt to explain this phenomenon in somewhat different ways, the bulk of escalation research is focused on identifying factors that promote irrational decision making. As discussed above, some exceptions do exist, however the focus is generally on the decision making activity of individuals taking part in some form of project. In the context of this research, escalation theory consequently presents an interesting perspective on factors promoting irrational and/or complex decision-making at the level of individuals. One of the main limitations of escalation theory is that technology is not included as a potential source of escalation. Furthermore, the focus on factors as opposed to processes provides a distinct but limiting approach to understanding the complex and ongoing relationship between organizations and technology (that is, not limited to a particular project or time frame).

The preceding sections have provided a brief overview of five theoretical frameworks frequently adopted within the IS discipline as means of addressing and explaining the relationship between organizations and IT in general, and adoption, assimilation, use and adaptation of IT in particular. Although they do not constitute phenomena per se, these frameworks widen the base of related research against which the observed phenomena of the duplicate systems paradox may be contextualized. Another way of viewing the above-presented frameworks is to consider them as potential theoretical perspectives for the analytical efforts of this research. The next section explicates and justifies the specific theoretical approach adopted in this dissertation, which is best described as a dialectical approach that makes use of theory on organizational information processing and a contextualist perspective on organizational change.

As described in section two, an emergent overarching research perspective was assumed when investigating the research question addressed in this dissertation. Consequently, emphasis was placed on understanding the relationship between organizations and information systems in terms of an ongoing process of mutual shaping that gives rise to emergent properties. While this perspective is important, it is a meta-level consideration rather than a specific theoretical direction. Thus, in addition to explicating the general research perspective assumed, it is also necessary to detail the specific theoretical device or devices used to inform the analysis of the empirical material. This is important for several reasons. Notably, compared to more grounded approaches (e.g. Glaser & Strauss, 1967), the use of specific theoretical perspectives in the analysis of empirical material both constrains and facilitates exploration of potential explanations. It constrains the process of data analysis in the sense that it provides a specific set of theoretically driven concepts and constructs through which the researcher approaches the empirical material. In this sense, reliance on a specific theory in data analysis might lead to a situation where the researcher only sees what the theory proposes and would thus impede creativity (Walsham, 1995b, 2006). On the other hand, theory also provides a focused starting point for data analysis that builds on existing research, which can function as a solid guideline for further exploration. Balancing these two aspects is an important task for any researcher, and is facilitated by being clear about which theoretical perspectives have been adopted and for what reasons. This increases the transparency of the research process, and thus the possibility for further discussion and evaluation of principal findings. As stated previously, the analysis in this dissertation builds on the idea of emergence in the relationship between organizations and technology. In relation to IS research, several different but related approaches have been described that attempt to move beyond deterministic accounts in the study of the relationships between organizations and information systems. For example, as discussed in section 3.5, the structural model of technology (Orlikowski, 1992; Orlikowski & Robey, 1991) represents an attempt to understand and frame the dual nature of technology as both objective reality and a socially constructed product.

In this dissertation, dialectical theory is adopted as the main

analytical device along with a contextualist view on organizational change and theory on organizational information processing. This chapter describes these theoretical perspectives and justifies their use in the analysis of the empirical data.

#### 4.1 DIALECTICAL THEORY AS AN ANALYTICAL LENS

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Dialectics is a multifaceted theoretical orientation that does not easily lend itself to a simple and straightforward exploration. From the early writings of Plato, through the works of thinkers such as Hegel, Marx, Mao Tse Tung (1937), Churchman (1971) and Israel (1979), dialectics have been discussed, interpreted, applied, extended and re-structured. As noted by Ford and Ford (1994), there is no single defining view on dialectics; instead, there are several different views embracing different ontological and epistemological assumptions. Therefore, the decision to adopt a dialectical analytical perspective when studying information systems in organizations presents some challenges – it is necessary to explicate the specific form of dialectics used and to state what dialectics can contribute to such a study. In general, it should be noted that dialectical approaches are often misconceived as being identical (or at least, very similar) to positions held by schools of thought such as Marxism. While it is true that the works of Marx were based on a dialectical approach, that is not to say that all dialectical work is Marxist; instead, dialectics should be described and understood as a general approach to the study of social phenomena (Mathiassen, 1998, p. 84). A similar point is made by Bjercknes, who states that

*“Dialectics is an analytical tool for explaining relations and understanding change in society”* (Bjercknes, 1991, p. 57).

As such a general analytical tool, dialectical approaches have been increasingly used in order to analyze and explain social phenomena in relation to change within areas such as organizational and information systems studies (Cho *et al.*, 2007). For example, Robey and Boudreau (1999) argue for a logic of opposition building on a dialectical approach as a way of studying and understanding organizational change in relation to technology. The authors argue that the deterministic logic underlying many studies investigating organizational consequences of technology has in fact resulted in contradictory empirical findings, both within studies and across studies. In order to address such contradictions, and to construct more elaborate explanations, four theories (organizational poli-

tics, organizational culture, institutional theory and organizational learning) employing a logic of opposition are articulated as alternative explanatory avenues. Additionally, in their examination of information systems development, Sabherwal and Newman (2003) make use of dialectical theory as a tool for addressing persistence and change occurring in the development process. In this respect, dialectical approaches are used not as value-based frameworks or platforms for political arguments, but rather as intellectual methods aimed at explaining the dynamics of change.

In general, dialectical approaches do not employ a technologically deterministic stance or a social deterministic stance; instead, they are concerned with the character of change. Thus, dialectical approaches can be used as tools for analyzing and explaining the dynamics of change and the interplay between technological and social aspects, rather than focusing exclusively on one or the other. A dialectical approach is thus well suited to the emergent research position assumed in this dissertation. As previously stated, the core issue under investigation is related to a persisting paradoxical situation in the relationship between an organization and several computer-based information systems. Since the adoption, implementation and assimilation of any computer-based information system in itself constitutes an act of change (Walsham, 1993), a theoretical perspective that explicitly targets change and how change unfolds is appropriate and relevant. A dialectical approach additionally provides a process perspective (Benson, 1977; Bjercknes, 1991) on change rather than a perspective that solely examines static entities. Providing an extensive account of the development of dialectics and the different views that co-exist under this label is a challenging task that is well beyond the scope and purpose of this dissertation. However, in order to be clear about the theoretical implications of this choice it is necessary to articulate some fundamental assumptions that underlie dialectical approaches in general, and the dialectical approach adopted here in particular.

The concept of contradiction plays a central role in all dialectical approaches. However, the definition of what a contradiction is and how it should be understood varies depending on which school of thought one examines. For example, as noted by Van de Ven and Poole, researchers building on the Hegelian school of thought frequently describe contradiction in the context of

*“[...] a pluralistic world of colliding events, forces, or contradictory values that compete with each other for domination and control” (Van de Ven & Poole, 1995, p. 517).*

A contradiction thus exists when opposing forces coexist, each of which would have an effect on a specific context or situation that is opposed to that of the others (Ford & Ford, 1994). In an organization, both internal and external opposing forces may be present. Internal opposites in an organization may have to do with conflicting interests between work units, while external opposites may be constituted by interests, events or developments that are at odds with the activities of the organization in itself or parts of the organization in some way (Van de Ven & Poole, 1995).

From a dialectical perspective, change (or stability) in any given context is explained as the outcome of struggles between opposing forces and the relative strength of these opposites. A lack of change is interpreted as a state of stability, and occurs when the relative strengths of the opposing forces are more or less equal, or when one opposite completely dominates a given situation. If, however, the other opposite in a contradiction gains strength, the relative balance will be affected, and this will cause change in some direction. Opposing forces in a contradiction are frequently described using the general labels 'thesis' and 'antithesis', which through struggle over time may converge into a 'synthesis'. In dialectics, synthesis is often regarded as the outcome of a struggle between a thesis and an antithesis; some scholars consider it to transcend the initial condition. Thus, the synthesis resulting from a struggle is not the thesis or the antithesis, nor is it viewed as a mere combination of the two. Rather, it is typically thought of as a new entity with new qualities that differentiate it from the thesis and the antithesis. However, synthesis does not always have to occur in a dialectical process (de Rond & Bouchikhi, 2004; Sabherwal & Newman, 2003; Van de Ven & Poole, 1995). An antithesis might be strong enough to completely defeat a thesis, thus resulting in a replacement of power or a reversal in direction rather than the creation of something new. Similarly, if a thesis is strong enough to hold back an antithesis over time, that will result in lack of change, stability, or inertia, depending on what perspective one assumes.

Other conceptualizations of dialectical theory suggest even more detailed notions of contradictions and their relation to change. Examples of such conceptualizations include works based on Mao Tse Tung (see for example Tse-Tung, 1937) and his ideas about the principal contradiction as a way of understanding social change. In this context, contradictions are viewed not as mere conflicts, but rather from the broader perspective of constituting relations. Contradictions are viewed as consisting of two opposites coexisting in a single unit. In this respect, contradictions are considered as totalities

where the opposites have two qualities, that of identity and that of struggle. Whilst struggle is used in order to describe the interplay between the opposites and thus the process of change, identity refers to the contradiction as a whole in its context. Thus, identity refers to the totality of the contradiction rather than to the opposites or the struggle individually. As noted by Bjercknes (1991) and Cho et al. (2007), several contradictions might exist at the same time in any given context. This implies that not only can struggle occur between opposites within a single contradiction, struggle might also occur between different contradictions. In this way, contradictions might be at odds with each other whilst at the same time being inherently dynamic. Mao states that although several different contradictions might exist at the same time, there will only be one so-called principal contradiction that essentially will constitute the overall frame for understanding a particular situation.

In the context of this dissertation, dialectics is used pragmatically as an analytical tool geared towards investigating and explaining change through an explicit focus on contradictions. Thus, there are no ideological or political reasons for the adoption of this particular theoretical perspective. Dialectics were used for two primary reasons: (1) dialectics provides a theoretical perspective that is explicitly focused on the process of change, which is important given that the research here attempts to explain the evolution of a phenomenon over time, drawing on empirical data from a longitudinal case study; and (2) dialectical theory proposes that contradictions are essential parts of social life and that it is by understanding how such contradictions play out over time that knowledge about the content, context and process at hand may be generated. Since the research reported in this dissertation was prompted by an empirical observation of a contradictory and paradoxical situation, a theoretical perspective that acknowledges the existence of contradictions and further provides the tools for analyzing and creating knowledge about such contradictions is motivated. As argued by Churchman (1971, p. 185), dialectics may not be a tool for the production of crisp and clear solutions to specific problems, but it may serve well as a tool for producing a more knowledgeable and illuminated process. As Churchman writes specifically about inquiry processes, this idea is transferable to the research process undertaken in this dissertation as well.

In keeping with the work of Cho et al. (2007), I choose to consider the different views on dialectics as being complementary. However, it is necessary to provide some additional insights into the specific positions that are assumed in this research. First, I do not, as Mao

does, prescribe that there will be a single principal contradiction for any given situation. Instead, I argue and take as my starting point that any given situation might exhibit several interrelated contradictions that may be of equal importance. The reason for assuming this position is to allow for a more open exploratory analysis. Additionally, some scholars argue that contradictions will inevitably result in a synthesis that is distinctly separate from the thesis and antithesis of a contradiction. I and other authors (de Rond & Bouchikhi, 2004; Sabherwal & Newman, 2003; Van de Ven & Poole, 1995) argue that such a synthesis is not the only possible outcome of the struggle between opposites. Synthesis may indeed occur, but, so may a more straightforward displacement or replacement of a thesis provided that the antithesis gains enough strength or momentum.

This discussion of the basic elements of dialectical theory was presented in order to explain the underlying foundation and motivation for using dialectical theory as an analytical lens. However, this does not explain how dialectical theory can be used in practical data analysis. Before providing such insights, a discussion of the second theoretical framework that informed the data analysis presented in this dissertation is needed. This second theoretical framework is primarily based on a contextualist perspective on information management and organizational change. While dialectical theory provides a rich set of tools for examining and understanding contradictions and change in social settings, it does not embody a comprehensive view on organizations or information management. This need not to be a problem in itself, however, since the research here is concerned with contradictions and paradoxes occurring in the process of managing information in an organizational setting, the adoption of a comprehensive theoretical perspective related to the character and principal functions of organizations provides structure to the application of dialectical theory. Also, the use of an explicit theoretical perspective on organizations further increases the transparency of the analytical process.

#### 4.2 CONTEXTUALIST VIEW ON ORGANIZATIONAL CHANGE

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Contextualism as a theory of method was originally proposed and developed by Pettigrew (1985a, 1985b, 1985c, 1987, 1990) building on the works of Pepper (1942) and grew out of a general critique against early research oriented towards investigating organizational change. As argued by Pettigrew, research on organizational change had previously been conducted mainly in an ahistorical, acontextual and aprocessual manner, building on the idea of changes as easily

distinguishable events or episodes with little or no relation to historical events or contextual factors. This way of understanding and addressing change had, according to Pettigrew, lead to a situation where research on change in organizations was generating weak theoretical explanations that failed to address the core features and processes through which change unfolds (Pettigrew, 1990, p. 269).

As argued by Pettigrew, change is an inherently dynamic process where phenomena undergoing change are interconnected at both vertical levels and horizontal levels. In this respect, change is described holistically as a dynamic process extending in time in which the content of change and the context of change are intrinsically interconnected and dependent. The vertical level in this context refers to

*“[...] the interdependencies between higher or lower levels of analysis upon phenomena to be explained at some further level”* (Pettigrew, 1987, p. 655),

whilst the horizontal level refers to

*“[...] the sequential interconnectedness among phenomena in historical, present, and future time”* (Pettigrew, 1987, p. 656).

From this point of view, theories of methods aimed at providing comprehensive explanations of change should therefore be geared towards addressing the relationship between phenomena and context, and how these relationships play out over time, thus taking into account both vertical and horizontal levels of analysis. Pettigrew labeled these general principles for investigating change the contextualist approach, and described them as being both multilevel and processual in character.

In more detail, a contextualist approach to investigating organizational change highlights embeddedness in the sense of paying careful attention to the interconnectedness between different levels of analysis. This implies that change should be investigated by exploring potential relations between, for example, the level of individuals, units and the organization itself. Further, contextualist research builds on a processual perspective in which change is further investigated by examining its temporal interconnectedness. That is to say, change should be examined in relation to past, present, and future events and circumstances; organizations are treated as continuing systems. In this respect, a contextualist approach includes the view that processes shape structure and context over

time, but context and structure also contribute to the shaping of processes in a dialectical fashion (Pettigrew, 1987). Put differently, an important aspect of a contextualist approach is to explore how action is shaped by context, and how context is shaped by action. In essence, researchers adopting a contextualist perspective in the study of organizational change must therefore consider and explore three key factors; (1) the *content* of change, (2) the *process* of change, and (3) the *context* of change. Here, content refers to the ‘what’ of a change, process refers to the ‘how’ of change, and context refers to the ‘why’ of change. Context is further divided into two parts, inner and outer context. Inner context refers to features related to the structural, political, economic and cultural environment in which change occurs. Outer context on the other hand, refers to factors such as the economic, political and social environment in which a given organization exists and functions.

As described above, a contextualist approach to the study of organizational change requires the researcher to explore and analyze change by paying careful attention to multiple levels of analysis as well as to the process of change by seeing the organization as a continuing system. This perspective thus provides a comprehensive and clear framework for investigating how and why change occurs in an organizational setting. In this respect, it complements the dialectical approach by providing structure to the identification and analysis of contradictions and how they play out over time. In fact, Pettigrew states,

*“[...] the processual analysis requires a motor, or theory or theories, to drive the process, part of which will require the specification of the model of human beings underlying the research”* (Pettigrew, 1987, p. 656).

It thus seems appropriate to adopt an approach in which dialectics serves as the analytical ‘motor’ and contextualism provides a comprehensive framework for addressing organizational change. However, this does not address the *content* part of change. Contextualism does not specifically address the content of change in the sense of what particularly is undergoing transformation. This is necessary so because such a specification would impair the generic qualities of the approach. While the contextualist approach provides clear guidance as to how organizational change can be addressed and investigated, it is necessary to provide more detail regarding the specific phenomena undergoing change, i.e. the content of change.

### 4.3 ORGANIZATIONS AS CONTINUING INFORMATION PROCESSING SYSTEMS

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In this dissertation, the content of change is concerned with contradictions occurring in information management in organizations. Information management in this respect can be understood both as a specific activity amongst other activities taking place in an organization, but also as the principal function of any organization. For example, as argued by Tushman and Nadler (1978) organizations can be understood as open social systems that are confronted with work-related uncertainty at various levels. In this context, uncertainty refers to the absence of information needed to perform a task in an organization. Organizations thus have information processing requirements and must develop information processing capabilities to function effectively. In this respect, organizations can be considered as information processing systems whose primary tasks are related to gathering, processing and creating information. Indeed, this perspective is frequent within organization studies that focus on organizational design. For example, Galbraith (1974) argues that differences in organizational designs are related to the relative levels of uncertainty that exist in relation to task execution. Thus, greater task uncertainty leads to a greater need for information that must be processed in order to achieve a given level of performance for a particular task. This, in turn, means that different organizational designs represent distinctive strategies adopted by organizations in order to, for example, increase their ability to preplan or their flexibility in dealing with situations where only limited preplanning is possible. Later authors expanded on the concept of uncertainty in relation to information processing requirements. Daft and Lengel (1986), argue that organizations process information for two distinct reasons, to effectively manage uncertainty, but also to manage equivocality. The authors argue that the underlying assumption that the quantitative gathering of more information will necessarily reduce uncertainty and therefore increase efficiency in task performance constitutes an oversimplified view on organizational activities. Instead, the authors complement the notion of uncertainty with the notion of equivocality and state that these two should be considered as complementary forces that exist in organizations and influence information processing activities. Here, equivocality is explained as

*“[...] the existence of multiple and conflicting interpretations about an organizational situation” (ibid. p. 556).*

In this respect, if equivocality is high in relation to task performance, simply gathering more information does not represent an adequate option because of the very nature of the situation. Equivocal situations are associated with a high degree of ambiguity, which means that people attempting to perform the task might not even understand its purpose, let alone what information is needed to complete it. The need for increased information processing in a particular context is consequently explained as being derived from increased levels of uncertainty and equivocality, which in turn are explained as stemming from the characteristics of the task at hand, the context in which the task is carried out, and the interconnection and dependencies between units and subunits involved in that particular task. Information processing requirements may thus differ considerably in character, which consequently implies that information processing solutions (i.e. capabilities) must be adapted fit the particular requirement at hand (Leifer & Mills, 1996). Such solutions may for example include the development of new organizational strategies, the implementation of new communication channels, and the adoption of computer-based information systems.

In this research, the focal issue at hand is represented by the conception of organizations as continuing information processing systems that have information processing requirements that in turn need information processing solutions. Here, I use the overarching term 'information management' to refer to the activity involving exploration and leveraging of information processing solutions (social or technological) to match information processing requirements. This constitutes the 'content' part, or put differently, that which is undergoing transformation from a contextualist standpoint. The next section details the specific analytical approach adopted in this dissertation and explains how the theoretical frameworks outlined above fit together and how they informed the analysis of the empirical material.

#### 4.4 APPROACH TO DIALECTICAL ANALYSIS

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The focus of the research described in this dissertation is a paradoxical phenomenon occurring in the information management efforts of an organization. More to the point, the research question targets a situation in which an organization continuously allows multiple functionally overlapping, partially competing and largely incompatible information systems to persist to co-exist even though this impedes overall organizational performance. The information management efforts under investigation involve the adoption and assimilation of a new Enterprise Content Management

(ECM) system along with its relationship to existing and potential future solutions (social or technological) in the organization. In this respect, three important observations can be made: (1) this research deals with a paradoxical phenomenon that has existed for some length of time; (2) that this phenomenon is related to activities and efforts associated with information management; and (3) that this phenomenon exists in an organizational context. The theoretical frameworks as presented in this chapter have thus been adopted to provide theoretically-grounded guidance to the analytical efforts in this research. In short, these frameworks are: (1) a dialectical perspective on social change in general, (2) a contextualist approach to the study of organizational change in particular, and (3) an understanding of organizations as information processing systems that exhibit information processing requirements and need information processing solutions. These theoretical frameworks provide distinct but complementary perspectives and a comprehensive set of tools for analyzing the empirical data gathered in the study described herein.

The dialectical perspective assumed provides an overarching perspective on social change that focuses explicitly on contradictions and how such contradictions affect and drive change processes. Change or stability can, from a dialectical perspective, be explained as the outcome of struggles that exist between opposing forces. Thus, seemingly contradictory phenomena such as the one examined in this research may be investigated by identifying and examining opposites, their struggle, and their relative strength and balance. Moreover, since most contexts tend to exhibit several interrelated contradictions, struggles can occur between contradictions as well, thus affecting the overall process of change. In this respect, dialectics provides the tools for identifying, describing and explaining contradictory phenomena through a thorough analysis of existing opposites, forces and their interconnections. Dialectics does not, however, embody a specific perspective on the context of social change. Here, the context is that of an organization, and so a fundamental concern is how contradictions may be identified and investigated in an organizational context. In this respect, the contextualist approach to the study of organizational change, complemented by a perspective on organizations that treats them as information processing systems, offers useful guidance on how to study organizational change and the content undergoing transformation. Put differently, the theoretical frameworks discussed in the preceding sections facilitate the identification and exploration of contradictions related to the phenomenon under investigation here.

The contextualist perspective has informed this research by providing guiding principles for the collection and analysis of data. Adopting a contextualist stance requires the researcher to collect data and pay careful attention to the particular area undergoing transformation (content), the context in which transformation is taking place (both inner and outer context), and the process of transformation. Thus, organizations are principally considered as continuing systems where change by necessity is an ongoing process with high interdependencies between horizontal levels as well as vertical levels. Hence, data needs to be collected at multiple vertical levels (for example at the individual level, group level, and organizational level) as well as over multiple periods of time to provide insights into the processual character of change. The contextual perspective thus complements the dialectical analysis in the sense that it offers clear guidance to the collection of data related to change in organizational contexts. The research reported in this dissertation strived to incorporate all of the above guidelines by the specific means of a longitudinal case study covering change efforts related to information management taking place in an organizational context over a time span of nine years. Data has additionally been collected at multiple vertical levels, and contextual factors have been investigated (see chapter five for details on data collection). The third and final theoretical perspective used as an analytical lens in this research is the perspective on organizations as information processing systems. The principal motivation for incorporating this perspective is that it complements the contextualist approach by offering a theoretical framework specifically targeting the content undergoing transformation. In this respect, it provides a vocabulary grounded in theory that is able to explicitly address the actual and practical work carried out (information management) in the organization under investigation.

Viewed separately, each of the above-mentioned frameworks includes unique tools for addressing the phenomenon under investigation; combined, they constitute the overarching analytical approach adopted in this research. This approach has an associated structure, that is, a way and sequence in which the specific frameworks come into action. To be specific, the temporal order of application can be said to be content-centric. This means that the idea of organizations as information processing systems guided the identification of content-specific data material. This identification was in turn guided by the contextualist approach in that content categories in the material were examined in a processual manner, investigating past, current and future events, issues or statements related to

that which is undergoing change. In this context, the word ‘future’ refers to things such as data material related to plans, and strategies that express potential future directions. Additionally, the content analysis was guided by contextualism, highlighting the importance and role of context. More specifically, four theoretical constructs derived from the above theoretical frameworks have been developed and used in the analysis process; (1) information processing requirements (IPR), (2) information processing solutions (IPS), (3) information processing transformations (IPT), and (4) information processing context (IPC). Thus, if organizations are considered to be continuing information processing systems, the following distinctions can be made: an organization will exhibit IPRs in need of IPSs. The process of mapping IPSs to IPRs is captured in the construct IPT. IPC represents the context in which IPRs IPSs and IPT unfold over time. Thus, the first step of the approach adopted here consisted of analyzing the empirical material in order to identify and code the above-presented constructs. The second step of the approach was to apply the dialectical perspective to the resulting coded material in an investigation of potential contradictions present within and between various levels.

In the next chapter, the research design of this dissertation is explained and discussed in detail. In this regard, a further elaboration on the theoretical constructs is presented along with the coding schemes used to analyze the empirical material.



## EMPIRICAL INVESTIGATION

Discussions related to research design are frequently structured around the articulation of one or more research methods and how such methods have been applied in the collection and analysis of empirical material. While this constitutes an essential part of any research design, I argue that it is equally important to identify, articulate, and be aware of the underlying assumptions (or equivalently, the philosophical underpinnings) of the design. There are several reasons for this statement. First, methodological choice is intimately related to the philosophical underpinnings (whether explicit or implicit) of the researcher, which makes the articulation of these foundations essential in order to increase the transparency of the research process. For example, as argued by Collier in his work on critical realism,

*“A good part of the answer to the question “why philosophy?” is that the alternative to philosophy is not no philosophy, but bad philosophy. The “unphilosophical” person has an unconscious philosophy, which they apply in their practice – whether of science or politics or daily life”* (Collier, 1994, p. 17).

In this respect, then, being clear about underlying philosophical assumptions represents an attempt to be clear about arguments, logic and explanations, which in turn facilitates evaluation of the quality of the research process. Second, when relying on existing theories in the analysis of empirical material, as is done here, it is important to be aware of the underlying assumptions present in those theories, and of the potential implications these assumptions might have in relation to the researcher’s starting points. For example, as noted by Garcia and Quek,

*“Methodology relates and actually depends upon theoretical issues which in turn are bound to philosophical conceptions”* (Garcia & Quek, 1997, p. 459).

Accurate evaluations of the research process as a whole are greatly facilitated by clear explanations of the logic behind the chosen epistemological, theoretical, and methodological approaches, and of the kinds of answers that can be obtained using the chosen methods. In

order to provide such clear explanations, the following sections discuss the research method adopted in this study and its philosophical underpinnings, the research site, the process by which data was gathered, and the specifics of the data analysis process employed.

## 5.1 PHILOSOPHICAL FOUNDATIONS

The philosophical underpinnings of research methods are often discussed in terms of ontological and epistemological positions. In this context, ontology refers to the nature of things (Van de Ven, 2007) whilst epistemology refers to the theory of knowledge in general, and the process of acquiring knowledge in particular<sup>6</sup> (Hirschheim, 1992). Several classifications of ontological and epistemological perspectives exist in the literature. For example, Van de Ven (2007) differentiates between logical positivism, relativism, pragmatism and critical realism in his work on the reciprocal relationship between the philosophy and practice of science. Within the information systems field, on the other hand, epistemological positions are frequently divided into positivist, interpretivist and critical epistemologies<sup>7</sup> (Orlikowski & Baroudi, 1991). However, as noted by Myers (1997), it is not trivial to adhere strictly to one of the above-mentioned epistemological positions; although they are described as philosophically-distinct ideals, the distinctions are less clear-cut in practice (see Lee, 1991 for a detailed discussion). One of the fundamental starting points for the work described in this dissertation relates to the position assumed regarding causal agency in the relationship between technology and social actors. In chapter two, I argue that the consequences of information technol-

6. Other more elaborated conceptualizations do exist. See for example (Klein & Lyytinen, 1985)

7. As illustrated in previous chapters (e.g. chapter two), research within the information systems discipline may rely on very different ontological and epistemological foundations. This situation has generated several longstanding discussions amongst IS scholars regarding the appropriateness, or lack thereof, of different research approaches present in the field. A multitude of journal publications and academic books have been published on the topic (Galliers, 1992; Klein & Myers, 1999; Lee & Baskerville, 2003; Lee *et al.*, 1997; Mingers, 2003; Orlikowski & Baroudi, 1991; Walsham, 1993, 1995a), covering a wide array of issues and developments related to for example overarching philosophical assumptions, research methods, and quality criteria's for the evaluation of research. These discussions represent essential parts of a maturing and dynamic academic discipline, however, providing an extensive overview of the historical developments and current movements related to ontological positions, epistemological approaches, and methodological choices in the information system discipline is well beyond the scope and purpose of this chapter.

ogy in organizations emerge from complex interactions between technological features and social actors. This conception of causal agency has been labeled an emergent perspective (Markus & Robey, 1988), and implies a focus not only on technology or social aspects alone, but also, and more importantly, on the interactions between the two (Lee, 2001). Thus, an emergent perspective acknowledges that a given situation can only be understood by examining its technological characteristics and both the subjective and intersubjective experiences of social actors. In this respect, the epistemological underpinning of this research can be characterized as ‘broadly interpretive’ in the sense that it is concerned with

*“[...] how the social world is interpreted, understood, experienced, produced or constituted”* (Mason, 2002, p. 3).

Orlikowski and Baroudi (1991) describe studies based on an interpretive epistemology as studies that build on the assumption that

*“[...] people create and associate their own subjective and intersubjective meanings as they interact with the world around them”* (ibid, p. 5).

Thus, interpretivist researchers generally assume that knowledge of reality is gained through social constructions and that social phenomena can be adequately understood through the meanings that people assign to them (Klein & Myers, 1999). An outcome of this line of thought is the view that there is no such thing as value-free data since the researcher relies on his or her preconceptions in the process of enquiry and interacts with other human subjects through social constructs such as language and artifacts (Klein & Myers, 1999; Walsham, 1993, 1995a). This type of interaction may lead to a change of initial preconceptions, which thus challenges the researcher to be reflexive about his role in the research process and about the testimonies of the respondents (Hammersly & Atkinson, 1983).

One of the central elements of the research described in this dissertation centered on the observation and analysis of organizational members and functions along with their interpretations and communications as they strove to adopt and assimilate a new content management system. However, equal emphasis was placed on a careful examination of the technological systems involved in this process so as to obtain insights into the interaction between the organization and the technology. In essence, then, the term

'broadly interpretive' signifies that this research is grounded in an interpretive philosophical orientation, albeit with an explicit focus on interactive aspects of the relationship between social actors and technology. This implies that knowledge about the social world may be produced by examining subjective and intersubjective meanings and interpretations, but the approach also acknowledges that technological characteristics may play important roles in shaping such interpretations<sup>8</sup>. Within the field of IS research, the balance between interpretations of the world and the world *per se* has been discussed extensively in relation to issues such as the role of non-human agency<sup>9</sup> and the limits of social construction.<sup>10</sup> The maintenance of this balance is important if one is to produce results that are rigorous and relevant. Having thus clarified the epistemological position assumed in this study; it is now necessary to explain and justify the research method used.

Research methods are often divided into two categories: quantitative and qualitative (Myers, 1997). Quantitative research methods emphasize quantitative data as the primary means for explaining phenomena and frequently build on the assumption that there is an objective reality that may be captured and described through testable hypothesis in the form of, for example, statistical analyses (Garcia & Quek, 1997). By contrast, qualitative methods emphasize the investigation of processes and meanings through metrics other than quantity, amount, intensity or frequency (Denzin & Lincoln, 1994). However, as argued by Mason (2002), qualitative research is

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8. This distinction could be made in relation to an ontological position as well. Whilst interpretivism assumes that reality as such is socially constructed (subjective ontological position), other positions do exist. For example, critical realism (e.g. Bhaskar, 1978, 1991) assumes an objective ontological position (reality exists independent of our cognition) while adopting a subjective epistemological position (Van de Ven, 2007). Such a position could provide an interesting starting point for an analysis that acknowledges the potential role of technology. However, I would argue that the role of technological features (socially constructed or not) can also be adequately understood from an interpretive perspective.

9. For a discussion, see the debate from 2005 in SJIS regarding how and why to combine theories in order to better understand the role of IT in social settings (Hanseth, 2005; Holmström, 2005; McMaster & Wastell, 2005; Orlikowski, 2005; Rose *et al.*, 2005a, 2005b; Walsham, 2005).

10. An illuminating debate on this topic is that between Kling and Grint and Woolgar in *Science Technology and Human Values*. Grint and Woolgar harshly criticize Kling's position that IT exists regardless of our interpretations of it, and the debate presents us with a good example of the extreme points we can find in this debate and the force with which proponents of a position argue for their beliefs (Grint & Woolgar, 1992; Kling, 1991a, 1991b, 1992a, 1992b; Woolgar & Grint, 1991).

difficult to precisely define because it is not based on a unified set of techniques or philosophies. Rather, it has grown out of a diverse set of intellectual and philosophical traditions such as the interpretivist sociological tradition (which includes for example phenomenology and symbolic interactionism), postmodernism, anthropologism and psychology. In general, however, qualitative research attempts to develop in-depth understandings based on a constructive approach where no clear-cut objectivity or reality is assumed (Garcia & Quek, 1997). In this respect, a qualitative approach fits well with the philosophical underpinning previously outlined and moreover constitutes an adequate approach in relation to the research question under investigation in this dissertation. While a multitude of qualitative methods have been developed, one in particular stands out as being particularly well-suited to the study at hand: the case study. The next section explains why the case study was chosen as the primary research method and describes how it was implemented in the research presented in this dissertation.

## 5.2

### QUALITATIVE CASE STUDIES

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Although it has been stated that the research approach adopted here is broadly interpretive and highly qualitative in character, it must be recognized that the chosen research method, the case study, may be positivist, interpretive or critical in nature (Klein & Myers, 1999). This implies that several different approaches to case study research exist and furthermore that such approaches may differ in terms of their fundamental assumptions about reality and how knowledge can be adequately produced. This research draws on the work of Yin (2003), who is recognized as an authority on case study research (Healy & Perry, 2000), and provides distinct definitions and explanations of the case study method. In this context it should, however, be pointed out that Yin's approach is grounded in an implicitly positivistic stance (Walsham, 1995b, p. 74), which is manifested primarily in the quality criteria he promotes for evaluating case study research. The quality criteria employed in this dissertation therefore differ from those adopted by Yin in that they are explicitly geared for qualitative research. In this respect, I agree with Healy and Perry (2000) in that quality criteria are paradigm dependent and that research thus should be judged according to the terms of its own paradigm; I return to this point in the forthcoming sections. Nevertheless, most positivist and interpretive researchers accept the general definition of and motivation for using case studies provided by Yin. He provides the following definition:

*“A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003, p. 13).*

Further, Yin motivates the use of case studies by stating that the case study method constitutes the preferred research strategy when the researcher has little or no control over events and when the focus is on contemporary phenomena in a real-life setting. Moreover, he argues that case studies are specifically adequate when ‘how’ or ‘why’ questions are being investigated. In this respect, the case study method was particularly well-suited to the research described in this dissertation because: (1) the research was concerned with a contemporary phenomenon (a paradoxical phenomenon occurring in information management efforts related to organizational adoption and assimilation of new technology); (2) the research was conducted in a real-life setting (i.e. in an organizational context), (3) the researcher has had no control over events taking place in the context under investigation, and (4) the research question is a ‘why’ question, implying a processual, qualitative focus.

The case study method is frequently characterized by the use of multiple data sources and theory driven data collection and analysis. The use of multiple data sources strengthens the possibility of developing what Yin calls ‘converging lines of inquiry’, a process related to triangulation. In this context, Yin distinguishes between four types of triangulation (of data sources, amongst different evaluators, of perspectives on the same data set, and of methods) (ibid, p. 98). The triangulation of data sources in particular plays a central role in this dissertation. This type of triangulation requires the researcher not only to collect data from multiple sources, but also to use those data to corroborate the phenomenon under investigation, as opposed to using and analyzing the data separately. In this respect, data triangulation occurs when several sources of data point to the same conclusion or finding. As detailed in section 5.4, data triangulation was accomplished by gathering data from multiple sources and of various kinds, and at different levels in the context under investigation. However, it should be noted that the idea of data triangulation has been criticized by some academic writers for implying that there is an objective social reality that can be discovered through triangulation. Mason, for example, argues that the idea that different measurements of one and the same phenomenon will lead to a more accurate reading of that particular phenomenon is problematic since

*“[...] different methods and data sources are likely to throw light onto different social or ontological phenomena or research questions (or to provide different versions or ‘levels’ of answers)”* (Mason, 2002, p. 190).

The approach to triangulation adopted in this research is pragmatic in the sense that triangulation is used as a means to further improve the quality of the data analysis. In this respect, no assumptions of a given objective reality are made; rather, multiple data sources are used to illuminate the phenomenon under investigation as much as possible and to increase the transparency of the data analysis (and thus the logic behind it).

The case study approach adopted here can be described as being theory-informed in that both the data collection and the data analysis processes were theory-guided. As discussed in chapter four, a contextualist approach to data collection was employed, using a dialectical stance. The dialectical approach provided a theoretical focus during the data collection process through its emphasis on the concept of contradiction and the inherent structures of and relationships between contradictions. Contextualism provides a useful perspective on how change unfolds in organizational contexts and thus informed the data collection process by providing a structure for the identification of contradictions. Thus, these two theories collectively informed the data-gathering campaigns performed in the case study. The overarching analytical approach adopted in this study was formed by combining key concepts and perspectives derived from dialectics and contextualism with concepts and perspectives from theory of organizations as information processing systems. The data collection and data analysis processes carried out in relation to the case study consequently conform to the general characteristics of case study research as described above.

As argued in the beginning of this section, case studies can have different philosophical underpinnings. However, they can also vary in purpose and scope. In this context, the purpose of a case study is intimately related to the type of research question under investigation. Yin distinguishes between exploratory, descriptive and explanatory case studies, largely on the basis of the type of questions they are intended to answer. Exploratory case studies are frequently related to ‘how’ and ‘why’ questions because such questions target issues and developments that need to be traced over time. This research poses a ‘why’ question and attempts to explore developments from a processual perspective. In this respect, it can be considered exploratory. In terms of scope, Yin distinguishes between single

and multiple case study designs, and between embedded and holistic case study designs. The case study reported in this dissertation adopted a single-case design, that is, it focused on a single case containing one primary unit of analysis. Specifically, I studied the evolution of information management efforts in an organizational context over time, with a particular focus on the adoption and assimilation of a new Enterprise Content Management (ECM) system. Despite being a single-case design with only one primary unit of analysis (the administrative section of the organization under investigation), different levels of the organization in question were studied in order to obtain adequate empirical data. The levels examined include individual employees, a number of organizational units, and the management level representing the organization as a whole. The purpose of including multiple levels in the data collection was to collect as wide a range of data as possible in relation to the phenomenon under investigation. Section 5.4 contains details on the data collection process and thus also on the various levels at which empirical data been has been collected. The processual nature of the study is illustrated by a brief discussion of its scope.

Data was collected over two different time periods, the first between August 2005 and May 2006, and the second between May 2009 and November 2009. Data collection during the two time periods was carried out in the same context and targeted the same overarching process (the adoption and assimilation of an ECM system in the context of information management); in both cases, all data was gathered by the author of this dissertation. In this context, it is important to emphasize and explain the processual and explorative character of the study in terms of how it affected the formulation of questions and the focal issues under investigation.

During the first data gathering campaign, the primary focus of the study was on investigating the low utilization of a new ECM system in the organization. The ECM system had been introduced into the organization one and a half years before the study began, but few employees were making use of it. Emphasis was therefore placed on investigating the lack of interest in the system and on determining whether there was a mismatch between the functionalities of the system and the requirements of the organization's functional units and employees. Prior to the adoption of the new system, three different organizational teams had conducted studies to identify the organization's problems and needs related to the management of information and had drawn up detailed requirements specifications for the new ECM system to ensure that it would be capable of satisfying these needs. These processes started in 2000 and ended with the formal adoption of the system in spring 2004. The lack of interest in the new system therefore came as a surprise to the team

responsible for implementing the system, and prompted the first round of data-gathering reported in this dissertation. In brief, the data gathered in this first part of the study indicated that the role of the new system was unclear to many individuals and functional units because several functionally overlapping and (to some extent) competing systems co-existed in the organization. At that point in time, these overlaps were seen as temporary issues that would be solved with time as the roles and functions of the various systems in the organization settled and became more well-defined. After this first data gathering campaign had been completed, the researcher kept in contact with key respondents in the organization in order to keep track of developments. In the beginning of 2009, the researcher again contacted representatives from the organization for an informal discussion of the then-current developments in the system. At this time, an interesting observation was made: the problem of overlapping, competing and incompatible systems had persisted. This was intriguing in several ways. First, organizational members articulated that the situation was unpleasant and damaging to the performance of the organization, but they had not been able to solve the problem. Second, the problem identified in 2006 had not diminished; instead, it had become more severe and more complex. In light of this information, the researcher therefore contacted the organization and requested permission to conduct a second round of data gathering in order to investigate why these problems were persisting. The organization agreed to this and the new data gathering campaign commenced in May 2009. This round of data collection attempted to cover as many respondents as possible from the first round of data collection and also members of the management team in order to acquire data at the overarching organizational level. Because two different datasets were gathered on different occasions, this could be framed as two distinct but related case studies; however, in this dissertation it is presented as a single-case study design.

A central challenge related to any form of research, whether quantitative or qualitative, is to clearly specify the quality criteria that are applicable to the research and how such criteria have been addressed. In this context, rather than following Yin's procedure, I chose to adopt the quality criteria for qualitative research proposed by Mason (2002, p. 7). The primary reason for this is that Mason provides specific guidelines for the evaluation of qualitative research in general, whereas Yin adopts a more positivist stance. The general guidelines for ensuring quality in relation to qualitative research promoted by Mason are summarized in the table 1 (the guidelines presented in the left column are those written by Mason, whilst the descriptions in the right column represent my personal understandings and interpretations of those guidelines).

**TABLE 1: QUALITY CRITERIA FOR QUALITATIVE RESEARCH**

<b>Guideline</b>	<b>Description</b>
1. Qualitative research should be systematically and rigorously conducted.	This guideline highlights the importance of acting in a systematic and rigorous way in the research process as opposed to ad hoc or casual approaches. Thus, qualitative research should strive towards being well structured and systematically conducted.
2. Qualitative research should be accountable for its quality and its claims, or to use Clive Seale’s terminology it should be ‘fallibilistic’ (1999: 6).	This guideline states that qualitative research should be conducted in such a fashion that readers of the research should be able to fairly judge the quality of the claims, and therefore have access to material that makes such judgments possible.
3. Qualitative research should be strategically conducted, yet flexible and contextual.	Qualitative research should thus exhibit sensitivity to the contexts and situations in which the research is carried out whilst nevertheless being characterized by a sound research strategy.
4. Qualitative research should involve critical self-scrutiny by the researcher, or active reflexivity.	Qualitative researchers should be aware of their own actions and roles in the research process and be aware that it is not possible to be completely objective or neutral in relation to the knowledge that is generated.
5. Qualitative research should produce explanations or arguments, rather than claiming to offer mere descriptions.	Qualitative research should move beyond simply describing or exploring something. Instead, qualitative research should produce explanations and arguments and in that process, the researcher must be explicit about the underlying logic. Being explicit about the logic of arguments and explanations is important since they, in part, are based on the assumptions and ways of seeing the world of the researcher.
6. Qualitative research should produce explanations or arguments which are generalizable in some way, or have some demonstrable wider resonance.	Qualitative research should not simply produce idiosyncratic explanations. Rather qualitative research should attempt to generalize to some wider context and in this way clarify the authorial presence of the researcher.
7. Qualitative research should not be seen as a unified body of philosophy and practice, whose methods can simply be combined unproblematically.	Qualitative research may differ in character and may be based on different philosophical underpinnings. Therefore, qualitative researchers must take care in combining different methods and be clear about the arguments for the adopted approach.
8. Qualitative research should be conducted as a moral practice, and with regard to its political context.	Qualitative research must be performed in a way that it is sensitive to the particular contexts in which it is conducted. That is to say, research must be conducted in an ethically sound way.

The following paragraphs discuss each of these guidelines in turn and the steps taken to ensure that they were followed during the gathering and analysis of data.

**Guideline 1:** The case study reported in this research was carried out systematically. One particular feature that ensured a systematic approach is that data was collected during two different time periods. The observations made at the first data gathering campaign were used to draw up a theory-informed design for the second data gathering campaign so as to explicitly target a specific research question. Further, existing and well-established theories on organizational change, dialectics and organizational information processing were used to sharpen and focus the data gathering and analysis processes. Moreover, interview guides were developed to ensure a clear focus and that no relevant issues were overlooked. To ensure its accuracy, the gathered empirical data was summarized and presented to members of the organization in the form of a written report and in the course of a series of discussions.

**Guideline 2:** The overarching approach in this dissertation was to be as transparent as possible with regards to its underlying philosophical foundations, assumptions on causal agency, the literature review process, the use of theories, and the provision of details related to the data collection and analysis processes. The primary reason for adopting this approach is to enable the reader to accurately judge the research process in general, and the claims and explanations presented in the discussion in particular. Of course, it is up to the readers rather than the author to determine whether or not success has been achieved in this regard. However, the aim was to make all of the relevant material available to the reader.

**Guideline 3:** Because this research examined a phenomenon occurring over an extended period of time, it was important to adopt a flexible approach. The discovery of a phenomenon that at first glance seemed likely to be temporary and short-lived but which in fact persisted necessitated the initiation of a second data collection program in which new data was collected and old data was reinterpreted with a specific focus. In this respect, the research carried out here was strategically conducted and flexible.

**Guideline 4:** Any research process might potentially put the researcher in a position where they need to be explicit about the assumptions they have made and their reasons for using a given set of theoretic-

cal frameworks. In this respect, explicitly taking a standpoint or making decisions regarding such matters requires the researcher to have given some thought to why he or she makes such decisions. I have attempted to provide a rigorous and extensive justification for the theoretical perspectives I chose to inform the data collection and analysis conducted in this study. Since qualitative research to a large extent depends on the abilities of the researcher to analyze and theorize, reflexivity is essential. I have thus tried to be critical of my own arguments and conclusions in order to uncover any unwitting influence I may have had on the research process.

**Guideline 5:** The case study carried out in this research was explorative in that it focused on tracing the evolution of an emerging phenomenon over time; as such, it could also be described as being processual. Despite being explorative, attempts were made to contribute to theory by providing a detailed and explanatory answer to the research question rather than simply describing the phenomenon. That is to say, in this dissertation, I have attempted to (1) describe the character of the phenomenon under investigation, and (2) provide a detailed explanation for the persistence of the phenomenon that is informed by theory and grounded in empirical data. By necessity, such explanations are dependent on my arguments, and one important aspect of the research process was to clearly state the logic underlying these arguments.

**Guideline 6:** One of the primary goals of the study and analysis presented in this dissertation was to move beyond the mere production of idiosyncratic explanations. Consequently, I have attempted to generalize the study's findings and conclusions to a wider context, even though a single-case design was adopted. As argued by Yin (2003, p. 10), it is possible to generalize from the results of individual case studies to broader theoretical propositions (what Yin calls 'analytic generalization'). The alternative would be to generalize from studies of populations or universes; Yin terms this process statistical generalization. The distinction between these ways of generalizing findings is important. While statistical generalization involves inference on the basis of the results obtained by studying a sample of a population, analytical generalization is not concerned with a sampling logic. Instead, analytical generalization is carried out in relation to previously developed theories, which means that theoretical propositions based on the empirical material are compared and related to existing theories. Other academic writers agree in principle with Yin's assertion that generalization from the find-

ings of qualitative case studies is both reasonable and useful. For example, Walsham (1995b) argues that generalization based on interpretive case studies can be achieved in four ways: through the development of concepts, the generation of theory, the drawing of specific implications, and through the contribution of rich insight. Thus, the development of abstract concepts based on empirical case study data constitutes one interesting way of moving from empirical details to a more general concept. As Walsham explains, such concepts may constitute parts of clusters of concepts, propositions and world-views that together form more comprehensive theories. In this way, the development of interrelated concepts can play a role in theory development and serves as another important form of generalization. However, generalizations of the kind discussed by Walsham should be viewed as tendencies rather than predictions. Similarly, Lee and Baskerville (2003, p. 233) also argue for four types of generalizations: generalizing from data to description, generalizing from description to theory, generalizing from theory to description, and generalizing from concepts to theory. Other researchers have also emphasized the importance of generalization in qualitative research. For example, one of the seven principles for the conduct and evaluation of interpretive field research in information systems as put forth by Klein and Myers, is the principle of abstraction and generalization (1999, p. 72). In this dissertation, two types of generalization are made; in the vocabulary of Walsham (1995b), these are the development of concepts and the generation of theory. Thus, the identification and characterization of the phenomenon examined in this dissertation, i.e. the duplicate systems paradox, represents the development of a core concept based on empirical observations. Furthermore, the resulting explanatory model presented and discussed in chapters 7 and 8 represents the generation of a theoretical model related to the research question and the studied phenomenon.

**Guideline 7:** As noted in the introduction to this chapter, qualitative studies can be based on a variety of different ontological and epistemological assumptions. It is therefore necessary to carefully consider the implications of one's assumptions when choosing which methodological devices are to be used in the collection and analysis of empirical data. I have provided a detailed and explicit discussion of my reasons for choosing to use specific theoretical frameworks and research methods. In essence, the theories and the explorative single-study case design adopted were chosen to emphasize a processual perspective.

**Guideline 8:** As discussed above, Yin (2003) describes case study research as research conducted in a real-life context, investigating a contemporary phenomenon where the researcher has little or no control over events taking place in that context. This research reported in this dissertation was conducted in a way that is consistent with this description. Although little control was exerted over the events being studied, great care was taken to ensure that the work was conducted in an ethically sound manner with respect to the individual members of the organization and to the organization as a whole. For example, a contract was drawn up and agreed between the researcher and the organization before any data was collected in order to make sure that data collection was conducted in a way that would enable individual members of the organization to feel secure throughout the process. The decision to not use the real name of the organization and to ensure the anonymity of all respondents in the study was reached jointly by the researcher and representatives of the organization before any data was gathered. All respondents in the study were informed of the general agreements between the researcher and the organization before any data were collected, and all respondents had the opportunity to opt out of interviews and other data-gathering campaigns. Efforts were thus made to ensure that the research was conducted in an ethically sound way that would protect the integrity of the respondents and the organization as a whole.

### 5.3

### RESEARCH SITE

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The case study presented in this dissertation examined the information- and document management efforts carried out by the administrative units of a single organization. Specifically, the case study focused on processes related to the adoption and assimilation of a new ECM system. The study was conducted within one single organization in the medical care sector, here called HealthOrg. The organization is referred to by this pseudonym throughout this dissertation, according to the terms of an agreement made between the researcher and representatives of the organization at the start of the study. The primary reason for using a fictive name, and thus ensuring the anonymity of the organization in general and specific individuals in particular, is that organizational representatives expressed concerns about making potentially sensitive material publicly available.

HealthOrg is an organization in the medical care sector in Sweden that employs about 9000 people. The organization is politically governed, which means that its managed by political representatives

chosen by Swedish citizens in the particular geographical area that this organization covers. The elected representatives form various committees with different responsibilities, a joint board of directors and a shared council; collectively, these groups are referred to as the 'political unit' of the organization. The primary responsibilities of the political unit are to develop overarching strategies for the organization as well as to decide on general economic policies. That is to say, the political unit draws up the general guidelines to be followed in the work conducted by the organization and makes decisions on the general distribution of organizational funds. Such decisions are frequently communicated in the form of activity- and economic plans that are to be acted on by workers in the non-political divisions. Another major function of the political unit is to evaluate the plans and activities of the organization as a whole. There are also two major 'non-political' organizational units that are staffed by unelected workers. The first of these focuses on providing health- and medical care; the other performs administrative staff functions. The group that provides health- and medical care covers six areas of activity, each of which is focused on specific aspects of health- and medical care. There may be several units and subunits working to provide care within a single area of activity. The administrative division of the organization consists of seven staff functions or units. Each of these staff functions constitutes a defined unit in the organization but may consist of multiple sub-units. There are thus a total of thirteen major units in the non-political part of the organization; each of these units has an operational manager who is part of a management board. This board is chaired by the executive director of the non-political part of the organization, who is ultimately responsible for overseeing all of its activities.

The main responsibility (and thus function) of the organization is to provide health- and medical care to the general public. This is achieved in practice through the work carried out within the six areas of activity, but the general framework that dictates the overall direction of the organization along with the division of funding is established by the politicians. The management board coordinates the work and effectuates strategic plans for the organization. The administrative division of the organization provides support to the health- and medical care units, and to the management board. The seven units that together constitute the administration of the organization have around 270 employees; it was within this division that the case study was conducted. While the study specifically focused on the administration of HealthOrg, members of the management board were also included in the study because they are important

actors in the decision-making processes that affect the administration and act at the organizational level rather than at the unit or sub-unit level.

The seven units within the administration are: (1) the staff of the Secretariat (2) the research, development and education staff (3) the staff for growth and regional development, (4) the staff for organizational management, (5) the staff for information, (6) the financial staff, and (7) the human resources staff. The secretariat is responsible for supporting various committees and divisions in the organization in the preparation and execution of meetings. This staff is also responsible for preparing for and following up on the execution of decisions made at the organizational level, and for maintaining the formal diary of the organization and controlling access to that diary by organizational members and the general public. Additionally, the secretariat staff coordinates efforts to ensure that the organization complies with all of the relevant regulations. The staff for research, development and education is primarily concerned with the development of the organization's research policies and for the provision of education. The staff for growth and regional development directs, coordinates and follows up on the organization's activities related to growth and regional development. These actions may include issues related to infrastructure and strategic planning. The staff for organizational management provides theoretical support for the management's work in guiding and directing the organization. In this respect, it provides strategic support for efforts in work prioritization, the development of care processes, and so on. The three remaining divisions provide traditional management support, involving the general management of information, communications and press (the staff for information), the management of budgets and other financial issues (the financial staff), and personnel (the human resources staff).

The collective label used for these units in this dissertation is 'the administration'. However, it is important to emphasize that 'the administration' in this organization performs functions above and beyond those of a typical administrative division. For example, the staff for growth and regional development develops plans and commitments to support regional growth. Similarly, the staff for research, development and education is responsible for the evaluation and administration of research grants. Thus, the term 'the administration' is used here for want of a more precise term since there is no formal name for these seven divisions in the organization.

In summary, then, the primary focus of the case study described in this dissertation was on the administrative division of HealthOrg,

a large politically governed organization within the medical- and health care sector. While the structure of politically governed organizations is unique in several ways, the internal work of their administrative divisions is comparatively generic in terms of the management of information. However, it should be noted that as a provider of a public service, organizations such as HealthOrg are subject to specific legislation. Primarily, this is manifested in requirements related to formal record keeping, something that affects all parts of the organization including the administration.

Although the seven administrative units have different areas of interest, the work carried out in the administration is, in general, information-intensive in the sense that it is chiefly concerned with the production, distribution, access and general management of information. This information is primarily produced digitally, using various desktop software applications such as Microsoft Word or other more specialized computer-based information systems. However, the administration is also responsible for the management of a large number of physical documents of various sorts. For example, in the year 2000, close to 400000 physical copies were made of various documents in the organization. As previously mentioned, the organization is also required by law to keep a formal diary in which all of the information it handles must be recorded. The volume of information entering the diary is considerable: in the year 2000, more than 16000 cases were entered into the diary. In this context, a case is a generic term that may refer to a single page document or to a large group of interrelated documents. The diary also contains records of all of the digital information produced in the organization, including things such as electronic mail conversations.

Activities within the administration may at times require individuals and groups from several units (and sub-units) to cooperate. These activities that necessitate cooperation are referred to as 'cases'. A single case may thus encompass large volumes of information in the form things such as formal documents and electronic mail conversations, and may cover an extended period of time. Thus, some of the work processes carried out in this part of the organization can be characterized as collaborative work processes wherein different actors are dependent on input from other actors. Hence, if information is lost at any point in the work process, the process will fail, or fall behind. Typically, work processes within the administration involve information subject to formal recordkeeping, which means that even if such work processes are not 'cases' in the strict meaning of the word, they become collaborative in that information must be passed to the diary. A central challenge in relation to the type of

collaborative work processes taking place in the administration is therefore to manage these work processes in an efficient way, making sure that information is not lost, that it is readily available to all concerned parties, and that it is managed in a way that is compliant with the relevant formal regulations concerning information management. The administration thus expends a lot of its resources on checking the accuracy of the information produced, ensuring that work processes are carried out effectively, keeping records of all decisions, and minimizing errors in information management in general. The management of both information- and work processes within the administration is intricate for several reasons: (1) the administration has a complex structure, consisting of seven units, each of which may have multiple sub-units; (2) each unit operates autonomously but is at times required to cooperate with other units; (3) large volumes of information are handled by the administration each year; (4) several different technological systems are used to produce, distribute, access and manipulate information; and (5) there is a considerable body of formal legislation that applies to the work carried out by the administration, making it necessary to keep formal records of all information and decisions. The administration had for some time been experiencing problems related to collaborative work processes and information management in general, and to recordkeeping in particular. It was therefore decided that a new Enterprise Content Management system should be acquired. An ECM system was seen as a potential way to improve efficiency and to make case- and information management more robust and consistent. The adoption, implementation and assimilation of the new ECM system however turned out to increase rather than decrease the problems that the administration was experiencing, an outcome that was both surprising and unexpected from the perspective of the organization. In this respect, this research identifies a phenomenon, the duplicate systems paradox (detailed in chapter 6), and provides an explanation that is guided by theory and grounded in empirical data for why this phenomenon arose and persisted.

#### 5.4.

#### DATA COLLECTION

As explained in section 5.2, data was collected over two different periods of time, between August 2005 and May 2006, and between May 2009 and November 2009. Whilst the two data gathering campaigns were part of the same case study, they differed in terms of the phenomenon on which they focused and in terms of the theoretical framework within which they were conducted, as described in chap-

ter 4. Specifically, the first data-gathering campaign was conducted to identify the reasons for the apparent lack of interest in, and use of, the new ECM system implemented within the organization's administrative division in 2004. A broad approach was adopted to investigate the nature of work carried out within the administration, the character of the existing and new technological solutions, organizational structure, and perceptions of the new ECM system. This first data-gathering campaign was not informed by any theoretical perspective; instead, an explorative approach data collection approach was employed, grounded in the experienced problems as articulated by the organization. By contrast, the second data gathering campaign was guided by a specific theoretical framework and focused on the duplicate systems paradox. As discussed in section 5.2, the issue of co-existing, functionally overlapping, competing and partially incompatible systems had been assumed to be a temporary problem but in fact proved to be persistent. It was this initial identification of the duplicate systems paradox that prompted the second data gathering campaign. In this respect, the theoretical framework presented in chapter 4 was developed to inform the second round of data collection and the analysis of the gathered data. As discussed in section 5.5, the analysis examined data gathered in both stages of the study and thus involved some reinterpretation of data acquired during the first data-gathering campaign.

In general, defining the role of theory is an important and complex issue in most research. Building on the work of Eisenhardt (1989), Walsham (1995b) distinguishes between, and provides examples of, three different ways in which theory can be involved in research: as an initial guide for design and data collection, as part of an iterative process of data collection and analysis, and as a final product of the research<sup>11</sup>. As evident by this conceptualization, theory may be used in different ways and at different stages in a study. Walsham argues that using theory to guide and inform study design and the data collection process facilitates the creation of an initial framework that builds on existing knowledge within a particular domain, and the use of such frameworks to inform the selection of topics for study and approaches to empirical work. In this study, theory was used to help guide the data collection activities carried out in the second data-gathering campaign. By this point in the project, the existence of the duplicate systems paradox had been

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11. Walsham later extended his discussion on the role of theory by incorporating a dimension related to how a specific theoretical perspective is chosen (see e.g. Walsham, 2006).

noted, and theory was thus consulted to provide a comprehensive framework to help guide the data collection activities, and so as to obtain an analytical framework. Specifically, the main theoretical vehicles used to inform the empirical work were dialectics, contextualism and theory of organizational information processing. It should be noted that Walsham warns against the over-rigid application of theory in the early stages of research and argues that researchers must maintain a flexible attitude towards the empirical data and the theoretical vehicles adopted. Such flexibility is, according to the author, possible and desirable when theory becomes part of an iterative process of data collection and analysis (i.e. the second use of theory as explained above). This research has involved an iterative process in that the identification of the phenomenon under investigation emerged over time, which meant that theory informed subsequent stages of empirical work.

#### 5.4.1

#### Data sources

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According to Yin (2003, p. 8), one of the major strengths of case study research is its ability to include and deal with a large variety of empirical material such as documents, artifacts, interviews and observations. In this research, data was acquired from several different sources using a variety of methods during the two data-gathering campaigns, facilitating triangulation. The primary data sources in this case study were interviews and documents, but several other sources were also used. Table 2 summarizes the data sources included in the study and provides a short description of each. The subsequent sections provide more detailed descriptions of each of the sources.

**TABLE 2: OVERVIEW OF DATA SOURCES**

<b>Data source</b>	<b>Data source</b>
Interviews	<i>August 2005 to May 2006</i> : 9 interviews were conducted, each between 30 to 130 minutes long. All interviews were recorded and transcribed. <i>June to November 2009</i> : 14 interviews were conducted during this phase, each between 40 to 140 minutes long. All interviews were recorded and transcribed.
Documents	Documentation pertaining to the various internal projects carried out within HealthOrg, requirements and specifications related to the acquisition of a new technological system, notes from internal project meetings, technical specifications of systems including system Alpha and system Beta, internal reports, public e-mails (from within the organization), formal decisions, plans, strategy documents.
On site visits (observations)	Demonstrations of technological systems in action, and observations of practical work in the various systems. Observations were conducted on three separate occasions and lasted for between 20 and 120 minutes.
Qualitative electronic survey	The survey was conducted during the first data collection campaign and was electronically distributed (using the web-based survey tool Questio) to 148 users of system Beta. 96 respondents began the survey and 88 completed it. Questions in the survey covered issues specifically related to system Beta, for example: reasons for use or non-use, perceptions of the system, frequency of use, knowledge about who had initiated the implementation process, etcetera. The survey mostly requested free text answers.
E-mail, phone and informal meetings	Carried out informally during the research project with members of the organization (mostly with one of the project managers).
Workshops	Two workshops were conducted in which the research was presented and discussed with representatives from the organization.
Internal survey and report	I had access to data obtained from an internal survey carried out by a project team within HealthOrg investigating technological systems related to document- and information management.

As previously discussed, interviews were conducted during both data-gathering campaigns of the case study. All of the interviews were semi-structured and conducted according to previously-established interview guides (Kvale, 1997). In the first data gathering campaign, two interview guides were developed, one used in interviews with the project managers who oversaw the acquisition and implementation efforts related to the new ECM system, referred to as system Beta, and one used in interviews with employees within the administration. The main motivation for developing two guides as opposed to one was that the different respondent groups were expected to offer different types of insights related to system Beta, and so the two guides focused on different aspects of the implementation and use of the system. The interview guides used in the first data gathering campaign were, however, not informed by theory. Rather, the guides were grounded in articulated problems related to the use of system Beta and so focused on open-ended questions targeting a wide array of issues such as the nature of the work conducted within the administration of HealthOrg, the character of existing technological solutions, the character of system Beta, organizational structure, and users' perceptions of system Beta. The interview guide prepared for the project managers involved more specific but open-ended themes related to motivation for the adoption of system Beta, the process by which requirements were specified, and the implementation process.

As discussed in the preceding sections, the second data gathering campaign was informed by theory and the identification of the duplicate systems paradox. Thus, the second round of interviews focused on addressing the phenomenon of persistent co-existence of functionally overlapping, competing, and partially incompatible technological solutions. Theory was used in the preparation of three interview guides targeting the project managers and respondents working in the IT department, employees in the administration, and the management of HealthOrg. As before, by using several different interview guides, I was able to target slightly different aspects of the phenomenon under investigation; the use of theory when designing the guides so as to maximize the likelihood that the interviews would yield interesting data on the content, process and context under investigation. It should however be pointed out that the use of interview guides has both benefits and drawbacks. As argued by Patton (2002, p. 349), the primary advantages of using interview guides are that one obtains a more comprehensive dataset and can adopt a systematic approach to data collection. In this way, what

Patton calls ‘logical gaps’ in the data can be anticipated and closed without interrupting the conversational flow of the interviews. The main weaknesses of relying on interview guides are, according to Patton, that important topics may be unintentionally omitted and that the flexibility allowed by having themes or outlines as opposed to a sequence of specific questions may reduce the comparability of responses. In this research, the benefits of using interview guides in achieving a systematic and comprehensive approach were considered to outweigh the potential negative aspects. Nevertheless, the author supplemented the interviews by taking notes during the interviews in order to further capture interesting observations and nuances in the interviewees’ responses. In total, 9 interviews were conducted in the first data gathering campaign and 14 in the second. All interviews were recorded on tape and subsequently transcribed, and lasted between 30 to 140 minutes. As argued by Mason, transcriptions should, however, be considered partial rather than complete. For example, she states:

*“[...] do not assume that transcription provides an ‘objective record’ of your interviews, or that you do not need to make a record of your own observations, interpretations and experiences of the interview” (Mason, 2002, p. 77).*

Being aware of this, the author of this research iterated between listening to audio files, reading the transcripts and examining notes taken during the interviews when assessing and analyzing the empirical material.

The selection of interviewees for the two data gathering campaigns differed to some extent. In the first data gathering campaign, one of the project managers responsible for the implementation of system Beta provided important information that was used to identify possible respondents. This individual did not, however, provide specific names of individuals within the organization; instead, they aided in the process by providing a list of employees who worked within the administration and had access to system Beta. On the basis of this information, interviewees were selected with the aim of interviewing at least one employee from each of the seven units of the administration. Unfortunately, this proved impossible during the first data gathering campaign because of time constraints and difficulties in identifying employees willing to or having the time to be interviewed. Consequently, only workers from five of the seven units of the administration were interviewed in the first campaign. Additionally, two project managers were interviewed during this

phase. In the second campaign, an attempt was made to interview all of the individuals who participated in the first campaign, along with representatives from the managing board and IT department. However, two interviewees from the first data gathering campaign were not able or willing to participate during this stage. Table 3 provides a summary of the interviewees in terms of their roles and positions in the organization and the number of interviews in which they participated. In this context, it should be noted that the roles of some of the interviewees changed between the time of the first campaign and that of the second.

**TABLE 3: OVERVIEW OF INTERVIEWEES**

<b>Role in the organization</b>	<b>Division in the organization</b>	<b>Number of interviews</b>
Project Manager 1 (became the administrator of system Beta)	The staff for the Secretariat	3
Project Manager 2 and IT strategist	IT department	2
Executing officer	The staff for Organizational management	2
Executing officer	The staff for Organizational management	2
Executing officer	The staff for the Secretariat	2
Economist	The financial staff	1
Executing officer	The staff for the Secretariat	2
Executing officer	The staff for Growth and regional development	1
Executing officer	The staff for the Secretariat	2
Information officer	The staff for Information	2
IT strategist	The staff for Organizational management	1
Head of the IT strategy group (and part of the management board)	Management board	1
Head of the central IT department	IT department	1
Administrator of system Alpha	IT department	1

Total: 23

### 5.4.3 Documents

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Documents pertaining to HealthOrg were another important source of data. These documents included things such as internal project documentation, the requirement specifications for system Beta, notes from internal project meetings, technical specifications of several different systems, internal reports, formal decision documents, planning documents, strategy documents and annual reports. Taken together, these sources provided a rich set of data that was used to create a contextualized understanding of the organization, from both a historical and a contemporary perspective. The vast amount of documents additionally provided a frame of reference to which things such as statements made in interviews could be compared.

### 5.4.4 Observations

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Observations were made on three separate occasions during the data-gathering campaigns and primarily involved watching demonstrations of technical systems. The duration of these observations ranged from 20 to 120 minutes and included demonstrations of the systems' functionality and of practical work being carried out using the systems (in system Beta and system Alpha; more detail concerning system Alpha is provided in later chapters). As Patton notes, however:

*“The extent of participation is a continuum that varies from complete immersion in the setting as full participant to complete separation from the setting as spectator, with a great deal of variation along the continuum between these two end points”*  
(Patton, 2002, p. 265).

The observations made during these demonstrations provided more detailed insights into the workings of the systems, and notes were therefore taken during each observation. I additionally asked questions during the demonstrations in order to clarify complex interactions with each system, and so the demonstrations could be characterized as participant observations. In this context, it is important to note that participant observations also are subject to some limitations. As Yin (2003) argues, four major problems or limitations can be identified: (1) the observer has less ability to work as an external observer and may in this respect at times be forced to assume positions contrary to the interests of good scientific practice; (2) a participant observer is likely to become a supporter of the group or organization being studied; (3) the participant role may

require too much attention in relation to the observer role; and (4) if the organization being studied is physically dispersed, it may be difficult to be at the right place at the right time. Whilst I acknowledge these limitations and dangers related to participant observation, the method was used sparingly in the study and emphasis was placed on the acquisition of functional knowledge about the technological systems themselves rather than of the work performed using the systems.

#### 5.4.5 Qualitative survey

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Yin (2003) notes that case studies typically rely on six types of sources of evidence, namely documentation, archival records, interviews, direct observations, participant observations, and physical artifacts. In this research, an additional type of empirical data has been collected through the use of a qualitative survey. Whilst survey data can be used in the form of archival records (Yin, 2003, p. 89), surveys are not often used as data sources in qualitative case studies and the use of a survey in this instance therefore deserves further elaboration. The qualitative survey was part of the first data gathering campaign and served the specific purpose of collecting a broad range of data related to the use, non-use, and perceptions of system Beta. The majority of the questions in the survey did not have predefined answers; instead, the respondents had to answer in their own words. The survey was distributed electronically<sup>12</sup> to all employees within the administration that had access to the system at the time. Thus, 148 employees received the survey, 96 began the process of answering it, and 88 completed it. The respondents' anonymity was maintained, and so it was not possible to relate specific answers to the survey to specific employees in the organization. The survey provided a rich set of data in the form of collections of free text answers. Although the questionnaire generated a dataset consisting of answers to predefined questions, and thus lacked flexibility as compared thematic semi-structured interviews, the data obtained was important in obtaining a contextualized understanding of system Beta and its perceived role and function in the organization.

#### 5.4.6 Other data sources

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In addition to the sources discussed above, the case study also relied on data from other sources. Between August 2005 and November

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12. The web-based survey tool Questio was used in order to distribute the survey electronically within HealthOrg.

2009, several emails and phone calls were exchanged between the author of this research and representatives of HealthOrg. Frequently, such communications involved clarifications, requests for documents of various sorts, access to internal information in general, and discussions concerning the research project. Informal meetings not subject to tape recording and conducted without reference to interview guides also took place at times. Furthermore, two workshops were conducted in which the researcher presented and discussed the conclusions drawn from the gathered empirical data to representatives of the organization. Additional data was obtained in the form of responses to a survey conducted by an internal project team investigating document- and information management efforts within the organization. This data did not specifically target or involve the administration of HealthOrg (i.e. the unit of analysis in this research) but rather the wider context of health- and medical care; it was important in that it provided further context for the events and processes taking place within the administration of the organization.

## 5.5

### DATA ANALYSIS

The analysis of the empirical material was conducted in two main stages; the first involved coding of the data, while the second focused on dialectical analysis. Although the coding process and the dialectical analysis are described in separate sections of this dissertation, they are both part of the overall analytical process. As noted by Miles and Huberman (1994), coding plays a central role in the analysis of empirical data. The coding of the data was informed by theory in the sense that four theoretical constructs based on contextualism and information processing theory were developed, articulated and applied to the empirical data. The second stage of the analysis process involved a dialectical analysis of the coded data created in stage one, in which contradictions were identified in terms of internal opposites and struggles, along with tensions between contradictions. In both stages, work was conducted iteratively, with the researcher alternately focusing on empirical details and theoretical constructs. The analysis can thus be described as being grounded in empirical data and informed by theory. The work done in both stages was informed by the theoretical approach presented in chapter 4. In this context, it is important to emphasize that all of the empirical data was subject to coding and analysis. As discussed in section 5.4, the case study involved two data gathering campaigns, but only the second was guided by theory. In the analytical work, however, data from the first campaign was reinterpreted. The primary motivation

for doing this was that the phenomenon under investigation, the duplicate systems paradox, emerged over time and in this respect is dependent on and related to developments over time. Furthermore, although the specific focus of the first data gathering campaign was different to that of the second, they both addressed information management work in relation to the adoption and assimilation of system Beta.

The following subsections provide details of the coding process and the dialectical analysis in order to provide a comprehensive account of the analytical efforts carried out in this study.

### 5.5.1 Data coding

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Before explicating the specific process of coding, it is necessary to revisit the basic ideas of contextualism and information processing theory as well as the main research question under investigation. The coding efforts carried out in this research were informed by theory but grounded in empirical data, and so there is a reciprocal relationship between the applied theory and the empirical data. In essence, this study focused on a persistent phenomenon, i.e. the duplicate system paradox that emerged over time in the course of organizational efforts related to the adoption and assimilation of a new ECM system. The ECM system, here referred to as system Beta, was introduced with the aim of improving and facilitating a wide range of activities related to information management. However, rather than solving these problems and increasing organizational efficiency, the adoption and assimilation of the system impeded organizational performance, giving rise to a paradoxical situation. This observation, or phenomenon, is the subject of the research question that this dissertation seeks to answer:

*“Why do organizations allow multiple, overlapping, partially competing and largely incompatible information systems to persist and continue to evolve over time, despite continued awareness of the adverse consequences on organizational information management capabilities?”*

Thus, this research deals with a contradictory phenomenon extending in time and related to activities and efforts associated with information management in an organizational context. The empirical data was analyzed with the aim of addressing the research question by incorporating established knowledge related to contradictions, organizational change and information processing. Thus, although

the duplicate systems paradox was initially identified without theoretical guidance, theory was introduced into the research process prior to the second data gathering campaign to guide the data collection and analysis processes.

Two theoretical perspectives were used in the coding of the empirical data, namely contextualism and theory on organizational information processing. Contextualism is a theory of method for research concerning organizational change, in which organizations are viewed as continuing systems. Since the adoption, implementation and assimilation of any computer-based information system constitutes an act of change in itself (Walsham, 1993), contextualism is a suitable analytical tool for investigating how and why technology affects and is affected by organizational context. As detailed in section 4.2, contextualist analysis of change focuses on three key factors: (1) the *content* of change, (2) the *process* of change, and (3) the *context* of change. In terms of content, information management (or equivalently, information processing) was conceptualized as the main area of interest because system Beta had been adopted and assimilated with the specific intention of facilitating the conduct of these activities in the organization. Theory on organizational information processing posits that organizations exhibit information requirements to which capabilities or solutions need to be devised and implemented. Following this logic, two theoretical constructs (or codes) related to content were developed, IPR and IPS. IPR stands for information processing requirements and thus refers to the information processing needs and obligations of individuals, units, functions, and the organization as a whole. Thus, an organization may exhibit several different IPRs depending on which level is being considered and the specific interests of different actors. IPS stands for information processing solutions, and refers to the currently-available and potential future socio-technical solutions and ways of meeting to existing or envisioned requirements within the organizational context. These solutions may involve organizational strategies and structures, but frequently have technological aspects as well. Contextualism furthermore argues that change in organizations cannot be adequately described and analyzed without taking into account the process and context of change. In order to address these aspects of change, two additional constructs were developed, IPT and IPC. IPT stands for information processing transformations, and refers to the process of managing and linking solutions (coded as IPS) to requirements (coded as IPR). In this way, transformations are used inclusively in that no explicit delimiters for transformation processes are defined. The fourth and final theoretical construct is

IPC, which stands for information processing contexts. IPCs denote the context in which IPRs, IPSs and IPTs exist and unfold over time. A context may be both internal and external and can have organizational, managerial, financial, structural, and other aspects. Taken together, these theoretical constructs are the theory-informed codes that were used when coding the empirical data. Thus, on the basis of contextualism and information processing theory, the following coding scheme was developed.

**TABLE 4: THEORY INFORMED CODING SCHEME**

<b>Code name</b>	<b>Code description</b>	<b>Examples of events, issues or statements</b>
IPR	This code is related to the information processing requirements of the organization and its parts. In other words, it centers on the information processing needs of individuals, units, functions and the organizations itself. Any event, issue or statement assessed as a relevant IPR in relation to any of the above-mentioned levels should be coded.	<p>Statement: A member of the staff for the Secretariat states that they have a need to better control and overview documents and how documents flow in the organization, and that the current system has several problems. For example, documents are sometime lost or might be put in the wrong place in the organization, making them inaccessible.</p> <p>Statement: In a strategy document produced by one of the project teams, it is stated that the organization would benefit from knowledge-sharing between individuals and units. One of the stated reasons is that “the wheel is invented over and over again”.</p>
IPS	This code is related to available and future information processing solutions. Thus, this category centers on existing and potential solutions (socio-technological) to IPRs. Any event, issue or statement assessed as a relevant IPS in relation to any IPR should be coded. However, an IPS does not explicitly have to address an existing IPR.	<p>Statement: An investigation carried out by a project team appointed by the management board concludes that a new information and management system should be acquired in order make such management more efficient.</p> <p>Event: a new version of the main existing information management solution (system Alpha) was rolled out in the organization. The new version included new functionality.</p> <p>Event: the new system (System Beta) is used to launch a specific application aimed at deviation management in the organization.</p>

<b>Code name</b>	<b>Code description</b>	<b>Examples of events, issues or statements</b>
IPT	<p>This code is related to information processing transformations. In this respect, it is related to the process of managing and linking IPS and IPR in the organization. Any event, issue or statement assessed as relevant in relation to such management (or absence of management) of IPR and IPS should be coded.</p>	<p>Statement from an employee in the staff for the Secretariat: "I'm disappointed in the management since they themselves are not using the new system. What kind of signal does that send out to the organization?"</p> <p>Statement from the project manager of system Beta: "It's a bit like a competition between our system and other existing systems; you try to recruit as many users as possible by being nice and accommodating".</p> <p>Event: the executive manager sent out a memo to all employees making it clear that all document management concerning some particular issues was to be performed using system Beta.</p>
IPC	<p>This code is related to the information-processing context, that is, the context in which IPR, IPS and IPT unfold over time. Such a context may be both internal and external, and it may include technological, organizational, managerial, financial and other aspects. Any event, issue or statement assessed as relevant in the relation between IPR, IPS, IPT and IPC should be coded.</p>	<p>Event: a new policy on 24/7 governance is issued in Sweden. This policy puts pressure on authorities to be able to offer services to the general public in new ways. This event is used as an argument for proponents of system Beta.</p> <p>Statement: "we are a politically governed organization and that makes things a bit sluggish here"</p> <p>Statement: "since we are a public authority, we need to make information accessible to the general public and currently, we don't comply with that"</p>

In addition to the theoretically informed coding scheme, two additional coding schemes were developed, one involving codes related to time, and one related to role (speaker). The coding scheme pertaining to time was based on key events that took place within the organization in the efforts towards the adoption and assimilation of system Beta. On the basis of the empirical material, a case description (see section 5.3) and a description of the phenomenon in the form of the duplicate systems paradox (see chapter 6) were developed. These descriptions were used as input in the development of the time-based coding scheme in the sense that key events were identified and articulated. The periods of time between these key events were described as phases in the coding scheme. Specifically, seven time-based codes were developed: (1) system Alpha usage, (2) system Beta exploration, (3) system Beta implementation, (4) duplicate systems usage, (4a) duplicate systems intervention, (4b) system Beta development, and (4c) system Alpha renewal. The phases denoted by the last three codes (4a, 4b, 4c) can be regarded as sub-phases of a single overarching phase (the duplicate system usage phase); the individual sub-phases are separated by key events occurring within this longer phase. In addition to the time-based coding scheme, a role-based coding scheme was also produced. Five roles were identified and articulated: system Alpha administrator, system Beta champion, IT user, IT strategist, and manager. As was done when developing the time-based coding scheme, the case description and the description of the phenomenon were used as inputs when identifying these roles. The decision to limit the number of roles to five was motivated by the observation that for the purposes of the study, the identified roles were sufficient to accommodate the key aspects of the organizational functions fulfilled by the interviewees. When applying these role-based codes, the name of each respondent was coded in order to allow for greater traceability of the coded material. Although these two coding schemes were primarily developed on the basis of empirical observations, they were to some extent also informed by theory. Contextualism highlights the importance of a processual perspective along with interconnections between levels in organizations; the time-based and role-based coding schemes were useful in addressing and coding these aspects of organizational change.

Tables 5 and 6 present brief descriptions of the time-based and role-based coding schemes. The development of the two schemes via an iterative process of coding pilots and check-coding is then described in detail.

**TABLE 5: CODING SCHEME RELATED TO TIME**

<b>Code name</b>	<b>Code description</b>	<b>Examples of events, issues or statements</b>
<b>1.</b> System Alpha usage (January 2000– February 2002)	This code is used to denote events, issues and statements occurring before it was decided the utility of acquiring a new system should be explored. This code covers events, issues and statements occurring before March 2002.	Statement: We have no control over the information management processes in our organization. Sometimes, information gets lost and no one knows who is responsible, or where the information is stuck.
<b>2.</b> System Beta exploration (March 02- February 03)	This code is used to denote events, issues and statements occurring between the decision to explore the acquisition of a new system and the start of the process of implementing the system, that is, March 02 – February 03.	Event: A detailed requirements specification was produced and presented to the management board.
<b>3.</b> System Beta implementation (March 2003 – February 2004)	This code is used to denote events, issues and statements occurring during the implementation of the new system. The implementation phase took place between March 03 and February 04.	Event: Training on the new system is given to all its users.
<b>4.</b> Duplicate systems usage (March 2004 – December 2009)	This code is used to denote events, issues and statements occurring after the launch of the new system up until the end of the study in September 09.	Statement: I do not know who initiated this project in the first place. All of a sudden, they tell me I have to use this new system, but I don't like it.
<b>a.</b> Duplicate system intervention (August 05 – February 06)	This code is used to denote events, issues and statements specifically related to the intervention by the researcher.	Statement: The role of system Beta must be clarified; as it is, no one can see the value of using it except for the Secretariat.
<b>b.</b> System Beta development (February 07)	This code is used to denote events, issues and statements related to the first use of system Beta as a development platform.	Statement: We have been sort of smart in this respect, the new system is called system Gamma, you know, to free it from the heritage of system Beta.
<b>c.</b> System Alpha renewal (June 09)	This code is used to denote events, issues and statements related to the roll-out of a new version of the old system (Alpha).	Statement: I think the new version will be a tremendous asset to the organization. The new version includes many new features for information management, for example, you can chat through the mail client.

**TABLE 6: CODING SCHEME RELATED TO ROLES**

<b>Code name</b>	<b>Code description</b>	<b>Examples of events, issues or statements</b>
System Alpha administrator	This code is used to denote events, issues or statements pertaining to the administrator/s of the Alpha system (original system).	Statement: We have these document- and project databases, that include documents that they have out at the units, it can be anything from memos to vacation lists and so on that they can add themselves.
System Beta champion	This code is used to denote events, issues or statements pertaining to the champion/s of the Beta system (new system).	Statement: We need a better overview in that we must shift focus from the individual to the collective and make information less dependent on individuals.
IT user	This code is used to denote events, issues or statements pertaining to IT users in the organization (of any system).	Statement: I would say that the most frequent way is that you have a document in Word and then you submit it to other persons for editing, or you can print it and share it that way.
IT strategist	This code is used to denote events, issues or statements pertaining to IT strategists in the organization.	Statement: Looking at the core activity of the organization, it's possible to see that different units historically have acted relatively independently.
Manager	This code is used to denote events, issues or statements pertaining to managers in the organization.	Statement: In principle, we have no strategy that states how people are supposed to produce information, how they should manage different versions of one and the same document, and how information should be searchable.

In drawing up these coding schemes, the researcher engaged in an iterative process in which the codes were tested in coding pilots to assess their applicability to the empirical data. The coding pilots were carried out in the following manner. First, the author of this research coded a selection of empirical material (one interview, one document, and one page of quotes from the qualitative survey). The coded material was then reviewed by a second researcher (Professor Lars Mathiassen) and discussions were held in order to clarify how codes had been applied and the scope of each code. This process was repeated twice and resulted in revisions to the descriptions and scope of the codes in order to achieve definitional clarity. The final step in the development of the coding schemes involved check-coding (Miles & Huberman, 1994) in order to further ensure the consistency and reliability of the codes. Check-coding was carried out in the following way. A selection of empirical data was coded independently by two researchers (myself and Professor Lars Mathiassen) according to the coding schemes. The resulting coded material was then compared in terms of what codes had been applied to what segments of text, and furthermore, how large such segments were. Differences in how codes had been applied, and how large coded text segments were, were entered into a table and noted as discrepancies. Thus, if one researcher had coded a text segment and the other researcher had not, this was noted as a discrepancy. Similarly, if both researchers had used the same code in a specific place in a document, but the size of the coded text segment differed considerably, this was also noted as a discrepancy. Instances where the same code had been applied to the same text segment of roughly the same size were noted as agreements. In the vocabulary of check-coding, the intercoder reliability may be calculated as the number of agreements divided by the total number of agreements + disagreements (Miles & Huberman, 1994, p. 64). An intercoder reliability of approximately 90% is recommended in order to achieve a reasonably high level of methodological trustworthiness. In the first round of check-coding, the intercoder reliability was estimated at 64%, which is well below the recommended level. This prompted discussions between the two researchers that resulted in the further clarification of some arguments and revisions to the coding schemes. In this context, it is important to emphasize that coding is an act of interpretation, and as noted by Miles and Huberman (1994) each coder will have specific preferences that will be reflected in differences in their application of the codes. Clarifying such differences and achieving a high level of intercoder reliability consequently serves the primary purpose of establishing conceptually sound and consistent codes.

After having resolved the main differences in the application, descriptions and scope of the codes, a second round of check-coding was performed. A new selection of empirical material was thus made, and the process outlined above was repeated. The second round of check-coding resulted in an intercoder reliability of 88%, which is very close to the 90% suggested by Miles and Huberman.

The actual coding was carried out using the ATLAS.ti software package, which was specifically developed for conducting qualitative data analysis. This software was chosen because of its advanced functionality and its ability to deal with large amounts of empirical data. The first step of the coding process involved creating the final coding schemes as presented above in ATLAS.ti (see appendix 2 for a sample screenshot from ATLAS.ti). All of empirical data was then imported into the software and coded according to the coding schemes. The coding process involved going through all of the collected empirical material and coding quotes, for example as expressions of information processing requirements (IPR) or as belonging to a time phase such as system Beta exploration. The coding of roles, however, deserves further elaboration. When a role code was used, a judgment was made in terms of who the speaker was. For example, if an IT user (role) stated something pertaining to the management (another role) both codes could be used on the same text segment. The speaker in this example was the IT user, something that was represented by an additional identification code (as explained previously). This process exploited the ability of the software to add notes to coded text segments. This feature was used repeatedly during the coding process and specifically in relation to role codes as a means of further articulating interesting observations and clarifications.

In total, 943 quotes were coded with 2629 codes as defined in the three coding schemes (this number does not include identification codes). As is obvious from these numbers, single quotes were frequently coded with multiple codes. After the coding was completed, the coded material was exported from ATLAS.ti in several formats. Among other things, ATLAS.ti has advanced functionality for grouping and relating coded quotes so that files may be generated containing the actual text segments along with related codes. All of the coded data was used as input in the second stage of the analytical efforts, the dialectical analysis.

### 5.5.2

### Data analysis process

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The primary theory used to inform the second stage of the data analysis was dialectics. Dialectical theory posits that change may

be explained by identifying and examining contradictions. The perspective on contradictions assumed in this research (as articulated in section 4.1) is that contradictions may be conceptualized as totalities in which opposites exist and have two qualities, identity and struggle. The identity of a contradiction refers to the totality of the contradiction; change (or stability) is explained as the outcome of the struggle between opposing forces and the relative strengths of and balance between these opposites. Furthermore, any given situation is likely to exhibit several interrelated contradictions, which implies that in addition to the struggles between opposites within a single contradiction, there may also be tensions between different contradictions. In this way, contradictions can be at odds with each other whilst at the same time being inherently dynamic.

The choice of dialectics as the key theoretical perspective in the analysis of the data was motivated by several factors. First, as discussed in chapter 2, the meta position of this research derives from the view that consequences of information technology in organizations emerge from complex interactions between technological features and social actors. This conception of causal agency has been labeled an emergent perspective (Markus & Robey, 1988), and implies a focus not only on technology or social aspects alone, but also, and more importantly, on the interactions between the two (Lee, 2001). Dialectics does not employ a technological or a social deterministic stance; instead, it is concerned with the character of change, which maps well with the overarching emergent position assumed. More importantly, however, previous research has demonstrated that studies of the organizational consequences of IT often generate contradictory findings (Robey & Boudreau, 1999). Such contradictory findings have been identified both within and across studies and have frequently been considered as inconsistencies that need to be resolved. As argued by Robey and Boudreau, however, the adoption of theoretical logics that accommodate and can account for contradictions in observed phenomena may potentially explain a wider range of organizational outcomes. Whilst Robey and Boudreau promote 'a logic of opposition' as a means to incorporate and explain contradictions, dialectics was adopted as the primary logical approach in this dissertation. The phenomenon identified in this research, the duplicate systems paradox, represents a contradictory outcome of efforts to adopt and assimilate an ECM system, which implies that dialectics is well-suited to the further exploration of this phenomenon. Furthermore, as any situation may exhibit several interrelated contradictions, a theoretical perspective that specifically acknowledges the existence of, and provides the tools for explain-

ing such contradictions is motivated. Thus, the assumption made in adopting dialectics was that it would enable a detailed exploration and explanation of the forces and struggles responsible for the phenomenon under investigation. The following section describes how dialectics was applied to the coded data produced in the first stage of the analytical process.

Contradictions were identified using an iterative process as recommended by Cho et al. (2007). Following Bjerknæs (1991), these authors argue that a key approach in the identification of contradictions is to focus on conflicts occurring in the situation under investigation. Conflicts frequently represent antagonistic contradictions that may or may not be resolved over time. Further, the authors adopt the propositions promoted by Robey and Boudreau (1999) and Robey et al. (2002), which state that the opposing forces involved in contradictions often align with specific stakeholders and interest groups in the context under investigation. Opposing forces may, nevertheless, also align with more abstract occurrences such as cultural assumptions, institutionalized values and organizational memory. Finally, the approach promoted by Cho et al. incorporates the view proposed by Bacharach et al. (1996) in that contradictions may be identified and analyzed between different levels.

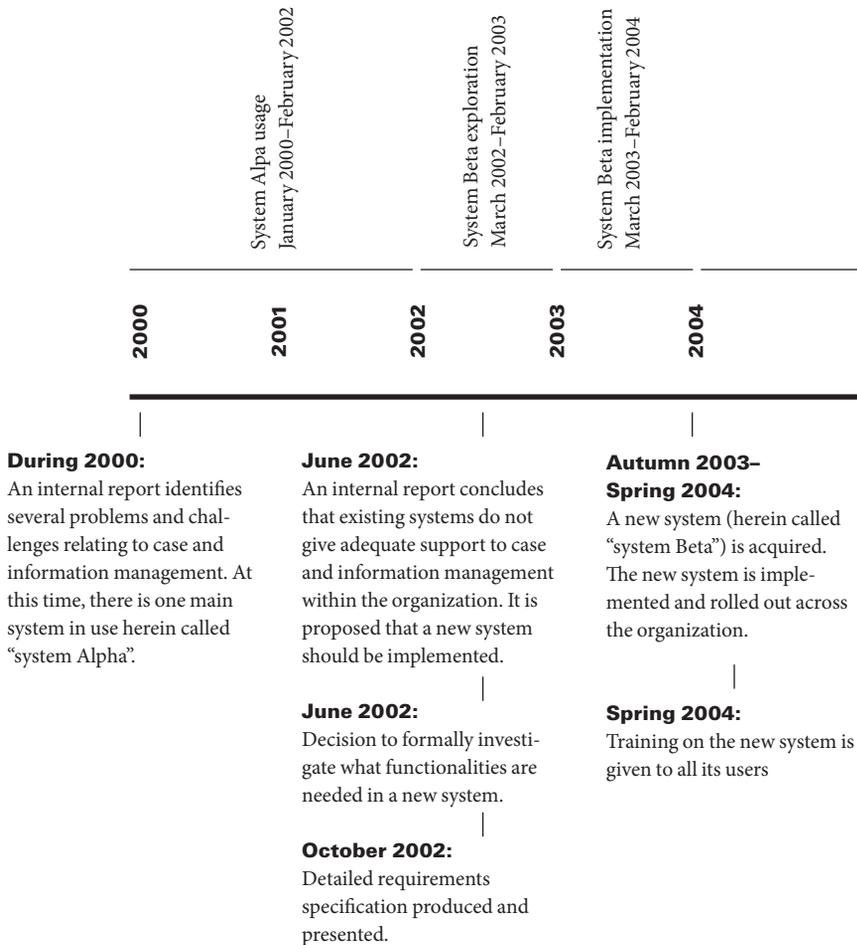
The overarching approach to the identification of contradictions that was adopted in this dissertation was that recommended by Cho et al. However, it is important to emphasize that contextualism and theory on information processing provided additional structure to the process in the form of the content, process and context categories applied to the empirical data in stage one during the coding process. Thus, contradictions were sought in the empirical data coded with the theory driven codes (IPR, IPS, IPT and IPC). For example, conflicting requirements were sought in data coded with the theoretical construct IPR, opposing forces pertaining to cultural assumptions and institutionalized values were sought in material coded with IPC, and opposites related to interest groups and stakeholders were identified in material coded with roles. In this respect, the process of identifying and explicating contradictions was conducted in a highly iterative fashion, according to the basic principles suggested by Cho et al. The process resulted in the identification of 16 initial contradictions. In order to achieve definitional clarity, the subsequent step in the analytical process consisted of aggregating the identified contradictions into more overarching categories whilst at the same time retaining the explanatory power in the identified contradictions. This process was similar to that of axial and selective coding in the vocabulary of grounded theory

(Strauss & Corbin, 1990). Within grounded theory, data analysis is frequently based on three types of coding: open coding, axial coding and selective coding. Open coding in this context refers to the process of labeling and categorizing data, a process that may result in the development of hundreds of codes applied to large amounts of data segments. Such codes are then grouped together to form categories and subcategories (Corbin & Strauss, 1990). Axial coding, on the other hand, refers to the process of further grouping categories that are conceptually similar and primarily serves the purposes of eliminating redundant codes and grouping conceptually comparable categories. The final step, selective coding, refers to a process in which all categories are unified around a 'core category' representing the central phenomenon of the study (ibid, p. 14). As was explained previously in this chapter, the analytical efforts in this dissertation were informed by theory; this clearly distinguishes the method from completely grounded approaches. Nevertheless, the process of aggregating the 16 initially-identified contradictions into more abstract contradictions was similar to that involved in the second and third steps of grounded theory as explained above. Thus, the 16 initial contradictions were compared in terms of their constituent opposites and inherent struggles in order to identify similarities and overlaps. This process was done iteratively, with each aggregation being checked against the empirical data and the description of the phenomenon (see chapter 6) in order to avoid a loss of explanatory power. The process was considered complete when no further abstraction was possible without losing detail in the overall explanatory account. The process resembling axial coding resulted in the development of three main contradictions based on the 16 initially identified. In terms of selective coding, no 'core category' was developed. However, the resulting explanatory model (which consists of the three overarching contradictions together with their interrelated dynamics) could be considered to be a core explanation in relation to the phenomenon under investigation. Empirical evidence pertaining to the identity, opposites, struggle and consequence of these contradictions are detailed in chapter 7 along with the contextualized tensions that played out over time between them.

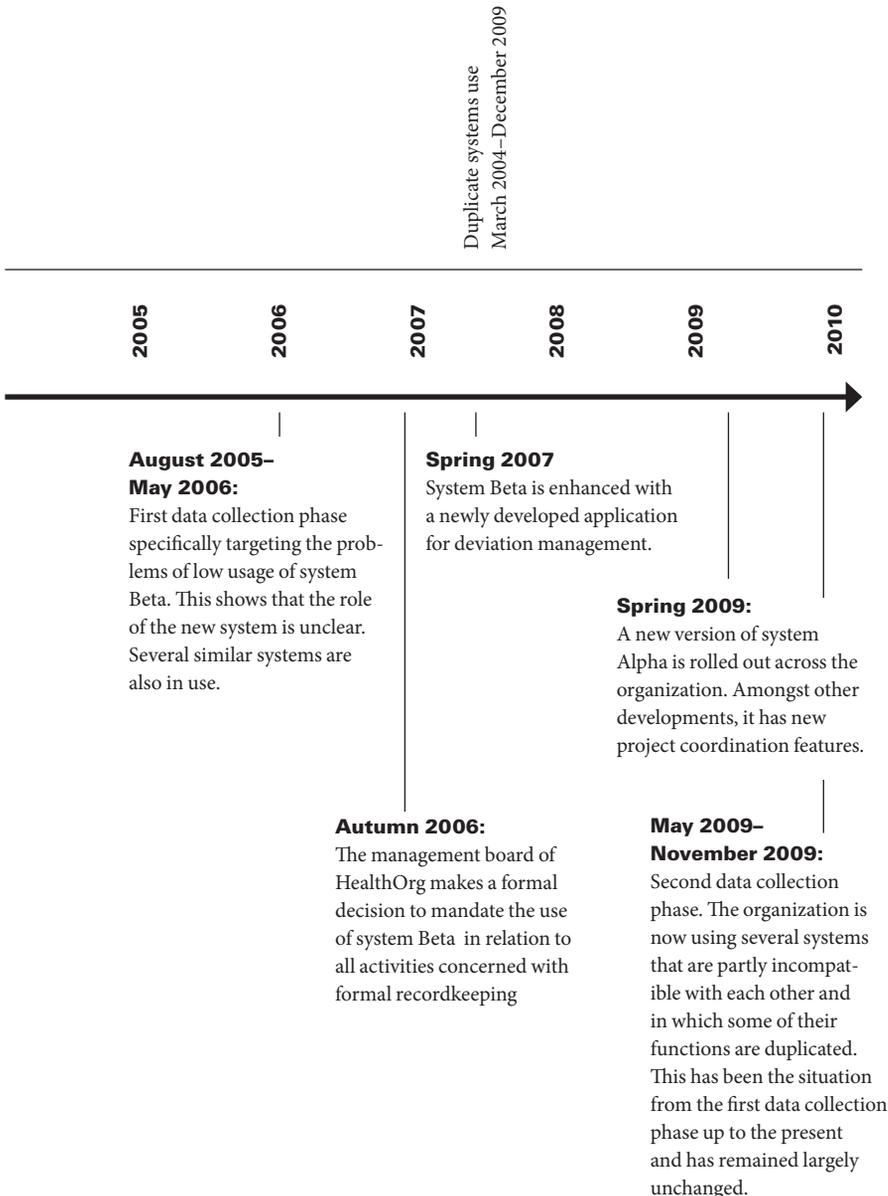
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## 6. THE DUPLICATE SYSTEMS PARADOX AT HEALTHORG

The main objective of adopting a new ECM system in the administrative part of HealthOrg was to improve recordkeeping and case and document management. Some actors, however, hoped that the new system additionally would come to function as a generic technical platform through which the organization could improve its ability to make use of knowledge and information previously bound



to individuals. However, the assimilation of the new system into the organization led to some unexpected outcomes including a persistent paradoxical phenomenon, herein called the “duplicate systems paradox”. In the following, a processual account of how the duplicate systems paradox emerged in relation to the overall research project is presented in an experience-near fashion, based on empirical data. This account describes four main phases and explains the key events taking place within the organization at those times. A summary of the overall process is provided in the form of a timeline of key events (see figure 1), followed by a detailed description of the four main phases



Much of the work carried out in the administrative sections of HealthOrg can be described as being highly information intensive. The administration is made up of various offices that deal with tasks such as project coordination, formal recordkeeping, financial planning, meeting support, strategic planning, communications including press releases, and human resources management. Consequently, these administrative units provide support to both the political unit of the organization and to the part that provides health and medical care to the general public. The term 'case' was often used by HealthOrg to denote a collaborative work process that was potentially a long term project, involving people from many different parts of the organization and dealing with large amounts of information. Coordination of such cases forms an essential part of the work of the administration and ensures that each case is properly carried out, is finished on time and, above all, adheres to all the rules and regulations that apply to HealthOrg's activities, for example, relating to formal recordkeeping.

In 2000, concerns were raised by various individuals within the organization regarding the efficiency of case management in general, and document management in particular. Such concerns originated from the staff working for the Secretariat since they were responsible for the overall coordination of case management and recordkeeping. Ensuring that documents produced by the other administrative sections arrived at their intended destinations on time, and in the correct format, was chiefly the responsibility of these staff. A frequent complaint was that information tended go missing in the course of the work; another was that maintaining control over the location of information at any given time was problematic, and sometimes impossible. At this point, the head of the Secretariat contacted the management board of HealthOrg with a request to launch an internal investigation to scrutinize case and document management within the organization. The management board at HealthOrg recognized the validity of the concerns raised by the head of the Secretariat and decided to put together a project team responsible for investigating whether there really were problems in the everyday workings of the administration. The project team conducted a pilot study to investigate the processes related to recordkeeping and the management of documents and workflows. This study took nearly a year to complete, and resulted in the production of a report that outlined a number of severe problems in the information management processes within the organization. The main conclusion of the report was that the current technological

systems used in HealthOrg were unable to support the needs of the administrative divisions adequately in respect of tasks such as co-ordination, case management and document management. At this time, the main technological system in use was system Alpha. This system was composed of a well-known database driven client/server system which provided basic functions for electronic mail management, shared virtual document folders, threaded discussions and the creation of various types of database. Thus, system Alpha could be considered a groupware system, but could also be used as a platform for application development. This latter feature had resulted in numerous applications being developed on the platform with most of them specialized to provide support to divisions dealing with health and medical care. Despite having the capability to share document folders and to create databases, it was felt that system Alpha lacked specific functions targeted at efficient case, process, and document management within the administrative divisions. Hence, within the administration divisions, system Alpha mainly functioned as an electronic communications channel because of its electronic mail and discussion board capabilities. Nevertheless, system Alpha was also the main method of sending and receiving information in the case and document management processes. The project team did, however, also note that several small-scale systems within HealthOrg had been created. These systems were specifically targeted at document management (some of them were hosted on the system Alpha platform), but frequently these systems were unable to exchange information with each other, and were used by specific sections rather than by the organization as a whole. Thus, at this time, sections within HealthOrg frequently made use of specialized technical solutions that had been developed to address the particular requirements of just those units.

The management board of HealthOrg considered the findings from the pilot study to be important not only because much of the work carried out within the administration was indeed organized around case and document management, but also because problems in complying with formal legislation related to recordkeeping were unacceptable. Well-functioning work processes were therefore considered crucial to the overall performance of this part of HealthOrg. This realization led the management board to start investigating potential solutions to these problems.

## 6.2

### SYSTEM BETA EXPLORATION

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Based on the results of the pilot study, a second project team was assembled to undertake a more detailed investigation of the prob-

lems related to the coordination of work processes, and case and document management in the administrative part of HealthOrg. The project team was made up of representatives from several different units and roles within HealthOrg. This new team was asked to suggest viable solutions to any identified problems. They presented their conclusions in a report published in June 2002, which described the current problems, a plan for solving those problems, and an approach for how HealthOrg might implement information management activities in the future. The principal problem identified in the report related to document management, specifically to the storage and distribution of documents. The report stated that, often, it was the responsibility of the individual employee to ensure that a specific document being used in a work process was stored on his or her own computer in an appropriate way. This meant that there was no consistent, overarching, strategy for document management in general and for the creation and storage of documents in particular. Instead, each individual relied on their own routines and software installed on their work computer to manage documents and other types of information being used in case work. Whilst system Alpha was accessible to all employees within the administration, the report did not portray it as a well-functioning case and document management platform. Rather, system Alpha was described as principally an electronic mail system with limited case, process and document management facilities. Some exceptions did exist where specific applications based on the system Alpha platform had been developed to facilitate the creation and sharing of documents. However, such applications tended to be isolated systems, used within individual business units.

At that time, only some information was distributed electronically, whilst the rest was distributed on paper. Therefore, it was up to an individual employee to make sure that they distributed any relevant information to actors involved in the work process at the appropriate time. Many employees within the administration, however, felt uncomfortable distributing information and often circulated documents both digitally and in physical form. There were both advantages and drawbacks to this strategy. When distributing the same information in different forms, employees felt certain that the information would reach its destination. However, this also meant that the receiver of the information was required to double-check that the physical and digital versions of the information were indeed identical, a process that could be time-consuming. Another important problem involved the management of different versions of the same document in the overall work process. Since a document, or a group of documents, could be stored on a number of different

computers, there was no way to be certain what constituted the most current version at any given time. Changes made to a document thus had to be communicated in some way to the others involved. Such communication might involve electronic mails, telephone calls, handwritten notes, memos, and face-to-face conversations. Thus, a great deal of time was spent simply making sure that everyone involved in a given case had access to the latest version of a particular document. This meant that managing the overall work process was, at times, highly problematic and time-consuming. There was no simple way of ascertaining the status of a specific work process, an issue that was particularly apparent not only for employees in the Secretariat's staff but also for anyone involved with a case. As a consequence, the report stated that there was a high risk of crucial information being mislaid, of new documents being overwritten by older versions of the same documents, and of work processes taking longer than expected.

The report concluded that the existing technological infrastructure did not provide adequate support for the actual work carried out by the administration of HealthOrg; therefore, the report recommended the acquisition of a new computer-based content management system. A new system would make formal recordkeeping more efficient and robust; and, just as importantly, overall work processes would also become transparent and consistent. The project team expanded their recommendation to acquire a new system by pointing out that, as well as solving the problems in managing documents and information, such a system could, and should, become a central information management system for the entire organization, and not just for the administrative sections. As a direct consequence of this report, the management board of HealthOrg decided to invest in a new technological platform intended to address these problems. A third project team was consequently put together, this time with the aim of investigating the types of systems that were available to buy, and to recommend a specific system to purchase. This work resulted in a detailed requirements specification which was presented in a report in October 2002.

The requirements specification detailed the basic requirements that a new content management system would need to meet, and illustrated possible future uses of such a system. The requirements specification identified HealthOrg as an information intensive knowledge-based organization in which considerable time and effort were spent on the creation, distribution, access and search for information. A new content management system would therefore not only solve existing problems in the organization as detailed in

previous reports, but would also function as a foundation for all information management in HealthOrg. It was also made clear that not all types of information would be entered into the new system: some patients' medical information would be too sensitive to enter, and such data were already managed by specialized systems. The main objectives of the new system were to:

- ✎ make case and document management simpler and ultimately, faster
- ✎ increase the availability of documents and other information both internally and externally
- ✎ avoid duplication of work
- ✎ maintain appropriate access to information for the general public
- ✎ make planning more efficient
- ✎ make all information available electronically
- ✎ make work processes more robust and less vulnerable to delays
- ✎ increase cooperation between existing systems and functions
- ✎ make more information electronically searchable.

The requirements specification also included future uses of the new system, stating that:

*“One of the overarching purposes of the system is that it should make the future information management of HealthOrg simpler and more efficient. Such management should be characterized by an ambition that documents that are created can and should be accessible by all who wish [to access them], irrespective of geography or position. It should be a system that promotes a culture where it is natural to cooperate and share information. Another purpose with the system is that it provides adequate support to the ambition of HealthOrg to be a democratic and open organization.”*

The completion of the requirements specification initiated the third phase relating to the adoption of an ECM system in HealthOrg, that is, system Beta implementation.

### 6.3 SYSTEM BETA IMPLEMENTATION

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The requirements specification led to a procurement process that was concluded in spring 2003. By spring 2004 the new system had been acquired, implemented and rolled out across the administrative

units of HealthOrg. The final decision to invest in the new system was made by the management board, based on the information produced by the three project teams. The new system comprised a well-known ECM system, herein called system Beta. System Beta was based on Microsoft's .Net technology and chiefly relied on the web browser Microsoft Internet Explorer to allow users access to the platform. In general, system Beta was characterized as a highly adaptable, process controlled ECM platform with specific functionalities handling recordkeeping, document management, register management, case management, meeting administration and process management. The system already included these functionalities but it could also function as a development platform for specialized applications, similar to the core feature of system Alpha. System Beta was, however, primarily selected for its capability to control and manage processes along with its advanced document management features. The system was based on a process server through which visualization, automation and analysis of work processes could be achieved. The project teams welcomed this feature since it would allow a better insight into the complex work processes referred to as "cases" by the administration. Thus, work processes could be precisely managed such that there was control over where specific information could be found at any time. This feature of system Beta would impact the daily routines for employees in the administration since the system provided a highly structured way of sending and receiving information throughout a work process. Moreover, the system provided advanced document management such as version management of documents, indexing of documents, free-text search, distribution and approval functions, adaptable security controls for groups of users, linking of messages and tasks to documents, the creation of metadata pertaining to specific documents, and integration between documents and work processes or cases. These features were put forward as being essential for efficient work processes, and also for achieving the goal of making all information searchable and accessible. Previous working practices had involved users storing documents and other types of information on their personal desktop computers, thus making the information inaccessible to other members of the organization. All the reports and pilot studies, however, described HealthOrg as a knowledge-based organization in which information was a key asset. In this respect, storing information on the ECM platform, rather than on individual computers would, theoretically, enable the organization to adopt a culture of sharing knowledge and information. For example, one of the project managers responsible for the implementation of system Beta stated that:

*“With system Beta, we now have the possibility of changing the focus from the individual level to the organizational level, which means that we will no longer be as dependent on single employees.”*

Another main feature of system Beta was to provide the section responsible for recordkeeping, the staff for the Secretariat, with improved overviews of workflows and management of information. Since all information that was subject to formal recordkeeping could now be created and stored within system Beta, the process of recordkeeping would, in theory, become quite straightforward. As one of the employees working in the Secretariat expressed it:

*“Previously, our way of working was based on the idea that some individuals had control and were able to make things work, system Beta is assuming that role in a way that was not previously possible”.*

Other benefits of implementing system Beta for example included its facilities for meeting administration. Meeting administration enabled the automatic creation of invitations and presentation lists, along with the generation of minutes and memos. Overall, system Beta was a technological platform capable of far more than mere recordkeeping and document management. This was also realized by the team implementing system Beta who wrote:

*“The system should be viewed as a shared system for the whole of HealthOrg [...] and it should be clear that implementing the system will require changes to existing routines and ways of conducting work. Nevertheless it will enable possibilities for cross-boundary work and a more flexible organization. The implementation will require the full support of the management board of HealthOrg”.*

The implementation of system Beta was thus considered a complex task and the team argued that the implementation would not only involve technical issues, but, more importantly, would also involve organizational issues relating to a change in current working practices. In the final report, the project team described System Beta as strategically important to the future of HealthOrg. Thus, some four years after the initial observations and realization that there were problems in the work processes carried out by the administration, system Beta was adopted and implemented.

After implementation was completed, the formal ownership and administration of system Beta was allocated to the staff of the Secretariat, where one of the implementation project managers also worked. Most other technological systems were, at this time, managed by the central IT department at HealthOrg. The main incentive for giving ownership and support of system Beta to the staff of the Secretariat was that they already had the main responsibility for information processes and formal recordkeeping, activities that were handled well by system Beta. Thus, one of the former project manager became the official 'face' of the system and assumed the chief responsibility of providing training on, and managing daily operations of, the system. In autumn 2005, system Beta had been in use for about one and a half years within the administration of HealthOrg. The expected benefits from using system Beta had, however, not been realized due to what seemed to be a lack of interest from employees within the administration. The system was simply not being used to the extent that had been hoped and this was causing problems for HealthOrg. The fundamental principle of system Beta was based on the idea that the full benefits of using the system would only be realized when all potential users actually used it. After one and a half years, this was not the case at HealthOrg. The organization had thus invested heavily in a new technological platform without receiving the predicted benefits, a problem that puzzled the project manager of system Beta. The previously identified problems within the organization had continued despite the rollout of system Beta, and there were few beneficial effects of the system. In an effort to investigate why the system did not achieve the level of impact expected, representatives from the staff of the Secretariat contacted the author of this dissertation with a request for assistance. From the time of the implementation of system Beta, the staff of the Secretariat had assumed formal responsibility of the system and in this respect were interested in finding out what the major problems were, and how such problems might be addressed. Collaboration, in the form of a research project, was started during early August 2005, and the first round of data collection was designed and instigated in August 2005 (see chapter 5 for details on case study design and data collection).

At this point, the main purposes of the study were to investigate why there appeared to be a lack of interest in the system and to discover if there was a mismatch between what had been specified for the system and what had actually been delivered. The study included interviews with employees from six of the seven administrative units, interviews with the two project managers of system Beta,

document reviews, and a qualitative computer-based survey sent out to all employees with access to the system. The results from the study were summarized in a report that was presented to a group of representatives from HealthOrg, made up primarily of staff from the Secretariat, but also from the management board.

A number of specific observations were made in the first round of data collection in relation to why system Beta had only limited impact within the organization. However, the final report based on the data collected concluded that the role of system Beta was unclear within the organization in several ways. First, the purpose of the system was not clear to many of the respondents who worked in administration, thus increasing the sense of uncertainty as to why the system had been implemented at all. Second, at this time no formal decision had been conveyed as to whether system Beta should indeed become the main platform for case, process and document management, or whether it should be viewed as a specific system targeted at recordkeeping. Third, using system Beta was not mandatory at this time, which meant that many users failed to become aware of the potential benefits that the system had to offer. Users frequently questioned how a system could be of strategic importance when no official decision that mandated the use of that system had been made. A fourth and important observation was that there now existed several incompatible systems that overlapped functionally with system Beta within the administration of HealthOrg. To this end, it appeared that system Beta was one of several options for managing documents and information, as other solutions that covered similar tasks existed. Solutions of this sort included, for example, the use of shared databases and folders based on the System Alpha platform, internal web pages published on the intranet, and the communication of information through system Alpha's electronic mail function. Whilst these solutions covered similar tasks, they were, to a large extent, unable to exchange information as a result of incompatibilities between their respective interfaces.

The observations were discussed at a meeting between the researcher and representatives from HealthOrg. At this point, the main reasons that might explain the low usage of the new system could, to some extent, be classed as temporary in nature. For example, the problems caused by the existence of other incompatible systems that duplicated the functions of system Beta were recognized to be damaging, yet probably temporary: it was felt that eventually, the issue could be solved with better communication as the roles of the various systems in the organization became better defined. The representatives from HealthOrg that participated in the discussion

argued that there were several reasons why the problems relating to system Beta had to be resolved. First, the original problems relating to case and document management that system Beta was supposed to have solved had remained, a situation that was not acceptable. Second, the implementation of system Beta had created a situation where users felt even more uncertain as to which system to use when creating, distributing and managing information. Because several incompatible systems that overlapped functionally with system Beta existed, there was a risk of making problems relating to information management worsen rather than improve. The main conclusion that came out of the discussion was therefore that the specific roles of the various systems existing in the organization had to be explained to all involved parties. As a consequence, the management board of HealthOrg later formally decided that all information that was subject to formal recordkeeping should be created and distributed using system Beta. This decision was communicated to all employees in the administration of HealthOrg in 2006 in an attempt to resolve the issue of unclear system roles.

Since many of the factors responsible for the low usage of system Beta were seen as damaging yet potentially temporary in character, the researcher kept in contact with key respondents within the organization in order to keep track of any significant developments. At the beginning of 2009, the researcher once again contacted representatives from the organization in order to discuss current developments in relation to system Beta. At this time, an interesting observation was made. The problem of incompatible systems that duplicated the functions of system Beta had remained, and was now adversely affecting overall performance within the administration of HealthOrg. Three years had passed since the first data collection period had ended, but it seemed as if the problems initially identified at that time had not been resolved. Rather than the number of problems that were identified in 2006 reducing, there were, in fact, now more and the organization seemed incapable of breaking free from this highly problematic situation.

In 2006, the identified problems had been considered temporary in nature and manageable. However, by 2009 these problems could be considered as being persistent. Thus, although the implementation of a new ECM system had been intended to improve the management of documents, information and processes, it had instead surprisingly led to an adverse impact on the ability of the organization to manage its data. Moreover, this impact was persistent, which was inconsistent with several observations that had been made. The original intention of adopting system Beta had been to resolve prob-

lems and improve information management, both of which had not been achieved. Instead, the system had been a factor in the creation of a situation in which several incompatible systems that duplicated the functions of system Beta were being used. This situation damaged the performance of the organization by, for example, creating redundant work and adversely affecting information integrity. Employees were aware of such issues, had experienced them and discussed them, yet HealthOrg had been incapable of resolving the problem of duplicate systems usage. These observations therefore led the author of this dissertation to describe the situation as a paradox – the duplicate systems paradox. The choice of describing this situation in the vocabulary of a paradox, however, deserves some further consideration.

The concept of a paradox is used in a wide array of academic disciplines but carries a number of very different connotations. For example, as noted by Poole and van de Ven (1989), the term paradox assumes one meaning in general parlance, a specialized and narrower meaning in the field of logic, and yet another sense in rhetorical studies. In general, Poole and van de Ven (1989, p. 563) argue that the concept of paradox may be used informally to describe interesting contradictions. Herein it is used to denote something puzzling that grabs our attention. To this end, Poole and van de Ven suggest that paradoxes are potentially important elements in theory-building that specifically address, and build upon, contradictions and tensions. Other researchers have proposed more elaborate definitions. For example, Lewis (2000, p. 760) stated that:

*“Paradox denotes contradictory yet interrelated elements – elements that seem logical in isolation but absurd and irrational when appearing simultaneously”.*

Regardless of specific definition, however, the formulation and use of paradoxes presents researchers with new opportunities to ask questions in fundamentally different ways (Poole & Van de Ven, 1989). Indeed, the concept of paradox (and paradoxical analysis) has been used in a variety of academic fields in order to address and explore a broad range of phenomena such as organizational change (Lüsher & Lewis, 2008), strategic alliances (Clarke-Hill *et al.*, 2003), and work groups (Murnighan & Conlon, 1991). In this research, the concept of paradox is used to indicate a puzzling outcome of technology adoption and assimilation, which resulted in persistent negative impacts caused by duplicate systems usage. In the vocabulary of Lewis (2000), the interrelated components of the duplicate

systems paradox are thus made up of the use of duplicate systems, which caused adverse effects on the performance of the organization, and the organization's awareness and intent to resolve the situation. For three years, HealthOrg had been aware of, and adversely affected by, this situation, so the fact that the situation remained was, indeed, a paradox.

Against the background of having identified the duplicate systems paradox, the author of this dissertation contacted the organization with a formal request to conduct a new round of data collection to investigate further why these problems remained and to attempt to explain the existence and mechanism of the duplicate systems paradox. The organization agreed to this, and a new study was begun in May 2009, as explained in chapter 5.

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## 7. DIALECTICAL ANALYSIS OF THE DUPLICATE SYSTEMS PARADOX

This chapter presents a dialectical analysis of the duplicate system paradox identified in chapter six. In this respect, the focus of the chapter is on explaining how the paradox was formed in the first place, and furthermore, why HealthOrg was incapable of breaking free from it being aware that it was hampering the overall performance of the administrative sections. A dialectical approach was adopted as the primary tool for addressing and explaining the duplicate systems paradox, informed by a contextualist perspective and theory on organizational information processing. As mentioned previously (chapter 4), any given context is likely to exhibit several interrelated contradictions, and the administrative sections of HealthOrg are no exception to this. In the first round of dialectical analysis of the coded empirical material, 16 initial contradictions were identified. Through rounds of iterative aggregation, these were combined into three overarching contradictions that could be used to explain the paradox under investigation. Each of the three contradictions involves an identifiable struggle between internal opposites, and these struggles are also related in time and connected to key events taking place in HealthOrg. Thus, although the three contradictions are analytically distinct, they are highly interrelated and dynamic in character and together form an explanatory framework that can be used to understand the duplicate systems paradox.

The following section discusses each of the three contradictions by providing empirical evidence related to the internal opposites in each contradiction along with a description of the struggle that took place within each contradiction. These sections are followed by a section articulating the tensions existing between the contradictions, explaining how the contradictions related to each other and how they played out over time and at various levels in HealthOrg.

### 7.1 INFORMATION MANAGEMENT REQUIREMENTS: IN BETWEEN CONTROL AND SUPPORT

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This contradiction concerns *requirements* associated with information management in HealthOrg. It centers on the shifting character of requirements and how such requirements were expressed and manifested at various levels and at different times in the organiza-

tion. In this context, a requirement represents a necessity, wish or obligation in relation to information management in the organization. The requirements in HealthOrg were typically based on the information management needs of individual employees, of units, or of the organization as a whole. In the empirical data, requirements were expressed in several ways, for example through direct statements by respondents, through written documents, or indirectly through events, actions or a lack of action in a certain context.

The particular contradiction discussed in this section relates to the dynamics between two opposing information management requirements identified in the empirical material, namely control and support requirements. Control requirements reflect the need to control information and processes related to its creation, storage, distribution and access in order to maintain adequate efficiency and high quality in the work carried out by the organization. Control requirements were frequently based on identified or experienced problems occurring in the organization and in that respect attempted to acknowledge and address such problems. Support requirements, on the other hand, frequently emphasized organizational complexity as a key factor in information management and in that respect built on the perspective that the heterogeneous character of the organization necessitated the provision of adequate and adapted support to units and individuals in the HealthOrg in order to maintain high levels of efficiency and quality in work. In this manner, support requirements frequently addressed specific issues at the unit- or individual level as opposed to control requirements, which typically addressed the organizational level.

Information management requirements related to control contrasted distinctly with requirements related to support in implying different management paths and technological options for HealthOrg. The complex relationship between control and support thus constitutes the identity of this contradiction. Although they address different information management needs and different levels of HealthOrg, both control and support requirements were essential in order to achieve high organizational performance. In this respect, HealthOrg needed to balance the two opposites in order to find a way to constructively move forward. However, the struggle between these opposites was never settled in a stable way, and instead contributed to maintaining a situation of uncertainty in the organization in terms of which requirements were more important to address. The next three sections discuss the two opposites in the contradiction – the support and the control requirements – and then detail the struggle that occurred between them.

The origins of information management requirements related to control can be traced to several sources, both internal and external to the organization. The most significant external sources that directly or indirectly affected the need for increased control of information management in HealthOrg were formal legislation and general guidelines and visions for authorities in Sweden. As mentioned previously, HealthOrg is a politically-governed organization that is subject to the formal legislation that governs the activities of authorities in Sweden. Several specific laws are relevant in this context; HealthOrg was required to keep a formal diary that provided access to information that was classified as public records, to make possible the separation between public record information and information classified as sensitive or private to the organization, to maintain a transparent structure regarding its work processes, and to enable the protection of information concerning the personal integrity of citizens that came in contact with the organization. These outer contextual factors directly affected the need for control in relation to information management in the organization. Not surprisingly then, control requirements expressed in HealthOrg were frequently discussed in the context of these external factors.

The second class of external sources that necessitated control of information management activities in HealthOrg was the general guidelines and visions pertaining to Swedish authorities. In the beginning of 2000, the Swedish Parliament decreed that Sweden should become an information society for everyone<sup>13</sup>. The objective was framed as increasing the level of service offered to Swedish citizens by authorities through a better and more comprehensive use of the Internet. In this respect, Swedish authorities became expected to work actively in order to realize this vision, which included increased collaboration between different authorities, and the provision of extensive electronic services to citizens. Although these decrees are not legislation in a strict sense, these goals articulated by the Swedish Parliament were important outer contextual factors that needed to be addressed by HealthOrg in some way. The provision of comprehensive electronic service to citizens is complex, and presents the organization with numerous internal and intra-organizational challenges; these in turn necessitate certain levels of control relating to the production, storage, distribution and access to information held by HealthOrg. Thus, two significant outer con-

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13. More information about the policy can be found in the proposition 1999/2000:86. Ett informationssamhälle för alla. Stockholm: Näringsdepartementet.

textual factors affected and shaped the articulation of requirements relating to control of information management within HealthOrg. This was acknowledged in a series of internal reports focusing on problems related to information management, the first of which was written in the beginning of 2000. For example, one of the reports contained the following formulation:

*“Information stored in the organization [HealthOrg] should be possible to trace and identify in a long-term perspective. The formal requirements are the following:*

- ⊕ *Information that is no longer needed when a specific case is finished should be identifiable and possible to remove*
- ⊕ *Storage of information should be done in a system-independent fashion and in a standardized format*
- ⊕ *Storage of information should be done in a medium that is secure in time*
- ⊕ *Information should be searchable and include several options for search*
- ⊕ *Information should be possible to use electronically”*

Additional control requirements were imposed as a consequence of internal organizational problems occurring in work processes within and across units in HealthOrg. For example, in the beginning of 2000, several problems were articulated by the staff for the Secretariat, including problems related to information getting lost in case management processes, work processes missing deadlines, and information being inaccessible to concerned actors in the organization. Such problems were promoted as clear arguments for increased information management control, and as one of the respondents working in the staff for the Secretariat put it:

*“The most challenging aspect here is the surroundings if I put it that way. Everything arrives here in the last minute, which is very irritating. Here at the staff for the Secretariat, we are responsible for collecting and distributing information to the politicians, and everything is late.”*

Traditionally, the staff for the Secretariat had been the administrative unit responsible for the maintenance of the diary and additionally for making sure that information created in the administrative units reached its intended destination on time and in a correct way. Frequently, this information was used as input for political processes and served as the basis for executive decisions; as such, it was con-

sidered as highly important since a delay in delivering information to the politicians could have adverse consequences for the entire organization. Problems such as the loss of information, being unable to obtain an overview of specific case processes, and not receiving information on time were thus extremely challenging for this part of the administration to deal with. These problems were present at the intra-unit level since the relevant information was often produced during collaborative work processes conducted over extended periods of time and involving participants from several units. Because of these difficulties, the staff of the Secretariat was a key proponent of increased control of information management in general and of document- and case management in particular.

As explained in chapter six, the initial problem identification made by the staff for the Secretariat led the management board of HealthOrg to assemble several project teams responsible to further analyze current problems and requirements. In total, the teams spent approximately three years working on articulating information management requirements and potential solutions. In the early stages of this work, control requirements were defined with reference to external contextual factors and specific problems occurring in work processes related to recordkeeping and case management. In this respect, the control requirements specifically referenced the perspective and needs of one particular unit in the administration, that of the staff for the Secretariat. For example, the final report on the analysis phase concluded that:

*“The investigation of requirements that the project team has conducted shows that there is a need for, amongst other things, a simplified distribution of cases, an increased scope for locating information, and improved facilities for controlling and defining the scope of projects and cases”.*

Thus, at this stage in the process of articulating requirements, control related aspects of information management were emphasized in two ways, by reference to outer contextual factors and by pointing to existing problems at the intra-unit level. The three reports (based on the pilot study, the analysis, and the requirements specification) were used as input by the management board of HealthOrg and in this respect formed the base for decisions regarding which requirements were most in need of being addressed. Overwhelmingly, the report based on the pilot study emphasized the control related aspects of information management. However, as time passed and work continued in the various project teams, control requirements

began to be expressed not only in terms of outer contextual factors or internal problems as perceived by the staff of the Secretariat, but also as a way of improving the general character of work in HealthOrg. This way of framing information management requirements shifted the focus from requirements specifically assuming the perspective of the staff of the Secretariat to more general requirements pertaining to all administrative units. In this respect, the line between control requirements and support requirements became less clear-cut, as is discussed in the following sections.

### 7.1.2 Support requirements

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The seven administrative units that together constituted the administration of HealthOrg managed a wide variety of tasks and information. Although their work was similar in that it was concerned with the production, storage, distribution and access to information, each unit had clearly delineated areas of activity with their own particular focuses and challenges. For example, the staff for research, development and education addressed issues related to research policies and the provision of education, while the financial staff managed budgets and other financial issues in the organization. Thus, although they all played important roles in the administration of HealthOrg, the different units exhibited considerable variation in their specific work activities. As a consequence, information management requirements expressed at the level of specific units were less oriented towards comprehensive control of work processes between units, and instead more focused on supporting the particular needs and wishes of individuals and groups within single units. That is to say, the administration consequently constituted a heterogeneous environment in which localized information management requirements were identified. Such requirements were expressed at both the individual and unit levels and regularly focused on specific needs for information management support. For example, one of the respondents working on the financial staff said the following about his work situation:

*“First and foremost I need to understand my own work, that is, financial questions, my own specific software programs and so on. I must feel secure in those things in order to be able to interact in a good way with for example a surgeon or anyone else in the organization. Everything needs to be translated into financial terms and that is a complicated task”.*

Moreover, the administrative units of HealthOrg also exhibited internal heterogeneity in that single units often performed a large variety of internal work processes and tasks, some of which were dependent on the skill sets of single individuals. One of the respondents on the financial staff expressed the heterogeneous character of the work in the following way:

*“The work we do is very much based on individual knowledge and experience. That is also why it takes a long time for new employees to find their role and position, to be honest”.*

The above quotation exemplifies a view of the work carried out in the administration that was expressed by a number of respondents, one that highlights the individual capabilities needed to get work done in a correct and efficient way. Thus, individual knowledge and experience were emphasized as key assets to specific units and to the organization as a whole. In this way, personal freedom and flexibility regarding how work was carried out was considered important in order to ensure high quality. One of the project managers of system Beta commented on this in the following way:

*“Internally, things are not very strictly controlled. If you receive an assignment and are expected to present the output from that assignment some six months later, the way in which you produce the output is, well it’s basically your own choice, your freedom to choose. If you then choose to use some specific software to support you in the process, there is no one that will point a finger at you and say that you are wrong”.*

In this context, it is important to point out that the administrative units existed in a larger organizational context with the primary purpose of providing health- and medical care. As such, the specific function of each administrative unit, and of specific employees in such units, was of essential importance to the entire organization. Consequently, many respondents expressed the opinion that the most important factor in their work was making sure that high quality output was generated for each assignment. For example, an employee working in the staff for Organizational management for example stated that:

*“I have a continuous dialog with various medical care units in the organization, and a lot of my work is about collecting and compiling information from those units in order to support the*

*overall management of HealthOrg. I very much rely on personal connections in order to get the information I need”.*

It was therefore not surprising that the administrative units exhibited strong local cultures, each of which was primarily focused on achieving its own internal goals. Thus, employees within a single unit frequently assumed a bounded perspective in that they first and foremost considered the internal activities of the unit or themselves as the most important to perform, while inter-unit activities were often downplayed. Such inter-unit activities involved case management processes as described in previous sections, along with formal recordkeeping activities. Support requirements expressed within specific units were frequently articulated and managed informally within that particular unit. An illustrative example comes from the staff for Information, where the need for a shared document space was expressed and managed locally:

*“All of us here at Info [the staff for Information] can now access that shared folder. We can create sub-folders and show what news we plan to publish, if there are finished pieces, and so forth.”*

Other units exhibited similar patterns in that requirements related to information management support were typically expressed and managed in the local context of the unit. Thus, support requirements articulated at the level of the entire administration were less common in the empirical material. One exception was, however, found in the requirements specification published in October 2002. In this report, HealthOrg was described as an

*“information intensive knowledge-based organization”*

in which considerable resources were spent on the creation of and search for information. In this respect, the report stated, a new case- and document management system should function as an information base for the entire organization and not only for the staff of the Secretariat. The system should make information searchable and accessible in a way not previously possible, which meant that all administrative units should have access to the system and actively use the system as a total information management solution. This way of framing requirements shifted the focus from requirements specifically assuming the perspective of the staff for the Secretariat, or any other single unit, to more general requirements that would be useful to all administrative units. In this respect, the requirements

specification articulated a vision whereby increased access to information and better distribution channels would increase the overall performance of HealthOrg. This would, however, necessitate a more uniform management of two distinct but highly interrelated aspects: (1) the actual information, and (2) the work processes related to information. In terms of the actual information, this meant that all information produced in HealthOrg should be produced and stored in such a way that it benefitted the organization as a whole and was readily accessible to organizational members at any time. Improved support for processes involving the creation, storage, distribution and access to information was therefore framed as a prerequisite to realizing the objectives expressed by the project teams.

### 7.1.3 The struggle between control and support

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As exemplified in previous sections, both control and support requirements represented essential aspects of information management in HealthOrg. At the organizational level, increased control of information management processes was framed as being important to mitigate practical problems occurring in work processes as well as for compliance with the formal legislation that applied to HealthOrg. At the unit- and individual level, however, control-related aspects of information management were less emphasized and recognized. Instead, specific units and/or individual employees frequently stressed the need for localized support related to the specific character of the work being conducted. In this respect, the struggle between control and support can partially be described as a struggle between different organizational levels, or put differently, different organizational perspectives. In this context, the staff for the Secretariat was the key proponent for increased control of information management efforts together with the three project teams responsible for conducting the pilot study, the analysis, and the requirements specification. In a sense, then, the need for increased organizational control of information management in HealthOrg can be viewed as a localized support requirement specifically pertaining to the staff for the Secretariat. This particular unit carried the formal responsibility of recordkeeping and the coordination of inter-unit work processes and therefore practically manifested the overarching organizational-level perspective. This perspective can be framed as a cross-boundary perspective in the sense that this administrative unit was responsible for the coordination and general management of information produced in different units. Conversely, most of the other administrative units and specific employees within those units

adopted a bounded perspective that emphasized the particular requirements of the work being conducted.

In the beginning of 2000, control requirements dominated the contradiction in the sense that the perspective of the staff for the Secretariat was highlighted and communicated to the management board of HealthOrg. The experienced problems, as articulated by the staff for the Secretariat and the pilot study, therefore served as a foundation for the articulation of control requirements. At this point, support requirements pertaining to specific units were not communicated or discussed at the organizational level. Thus, at this stage the idea of implementing increased control in relation to information management processes was considered as necessary as well as relatively unproblematic. This also impacted on the suggested solutions that were promoted in order to realize increased control, something I will return to in the following contradictions. However, the internal analysis conducted subsequent to the pilot study broadened the range of information management requirements in HealthOrg by further elaborating organizational needs in relation to a potential solution for increased control. This elaboration framed HealthOrg as a knowledge-based information organization and stated that a solution intended to increase control could and should also support information- and document management in general, as opposed to simply the activities articulated as being important to the staff for the Secretariat. The report stated:

*“It is of great importance that a future case- and document management system becomes a system for the entire organization and not a system that only supports specific parts of document management and the work processes that exist within administrative units.”*

This was the first instance in which the role of the new system was framed in a way that acknowledged the potential importance of requirements other than those specifically articulated by the staff for the Secretariat. Thus, a gradual shift from requirements strictly related to control was initiated. The final report, the requirements specification, further nuanced the perspective on what requirements that should be prioritized by emphasizing support related requirements rather than control requirements. For example, it was stated that:

*“Extensive resources are spent on producing and searching for information of various sorts. Employees, elected representa-*

*tives and the general public increasingly demand the ability to find relevant information in an efficient manner. A case- and document management system should increase the availability of information and additionally make internal processes more efficient. [...] The system should therefore function as an information repository for the entire organization and not as a mere tool for registrars, secretaries and executing officers”.*

The requirements specification constituted the formal input to the management board of HealthOrg responsible for making the decision on whether or not to acquire a new system. The management board accepted the requirements specification and in this respect also accepted the formulations regarding information management requirements expressed in the document. Thus, at this stage, emphasis was placed on addressing both control and support requirements, and the new technological system was regarded as a constructive way of achieving this. In practice, however, the support requirements expressed in the requirements specification were based on visions of a future way of managing information in HealthOrg, and not on the actual requirements of the administrative units. One of the project team members that produced the requirements specification and subsequently became part of the team responsible for implementing the new system commented on this, saying that:

*“It would make things easier for us if users had the same way of thinking about information management and information flows, you know, how things actually are related from information at the bottom level up to the topmost level”.*

The quote illustrates the point that the support requirements expressed in the requirements specification decided upon by the management board primarily addressed organizational level requirements, rather than unit- or individual level requirements. In this respect, both the control and the support requirements emphasized the needs of workers at the organizational level over those expressed by individual employees and single units. The different types of requirements expressed in formal documents, visions, and by individuals, single units and at the organizational level therefore represented very different types of requirements and management paths.

In essence, control requirements could be traced to an organizational-level perspective that was not articulated or recognized at the individual- or unit level in HealthOrg. Moreover, the support

requirements formally articulated to the organization, for example in the reports used as input by the management board of HealthOrg, were not grounded in the actual requirements expressed by single units, but rather in visions based on a perspective of HealthOrg as an information intensive knowledge-based organization. Moreover, the management board of HealthOrg remained passive in promoting and/or explaining what requirements that should be considered important and addressed, and for what reasons, which contributed to the creation of a situation of uncertainty in the organization. This situation extended in time and remained unchanged for the entire duration of the study described in this dissertation. The struggle between control and support was, however, not expressed as a clear conflict between different parties in the organization; instead, it manifested itself implicitly through a lack of change in any direction. In this manner, requirements related to control were grounded in formal yet poorly communicated decisions made by the management board which provided some weight to their importance, whereas the support requirements were primarily grounded in the specific workloads of the different units in the administration. Overall, this created a sense of uncertainty regarding which requirements were most important to address, and this situation led to a lack of change.

#### 7.1.4 Summary of the contradiction

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By and large, the struggle between control and support manifested itself as a lack of change in any direction and instead led to a situation characterized by uncertainty and lack of mutual understanding. The initiatives related to realizing increased control of information management at the organizational level impacted on the amount of attention given to support requirements experienced at the unit level. The focus by single units on requirements specifically emphasizing support on the other hand affected the level of attention given to organizational-level requirements. In this respect, the consequence of the contradiction was manifested by the creation of a space of uncertainty in which a lack of mutual understanding was established.

#### 7.2 INFORMATION MANAGEMENT SOLUTIONS: IN BETWEEN OPTIONS AND PRACTICES

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This contradiction relates to information management *solutions* within HealthOrg and in this respect focuses on the character of

solutions and how such solutions were perceived, enacted and rationalized at various levels and at different times in the organization. Here, a solution is defined as a socio-technical system geared towards addressing information management requirements as expressed within HealthOrg. Several solutions for the management of information were identified in the empirical material. Such solutions were expressed and explained in interviews, through technical documentations, through references made in surveys, and through technical demonstrations observed during onsite visits. These solutions were, however, far from straightforward, and their evolution was associated with tensions and contradictory events.

The specific contradiction addressed here focuses on the tension and struggle that occurred between a new technological option and existing practices. In this context, the new technological option took the form of an ECM system, system Beta, which was introduced to solve particular problems and address specific requirements related to information management in the organization. As a solution, system Beta promoted increased levels of standardization in the production, storage, distribution and access to information. Furthermore, system Beta had the ability to serve as an overarching platform for generic document- information- and case management within the organization. In this respect, the design of system Beta was based on an 'all or none' philosophy in that the full benefits and effects of using system Beta could be realized only when it was being used by almost all of its potential users (i.e. the administration of HealthOrg). System Beta thus represented a new option for information management. However, within HealthOrg, there were already several existing and well-established solutions in use. Thus, within the administration of HealthOrg, there existed several practices regarding information management, some of them unique to single units, some of them common to all units. Such practices included routines, workflows, and technological systems that taken together constituted the existing ways of managing information. In general, these information management practices exhibited low degrees of standardization regarding the production, storage, distribution and access to information. Instead, many existing practices built on the idea of customization as key to the performance within the organization, which for example meant that different solutions for one and the same problem could be identified in various units in the administration. Nevertheless, existing practices also involved the use of a technological platform available to all employees within HealthOrg, namely system Alpha. System Alpha provided capabilities for electronic mail management, shared virtual document folders, threaded discussions and the creation of

databases of various sorts. In this respect, some of the platform's functionality mirrored that of system Beta.

The adoption of the new technological option for information management within HealthOrg presented the organization with not only a new technological system, but also with new ways of conducting work, new ways of thinking about information, and to some extent, new structures. In this respect, system Beta and its associated routines and work flows stood in stark contrast with existing practices geared towards customized, flexible and de-centralized information management. The intricate relationship between option and practices thus constitutes the identity of this contradiction. Although it promoted a different approach to the management of information, with increased standardization and changes to existing ways of conducting work, system Beta overlapped functionally with existing and well-established practices and solutions for information management, a fact that made the specific roles of the various solutions diffuse. This, in turn, created confusion regarding the perception and use of the various solutions.

### 7.2.1 The new option

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System Beta was chosen as the new technological option for information management in HealthOrg on the basis of the results from a pilot study, an organizational analysis, and a requirements specification carried out by three project teams over a time span of close to three years. Thus, the final decision to acquire System Beta, made by the management board of the organization, was based on a substantial amount of information about current problems, contextual factors and the character of the new system. Primarily, system Beta was acquired in order to address information management requirements related to control and in this respect represented an attempt to ensure that HealthOrg would comply with Swedish legislation regarding things such as recordkeeping, and additionally to make document- and case management more efficient. System Beta was however also contextualized against the background of an increasing heterogeneity in existing information management solutions, a situation that had made access to information problematic in HealthOrg. For example, in the final report from the analysis phase it was concluded that:

*“Existing systems within HealthOrg make documents available to some extent, but they do not cooperate with each other”.*

Thus, from an overarching organizational perspective, it was deemed better to replace the existing solutions with one common solution than to attempt to integrate the existing solutions. One of the project managers in charge of implementing system Beta framed it in the following way:

*“We want to capture the information that is managed in these processes and improve the management of documents. The flows [in system Beta] build on actual case management processes and make it possible to access information in a different way than before, when we had fairly clear boundaries around our work processes. In that way, system Beta opens, well it removes the walls so that we can participate in others’ work processes, both in terms of access to documents and also to processes”.*

System Beta was thus viewed as a solution with several benefits. First, it included functionality for structured electronic recordkeeping with controlled levels of access to the diary. This was considered an essential capability against the backdrop of problems articulated by the staff for the Secretariat. Secondly, system Beta was built on Microsoft .Net technology, which amongst other things meant that information in the system could be produced and accessed through web based applications such as a browser. This feature was framed as important since it was considered that web based technologies constituted a safe option for the future in terms of durability. Third, the system included advanced functionalities for document-, register-, and case management in addition to functions for the management of meetings. This broad range of advanced functionalities was considered important, providing additional scope for addressing problems in the organization and improving the overall quality of work. Fourth, system Beta was based on an advanced and highly adaptable process-controlled platform, which could enable the construction of better and more structured work processes in the organization. A fifth benefit related to choosing system Beta as the new technological option was related to its ability to function as a development platform. This feature was, however, not emphasized in the work preceding its formal adoption, but was instead used and articulated later during the assimilation of the system.

The acquisition of a new technological solution was, as has been shown in previous sections, triggered by specific problems related to recordkeeping along with contextual factors related to formal legislation. However, instead of acquiring a solution that solely addressed issues with recordkeeping, the management board of

HealthOrg acquired system Beta, which went far beyond this in terms of functionality. Several reasons for this were identified in the empirical material. As previously noted, the internal organizational analysis had expressed concerns regarding access to information in the organization. These concerns were contextualized and motivated against the perception of HealthOrg as an information-intensive knowledge-based organization in which information was viewed as a primary asset. Thus, making information previously bound to specific individuals accessible to other employees in the organization was seen as a central objective in order to reduce duplicate work and to enable a more efficient use of information. One of the project managers of system Beta for example stated that:

*“We need a better overview in that we must shift focus from the individual to the collective and make information less dependent on individuals. This will mean that we can achieve better quality in work processes involving the generation of information”.*

The advanced document management and work flow modeling capabilities of system Beta were seen as potential solutions to such objectives. Furthermore, the internal organizational analysis noted that several local document management systems existed in isolation in the organization. From an overarching organizational perspective, such systems could be replaced by system Beta in order to provide a common solution. Thus, system Beta was not only viewed as a way of addressing requirements related to control, but also for dealing with requirements related to support in that the system included functionality for document management that provided equal, if not superior, capabilities for single individuals and units in the administration. System Beta was, in this way, a solution that could offer advanced support to document management at the same time as it promoted increased levels of standardization. The view on system Beta as a comprehensive information management platform was, however, not shared by all employees in the organization. For example, one of the project managers in charge of implementing system Beta stated that:

*“We acquired system Beta as an information management system. But it was not completely clear that it was an information management system when we were about to acquire a system, many people, among others the IT department, thought that this was a diary system. I guess that’s a bit of a problem, that people talk about a diary system when what we really need is an information management system”.*

The view that system Beta constituted an information management system, as opposed to merely a diary system, was nevertheless communicated in the material provided to the management board. Thus, the decision to acquire the system was made in relation to a description and framing of the system as an information management system. As such, the system included the potential to reform not only work processes related to recordkeeping, but also processes related to general case- and document management within HealthOrg. This was emphasized in the final report produced by the project team responsible for the analysis phase, which stated that:

*“The adoption of an electronic document- and case management system is a comprehensive task that involves changes to current routines and ways of conducting work and demands active support from the management [in HealthOrg]”.*

The above quotation illustrates the view assumed by the three project teams regarding the character of system Beta. The adoption of system Beta was in this respect seen as an essential step in moving towards a unified solution for information management in HealthOrg, a view that was endorsed by the management board's decision to actually acquire the system. The system could, at least in theory, incorporate and provide structure to a wide array of diverse work processes and additionally function as a general information repository. Thus, the functionality of system Beta was considered to fit the overall ambition of providing a unified solution for information management though its focus on standardization of work processes and information. Technological functionality aside, in order for system Beta to serve as a unified information management solution, it would be necessary for its level of usage amongst its potential users (i.e. the administration) to be close to 100%, since the system was built on an 'all or no one' philosophy in order to enable standardization and homogeneity. Thus, transitioning information management activities from existing practices to the new option constituted a crucial task to HealthOrg.

### 7.2.2

#### Existing practices

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While system Beta constituted a new option for information management in HealthOrg, several practices related to information management already existed in the organization. In this context, a practice refers to work processes, routines, and technological systems related to the management of information. Several such practices

were identified in the empirical material, ranging from practices existing at the individual level, to the unit level, and up to the level of the entire administration. Thus, routines, work processes and technological solutions exhibited considerable variety throughout the administrative units, with one main exception in the form of system Alpha. System Alpha was the main shared technological solution used to manage electronic mail, shared databases, threaded discussions and shared virtual document folders. In this respect, system Alpha could be seen as a groupware system, but it also had the ability to serve as a platform for application development. Within all of HealthOrg (including the medical- and health care units), some 75 to 80 applications based on the system Alpha platform had been developed over the years, most of them with the purpose of supporting particular units in the medical- and health care activity areas. Furthermore, system Alpha functioned as the main backend to the Intranet in HealthOrg, providing information to the Intranet from its various databases. System Alpha thus constituted the most well established technological platform in the administration of HealthOrg, and close to all employees had access to the platform and used its functionality on a daily basis. As discussed above, system Alpha incorporated functionality for a diverse set of tasks related to information management. Nevertheless, unlike system Beta, which emphasized standardization and homogeneity in information management activities, system Alpha had to some extent been used to develop customized solutions tailored to the requirements of single units and even single individuals. In this respect, system Alpha had been employed to meet requirements related to localized information management support. The administrator of system Alpha, who worked in the central IT department, stated that:

*“We have these document- and project databases that include documents that they have out at the units, which can be anything from memos to vacation lists and so on that they can add themselves. I help them by setting up the database, and they administrate it themselves. They can add calendars for example where they post things that will happen this week. So, these types of document- and project databases, they control themselves”.*

System Alpha thus functioned as a common platform with some core features such as email used by almost everyone, but also as a solution for meeting localized support requirements through its ability to provide specialized solutions based on shared document folders, databases and associated functionality.

The various administrative units in HealthOrg exhibited both similar and distinctly different practices related to the management of information. As noted in previous sections, all of the administrative units primarily worked with information, but the specific tasks assigned to individual units differed. In terms of similarities, communication and personal relationships were frequently described as being essential in order to be able to carry out work efficiently within the administration. In this context, use of the email capabilities of system Alpha was frequently emphasized as important in distributing and getting access to information through collaborations in the administration. For example, an executing officer stated that:

*“One of the most important systems is the email system. [...] I would say that the most frequent way is that you have a document in Word and then you submit it to other persons for editing, or you can print it and share it that way”.*

The above quotation provides a good example of a widespread practice regarding the production and distribution of information in collaborative work processes within the administration, i.e. a reliance on personal relationships and the basic functionality of email. One of the respondents working in the staff for Organizational management further highlighted the importance of personal relationships by stating that:

*“It comes down to being able to create relationships so that you get a climate that enables you to get access to information in a good way. And of course, if I have a good relationship with the person that is supposed to send me information, that makes it much easier than had I been some anonymous person just demanding information”.*

The importance of having good relationships with other employees was often emphasized at the inter-unit level, that is, when information had to be passed between administrative units, since there were few technological solutions common to all units aside from email. Within specific units, however, strong local practices had been established, and this development affected how information management activities were carried out. A clear example of how a strong local practice that affected information management activities within a single unit can be seen in the work carried out by the financial staff. One of the respondents from this particular unit stated:

*“Within Finance, we have developed our own, well we have our own server where we save all documents. We have a structure that we have tried to follow over the years. [...] But we are stupid enough to have to options really. We have one server where we have gathered financial information in a structured way, and then we have system Alpha where we save information about what the staff is doing, and memos and themes. So we have sort of two options”.*

Within this particular unit, a specific server had thus been developed in order to store sensitive financial information. The unit nevertheless also made use of databases and shared virtual folders based on the system Alpha platform in order to manage other types of information. This local practice was thus specifically geared towards meeting requirements expressed within the unit, and paid less attention to inter-unit requirements. A similar pattern was observed with individual information management practices in that solutions existed that exclusively assumed the perspective of one single individual. For example, some respondents in the administration had work assignments that involved dealing with sensitive information about people undergoing medical care. In such cases, information was frequently stored directly on the employee’s personal computer, or in a specialized database developed on the system Alpha platform to ensure correct levels of access to the information. In a similar vein, several individual employees within the administration had specialized assignments involving communicating and exchanging information with external partners outside of HealthOrg. Such assignments had often resulted in the development of dedicated solutions and routines with the single purpose of making external cooperation possible. One of the respondents in the staff for Organizational management for example framed it in the following way:

*“I gather information from various places in our organization and then I compile that information and send it to a nation-wide database. I guess you could say I’m the spider in the net. [...] Much of my work is individual, but I do deliver information to parts of HealthOrg as well, primarily to the management board”.*

Most administrative units exhibited bounded perspectives in that they first and foremost considered and attempted to address issues and requirements occurring within the particular unit. In this

respect, localized practices had been developed regarding how to best manage information. At the inter-unit level, as previously mentioned, the electronic mail functionality of system Alpha constituted the primary tool used to manage communication between units. The Intranet of HealthOrg was also sometimes used as a facility for inter-unit information management. The Intranet of HealthOrg provided internal information to employees within the organization and in this way constituted a form of information repository. The content published on the Intranet was fetched from special databases developed on the system Alpha platform. Thus, general information applying to all employees within HealthOrg was frequently communicated through this particular solution. However, it is important to emphasize that the Intranet did not have any case- or process management (i.e. management of work processes) capabilities; its role was focused on the provision of news and general information.

### 7.2.3 The struggle between a new option and existing practices

As exemplified in the previous sections, there existed several local practices related to information management within HealthOrg. Some of these practices existed at the level of specific individuals, some at the level of specific units, and others were common to all administrative units. These practices were very much grounded in the specific problems faced by and requirements of individuals and units, and were in this respect frequently bounded in that they did not take account of inter-unit level needs. Within the administration of HealthOrg, there was a long tradition of using system Alpha, and various solutions had been built on this platform (for example databases) to provide for support requirements existing within units or at the individual level. Although some of the functionality of system Alpha was also found in system Beta, there were some key differences between the two systems. First, system Beta promoted increased levels of standardization in the production, storage, distribution and access to information, whereas system Alpha had been used in a de-centralized, flexible way. A clear example of this was that the financial staff made use of a local database based on the system Alpha platform to manage information. This database was, however, inaccessible to other units and employees within the administration. Similar patterns were found in several other units. Second, system Beta constituted a single-system solution to information management in that in order to realize the full benefits of using the system, almost all work processes and documents had to be managed within

the system. Thus, system Beta represented an attempt to provide a unified solution to information management within the administration by gathering all information within a single system that could be used to manage work processes in a controlled way. System Alpha, on the other hand, primarily functioned as a platform on which localized databases and document folders could be created and managed. Thus, with the exception of its electronic mail capabilities, system Alpha was not thought of or used as an overarching single-system solution for information management. Third, whilst system Beta was specifically geared towards managing all information produced within the administration, it was not geared towards exchanging information with external partners. System Alpha on the other hand had the ability to exchange information with external partners through its electronic mail capabilities along with specialized databases. Fourth, system Beta included functionality for managing work processes through its process model in which work processes could be specified to include specific individuals, tasks, version management of documents and deadlines. Such advanced functionalities were not included in system Alpha. Fifth, system Alpha provided electronic mail capabilities, functionality that was not included in system Beta. System Beta did support communication within the system through messages and the sending and receiving of notifications related to work processes, however, this type of communication was not comparable to the functionality of electronic mail since it could only be achieved within the system itself. Lastly, system Beta included functionality that enabled structured management of meetings. System Beta was able to partially automate the administration of meetings, for example by generating lists of participants and talking points, and by providing automated invitations to meetings. Such invitations were not sent via electronic mail, but rather as notifications within system Beta.

There was also considerable overlap in the information management capabilities of the two systems and in the type of tasks addressed. In practice, system Alpha was often used to manage and store information on shared virtual folders and databases, features that provided adequate support for information management for single units and/or individuals. With this and its electronic mail capabilities, system Alpha provided technological functionality that enabled joint storage and sharing of information similar to the overarching ambition of system Beta. One of the objectives of introducing system Beta was to allow for the reuse of knowledge and information; system Alpha provided some support for this, at least at the level of single units. System Alpha additionally fueled the In-

tranet with general information pertaining to all employees within HealthOrg and in this respect constituted an information repository common to the entire administration (inter-unit level information distribution). Additionally, System Alpha and system Beta both had the ability to serve as development platforms, that is, as a basis for the development of specific applications.

At the time of acquisition of system Beta, HealthOrg had spent considerable amounts of resources on investigating, planning and selecting a new technological solution for information management. In this respect, successfully assimilating system Beta into the organization was considered essential in order to solve existing problems in the organization, but also to capitalize on invested time and money. The management board along with the staff for the Secretariat and actors from the three internal projects investigating the need for a new solution all shared this perspective. Deploying system Beta into the organization nevertheless constituted an intricate challenge since existing practices were deeply rooted and constituted contexts in which tasks were intimately interconnected with existing technological solutions. Furthermore, there were functional overlaps between system Beta and system Alpha, even though the two systems were distinctly different in terms of the type of management paths they promoted; this fact further complicated the introduction of system Beta into HealthOrg. Moreover, in the work preceding the acquisition of system Beta, it had been argued that the system could be used to restructure work processes and routines within the administration, an argument made from the perspective whereby system Beta was viewed as an overarching information management system. This view did however not, as will be further discussed in the following sections, align with the way in which system Beta actually was implemented.

The implementation of system Beta began in the autumn of 2003 and extended into spring 2004. During this time, one of the project managers in charge of specifying the requirements for system Beta became its chief administrator. The staff of the Secretariat was made responsible for the administration of system Beta; conversely, the central IT department was responsible for the administration of system Alpha. After having implemented the system technically, education on system Beta was provided to all potential users of the system, that is, all employees working within the administration. The general idea was to provide an opportunity to explain the purpose of the system, and to present the functionality of system Beta in order to enable employees and units to gradually move over to the new system. The educational efforts were managed and provided by

the administrator of system Beta, and extended throughout spring of 2004. The ambition of clearly articulating the intended role and functionality of system Beta was, however, not entirely successful. Instead, different perceptions of the role of system Beta along with the purpose of specific functions in the system began to emerge in the organization.

As has been articulated previously, system Beta was intended to solve specific problems related to formal recordkeeping, but also to function as a comprehensive case- and information management system. The perceptions of system Beta nevertheless exhibited considerable variety within the administration. As one of the respondents working in the staff for Organizational management put it:

*“I’m not really sure. It’s a system that I’ve only been in contact with a few times when I’ve been made aware that information has been sent to me within that system, but what type of system it is, I don’t really know”.*

Other respondents had different perceptions that aligned more with the overarching purpose of system Beta. One of the respondents in the staff for the Secretariat for example stated:

*“I would say that it is a general document management system that is flexible and enables different ways of working with it. But above all, it’s a document management system”.*

The first qualitative electronic survey that was conducted included questions specifically targeting how employees perceived system Beta. The empirical material resulting from this survey clearly showed that there existed a multitude of perceptions both regarding the type of solution system Beta constituted, and additionally regarding its intended purpose. Three main types of perceptions could however be identified in the material: (1) system Beta was perceived as a document management system, (2) system Beta was perceived as a diary system, and (3) system Beta was perceived as a general information- and case management system. System Beta was, however, also discussed and thought of in more technical terms by some respondents. The administrator of system Alpha for example compared system Beta to an application developed on the system Alpha platform. For example she argued:

*“On the system Alpha platform, we have developed a document management application where some medical care units store*

*information. [...] If I must compare, I would say that system Beta is comparable to that specific application”.*

The administrator of system Alpha did consequently not share the perception of system Beta as a comprehensive information management platform, but instead viewed the system as equal to specific applications that could be developed on the system Alpha platform. The head of the IT department on the other hand provided a different view on system Beta in stating that:

*“System Alpha is first and foremost a development platform on which you build applications that are used but you can also build applications on the system Beta platform. They are slightly different these two, but we absolutely have applications that could be built in either or. [...] In terms of functionality, the two systems do things in very different ways, but they achieve the same thing”.*

Additionally, specific functionalities of system Beta were perceived differently throughout the administration. Some respondents argued that the system constituted a simple and straightforward way of working with information, whilst others considered the system highly complex and difficult to use. Still other respondents argued that the level of uncertainty regarding who had access to what information in system Beta was high and that this uncertainty made them hesitant to work with the system.

Overall, system Beta was only partially assimilated into the administration of HealthOrg. System Beta overlapped functionally with existing and well-established practices and solutions for information management, a fact that made the specific roles of the various solutions diffuse. Furthermore, system Beta was perceived in very different ways throughout the administration and such perceptions impacted on the ways in which the system was used or not used.

#### 7.2.4 Summary of the contradiction

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The struggle between the new option and existing practices primarily manifested itself in the creation of a situation where the specific roles and functions of the various solutions became ambiguous. Despite emphasizing different ideals regarding information management in terms of standardization versus customization, system Beta also overlapped functionally with existing solutions and information management practices within HealthOrg. This functional overlap contributed to system Beta being only partially assimilated, which in

turn affected its role in the organization and the way it was perceived.

### 7.3 INFORMATION MANAGEMENT TRANSFORMATION: A STRUGGLE BETWEEN TOP DOWN AND BOTTOM UP APPROACHES

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This contradiction concerns transformations within HealthOrg and in particular the shifting character of ideas and approaches associated with the process of mapping information management solutions to information management requirements. The concept of transformation is thus used to denote processes related to identifying, mapping, implementing and assimilating information management solutions to meet requirements expressed within HealthOrg. In the empirical material, transformations were identified through the analysis of ideas, arguments, actions and lack of actions related to solutions and requirements.

Specifically, this contradiction centers on the struggle that took place between two different approaches to managing transformations, one top-down approach and one bottom-up. The top-down approach originated from a centralized perspective that primarily emphasized the importance of catering to the overarching organizational level when identifying and implementing solutions to requirements. In this respect, the top-down approach was well-suited to the stated control requirements and the provision of a unified solution for information management in the organization, and constituted an approach to transformation that built on the idea of transformation as being structured and implemented according to preexisting plans. Furthermore, the top-down approach implies that transformations taking place within HealthOrg would be best managed by considering the organization as a whole, rather than paying detailed attention to issues and events taking place within single units.

The bottom-up approach to transformation was based on the idea that transformations could and should be grounded in, and emerge from, the actual work carried out within the particular units of the administration of HealthOrg. Thus the bottom-up approach was driven by local support requirements that had a long tradition within the organization. The bottom-up approach also offered a potential fallback strategy in the assimilation of system Beta.

The overall transformation process, that is, the process of mapping, implementing and assimilating a solution (i.e. system Beta) to information management requirements within HealthOrg was characterized by a constant shift between bottom-up and top-down approaches. Viewed separately, these approaches build on very dif-

ferent ideas about how to best manage organizational transformations and had they been adopted independently, they would have generated opposite effects. The identity of this contradiction thus relates to the balance between the bottom-up and top-down approaches to the transformation process. System Beta was adopted and assimilated in a series of different phases, and the approach to transformation changed from phase to phase. These changes impacted on the way that system Beta was introduced, communicated, received and used throughout the administration and in this respect contributed to the creation of a complex organizational situation with high degrees of uncertainty regarding technology, strategy and the process of change. The next three sections describe this contradiction in more detail, focusing on the top-down approach, the bottom-up approach, and the struggle that occurred between them.

### 7.3.1 Top-down approach to transformation

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The overarching transformation process that took place within HealthOrg was related to the identification, adoption and assimilation of a new solution for the organization's information management requirements. In this respect, the process of transformation was intimately connected to the articulation of requirements and also to existing practices and work processes within HealthOrg. Principally, the top-down approach was informed by a perspective on transformation that was firmly rooted in a belief in central planning and formal execution in the organization. In this way, the top-down approach assumed an organization-level perspective in primarily stressing overarching organizational needs and obligations. During the transformation process, however, the top-down approach emerged, disappeared and reappeared in different forms and was communicated and advocated by different actors in the organization. The top-down approach was thus far from straightforward in its execution and was not universally accepted in HealthOrg. In the empirical material, several factors were identified as being important in this context, including the shifting character of the work process preceding formal adoption of system Beta, the specific interests of different stakeholders in the organization, implicit decisions made by the management board, and the character of existing practices. In this section, each of these factors are explained to provide a clear view on how the top-down approach was manifested throughout the transformation process involving system Beta.

As discussed previously, the initial problem with formal record-keeping identified by the staff for the Secretariat led the management

board of HealthOrg to assemble a total of three project teams to further analyze the problems and requirements existing in HealthOrg. The initial problem identification can in this way be seen as a bottom-up approach to transformation since it was grounded in practical problems as perceived by a single unit in the administration. However, this problem identification was only the starting point for a long period of work in which the three project teams spent close to three years investigating problems, analyzing requirements and proposing solutions, starting in 2000 and ending with formal adoption of system Beta in late 2003. During these three years, a top-down approach to the transformative activity of adopting and assimilating system Beta into HealthOrg emerged. Despite starting from the vantage point of finding a solution to a specific problem concerning formal recordkeeping within HealthOrg, the project teams' work quickly evolved into a comprehensive review of case- and document management activities in the organization. This change of character evolved from the interplay between the requirements of the organization, the character of potential solutions, and visions based on such solutions. A clear example of this development can be found in the final report from the analysis phase, where it was stated that:

*“A modern case- and document management system can provide additional benefits within activity areas not included in the directives, for example management of invoices. In the directives there is nothing that implies that HealthOrg is planning to acquire a platform for integration. During this work, it has become evident that such plans do exist. This project team has the opinion that both of these aspects must be further examined before a new system is procured”.*

In this quotation, the project team articulated that the acquisition of a case- and document management system might provide additional functionality that would be useful in solving certain problems faced by HealthOrg such as invoice management. Furthermore, in light of the fact that a platform for integration of existing technological solutions in the organization was being discussed, the project team indicated that such a system could overlap with the functionality existing in a new case- and document management system. This way of widening the perspective on what actually would and should be procured as a new solution contributed to the transition from concrete problem solving to the implementation of overarching visions. The character of the technological solutions that were being exam-

ined at this time played a crucial part in this process since many of the solutions exhibited functionality that reached far beyond mere recordkeeping. In this respect, the line of arguments from the project teams gradually started to emphasize overarching information management challenges and solutions rather than specialized solutions to specific problems. In an internal memo to the management board of HealthOrg in autumn 2003, the overarching top-down perspective had reached its peak, and it was stated that:

*“One of the more important purposes of the system is to simplify and support the future information management in HealthOrg. A management in which documents that are created can and should be used by all who wish to do so, irrespective of their place in the organization, geography or position. The system will promote a culture in which it is natural to cooperate and share”.*

This memo clearly shows that that the project teams promoted the adoption and assimilation of a comprehensive solution for information management in HealthOrg. This position was based on the capabilities found in the technological solution promoted (i.e. system Beta), a vision for the future of information management in HealthOrg, and existing problems in the organization. Thus, the work of the project teams included the creation of visions for how to best use existing and future information produced in the organization, how to control and manage work processes, how to address current and future problems related to case- and document management, and how to provide integration in information management activities. Above all, the work carried out by the project teams resulted in the proposition that a whole parts of the existing work processes and ways of thinking about information should be changed, largely based on the technological capabilities of system Beta. Such a change would, however, require extensive work and active support from the management board of HealthOrg, a point that was stressed by the project teams. The proposed plan of action along with the technological option provided by system Beta in this respect comprised a top-down approach to transformation where new structures, processes and technology were to be put in place. It was apparent that the focus at this time was on the organizational level and the provision of a unified solution to information management. In the context of ownership of information, one of the project managers stated that:

*“There’s a principle that all information that is produced within HealthOrg is owned by HealthOrg, but many people do their work independently and have their own computers and I mean that way of conducting work encourages secrecy. So in a way, HealthOrg doesn’t own its information even though it does formally”.*

In a sense, then, system Beta and the visions articulated around it, constituted a distinct top-down approach intended to address and correct a broad range of issues. As previously discussed, system Beta also constituted a single-system solution for information management built on an ‘all or none’ philosophy. This characteristic also contributed to the formation of a top-down approach to transformation because once system Beta had been acquired, it was necessary for almost all of its potential users to adopt it in order for its potential benefits to be realized. The project teams that proposed the adoption of system Beta were key stakeholders in the transformation process, since a successful assimilation of the system depended on the number of users actually transitioning. Not surprisingly, the project teams therefore emphasized the need for strong leadership by the management board in HealthOrg since the overarching responsibility for the procurement and deployment of the system formally rested with them. Well aware that the work by the project teams had gone far beyond the procurement of a recordkeeping system, one of the project managers also stated:

*“In our work, we devised a strategy around how to work, and they [the management board] accepted the approach we proposed. I mean, if you accept it and make the decision to implement, you have also accepted the plan and visions related to the system”.*

The management board of HealthOrg decided to acquire system Beta, and provided no official counter-arguments to anything proposed by the project teams, suggesting that the implementation of the top-down approach to the transformation of HealthOrg was anticipated to be straightforward. However, in the beginning of 2004, when system Beta was deployed into the administration, mandatory usage of the system was not advocated. Thus, the management board of HealthOrg had acquired system Beta along with its associated visions but had decided to not mandate the use of the new system. The administration therefore faced a situation in which a gradual transition from old practices to the new system was implicitly expected to take place. Thus, although it had been implemented on the basis of visions and the fact that its techno-

logical characteristics promoted standardization and overarching control, the actual assimilation of system Beta had moved away from a top-down approach and instead adopted a bottom-up approach to transformation.

### 7.3.2 The bottom-up approach to transformation

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The gradual transition strategy can be considered a bottom-up approach to transformation in the sense that system Beta, along with its visions and structures, was deployed into the organization without any major strategic decisions regarding the future use of the system having been made. Thus, making the best of the capabilities of system Beta was at this point in time up to the individual users or units in the administration, a strategy seemingly completely at odds with the top-down strategy envisioned and articulated by the project teams. System Beta built, as previously noted, on the principal idea that in order to control and manage work processes and information in an efficient manner, the vast majority of the employees would have to conduct their information management activities within the system. This ideal was derived in part from the character of the system, but also from the top-down strategy for transformation that had emerged in the preceding work. Despite the provision of training on the system to all employees in the administration, the transformation process soon entered a phase in which employees and units in the administration struggled to come to grips with the purpose of the new system, its functionality, its role in the organization and its sender. Not surprisingly, this bottom-up approach contributed to the formation of a multitude of different perceptions of system Beta, as explained in 7.2. A clear example of the effects of this approach could be seen in the empirical material from the first qualitative survey. The survey contained questions focusing on what unit or function employees' thought had initiated and deployed system Beta in to the organization. Almost 45% of the 88 responders completing the survey answered that they had no information about who had initiated and/or promoted the system, a situation that further complicated the transformation process.

The bottom-up approach to transformation came as something of a surprise to the members of the three project teams that had conducted the pilot study, the organizational analysis and the requirements specification. One of the project managers commented that:

*“There were flaws in communicating and implementing our strategy and vision. To be honest, there seemed to be no structure in the way it was done, and so from our side, we had to do something about it. So what we really did was that we attempted to make sure that the recordkeeping part was fully operational and after that we just drew a line and said our work here is done”.*

The bottom-up approach was thus perceived by the project manager as not mapping well with system Beta and its associated visions. Instead, energy was invested in solving the original issues and problems identified by the staff for the Secretariat. The formal administrative responsibility for system Beta was however placed upon the staff for the Secretariat, and in particular one of the project managers who was employed there. This meant that while the staff for the Secretariat rapidly took to using system Beta as the primary solution for formal recordkeeping, the system was not rapidly taken up as a comprehensive case- and document management system in the administration as a whole.

At this time, there were several overarching strategies and policies regarding the use of information technology in the organization. However, many of these strategies and policies remained unknown to most of the workers in the administration during the transition process. For example, a respondent working in the staff for the Secretariat stated:

*“There are IT strategies in the organization and I have tried to read them but they’re completely incomprehensible to anyone not working professionally with IT. They’re at a level that is, well, written by IT people for IT people”.*

Another employee, working in the staff for Growth and regional development, concluded that:

*“I don’t know if there are strategies at all. [...] I mean, each individual solves his or her own problems I guess. It would probably be possible to do things more efficiently, but I really don’t have the time to explore that. So I basically do what I’ve always done”.*

The bottom-up approach thus allowed for employees in the administration to more or less create their own ways of conducting work, even with system Beta in place. In this respect, system Beta was, some two years after implementation, only gradually assimilated into the organization, and there was significant variation in the way

it was actually used. One of the members of the management board, the head of IT management, made the following comment on the lack of communication of strategies and the heterogeneous use of IT:

*“In principle, we have no strategy that states how people are supposed to produce information, how they should manage different versions of one and the same document, and how information should be searchable. We don’t really have that. Historically, several different ideas and perspectives have existed and system Beta could have been a solution. But it’s very difficult to get this to work in real life”.*

The head of IT management of HealthOrg thus indicated that there in fact were no clear strategies related to information management within HealthOrg. Thus, the decision to acquire and deploy system Beta had been made primarily in relation to actual problems as described in relation to recordkeeping, whilst the overarching visions of standardized and streamlined information management had largely been disregarded. Nevertheless, system Beta had been implemented in HealthOrg not as a mere recordkeeping system, but rather because it provided a complete set of functionality to deal with a wide array of information management activities. The technological characteristics of system Beta coupled with the first shift from a top-down to a bottom-up approach to transformation initiated an ongoing struggle within the administrative units.

### 7.3.3 The struggle between top-down and bottom-up

Throughout the work preceding formal adoption and implementation of system Beta, the top-down approach to transformation dominated the contradiction. This was manifested by a focus on the generation of centralized overarching visions and plans for information management. However, when the system was implemented in spring 2004, there was an abrupt shift in the approach to the transformation, from a top-level perspective to a bottom-up approach. As such, there was no struggle between opposing forces at this point, just a straightforward shift in strategy that was poorly motivated and communicated. The administration thus entered into a phase in which system Beta and system Alpha coexisted with large overlaps in their functional capabilities and usage patterns. Individual employees and units in the administration were thus faced with multiple technological options in their daily work. The staff for the Secretariat had spent considerable effort on transitioning into using

system Beta as the new recordkeeping system for the administration. Thus, all information subject to formal recordkeeping was entered into system Beta. The bottom-up approach to transformation had, however, contributed to the creation of a situation in which use of system Beta was optional. Many employees and units therefore opted out of using system Beta, which affected the work of the staff for the Secretariat. Only some of the information subject to formal recordkeeping was sent to the Secretariat through system Beta; the majority continued to be received via the electronic mail capability of system Alpha, or on physical paper. Having to manually re-enter all information into system Beta as opposed to receiving information directly in the system was time consuming and problematic to the Secretariat. One of the employees stated that:

*“We would gain considerably if other people used system Beta when they have things that need to go through us. We have such short deadlines to manage so we are very much dependent on that people do this. We try everything from asking nicely to threatening to get people to use it”.*

As no formal decision to mandate the use of system Beta had been made, the staff for the Secretariat and the administrator of system Beta nevertheless had to rely on other types of strategies to increase the overall usage of the system. The administrator of system Beta for example commented that:

*“We have an unofficial policy now, that if someone comes to us and asks a question, for example, how do you do this in system Beta, then we run. We really try our best to pitch system Beta to them and to be accommodating. And we try to focus on some important groups of people because if we can get them to use it, then that will generate ripple effects”.*

The administrator of system Beta along with the staff for the Secretariat thus attempted to increase the use of system Beta in any way possible. A clear example of this strategy was exemplified by one of the respondents working in the staff for Information. This individual stated:

*“I was the project manager for an internal project in the organization and in that work, we used system Beta. To a large extent, that was because the administrator of system Beta was part of the team and helped out in setting things up”.*

Being accommodating to suggestions and flexible regarding support were considered key factors in enabling employees and units in the organization to transition. The motivation for doing this was partially based on pragmatic issues related to duplicate work, but also on a firm belief in the visions that had been developed around system Beta. Thus to some extent, the visions and strategies developed during the preceding work were still held in high regard. However, instead of a top-down approach and mandated use, proponents of system Beta had adapted their transformation strategy. This adapted strategy nevertheless contributed to a situation of competition for users. For example, the administrator of system Beta stated:

*“We can do similar things in both system Alpha and system Beta so when someone is about to launch a project, for example, the solution that they will use will depend on tradition, who is more flexible or who they happen to know in the organization. [...] It’s not a good situation because we put our energy in two different places and just continue to develop”.*

Despite realizing the potentially damaging situation that was unfolding in the organization, the proponents of system Beta continued their efforts to promote increased use of the system. Reflecting on the co-existence of multiple solutions for information management within HealthOrg, the administrator for system Alpha stated:

*“Unfortunately we have that situation now. I would like for us not to be in it, for things to be clear and for HealthOrg to have a single well-defined way of doing things”.*

The central IT department had the overarching responsibility for the vast majority of technological solutions within HealthOrg, including system Alpha. They were not, as previously discussed, responsible for the management of system Beta. In a sense, then, system Beta was a technological system that existed outside of the IT department and was primarily considered a diary system by the administrator of system Alpha. This also impacted on the way the IT department accommodated requests for general information management support, such as the creation of shared document folders. Such requests were most frequently accommodated since system Alpha was considered the main technological platform for generic information management. Thus, as time passed, both system Alpha and system Beta continued to compete for users, offering similar technological solutions for similar problems and requirements.

In late 2006, some three years after the implementation of system Beta, the management of HealthOrg made a formal decision to mandate the use of system Beta in formal recordkeeping. Having realized the problems experienced and expressed by the staff for the Secretariat, the management board decided to implement a partial top-down approach to the use of system Beta. This decision was communicated through electronic mail and on physical paper to all concerned employees and units in order to make sure that the decision was understood and diffused. The general idea was to streamline the work processes involving the staff for the Secretariat and in this manner decrease the amount of duplicate work having to be done by this particular staff. The decision nevertheless had limited impact on the use of system Beta and as one of the respondents working in the staff for the Secretariat reflected:

*“It’s going slowly, and I think that the upper managers are actually sinners themselves when it comes to using this system”.*

In a similar vein, one of the employees in the staff for Information concluded:

*“I don’t know if and how system Beta is used by the management of HealthOrg, I mean do they use it? I think that this is a symbolic question – they have to start using it so that we can stop thinking ‘why should we use it?’”*

Thus, many respondents felt uncertain as to whether system Beta was being used by people in the upper management of HealthOrg and in this respect questioned the importance of the system. The IT manager, part of the management board of HealthOrg commented on the lack of use of system Beta in the following way:

*“It’s close to impossible to achieve if you don’t remove other existing options. [...] As I remember it, this was something that was dropped in our lap. It turned out though, that the system lacked support in the organization which made it very difficult to implement”.*

The IT manager thus indicated that the work preceding the decision to acquire system Beta was not grounded in the organization, and that this was one of the reasons why a top-down approach had not been adopted in its implementation. The manager also reflected on their personal use of system Beta and concluded:

*“For my own part, I remember the first time I was confronted with system Beta and I realized that we have implemented a system that gives me a completely new role in the organization. As managers and controllers, we are drowning in information both in terms of email and in terms of physical paper. System Beta is a system that I myself have to monitor. [...] And in system Beta today, I receive information that should be filtered through other individuals first, but since that informal structure doesn’t exist in system Beta, I receive all of the information directly”.*

In 2007, however, another major shift in strategy took place in relation to system Beta, this time in the form of the release of a new application for deviation management. The administrator of system Beta explained:

*“System Beta is becoming more of a development platform now, and we have just launched a system for deviation management based on system Beta. We chose to rename this new system so that it would not be called system Beta and the interesting thing is that we have a high level of usage of this system. I don’t think people realize that they are in fact using system Beta, and that was the whole point of renaming the part focused on deviation management, that was strategically important”.*

Another employee involved in the development of the deviation management system stated:

*“Yeah, we renamed the system and that was a smart thing, but that is not the only reason to why people like this new system – it is popular because it addresses specific problems and needs in the organization. People spent a lot of time filling in forms regarding deviations, and what we did was to remove a lot of duplicate work in that process”.*

Using system Beta’s capability to function as a development platform in this respect constituted a bottom-up approach to transformation, with system Beta being used as a platform to address existing problems related to deviation management. Despite constituting a separate technological solution with a specific purpose, much of the functionality and interface of the deviation management system were identical to that found in system Beta. The launch of a deviation management system in this respect strengthened the position of system Beta in HealthOrg, and further blurred the boundaries

between system Alpha and system Beta. As previously mentioned, system Alpha functioned not only as a groupware system with electronic mail capabilities, but also as a development platform on which some 75–80 applications had been developed. With the launch of a deviation management application, system Beta had begun to offer the same type of capability.

From 2007 up until spring 2009, no major developments related to either system Beta or system Alpha took place in HealthOrg. Instead, the use of the two systems continued to overlap, and information was being created in both systems. At this time, the existence of two solutions related to information management was beginning to cause severe problems to the organization. One of the respondents working in the staff for Organization management for example stated:

*“Let me give you an example based on the feelings of uncertainty that exist. The other day, I received a notice to attend a meeting. It was sent to me in system Beta, but it was also sent by email and distributed physically on paper”.*

Several other respondents expressed similar concerns and experiences related to information existing in multiple systems, and duplicate work being carried out on multiple platforms. Despite these concerns, another major shift in strategy occurred in June 2009. The central IT department of HealthOrg implemented a top-down approach in rolling out a new version of system Alpha within HealthOrg. Since almost all employees in HealthOrg had access to the system, and it was an essential platform for electronic mail, information management and application development, the top-down approach to the implementation of a new version was seen as unproblematic and straightforward. The new version of system Alpha included new hardware but also, and more importantly, new functionality. Amongst other things, the new version included functionality for sending and receiving instant messages through the system (i.e. chat) with notifications of which users that were online and available for chat. This feature was well received by many respondents; one of the employees working in the staff for Organizational management stated that:

*“The new chat function is really great – you don’t have to write a complete email, instead if I see a green light next to that person I can simply send a short direct message. For example, I might ask for a clarification on a document or something”.*

The new version of system Alpha also included additional functionality related to things such as project coordination, an area of concern well addressed by system Beta through its process structure. The administrator of system Beta commented on the developments by stating:

*“It’s becoming an inflexible situation that’s difficult to break free from. I mean, the email system was, in the beginning at least, simply an email system that was well defined and so on. Other systems had other well-defined borders. Now, some of the systems have grown to incorporate new functionality over and over again”.*

The struggle between two opposing ways of thinking about and acting on transformation had over time contributed to the creation of a complex organizational situation in which high degrees of uncertainty regarding technology, strategy and process of change had been established.

#### 7.3.4 Summary of the contradiction

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Considered separately, the top-down approach and bottom-up approach represented vastly different ways of managing transformations. To this end, adopted independently, they would most likely have generated opposite effects. The overall transformation process within HealthOrg nevertheless exhibited several different phases within which the approach to transformation changed between a top-down and a bottom-up approach. This process of constant shifts increased the levels of uncertainty related to both technology and strategy, which in turn impacted the assimilation of the new option by introducing inertia into the overall transformation process.

#### 7.4 INFORMATION MANAGEMENT CONTEXT: THE DYNAMICS BETWEEN CONTRADICTIONS

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As was discussed in the previous sections, the three contradictions involved dynamic struggles taking place between their respective internal opposites. It is, however, important to point out that although grounded in empirical evidence, the distinction between the contradictions is an analytical one, meaning that there may also be relationships and dynamics between the contradictions. Furthermore, the contradictions played out over time in a context primarily constituted by the administration of HealthOrg. It was in this context

that the primary analysis in this dissertation was conducted, and it has been partially described in the discussion of the contradictions. However, it is necessary to provide a more detailed discussion of the character and position of the context for several reasons. First, the administration existed in the wider context of a large organization primarily oriented towards the provision of health- and medical care, and this relationship was important in terms of decision-making and attention shaping. Second, the administration exhibited internal heterogeneity in dealing with a wide array of tasks in that it functioned as both a support unit and an external force in the wider context of HealthOrg. Taken together, these observations affected and were affected by the relationships between and consequences of the three contradictions. Thus, in the following section, the dynamics between the contradictions are discussed and contextualized in order to provide an overarching explanatory account in relation to the duplicate systems paradox. The three identified contradictions are summarized in table 7 (see next page).

**TABLE 7: SUMMARY OF MAIN CONTRADICTIONS**

<b>Scope</b>	<b>Contradiction</b>	<b>Identity</b>
Requirements	Control vs support	In order to constructively move forward and articulate a clear management path for information, the organization needed to balance two types of requirements, control and support
Solutions	Options vs practices	The technological option included new ways of conducting work and new ways of thinking about information. In this respect, the option did not align well with existing practices
Transformations	Top-down vs bottom-up	The overall transformation process exhibited both top-down and bottom-up approaches, each of which promoted different ways of managing the transformation

7.4.1 The context of contradictions

It was previously argued (in chapter 4 and chapter 5) that the main context under investigation was an organizational context in general and the administration of HealthOrg in particular. While this is obviously true, the empirical data revealed that it was necessary and essential to further refine the definition of the context. More to the point, the administration existed within the wider context of HealthOrg, an organization whose primary purpose is to provide efficient and adequate health- and medical care to the general public. In this way, the vast majority of the organizational employees and activities were oriented towards achieving such objectives. Thus, from a functional perspective, HealthOrg as a whole had one core focus: the provision of health- and medical care. The administration, on the other hand, performed a heterogeneous set of activities including the provision of administrative support to its surrounding environment (i.e. health- and medical care units), the mediation of outer contextual factors into the organization, and the management of external relationships with various organizations, authorities and companies. For example, the administration provided traditional administrative support in the form of financial, information and

Struggle	Consequence
Organizational-level requirements related to control contrasted distinctly with unit-level requirements related to support	The heterogeneity of requirements contributed to a situation of uncertainty which manifested itself in a lack of mutual understanding
Existing practices built on customized, flexible and de-centralized information management stood in stark contrast with the new technological option and its emphasis on standardization	Despite promoting a different management path compared to existing practices, the new option overlapped functionally with existing solutions. This caused confusion in perceptions and use of the new option
Top-down approaches to transformation were envisioned and enacted at different times and by different actors in the transformation process. Such approaches however stood in conflict with bottom-up approaches to transformation enacted in other phases.	The transformation process exhibited several phases in which the strategy of transformation shifted between top-down and bottom-up approaches. This impacted the assimilation of the new option by causing inertia to the overall transformation process

human resources, but it also assumed responsibility for assuring that the organization adhered to formal legislation applying to Health-Org. One such example was manifested by the obligation to keep a formal diary in which public record information had to be entered, categorized and stored. The administration also included units responsible for external cooperation, for example the staff for Growth and regional development, which coordinated efforts related to strategic planning and involvements in regional infrastructure. The administration thus constituted a specific yet heterogeneous context that existed within the wider context of health- and medical care and simultaneously mediated outer (in terms of existing outside of the organizational boundaries) contextual factors affecting Health-Org as a whole. The administrative units and the units providing health- and medical care nevertheless shared the same management board. Taken together, this situation contributed to the shaping and dynamics of the identified contradictions. As such, it is important to further characterize the wider context in which the administration existed since it directly or indirectly affected the decisions made and helped to shape the overall transformation process related to the introduction of the new ECM system.

As a whole, HealthOrg had about 9000 employees, the vast majority of which were employed within its health- and medical care units. HealthOrg was a politically governed organization, which meant that its activities were directed by political representatives elected by Swedish citizens living in its geographical area. In terms of structure, this part of the organization was organized around six overarching activity areas, with each area assuming responsibility for a particular aspect of health- or medical care. Activity areas were, in turn, comprised of several specific units. The ultimate responsibility for the management of HealthOrg rested with the management board, which in turn received overarching directives from the political committees. To this end, the management board was required to manage two interrelated internal contexts, that of the administration and that of health- and medical care. Since it was in this wider context that the purpose of HealthOrg was defined, the wider context was the main focus of the concern and attention of the management board. From a technological perspective, the head of the central IT department illustrated the scale of the core activities of HealthOrg in stating that:

*“It all depends on how you count, but I would say that if you count each and every system that we have, there are about 400 systems in the organization. There are maybe 50 to 100 systems that are fairly large, and maybe 10 to 20 that operate 24 hours a day and that need to function properly in order to prevent people from actually dying”.*

Thus, in the wider context of the entire organization, there existed a multitude of technological systems, some of which were critical solutions involved in life and death situations. The large number of technological solutions existing in this context had in part been driven by the complexity and diversity of health- and medical care requirements in the organization, but also partly by historical inheritance related to organizational structure and management. One of the IT strategists working in the staff for Organizational management for example stated:

*“Looking at the core activity of the organization, it’s possible to see that different units historically have acted relatively independently. So, requirements specifications have not always been known and so on. But today, things are more streamlined”.*

In a similar vein, the administrator of system Alpha explained:

*“It’s getting better but I think that some seven or eight years ago, systems could sometimes just be introduced and implemented by almost anyone. [...] I don’t know the story behind system Beta, but I know of other systems that were introduced by strong individuals representing large units with specific needs”.*

Thus, the wider context in which the administration was situated had historically been characterized by heterogeneity and fragmentation in terms of what technological solutions that had been implemented and used. This had largely been due to single units having the freedom to act relatively autonomously, coupled with unclear or non-existent overarching IT strategies. A central challenge for the management board of HealthOrg had thus been to centralize and formalize processes related to the adoption and use of technological systems within its core activities. This challenge had resulted in the formation of a central IT strategy group with the purpose of helping the management board deal with questions related to IT. The group was formed in 2004, at the same time as system Beta was introduced to the administration of HealthOrg, and had expended considerable effort on centralizing decision making related to technological systems. The head of the IT department commented:

*“We don’t make formal decisions here; that is done by the IT strategy group, which in turn reports to the head of the management board of HealthOrg. We execute the decisions but play an important part in that. [...] Today we have a very centralized governance strategy whereby the IT strategy group makes the formal decisions and we execute them”.*

Strategy development, decision making and centralization regarding what systems should be adopted and used had thus been implemented within the larger context of HealthOrg. The head of the IT department argued that this had been done successfully and that the organization had taken large steps towards a more structured way of managing IT. For example, this individual stated:

*“Today, no one is allowed to acquire a system except for us. Of course there are still some people that do things they are not supposed to do, but in general we don’t install systems that we have not acquired ourselves. [...] It’s becoming better, I’m not saying it’s perfect but it’s much better than what it used to be. It used to be a mess”.*

As evident from the above quotations, the wider context of health- and medical care had been characterized by large challenges in relation to the overall management of technological systems. Given that some of the systems were essential to the core activities of HealthOrg, it was no surprise that much attention had been focused on this particular part of the organization. However, the transition to centralized management of IT solutions within HealthOrg had not been straightforward or fully successful. The head of the IT strategy group stated:

*“We’re in a good position when it comes to things such as image management and telehealth, the type of development that’s related to care activities. But then again, we have focused heavily on those areas, and there are other areas that we don’t manage in a good way at all”.*

Thus, the core emphasis of the work carried out by the IT strategy group had been placed on health- and medical care; in some specific areas such as telehealth, HealthOrg had assumed a leading position in Sweden. The focus on care-related technologies and systems in this respect contributed to a decreased attention to transformation processes related to information management in the administration. Thus, the contradictory situation manifested by the duplicate systems paradox could from this perspective be, at least partially, explained as resulting from a lack of attention being paid to the relative importance of the two internal contexts. Nevertheless, there were some relatively severe problems associated with the adoption and assimilation of technological systems in the wider context of health- and medical care. These problems were often similar to those identified and articulated within the administration, that is, they related to document- and information management. In autumn 2009, an internal project team put together by the IT strategy group published a report containing data based on a survey conducted within HealthOrg. The survey had specifically investigated existing solutions for document- and information management in the organization and in the report based on the survey it was stated that:

*“A problematic situation identified by the project team is that several different solutions are used for one and the same purpose”.*

The project team had thus identified several functionally overlapping systems used in the wider context of health- and medical care. These systems and solutions included things such as specific docu-

ment management systems, shared folders, databases, and operating system functionalities in addition to the electronic mail capabilities of system Alpha. Thus, in essence, this situation was similar to that identified within the administration of HealthOrg. The report additionally stated that:

*“The investigation has revealed obvious flaws related to quality and efficiency along with a lack of common routines and guidelines. One example of insufficient quality is deficient management of metadata in documents, for example status, owner, version, revision and date of affirmation. [...] To improve the situation, a central information management policy should be formulated to serve as a foundation for future activity of this kind”.*

An interesting observation is that the project team framed existing problems in terms of information management problems rather than document management problems. For example, it was stated that:

*“The first conclusion of the project team was that they would not be successful if they limited their focus to document management, and that the area should be investigated from the perspective of information management”.*

Information management was thus articulated as an overarching activity involving the production, presentation and communication of documents and information. The problems identified by this project team therefore overlapped considerably with the problems and challenges observed in the administration, which indicated that a lack of attention to the problems of the administration was at most only partly responsible for the persistent nature of the duplicate systems paradox.

#### 7.4.2 The dynamics between contradictions

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Each of the three contradictions presented and explained in sections 7.1 to 7.3 were identified on the basis of empirical evidence of the existence of inner opposites and how struggles between such opposites unfolded over time. In this sense, the contradictions are analytically distinct in that they concern different requirements, solutions and transformations related to the adoption and assimilation of a new ECM platform. The three contradictions are nevertheless highly

interconnected and situated within a multifaceted context. While the context in which they exist was further refined in the previous section, the contextualized dynamics between the contradictions have yet to be addressed. The following section therefore presents an aggregated perspective on how the contradictions interacted over time, and on how context contributed to the shaping and outcome of these interactions.

At the level of requirements, two opposing types of requirements were identified in the empirical material, requirements related to control and requirements related to support. In essence, the two opposites represented requirements existing at different organizational levels. Control requirements frequently emphasized an overarching organizational level whilst support requirements commonly expressed individual or unit level requirements. The struggle between the opposites was manifested by the creation of a situation of uncertainty with respect to which requirements were most important to address in order to maintain adequate quality and efficiency in daily operations. A mutual understanding between proponents of control and proponents of support was therefore not achieved. Over time, however, this contradiction became related to the contradiction concerning solutions. At the start of the year 2000, the articulation of requirements was grounded in experienced problems concerning information management in the administration. Such problems were related to both existing ways of conducting work and to existing technological solutions in the administrative units. The process of identifying and selecting a new technological solution to address information management problems however contributed to the creation of visions related to improved control of information management in general. The technological characteristics of system Beta included functionality far beyond recordkeeping, document management, and case management. In fact, system Beta constituted a development platform on which specific applications could be developed and run. Furthermore, system Beta built on an 'all or none' philosophy in that it required that all management of information should be conducted within the system in order to achieve its full potential. The visions articulated by the project teams responsible for selecting and proposing system Beta were therefore arguably grounded in existing requirements as well as the technological functionality existing in system Beta. In this way, visions framing HealthOrg as an information-intensive knowledge-based organization in which increased control could enable increased knowledge reuse emerged from the interplay between requirements grounded in practice and the technological capabilities of the new option.

Thus, although it included functionality adequate to address existing problems pertaining to an overarching organizational level, system Beta also contained functionality that overlapped with existing solutions used within the organization. This functional overlap along with visions that had departed from the original problem identification contributed to the creation of multiple perceptions of the new option. Thus, the role of system Beta became unclear to many of the employees of the administration. The dynamic interplay between technological characteristics and requirements thus played an important role in the shaping of visions related to the role and function of system Beta within HealthOrg, which in turn affected how employees and the management board perceived the new option.

Two different approaches to transformation (top-down and bottom-up) were identified; these constitute the opposing forces in the contradiction associated with the process of transformation. The top-down approach to transformation was to a large extent informed by the vision of a standardized way of managing information promoted by the project teams. Despite being indirectly sanctioned by the management board in their decision to acquire and deploy system Beta, the top-down approach to transformation was not realized at deployment of the new option. A top-down approach would have required some unit or function within the organization to assume ownership and formal authority over the assimilation process, but this did not occur. Instead, a bottom-up approach was indirectly adopted by not mandating the use of system Beta within the administration, and this situation manifested itself in a tension between the envisioned role and function of system Beta and its actual introduction and use. As previously discussed, the process of assimilation of system Beta therefore became characterized by shifts in strategies enacted by different actors within the organization. The tensions between different types of strategies on the one hand, and between strategies and visions informed by technological characteristics on the other, added inertia to the overall transformation process. Thus, instead of completely shifting information management activities from old solutions to the new option, only a partial shift was realized, a situation that caused considerable problems to the organization in terms of information co-existing in several incompatible technological solutions. Furthermore, this increased the level of uncertainty as to what technological systems to use when creating, distributing and accessing information, which in turn made redundant work necessary in many cases. Taken together, actors that promoted a top-down approach and thus endorsed a standardized management of information did not have sufficient

authoritative power to enforce their visions in the administration. The management board along with the IT strategy group, which did have such authoritative power, chose not to promote increased standardization and centralization of information management. The head of the IT strategy group explained their position in relation to the transformation process in the following way:

*“The visions of knowledge reuse have faded away and that is exactly what I mean, someone has to own that type of process and be a motor in it. The fact that we are responsible for IT doesn’t necessarily mean that we own all core processes, and this is where things are unclear”.*

The head of the IT strategy group continued:

*“I am the head of the IT strategy group, but everything that we do in our organization today goes through fiber optics and in one way or the other could be called an IT issue, so all of these problems end up in my lap. That wasn’t really the idea at all”.*

From the perspective of the IT strategy group, issues, challenges and processes relating to the way in which information should be produced, stored, distributed and accessed were not considered as being solely related to technology. Rather, as the head of the IT strategy group put it, someone else should assume responsibility for such strategic questions. The perspective assumed by the management board, however, was that information management was intimately related to the adoption and use of technological solutions, and that this could and should be managed by the IT strategy group. As a whole, however, HealthOrg constituted a heterogeneous context in which information was being produced and communicated in a multitude of ways. In section 7.2, for example, it was demonstrated that personal relationships were considered important if one was to work effectively in the organization. The head of the IT strategy group commented that:

*“For example, each and every meeting held in this building is happening in a mixed world where some people show up with a USB memory stick, others expect to find wireless Internet connection, a third person brings an overhead paper, and everyone brings paper copies of all information just to be sure. That is what our everyday life looks like, so how do you take the next step?”*

Thus, different actors in the organization perceived information management differently, a situation that caused displacement of responsibility and ownership of questions pertaining to such matters. The fact that no unit or function with authoritative power in the organization assumed ownership of information management processes thus contributed to the creation of an environment in which the adoption and assimilation of a new ECM system led to a persisting paradoxical situation involving functionally overlapping, largely incompatible and competing technological systems.

Overall, then, the persistent nature of the duplicate systems paradox was due both to specific contradictions playing out over time and to contextualized tensions existing between these contradictions.

RESEARCH CONTRIBUTION

This research comprised a qualitative case study of the adoption and assimilation process of an ECM system in the context of organizational information management. More specifically, this study identified a paradoxical phenomenon that emerged as a consequence of the adoption and assimilation of the ECM system by a single organization, HealthOrg. The phenomenon, named the duplicate systems paradox, was described as the co-existence of several incompatible information systems with duplicated functionality that remained in use, despite the organization being aware of the negative impacts of this use on information management. To this end, this research was designed to investigate how this paradox was created, and furthermore, how, and why, it was able to persist. This objective produced the following overarching research question:

*“Why do organizations allow multiple, overlapping, partially competing and largely incompatible information systems to persist and continue to evolve over time, despite continued awareness of the adverse consequences on organizational information management capabilities?”*

Although this case study investigated a single organization in a qualitative manner, it resulted in two distinct contributions, contributions that can be generalized to a wider context. First, as already mentioned, this research identifies and describes a specific paradox resulting from the adoption and assimilation of a new information management system. To this end, this dissertation provides a detailed and empirically grounded description of a particular form of organizational consequence of IT, which I have previously argued to constitute a core area of interest within the IS discipline. In addition, the nature and formulation of the duplicate systems paradox represent the development of a core concept based on empirical observations. Walsham (1995b, p. 79) describes such developments as one of four types of generalizations arising from interpretive research and demonstrates the generalization of concepts by referring to the seminal work of Zuboff (1988). Zuboff developed the concepts of ‘informaté’ and ‘automate’ to describe the potential effects of information technology. The development of concepts in this way adds to the existing body of work which enables other researchers to identify and investigate similar phenomena. The identification and charac-

terization of the duplicate systems paradox represents a similar goal. However, as will be shown in the following sections, it is argued that this research is the first to describe this particular type of outcome of technology adoption and assimilation in detail. Thus, it can be argued that this research has identified a unique phenomenon.

The second main contribution to the research field from the case study detailed in this dissertation is the development of an explanatory model relating to the duplicate systems paradox. This explanatory model, informed by dialectics, contextualism and theory on organizational information processing, explains the creation and continuance of the duplicate systems paradox using three overarching and inherently dynamic contradictions along with their contextualized tensions. In this respect, the model represents a second form of generalization – generalization to theory (Walsham, 1995b; Yin, 2003). The underlying foundations, along with the basic components and dynamics of the explanatory model developed here, have already been presented and discussed in chapter 7 of this dissertation. However, as argued by Yin (2003), generalization to theory also needs to be carried out in relation to previously developed theories against which the theoretical propositions may be compared and analyzed. In the following sections, therefore, the duplicate systems paradox is put into context with the three related phenomena as identified and presented in the literature review. This is done in order to reveal similarities and differences between the phenomena, but also to examine the potential application of the associated explanatory frameworks to the duplicate systems paradox. Furthermore, the explanatory model developed by this research is contrasted with well-established theoretical models and frameworks as detailed in section 3.5. These sections are then followed by some views on the implications for research as well as the implications for practice.

### 8.1 THE DUPLICATE SYSTEMS PARADOX CONTRASTED WITH OTHER PHENOMENA

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As elucidated in chapter 3, the method adopted to identify relevant and related research to that conducted here was primarily a phenomenon-centric approach. This approach resulted in the identification of three similar phenomena together with their respective explanatory frameworks. These phenomena are called “the assimilation gap”, “shadow systems”, and “workarounds”. In the following, the duplicate systems paradox is compared and contrasted with these phenomena and their associated explanatory frameworks.

Within the body of research that addresses the assimilation of information technology into organizations, one particularly interesting phenomenon, the assimilation gap, has been identified (Fichman & Kemerer, 1999). This phenomenon describes a situation in which organizations and firms adopt technology but fail to deploy and assimilate that technology into their working practices. In this respect, the assimilation gap is closely related to the duplicate systems paradox in that both phenomena concern paradoxical outcomes as a result of the adoption of technology. A major difference is, however, that the concept of the assimilation gap expresses a macro-level phenomenon, whilst the duplicate systems paradox describes a phenomenon that exists within a single organization. Thus, the assimilation gap concept illustrates a phenomenon that builds on the combined differences between cumulative acquisition and cumulative deployment across a population of adopters (*ibid.*, p. 258), and in this respect relates to how innovations are diffused. Conversely, the duplicate systems paradox represents a phenomenon occurring within a single organization and in this way focuses on the details of the adoption and assimilation process occurring within a single organization. The two phenomena are thus distinct in describing and explaining different scopes. Furthermore, they also differ in the sense that the assimilation gap phenomenon describes a lag between formal adoption and full-scale deployment, whilst the duplicate systems paradox describes a situation that involves formal adoption, deployment and an extended assimilation process. Nevertheless, the explanatory framework proposed by Fichman and Kemerer (1999) to explain why assimilation gaps exist is relevant to this discussion, and warrants further examination. Two theoretical vehicles are used, namely “increasing returns” and “knowledge barriers”. The theory of increasing returns postulates that some innovations will gain added value provided that other potential adopters choose to implement that innovation. Thus, an innovation is considered to include a “networked potential” referring to an imagined future worth of the innovation. Whilst the adoption process of system Beta involved discussions concerning the possible future value of the system in HealthOrg, such discussions were neither related to, nor dependent on, other organizations adopting the same technology. In this way, the teams responsible for adopting system Beta made no conscious risk assessment based on the networked potential of the system. In other words, the theory of increasing returns does not explain the duplicate systems paradox.

The second theoretical perspective used to explain why some technologies tend to exhibit assimilation gaps is the concept of

knowledge barriers, originally developed by Attewell (1992). In essence, the concept of knowledge barriers centers on the learning processes needed for the successful deployment of the technology. Theory on knowledge barriers posits that the adoption of complex technologies within organizations tends to create severe learning issues for the users within those organizations and may thus prevent a successful integration of such technologies. As new technologies are difficult to appraise, knowledge about such technologies is consequently difficult to acquire ahead of its use. It is argued that this is particularly true about technologies that are highly complex. Essentially, organizations are faced with doubts about how new technology may be successfully deployed and integrated. System Beta was indeed a complex organizational technology in that it contained a broad range of advanced functions. As well as including a wide array of essential functions such as recordkeeping, process management and version management of documents, system Beta also included the capability of functioning as a development platform upon which new software applications could be hosted. Indeed, the complexities of system Beta corresponded to what Fichman and Kemerer (1999) described as complex organizational technologies; the analysis of the results of the case study also demonstrated that the technological characteristics of the system affected how actors in the organization perceived the system. In essence, the perceptions of system Beta emerged as being diversified and fragmented, making straightforward training on the system difficult. This suggested that the theory about knowledge barriers was, to some extent, a relevant theoretical viewpoint of the duplicate systems paradox. Nevertheless, the analysis of the duplicate systems paradox also revealed that factors unrelated to the technology were equally important in the formation and continuance of the paradox. For example, the shifting approaches to transformation that occurred during the assimilation of the system contributed to inertia and uncertainty in relation to the overall assimilation process. This implies that the duplicate systems paradox may not adequately be understood by solely examining its technological nature. Rather, as will be discussed in section 8.2, several highly interrelated factors (one of which is the nature of the technological solution) and processes existing at different vertical and horizontal levels in the organization must be taken into consideration. To summarize, the two phenomena are concerned with different levels of abstraction and are therefore distinct. Furthermore, the theoretical vehicles used to explain assimilation gaps are mainly focused at the technology level, whereas the duplicate systems paradox comprises a complex phenomenon involving ele-

ments of technology as well as social aspects, thus requiring a wider theoretical approach.

The literature review, however, also demonstrated that in the broader body of research regarding assimilation, a great deal of effort has been focused on identifying and explaining both obstacles and aids to successful assimilation. Areas such as the importance of strategy (Chan *et al.*, 1997; Ragu-Nathan *et al.*, 2001), senior management (Armstrong & Sambamurthy, 1999), mutual adaptation (Leonard-Barton, 1988) and alignment between group, task and technology (Applegate, 1991) have been identified as all being vital to achieve a successful assimilation. To this end, the analysis of the empirical data confirmed the importance and role of strategy development and senior management by providing clear examples of how a displacement of responsibility related to the ownership of the assimilation process contributed to the creation of a situation of duplicate systems usage. Furthermore, the analysis illuminated the intricate relationships that existed between established practices (i.e. groups, tasks and solutions) and the new technology chosen. In terms of mutual adaptation, which has been described as the simultaneous adaptation of technology and organization (Leonard-Barton, 1988), this research showed that adaptation did occur, however only to a limited extent.

The second phenomenon identified as relevant to the explanation of the duplicate systems paradox was described by the concept of shadow systems (Boudreau & Robey, 2005; Liang *et al.*, 2007; Oliver & Romm, 2002). In particular, shadow systems were identified as a paradoxical phenomenon that occurs during ERP implementation. The shadow systems concept describes systems that continue to exist despite the clearly stated objective of replacing them, and mitigating problems they cause, with an ERP system (Robey *et al.*, 2002). In this context, shadow systems were defined as systems that in full, or part, replicated data on, and/or functionality of, the main system that should have been used in a particular organization. Thus one of the major negative impacts of shadow systems is the problems caused by redundant workloads and lack of data integrity (Behrens & Sedera, 2004). Hence, there are both similarities and differences between the duplicate systems paradox and the concept of shadow systems. Similarities between the two phenomena include the problems of redundant workloads and data being stored on several different systems. As demonstrated in the analysis, one consequence of the duplicate systems paradox was the increased level of uncertainty as to what system to use when distributing and accessing information within the organization. Therefore, the detrimental conse-

quences of the two phenomena are similar in nature. However, the duplicate systems paradox differs from the shadow systems concept in that the former describes a situation in which there is no formally sanctioned main system, and several systems of equal importance continue to be used. Thus, the duplicate systems paradox denotes a complex situation in which no system may be defined as either a shadow system or a main system, and so is distinctly different from that described by the shadow systems concept.

The existence of shadow systems has been explained in terms of a gap existing between the requirements of various stakeholders on the one hand, and the capabilities of the ERP system on the other (Behrens & Sedera, 2004). As the analysis of this research shows, overall requirements did vary but there was a conflict between two particular types of requirements, those of control and support. An important distinction can, however, be made in this context. Whilst system Beta explicitly promoted standardization of information management and specifically dealt with requirements relating to control, the assimilation process showed some evidence that similar tasks could be carried out using both system Beta and system Alpha. Furthermore, both these systems were platforms upon which new applications could be developed in order to enhance the basic functions on each platform. Such application development was also observed on both platforms during the study, which implies that explaining the continuing existence of duplicate systems in terms of a gap between requirements and technological capabilities fails to capture the complexity of the phenomenon. However, the literature review revealed another potential explanation as to the existence of shadow systems using a comparison between “old memory” and “new knowledge” (Robey *et al.*, 2002). This theoretical perspective has already been partially addressed in this chapter, however further elaboration is needed. As explained by Robey *et al.* (2002), the implementation of an ERP system into an organization requires members of that organization to engage in a complex learning process (similar to that described in relation to knowledge barriers) whilst, at the same time, unlearning their existing knowledge. This process of learning and unlearning may consequently become a severe challenge to the effective implementation of an ERP system. In this research, it was demonstrated that existing working practices using the existing systems tended to be favored over new practices, thus indicating that unlearning might indeed present a problem. Although the current research does not specifically examine learning processes, it partially confirms that the integration of new technology is affected by conflicts arising between existing practices and

new technological solutions. However, as stated before, learning challenges are not the only factors affecting the creation and continuation of the paradox.

The third and final phenomenon recognized as relevant to the duplicate systems paradox was that of workarounds. Workarounds, as previously discussed, have been defined, described and explained within several different areas of research. However, one of the main suggestions is that workarounds are ways of achieving tasks that do not use intended and/or specified practices and technologies. In principle, thus, a workaround may, or may not, constitute a paradoxical phenomenon depending on the context in which it develops. For example, in certain circumstances, such as the use of health information systems (HIS), an important goal is to improve the quality and reliability of the ways in which health and medical care is provided. This is often attempted by reducing the variation in organizational processes (standardization) using IT solutions (Azad & King, 2008). In such contexts, workarounds represent paradoxical phenomena since one would assume that organizational actors share the overall ambition of increasing quality and safety of health and medical care provision. The literature review, however, identified several different ways of defining and conceptualizing workarounds. In the following, these different ways are discussed individually in relation to the duplicate systems paradox.

Gasser (1986) defines workarounds as the intentional use of technology in ways for which it was not originally designed, or avoiding the use of technology altogether. Gasser mainly explains the cause of workarounds as being the existence of inadequacies in the technological solution, which users thus have to find ways of working around. In relation to the phenomenon identified in this research, workarounds as described above are a much more detailed and localized phenomenon than the duplicate systems paradox. Whereas Gasser describes a micro-phenomenon, created by a single individual as she or he uses (or does not use) technology, the duplicate systems paradox describes a phenomenon occurring within an organization, involving several technological solutions. Further, the duplicate systems paradox does not describe a situation where individual users intentionally use technology in ways for which it was not designed. Rather, because system Beta and system Alpha were flexible development platforms, their complex natures to some extent allowed a diversity of uses. Nevertheless, as demonstrated in the analysis, some users avoided using system Beta for some of its intended purposes simply because other alternatives that were also formally approved existed. Whilst this deliberate avoidance of use

coincides with the definition of workarounds as provided by Gasser, the main difference is that the duplicate systems paradox describes a situation in which several formally approved, functionally duplicating systems co-exist, making it difficult to define their use as unintentional. The analysis of the empirical material nevertheless revealed that certain users devised their own ways of working in order to handle the existence of duplicate systems: these methods may be considered to be examples of workarounds. For example, some of those surveyed said they distributed information using three or more methods (system Beta, system Alpha, and in print) to make sure that it would reach its intended recipients. However, I argue that this should be understood as one form of outcome of the paradox, and not as a different phenomenon. Using the vocabulary of Gasser, workarounds are phenomena created by individuals whilst the duplicate systems paradox forms an organizational phenomenon, that is dependent on a large number of factors.

Other definitions of workarounds do, however, exist. Azad and King (2008), for example, describe workarounds as

*“[...] non-compliant user behaviors vis-à-vis the intended system design”* (p. 264).

Contrary to the description provided by Gasser (1986), the emphasis here is on the inadequate use of systems, rather than on technological flaws. Thus, workarounds may be thought of as generated by either flaws in the technological solutions, or by users not adhering to procedures defined by the technology. Evidently, these two ways of describing workarounds are not mutually exclusive since, for example, a user may subjectively perceive a particular procedure used with a technological solution as inadequate for the task, contrary to the intended design. Nevertheless, the consideration of workarounds as non-compliant user behavior necessitates defining the point at which the behavior ceases to be compliant. In their way of describing workarounds, Azad and King adopt the perspective of the designer of the technology and define non-compliant use in relation to this point of reference. The analysis of the empirical data revealed examples of such workarounds in that some users in HealthOrg did not comply with the fundamental ideas underpinning system Beta. Thus, from the point of view of the project managers of system Beta, workarounds occurred as a result of non-compliant user behavior. The duplicate systems paradox, however, describes a situation in which several distinct but interrelated points of departure from compliant behavior may be identified. For ex-

ample, from the perspective of the administrator of system Alpha, users relying on system Alpha to undertake tasks that also may be undertaken in system Beta are not engaged in workaround activities. The duplicate systems paradox thus describes a highly complex and dynamic phenomenon where distinctions between compliant or non-compliant, and intended or unintended uses are dependent on whose perspective is adopted. Since several perspectives on technology use may be identified in the duplicate systems paradox, the phenomenon of workarounds as discussed above is clearly different from that of the duplicate systems paradox. Furthermore, as previously stated, the two phenomena each employ different units of analysis (individual versus organizational).

Workarounds have also been described as a specific form, or manifestation, of user resistance (Ferneley & Sobreperéz, 2006), where users devise workarounds, for example by “re-shaping technology”, to overcome their lack of responsibility, power and identity within an organization (Alvarez, 2008). Whilst it can be considered that the duplicate systems paradox includes elements of user resistance, such as the use of individual practices blended with well-established procedures, such resistance was mostly observable within groups of people rather than amongst individuals. Furthermore, this form of resistance was not exhibited as adaptations of the new technology, but rather as retention of existing (and formally authorized) working practices.

Finally, workarounds have been shown to be both temporary and persistent. For example, Tyre and Orlikowski (1994) demonstrated how a seemingly temporary workaround became the accepted practice, even after the issue that caused the workaround had been addressed. To this end, workarounds may be regarded as temporary adjustments, or, in equal measure, as potentially permanent solutions. In the context of the duplicate systems paradox, the workaround created for the distribution of information using multiple communication channels (as described above) indeed grew out of an initial uncertainty as to which communication channels should be used. As the duplicate systems usage was not resolved, however, this particular workaround came to be the accepted practice in the sense that some users regarded it as the only certain way of sending information. To some extent, then, this research confirms the observations made by Tyre and Orlikowski that workarounds may become accepted practice over time. Overall, however, it remains clear that such workarounds may be described as elements, or consequences, of duplicate systems usage, rather than as phenomena in their own right. As shown in the preceding sections, the descrip-

tions of the phenomenon of workarounds tend to have overlapping explanations. The following sections will, however, examine in more detail the explanatory models associated with workarounds, and relate such models to the duplicate systems paradox.

McGann and Lyytinen (2005) provide an interesting perspective on workarounds by proposing that workarounds were formed as part of improvised changes occurring in organizations. McGann and Lyytinen argue that change (in their case they examined change during the evolution of information systems) may be described as either planned or improvised, and be organizational or IT-related. Using this logic, workarounds can be conceptualized as comprising instances of improvised change driven by either the technology, or organizational processes. In the current research, improvisation as a constituent part of organizational change was not identified as being a key factor. In fact, the analysis demonstrated that little, if any, improvisation occurred in relation to the two main technological systems. However, one exception may be found in the work carried out by the administrators of system Beta. As they attempted to increase the number of active users of system Beta, they tried to develop rapid solutions to the requests made from various actors, or groups of actors, in the organization. This may possibly be considered to be a form of improvisation. However, this type of improvisation was not carried out by users creating workarounds, but rather as almost formal adaptations of the platform. Thus, its definition lies somewhere between the planned and improvised change described by McGann and Lyytinen. Overall, improvisation as a theoretical lens used to illuminate the mechanisms of the duplicate systems paradox falls short since an essential feature of the paradox is the exhibition of inertia and the lack of improvised change.

An interesting account concerning workarounds is, however, related to the concept of interpretive flexibility (Orlikowski 1992; Bijker, 1987). As argued by Orlikowski, ideas and interpretive schemes may be embedded in technological artifacts during the design process. When people use technological artifacts they may, however, assign their own meanings to the artifact which may, or may not, coincide with the original ideas and schemes as embedded by the designer of the artifact. Consequently, technological artifacts are postulated to have interpretive flexibility, implying that workarounds (or what Orlikowski calls “local innovations”) may, in fact, be the result of such flexibility. In relation to the duplicate systems paradox, interpretive flexibility is indeed an interesting theoretical perspective. The analysis provided evidence that interpretations of system Beta altered over time, and that visions and strategies

associated with system Beta appeared to be partly affected by the nature of the system, and by the perspectives and knowledge-bases of particular individuals. Furthermore, the analysis demonstrated that different actors in HealthOrg perceived and interpreted system Beta in radically different ways, even after the formal adoption and implementation of the system. For example, system Beta was seen as a generic information management platform, as a specific recordkeeping system, as a complex development platform, and even as a control monitoring system. These various interpretations were not, however, exclusively based on the technology per se, but were also dependent on the specific environment that each actor worked in (i.e. dependency on local practices), and the overall knowledge, perspective and objective of the actor. The analysis also provided evidence that organizational strategies (or lack thereof) impacted on how system Beta was perceived and interpreted (as described in the previous discussion on shifts between different approaches to change). Overall, these observations confirm that technological systems indeed may be interpreted in vastly different ways and that such interpretations are dependent on a large number of factors such as the nature of the technology, local practices, the perspective and knowledge of individuals, and organizational strategies. In the case of the duplicate systems paradox, however, the interpretive flexibility did not generate a multitude of localized innovations or workarounds; rather, it contributed to the creation of a disorganized situation in which duplicate systems usage could evolve. This research thus demonstrates that interpretive flexibility may not only generate unintended use of technology, but may also contribute to the formation of complex situations in which multiple agendas and technologies exist together. More importantly, however, whilst interpretive flexibility may form an interesting explanatory model as to why perceptions of technology may shift, it falls short of providing a comprehensive explanation as to why the paradox continued to be present.

From the viewpoint of inertia and interpretive flexibility, the final explanatory framework related to workarounds as proposed by Boudreau and Robey (2005) forms an interesting theoretical account which will be further examined. Based on a case study examining the implementation of an ERP system, Boudreau and Robey identified two different ways in which human actors enact technology: inertia and reinvention. Inertia describes how users avoid using the ERP system completely at first, thus causing inertia to the entire implementation process. Reinvention, on the other hand, involves users working around the constraints and limitations of the ERP

system and thus using the technology in an unintended fashion. The shift from inertia to reinvention can be further described as a process of improvised learning in which no formal guidelines are followed. In the case of the duplicate systems paradox, no apparent reinventions were identified, and as argued previously, improvisations (and improvised learning) by users were, therefore, almost nonexistent. Nevertheless, social influences were identified, such as the administrators of system Beta continuously striving to support user requirements and promoting the use of system Beta. Such influences did not, however, instigate improvised learning to any apparent extent. One could, therefore, argue that the duplicate systems paradox simply describes an assimilation process caught at the stage of inertia. As demonstrated in the analysis, however, the duplicate systems paradox involved a partial transition to system Beta along with continued application development on both platforms (system Beta and system Alpha). Thus, the duplicate systems paradox describes a dynamic yet persistent situation that is not possible to classify into the two distinct forms of behavior.

To summarize, the duplicate systems paradox forms a distinct phenomenon in its own right as it is not possible to describe it using any single one of the related phenomena described above. Whilst the assimilation gap phenomenon depicts a macro-level phenomenon, the duplicate systems paradox describes a phenomenon occurring within a single organization. Shadow systems are described in relation to the existence of a single, formally authorized, main system whereas the duplicate systems paradox relates to a situation where several systems of almost equivalent importance and formal status exist together. To this end, the duplicate systems paradox is different since it is not possible to draw a distinction between what constitutes a main system or a shadow system. Workarounds are created by individuals, as users either discover methods for working around the inadequacies of systems, or ignore the procedures defined for the technology being used. Consequently, such behavior can be considered as a workaround in relation to a given point of reference (for example, the intended purpose of a system, or the system's original functionality). The duplicate systems paradox, on the other hand, describes a complex organizational phenomenon involving multiple systems, multiple organizational units, and therefore multiple points of reference. In essence, the duplicate systems paradox is a unique situation created when an organization adopts new IT in order to improve certain organizational capabilities. The adoption and integration of new IT, however, leads to a situation of duplicate systems usage, causing unintended and adverse effects

on the performance of the organization. Despite being aware of this damaging situation, and wishing to resolve it, the organization is incapable of doing so. Thus, the work of adopting and assimilating new IT produces a protracted detrimental situation.

The preceding sections have included discussions related to the explanatory frameworks associated with related phenomena, along with their potential relevance to the duplicate systems paradox. Several insights from existing research, such as the existence and effects of interpretive flexibility on organizational use of IT, have been discussed as potentially relevant to the duplicate systems paradox. However, in order to clarify further the explanatory model developed in this research, the following sections will detail the underlying assumptions of the model, its ability to explain the paradox, as well as its relation to other well-established theoretical models within the IS discipline.

## 8.2 EXPLANATORY MODEL OF THE DUPLICATE SYSTEMS PARADOX

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In order to provide a comprehensive answer to the research question addressed in this dissertation, theoretical guidance was sought to support the analytical efforts related to the case study. As detailed in chapters four and five, three theoretical frameworks were combined into an overarching analytical approach. These frameworks were those of dialectics, contextualism, and theory on organizational information processing. In the following, I will revisit and discuss some of the underlying assumptions made by the selection and combination of these theoretical frameworks with the intention of contrasting the analytical approach adopted here with other well-established theoretical perspectives.

### 8.2.1 Basic assumptions

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First, I have argued that the successful investigation of persistent phenomena may be achieved by using theoretical perspectives that focus on change processes, since the explanation of the factors and dynamics that drive change includes the potential to reveal why change does not occur (i.e. inertia or stability). In this context, the use of dialectics provided the method for identifying and explaining opposites and struggles manifested in contradictions. Persistent phenomena may be recognized and elucidated by examining such contradictions with respect to the relative balance and power between opposites, and by articulating and investigating the struggle

that occur over time between such opposites. Previous research has demonstrated the usefulness of dialectical approaches in addressing a broad range of issues such as institutional contradictions (Seo & Creed, 2002), resilience to innovations in telehealth (Cho *et al.*, 2007), ERP implementation (Robey *et al.*, 2002), governance in municipal organizations (Robey & Holmström, 2001), systems development (Bjerknes, 1991; Mathiassen, 1998; Sabherwal & Newman, 2003), strategic alliances (Das & Teng, 2000; de Rond & Bouchikhi, 2004), and information systems outsourcing (Palvia, 1995). Furthermore, the use of dialectics as an analytical lens to reveal knowledge about change or persistence in relation to information systems and organizations has been suggested as a method to overcome the limitations of explanations that rely on deterministic logic. For example, Robey and Boudreau (1999) proposed using a logic of opposition to study organizational consequences of information technology in order to address contradictory findings explicitly within and across studies made in the field of IS. Robey and Boudreau suggested building on a logic of opposition with four theoretical avenues: organizational politics, organizational culture, institutional theory and organizational learning. In this research, the dialectical approach was enhanced by a contextualist perspective on organizational change, along with theory on organizational information processing. Thus, the dialectical approach adopted here explicitly focused on organizational processes related to the specific core activity of information management within organizations.

The inclusion of contextualism as an analytical device provided the dialectical approach with a comprehensive framework related to organizational change. In this respect, the view adopted in this research about organizations was that they could be considered as “continuing systems” (Pettigrew, 1987) in which processes shape structures and context over time, but where the opposite is also true, that is, that context and structure contribute to the shaping of processes. Thus, three key factors were identified as being important in investigating change: the content, the process, and the context of change. The combination of dialectics and contextualism provided me with an analytical framework that could be used for investigating and expressing change processes in terms of dialectical forces that operated at different organizational levels and were affected by context. However, theories of organizational information processing provided an analytical lens that explicitly focused on the content undergoing change. To this end, the content of change was, in this case, conceptualized as being defined by information management (or information processing). Since the overarching purpose

of adopting and integrating a new ECM system within HealthOrg was to improve information management activities and make them more efficient, theory on organizational information processing provided relevant theoretical constructs that could address the content of change. To this end, the analytical lens selected allowed me to analyze and understand the duplicate systems paradox in terms of interrelated contradictions occurring within an overarching process related to information management activities within the organizational context of HealthOrg.

Using the analytical approach described above, the explanatory model thus developed builds on a number of key assumptions:

- Contradictions exist and represent natural parts of organizational contexts
- The identification and analysis of such contradictions may reveal forces and mechanisms that either drive or inhibit change
- Organizations can be considered to be continuing systems, in which change can only be successfully analyzed and understood by examining factors (contextual or other) that are interconnected at both horizontal and vertical levels
- Information management in organizations may be principally described as a complex process of mapping information management requirements to information management solutions (social, technological, or socio-technical).

In terms of causal agency, the above assumptions suggest an emergent position in that constituting elements in change processes in general, and in contradictions in particular, may be mutually shaping. Whilst the assumptions presented above form the theoretical perspective that has guided the analytical efforts of this research, they do not, by themselves, constitute a specific explanatory model that describes the duplicate systems paradox. However, the resulting explanatory model is, by necessity, a product of the analytical application of the theoretical perspective to the empirical data. There is, thus, an intricate relationship between the theoretical perspective, the empirical data, and the resulting explanatory model. In this respect, the explanatory model may be examined and evaluated at different levels. Therefore, in the following I will first compare and contrast the theoretical perspective adopted here with other well-established theoretical frameworks as identified and described in section 3.5. This will then be followed by a detailed presentation of the explanatory model specifically relating to the duplicate systems paradox.

### 8.2.2 Contrasting the dialectical approach

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The literature review identified five well-established theoretical frameworks that are frequently used within the IS community as a means of explaining the adoption, assimilation and use of technology. These five frameworks are: institutional theory, structuration theory, theory on information infrastructure, actor network theory and escalation theory. The following sections will compare and contrast the theoretical perspective adopted in this research with these five theoretical frameworks in order to highlight their differences and similarities.

As demonstrated in the literature review, institutional theory forms a comprehensive framework that explains how, and why, organizational structures tend to endure. To this end, this endurance is interesting when related to the research carried out here since we are concerned with the persistent phenomenon of duplicate systems usage. In general, institutional theory suggests that organizations will exhibit patterns of action that evolve over time and become validated in the process (Eisenhardt, 1988). Furthermore, it is frequently argued that organizations are affected and shaped by different forms of isomorphism such as coercive, mimetic and normative isomorphism (DiMaggio & Powell, 1983). Thus, from an institutional perspective, organizations are considered to behave like larger institutions. Thus, organizations can be seen as behaving like the surrounding environment, as a result of processes such as those that involve cultural expectations, imitative behavior and increased professional development. As a theoretical perspective, then, institutional theory explicitly focuses on the endurance of institutionalized structures along with mechanisms that affect such institutionalization. It does not, however, explicitly consider the potential role and impact of technology in persistent situations (Holmström, 2000). The theoretical perspective adopted here, on the other hand, is less focused on persistence and more focused on change because it explicitly considers organizations as continuing systems in which change (or lack of change) is seen as a product of conflicting forces. Furthermore, such conflicting forces are not a priori assumed to be created by, for example, rules or norms, but rather, formed by any element (social, technological, socio-technical or contextual) exerting influence in a given situation. To this end, by focusing on contradictions rather than enduring structures and isomorphic pressures, the theoretical perspective of this research attempts to avoid the criticisms associated with institutional approaches which disregard the potential impact of technology. The focus on change as opposed to persistence may, however, seem illogical as this research involves

the study of a persistent phenomenon. The basic argument here is that a theoretical perspective that addresses change may also reveal factors that affect persistence. Although there are differences in focus between institutional approaches and the theoretical approach adopted here, there is also a fundamental similarity. In institutional theory, the importance of context is emphasized with explicit focus on institutions and certain forms of isomorphic pressures. Whilst not using the vocabulary of isomorphism and institutions, the theoretical perspective of this research also emphasizes the potential role and impact of context by including it as one of three key factors to consider when investigating organizational change (the other two key factors are content and process).

The second theoretical framework against which the theoretical perspective adopted here will be contrasted is built using structuration theory (Giddens, 1976, 1979, 1984) in general and the structurational model of technology (Orlikowski, 1992; Orlikowski & Robey, 1991) in particular. At the basic level, structuration theory posits that human agency is both constrained and enabled by structures (such as rules and strategies). In this way, human actors are affected by structures as they act; however, they may also work in ways that either reinforce or change existing structures. As established in the literature review, Orlikowski (1992) extends the structurational perspective in the development of the structurational model of technology. She posits that technology forms a specific structural property in organizations and furthermore argues that technology should be considered as a product of their design and their use. Also she considers that technology mediates human action by both constraining and facilitating action through, for example, embedded interpretive schemes. Moreover, the interaction between human actors and technology is considered to be affected by institutional properties such as norms and standards. Finally, interactions between human agents and technology are thought to influence the institutional properties of an organization by either reinforcing or transforming these properties. This theoretical perspective, then, proposes that effects of technology in organizations should be understood in terms of complex patterns of influences between human agents, technology, and institutional properties. In relation to the theoretical perspective adopted in this research, both similarities and differences can be identified.

The structurational model of technology attempts to focus on the relationship between technical and social dimensions, an objective that, at least implicitly, is shared with the theoretical perspective adopted here. Although technology is not explicitly mentioned, the

focus on opposing forces in terms of contradictions provides, as argued above, a way of analyzing change in organizations that does not emphasize social or technological factors alone. An opposing force may be considered to be, for example, an IT application, a structure, a human agent or a strategy, which thus implies an emergent perspective. In this respect, then, the two perspectives are similar since they are both attempting to move beyond a deterministic stance. Nevertheless, the structurational model of technology has received criticism for overstressing human agency and downplaying the role of technology (Berg, 1998), and for treating technology too abstractly (Monteiro & Hanseth, 1996). The dialectical approach adopted here may be described as more open than the structurational model of technology with regards to the question of agency. The key objective in the dialectical approach is shown by the identification and detailed explanation of central contradictions along with their internal and interrelated conflicts. Thus, a dialectical approach allows for an empirically grounded and detailed explanation of technological artifacts as well as other elements. I would, therefore, also argue that the dialectical approach forms a more suitable perspective from which to examine the specific details of change processes.

The third theoretical framework that was discussed in the literature review refers to theory on information infrastructures. Principally, information infrastructure theory posits that contemporary and emerging IT solutions exhibit vastly different characteristics compared to previous types of IT, primarily in constituting increasingly complex and interdependent information systems (Hanseth, 2010). Information infrastructure theory therefore proposes that studies examining IT need to focus less on individual systems and more on the escalating dynamics that take place in such infrastructures. In this context, information infrastructures are described in terms of unbounded, open and evolving socio-technical systems that are enabled as well as constrained by an installed base of existing components (*ibid*). Thus, information infrastructure theory forms a process-oriented perspective that highlights the evolving socio-technical and interdependent nature of modern IT solutions. In relation to the dialectical perspective adopted here, a principle similarity is that of a focus on process, as both perspectives consider change to be dependent on past, present and future developments. Furthermore, both theoretical perspectives emphasize the complexities involved in analyzing the boundaries between organizations and information systems. Whilst information infrastructure theory highlights the unbounded nature of infrastructures, the dialectical approach attempts to distinguish between 'inner' and 'outer' context

as a means of focusing on different types of contexts that may, or may not, impact the adoption of information systems. Besides the noticeable difference in approaching organizations and information systems as either infrastructures or continuing systems exhibiting contradictions, another difference may be established through the concept of installed base. In essence, information infrastructure theory is more explicit about the potential effects that existing components (e.g. installed base) in a context may have on the adoption of new infrastructure components. For example, it has been suggested that certain levels of path dependency will occur because the act of adopting a new component is dependent on the overall configuration of the infrastructure.

The fourth theoretical perspective with which the dialectical approach will be contrasted is ANT (Callon, 1986; Callon & Latour, 1981; Latour, 1987). In terms of perspective on agency, ANT does not discriminate between human and non-human agency. Rather, social contexts are claimed to be constituted by actor-networks in which the alignment of interest unfolds through a process of translation. Translation processes are furthermore seen as being closely related to the processes of inscription, in which ideas, interests and social agendas are embedded into material artifacts. Thus, through the process of inscription, material artifacts attain certain characteristics. However, over time, the material artifacts may, in their own right, come to affect human actors. In general, therefore, ANT represents a detailed theoretical perspective aimed at developing processual explanations of socio-technical contexts. In relation to the theoretical perspective adopted here, both perspectives share the underlying idea that agency may be the property of both human agents and technological artifacts. Whilst ANT constitutes a detailed yet generally relevant theoretical perspective, the dialectical approach adopted here is geared towards addressing a particular type of change process taking place in a specific type of context. The dialectical perspective specifically examines change processes related to the distinct organizational activity of information management. To this end, a principle difference between the two perspectives is their particular objective and scope. Furthermore, as mentioned previously, a fundamental assumption made in the dialectical approach is that change or persistence in socio-technical contexts may be explained by reference to dynamics and the struggles that occur within, and between, contradictions. ANT, on the other hand, shines its analytical light on processes of enactment, translation and inscription. Consequently, although there is agreement about some fundamental assumptions concerning

agency, the two perspectives illuminate social contexts in different ways.

The fifth and final theoretical perspective identified and described in the literature review is based on escalation theory. In general, escalation theory examines situations in which actors, despite being faced with recurring negative feedback, continue to repeat a flawed course of action (Harrison & Harrell, 1993; Staw & Fox, 1977; Whyte, 1986). Escalation theory is comprised of several specific models that explain the seemingly contradictory phenomenon of escalation. The major part of escalation research, however, is concerned with the identification of factors that promote irrational decision-making at an individual level. For example, Staw and Ross (1987) present four generic categories of factors thought to promote escalation: project factors, psychological factors, social factors, and structural factors. Thus, in relation to the theoretical perspective adopted here, a principle difference may be identified from the analysis, namely that the dialectical approach operates at an organizational level, whereas escalation theory operates at an individual level. Furthermore, escalation theory, as mentioned above, typically focuses on the identification of factors that promote escalation during time-limited activities such as projects. The dialectical approach, on the other hand, adopts a processual perspective that focuses on ongoing processes related to change and persistence. Another major difference between the two perspectives is that the dialectical approach, as previously argued, is prone to the influence of technology in change processes, whereas escalation theory typically ignores the potential impact that technology may have. Thus, whilst both address contradictory phenomena, it is the nature of the phenomena, the level and the scope of the theoretical perspectives that are considerably different. In this context, I argue that the dialectical approach constitutes a more comprehensive way to address a paradoxical phenomenon that is not restricted to a specific project, nor solely related to decision-making at the individual level.

To summarize, the theoretical perspective adopted in this research may be described as distinct in reference to the theoretical frameworks discussed above in that it specifically focuses on contradictions occurring within the particular organizational area of information management. Thus, although sharing some underlying assumptions with other well-established theoretical frameworks as discussed above, the dialectical approach offers a distinctive theoretical perspective in relation to the phenomenon under investigation. The following sections will detail the resulting explanatory model developed in relation to the duplicate systems paradox in order to

demonstrate the dialectical approach in action, but also, more importantly, to provide a complete explanation as to how, and why, the duplicate systems paradox could form and remain.

### 8.2.3 The resulting explanatory model

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By using the dialectical approach described above, the analysis presented empirical evidence of the existence and composition of three overarching contradictions found to affect the formation and persistence of the duplicate systems paradox. The contradictions were associated with the different analytical scopes: requirements, solutions, and transformations. Each contradiction was shown to contain internal opposites that were in struggle with each other. At the requirements level, this was exhibited as a struggle between the two opposite actions of control and support; at the solutions level, it was displayed as a complex struggle between the new technological solution and the existing practices; and at the transformations level, it was a top-down approach to change conflicting with a bottom-up approach to change. As well as exhibiting internal dynamics, the contradictions were also found to be highly interdependent as they exhibited contextual dynamics. Taken together, the three contradictions, along with their contextualized dynamics, were found to be central in explaining how, and why, the duplicate systems paradox formed and remained. None of the contradictions were resolved during the case study; rather, each contradiction was found to include opposites of more or less equal strength, something that affected the overall persistence of the paradox. Thus, the explanatory model highlights the complexities involved in adopting and assimilating IT relating to organizational information management by demonstrating that contradictory forces are present within, and between, the different scopes of requirements, solutions, and transformations. It also demonstrates the importance of understanding the nature of the context in which adoption and assimilation processes unfold. Whilst the internal mechanisms of these contradictions and the struggles within, and between these contradictions have already been thoroughly presented in chapter seven, a further elaboration on the nature of the model along with its potential implications is needed.

As mentioned previously, the explanatory model comprises three distinct analytical scopes within which contradictions were identified. In practice, however, these scopes were not independent of each other, nor were they easily distinguishable from each other. For example, as demonstrated in the analysis, visions and strate-

gies related to transformative work emerged as products of several sources of influence: the specific characteristics of the new technological solution, outer contextual factors such as legislation, internal organizational requirements, and personal beliefs and agendas. To this end, then, the different scopes were highly interconnected. Nevertheless, it was possible to identify opposing forces operating within the various scopes. For example, the transformation scope contains two radically different approaches to transformation, these being a top-down approach and a bottom-up approach. Despite being dependent on, and thus partly generated by, elements and forces within other scopes, as argued above, the identification of these two approaches reveals a central conflict that strongly affects the overall assimilation process. By closely examining how these different approaches interacted over time, this research demonstrated how the shifts between a top-down and a bottom-up approach were involved in creating an environment of uncertainty and inertia when switching to the new technological solution. In examining how the conflicting approaches interact over time, the explanatory model also, crucially, turns attention to the underlying reasons for the formation and enactment of transformation strategies. The same logic also applies to the scope of requirements and the scope of solutions. For example, within the scope of requirements, two types of requirements were found to be in conflict with each other. Requirements related to control were typically created from an organizational perspective, or generated by external contextual factors such as legislation. In this regard, such requirements, by and large, failed to acknowledge the highly localized, specific requirements present within particular organizational sections or existing at the level of an individual employee. Overall, this contradiction developed through a lack of mutual understanding between the proponents of increased control, and those of increased localized support, a conflict that continued over time. Nevertheless, as in the case of transformative approaches, the different types of requirements were also generated by, and dependent on, other elements and processes within HealthOrg. For example, one explanation of why many individual employees and organizational units more readily recognized and emphasized support requirements over control requirements could be found in the way in which HealthOrg had managed its daily operations in the past. Furthermore, questions relating to ownership, and thus production, storage and distribution of information also complemented perceptions of the nature of the work being carried out within the administration. Many employees, for example, considered their work to be primarily result-oriented and therefore believed that

overarching strategies relating to information management (e.g. increased control) were problematic and, to some extent, unnecessary.

Within the scope of solutions, the new technological solution was found to conflict with existing practices. The new solution, for example, enabled increased control and therefore addressed the specific requirements related to control rather than those related to support. Nevertheless, the new solution did include functionality that considerably overlapped with the existing technological solutions. However, as demonstrated in the analysis, several elements, processes and tensions, such as shifts in transformative strategies, hindered a full transition to the new system. Consequently, whilst all scopes (and thus contradictions) are interdependent, the explanatory model makes possible a processual explanation of the duplicate systems paradox by distinguishing, both horizontally and vertically within an organization, between elements and forces affecting technology adoption and assimilation. In essence, the explanatory model demonstrates that the duplicate systems paradox arose because:

- there existed multiple conflicting requirements in combination with a lack of a clear strategy for prioritization
- existing practices were not aligned with the new solution
- several, conflicting transformation strategies were adopted and enacted
- the organizational context was internally heterogeneous and externally linked to strong influences such as legislation
- the new IS involved a highly complex, advanced ECM system capable of functioning as a development platform.

In the following, key observations and explanations based on the explanatory model are further discussed in order to provide a more detailed insight into the dynamics taking place within, and between, the contradictions.

One of the principle reasons why HealthOrg ended up with duplicate systems usage was that system Beta was originally intended to function specifically as a recordkeeping system. As such, the system addressed the external legislative requirements that HealthOrg needed to adhere to, and in that way gained its primary legitimacy within the organization. In fact, the need for increased efficiency and control of recordkeeping was one of the most important requirements that system Beta had to meet when the adoption process began. As was shown in the analysis, however, the process of selecting and adopting system Beta evolved into an iterative process moving between technological characteristics, contextual factors,

and internal organizational requirements. To this end, the process of adopting system Beta as the recordkeeping system expanded into incorporating visions related to general information management in HealthOrg. Such visions were thus developed, based on problems that had been experienced within the organization, the functionality of system Beta and external contextual factors such as legislation. Above all, however, the advanced functionality of system Beta meant it could be used to increase standardization, efficiency and control of not only recordkeeping but also information management. Once implemented, system Beta therefore included functionality exceeding that of mere recordkeeping and thus overlapped with existing technical solutions. An important difference in this context was, however, that even though system Alpha and system Beta could manage similar, if not identical, tasks, the fundamental principle of system Beta was the provision of a unified and standardized way of managing information, whereas system Alpha generally had been adopted and adapted in a de-centralized way by different organizational sections and individuals.

The adoption and assimilation of system Beta was characterized by several shifts between radically different approaches to organizational transformation. Originally, a bottom-up approach to transformation was enacted where several individuals and sections in the organization had expressed concerns regarding information management in general, and recordkeeping in particular. Such concerns thus initially came from employees in the organization, and not from the management board. As new ideas relating to information management emerged from the project teams, a top-down approach to transformation was adopted. The reason for the change of approach was that the implementation of a comprehensive ECM platform that built on an “all or no-one” philosophy required virtually all the employees to start using the new system in order to benefit from it fully. The deployment of system Beta, however, was not accompanied by any decision that demanded its use. Rather, a bottom-up approach was enacted as the system was implemented within the organization, a situation that allowed diverse interpretations of the role of system Beta.

As different actors in the organization perceived the role of system Beta differently, a situation emerged in which a wide range of agendas was pursued. The management board of HealthOrg, for example, felt satisfied with having acquired and implemented a recordkeeping system, whilst the project manager of system Beta, along with the project teams, had developed more sophisticated ideas about the system. In this context, then, there emerged very

different ideas about which requirements should be addressed, and why. As no unit or function with authoritative power directed or controlled the overall assimilation process, the team behind system Beta did everything in their power to distribute the system and their ideas about it amongst the employees in the administration. As HealthOrg had, historically, been dominated by a de-centralized method of management of information, where solutions to local requirements had been developed in the local context, the standardized way of managing information as imposed by system Beta faced severe challenges. In essence, the functional characteristics of system Beta did not align with the heterogeneous and de-centralized nature of information management within HealthOrg. Nevertheless, some employees and sections, within the administration, began the process of transferring to the new system, using system Beta as an information management platform rather than as a recordkeeping system. Thus, at this point, duplicate systems usage was beginning to emerge within the organization.

As previously noted, system Beta was built on an “all or no-one” philosophy of information management. As only a partial move to system Beta had occurred, practical problems began to arise when information sent within the system required the recipient to be an active user in order to access it. Conversely, information produced and distributed by other systems and solutions (for example system Alpha), could not be accessed through system Beta. In this respect, the functional nature of both system Beta and system Alpha severely constrained the information management activities performed by individual employees. The continuing use of duplicate systems was further encouraged by the fact that system Beta was also a development platform. As specific applications, such as the application for deviation management, began to be developed based on the system Beta platform, the future existence of the system in the organization was underlined. Thus, individuals and sections not previously affected by the adoption of system Beta (for example, sections outside the administration of HealthOrg) were consequently becoming dependent on specific applications developed on the platform, thus further strengthening the overall status of the system within HealthOrg. In a sense, then, the persistent nature of the duplicate systems paradox was related to a partial transition to the new system along with its use as a development platform. Once these events had taken place, the process of assimilating system Beta was almost irreversible since the overall dependence on the system was increasing. This dependence, however, was not so much related to the use of system Beta as a comprehensive information manage-

ment platform, but rather, as argued above, to the platform character. Ironically, although HealthOrg had become dependent on system Beta as a development platform, its original function as a record-keeping system was far from being achieved. Consequently, a situation had emerged where system Beta was used by some users as a comprehensive information management platform, by others as a recordkeeping system, and by others still as a development platform. This situation caused the management board to adopt a top-down approach to transformation in ordering the use of system Beta as the recordkeeping system to be used. In a sense, this revealed an ambition to prioritize clearly organizational-level requirements of external legislative demands. This decision, made in 2006, came to have only a limited impact on the use of the system. One explanation to this could be found in the many shifts between transformative approaches that occurred. A top-down approach was enacted by the team behind system Beta who, however, did not have the authority to enforce that approach. The management board had, for their part, remained passive in communicating a clear approach during the first two years following deployment: they had implicitly enacted a bottom-up approach. Furthermore, with support from some administrators of other technological solutions such as system Alpha, local practices had developed and created local approaches to the management and, to some extent, the transformation of their daily activities. Taken together, this made the decision to demand the use of system Beta as the recordkeeping system some two years after implementation seem rather strange to many employees.

The process of adopting and integrating a technological solution within HealthOrg to address particular requirements had thus resulted in the acquisition of a complex information management system that could additionally function as a development platform. This platform, however, lacked the capability to interface with existing information management solutions within HealthOrg, thus reinforcing the problems of duplicate systems usage. In parallel with the assimilation of system Beta, other actors in the organization pursued other agendas, for example about the use of system Alpha. The rollout of a new release of system Alpha that included functionality similar to that of system Beta was a clear example of this. Again, the lack of overarching control and ownership of the processes involved in the adoption, implementation and use of technology, along with information management methods, contributed to a situation in which the duplicate systems paradox was established and continued to occur. The analysis additionally demonstrated that information management was an area of concern that no individual section or

employee fully assumed responsibility for. The head of the IT strategy group, for example, argued that although dependent on technology, questions pertaining to how information should be produced, stored and distributed did not solely belong to the IT area. The management board of HealthOrg, on the other hand, perceived such questions as being intimately related to information technology and thus the chief responsibility of the IT strategy group. In this context, then, the analysis demonstrated a displacement of responsibility for the core activity under investigation – information management.

In summary, the explanatory model is built on a process perspective, highlighting contradictory forces present at, and interconnected between, different vertical and horizontal levels within the organization. More specifically, the model demonstrates how three pairs of opposites, *control versus support* at the requirements level, *options versus practices* at the solutions level, and *top-down versus bottom-up* approaches at the transformations level, along with contextual tensions, affect the formation and persistence of the duplicate systems paradox.

### 8.3 IMPLICATIONS FOR RESEARCH AND PRACTICE

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This research has examined the adoption and assimilation of an ECM system in the context of organizational information management. Through the identification and explanation of the duplicate systems paradox, this study provides a detailed example of how, and why, unintended consequences of IT in organizations may emerge and continue over time. The fact that organizational IS adoption and use may lead to such unintended consequences has significant implications for both research and practice. For example, in terms of practice, it becomes essential to understand why unintended consequences emerge, and what organizations may do to avoid them. In terms of research, the identification of the duplicate systems paradox both supports and expands upon previous research within the IS discipline that addressed the organizational consequences of IT. When combined, the results presented in this dissertation point to six important lessons to be learned, in relation to the organizational adoption and assimilation of IT for information management activities.

First, the importance of understanding and characterizing the context in which the technology is to be implemented cannot be overemphasized. In the case of HealthOrg, several different contexts were identified within the larger context of the entire organization. For example, many of the individual sections within the administra-

tion had developed their own localized practices with established ways of doing things, including the use or non-use of IT. Furthermore, distinctions could be made between sections providing health and medical care, the administrative sections, and the political part of the organization. Moreover, HealthOrg was, as many organizations are, affected by its surrounding contexts, for example, legislative demands and relationships with external organizations and firms. Thus, viewing HealthOrg as one single context completely fails to acknowledge the complexities of the adoption and integration of IT. Whilst it is convenient to talk about one organization, or one context, in practice context may turn out to be much more of an intricate issue. This research thus suggests that organizations should pay careful attention to the practical side of context, rather than to the somewhat theoretical boundaries of the organization. In this respect, the two concepts of 'inner' and 'outer' context as proposed by contextualist perspectives (e.g. Pettigrew, 1987) provide a simple but powerful tool in analyzing the context in which IT is to be implemented. By applying these concepts, organizations can potentially discover previously unknown and highly localized practices, which could help in the long run to avoid successfully unintended consequences of the kind reported here.

Second, the case study of HealthOrg identified several contradictory requirements related to information management. Two types of requirements, control-related and support-related, are, by themselves, a logical requirement for any organization. To increase overarching control of information management activities is, for example, a frequent objective in most large organizations, and is a necessity in organizations dealing with sensitive information. On the other hand, increasing specialized support of localized practices to increase the internal efficiency of information management also represents a rational objective. When combined, however, the two requirement categories may be at odds with each other, as happened within HealthOrg. Whilst this may not always be the case, this research suggests that organizations should pay careful attention to potentially conflicting requirements, and devise clear strategies to decide how to prioritize between such requirements. For example, organizations should be clear about what level should be considered most important, that is, the organizational, group or individual level. Obviously, decisions related to prioritization of different types of requirements will depend on several factors that may vary from case to case. Nevertheless, the identification and explanation of requirements present at different levels in the organization may reveal problems that need to be considered when choosing IS. Furthermore, the

observations concerning requirements confirm previous research (e.g. Davidson, 2002) stressing the importance and the complexity of the specification of organizational requirements.

Third, a major challenge related to the adoption of a new ECM system by HealthOrg was caused by a misalignment of the functional capabilities and interpretive schemes in the ECM system, and existing organizational practices. This misalignment created conflict between new ways of thinking and working, and established practices. This suggests that organizations need to pay careful attention to what the adoption of a new IS means in terms of adaptation and/or realignment, and to what extent organizational activities, technological functionalities, or both, should be adapted. In particular, this is important when dealing with complex large-scale technologies such as an ECM system. In the case of HealthOrg, the ECM system not only included comprehensive capabilities for information management, but also the capability of functioning as a development platform; it was this last fact that generated significant challenges and opportunities to HealthOrg. In terms of challenges, the complex nature of the platform gave rise to a number of different perceptions regarding the role of the system. As the new system could handle a broad range of activities, people within HealthOrg seemed to experience problems in understanding the main function of the system. Furthermore, as HealthOrg successfully enhanced the new system with specific software applications, individuals and sections that had not previously used the system came to be dependent upon it. Whilst this obviously counted as a success to some extent, it also contributed to the persistence of the paradox since the overall dependence on the ECM system grew despite some of its functions being duplicated by other systems. Thus, organizations faced with implementing complex technologies such as ECM systems may benefit from clearly specifying and communicating the intended role of the system. Furthermore, organizations should be aware that the adoption of a new system that can also be used as a development platform may cause a cascade of effects and dependencies that are difficult to manage. To some extent, the above observations thus confirm that the use of information systems may, in fact, drift (Ciborra, 1996). Furthermore, it demonstrates that not only can drift occur through actual use by the intended users within an organization, but can also occur because of the system's specific technological nature (in this case, the system was a platform) being exploited by system developers.

Fourth, the case of HealthOrg exhibited several shifts between radically different strategies for transformation management. More

specifically, top-down strategies were mixed with bottom-up strategies in the management of change, which resulted in the creation of uncertainty and inertia within the overall assimilation process. As with different types of requirements, different strategies for change may appear, correctly, to be logical when viewed in isolation. However, as demonstrated in this particular case, when adopted together without a definite direction, they may cause severe problems. HealthOrg exhibited several shifts between strategies, beginning with a bottom-up approach where employees in the organization identified and reported problems, and, after several shifts, ending with a top-down approach authorizing a specific use of the new ECM system. The final shift, the authorization of a specific use of the new system, did, however, have only limited impact on the organization. Whilst there may be several reasons for this, a major factor was the high levels of uncertainty that organizational members experienced in relation to the strategies as a consequence of the many shifts. As this research relies on a processual perspective of change, it takes as a starting point the view that change cannot be adequately understood in terms of short episodic accounts. Rather, as have been pointed out, organizations are considered to be continuing systems in which change is linked to past, present and future developments. In this particular context, the limited impact of the final top-down strategy implemented to demand the use of the new system may therefore be explained by reference to historical events. Indeed, as the entire process of adopting and integrating the new system had been going on for almost six years at the time of the decision, and had incorporated several shifts, organizational actors were less likely to respond directly to the authorization because of their previous experiences. This implies that organizations faced with the challenge of adopting complex IT solutions need to take into account their previous strategies and planned new ones in order to devise a comprehensive strategic approach. This does not suggest that organizations should be completely rigid in their strategy to adopt and integrate technology; however, it does suggest that organizations may benefit considerably from avoiding disjointed, ad hoc, strategy development and implementation. In essence, these observations confirm previous research suggesting that the development of clear strategies for the assimilation of IT into organizations is of some importance (Chan *et al.*, 1997; King & Teo, 1997; Ragu-Nathan *et al.*, 2001).

Fifth, the case of HealthOrg demonstrated that information management was an area that no single organizational section or individual would assume full responsibility for. Whilst employees and

managers not involved with IT management issues frequently considered information management to be intrinsically linked to the control of complex information management systems, and therefore the chief responsibility of IT managers within the organization, the IT managers tended to argue that the development and implementation of strategies concerned with information production, storage and distribution was outside their sphere of responsibility. Thus, in the case of HealthOrg, a displacement of responsibility for the management of information was identified. As the new ECM system included advanced functionality aimed at, for example, document management, version management, workflow management, and the management of system access, strategic questions concerning information production, storage and distribution were suddenly turned into technology-related questions that were difficult to understand by individuals not knowledgeable about the system. On the other hand, individuals and sections knowledgeable in, and responsible for, the configuration of the new ECM system were typically not part of the management group responsible for overseeing the development of strategies and policies. This situation resulted in a lack of understanding between the various actors, and ultimately, a displacement of responsibility that proved damaging to the organization. This implies that information technology management and information management are highly interrelated activities, but are not mutually exclusive. Thus, organizations adopting technologies that are specifically focused on information management may benefit from developing distinct areas of responsibility and clear communication channels between the involved organizational units. Furthermore, these findings suggest that future research should pay careful attention to, and specifically investigate, the exact nature of the relationship between information management and IT management.

Finally, as made clear in the introduction to this research, it builds on an emergent perspective, (Lee, 1999, 2001; Markus & Robey, 1988) arguing that IS research should not only examine technological *or* social elements and/or systems, but rather, and more importantly, the emergent properties that may arise as a result of the interaction between the two. To this end, the combination and application of the three theoretical frameworks of dialectics, contextualism and theory on organizational information management, presents a comprehensive analytical lens that can be used to investigate such emergent properties. The theoretical perspective draws specific analytical attention to contradictions and how opposites, tensions, and forces are central in the shaping of organizations. As

opposites are not a priori assumed to be formed by certain types of elements, the approach is inclusive in the sense that any element, be it social, technological, structural or other, exerting influence in a given situation may be explicated. Consequently, this research demonstrates how a dialectical approach may be used to investigate organizational information management specifically in relation to the adoption and assimilation of IT. To this end, it extends the number of theoretical avenues proposed by Robey and Boudreau (1999) that are built on a logic of opposition by specifically addressing information management.

As argued in the introduction to this dissertation, the organizational consequences of IT have become an important focus for IS research. The research presented in this dissertation expands this area in two distinct ways. First, it demonstrates that organizational adoption and assimilation of IT may lead to *persistent* paradoxes that cause adverse effects on the information management capabilities of organizations. Second, it demonstrates, through the use of a dialectical approach, how and why such paradoxes appear and persist. While the previous chapters (i.e. chapters 7 and 8) have detailed and discussed the findings and implications of this research, this concluding chapter provides a summary along with some closing remarks.

Previous research has shown that adoption, implementation and assimilation of IT may, and indeed frequently does, fail (e.g. Keil & Montealegre, 2000; Mähring *et al.*, 2004; Montealegre & Keil, 2000; Sauer, 1993). It is therefore no surprise that much effort has been spent on identifying factors that potentially may, or may not, promote the successful assimilation of IT (e.g. Armstrong & Sambamurthy, 1999; Chan *et al.*, 1997; King & Teo, 1997; Ragu-Nathan *et al.*, 2001). This research, however, additionally demonstrates that organizations may adopt and come to *use* technology continuously in paradoxical ways that have a persistent, adverse influence on the performance of an organization. Thus, this observation is different from the notion of failure, since organizations that adopt new technology may become dependent on it, whilst at the same time, suffer adversely from it. This was defined as a duplicate systems paradox, shown to be dependent on the interactions between technological, social, structural and strategic elements, over time. As shown in previous sections, whilst similar phenomena have been identified and explained in terms of assimilation gaps (Fichman & Kemerer, 1999), shadow systems (Behrens, 2009; Behrens & Sedera, 2004; Boudreau & Robey, 2005; Liang *et al.*, 2007; Oliver & Romm, 2002), and workarounds (e.g. Azad & King, 2008; Gasser, 1986), this research demonstrates, to the best of this author's knowledge, a distinct phenomenon not previously detailed in IS research.

The work presented here confirms the observation made by Robey and Boudreau (1999), that organizational consequences of IT are, indeed, contradictory. A general implication of this research

is, however, that the outcomes may be more contradictory than previously assumed. As daunting as this may appear to IS researchers, this suggests there should be an increase in the effort spent on explaining the complex relationship between IT and organizations. Processual accounts, such as the one provided in this research, may significantly contribute to our overall understanding and knowledge about the effects of IT in organizations through the development of detailed, empirically grounded and theoretically informed insights. To this end, this research provides a starting point for future research by addressing ongoing organizational processes involving IT from another perspective; this research has added to the vocabulary that may be used when examining IT adoption and assimilation.

This research also demonstrates the potential of using a dialectical approach in the analytical development of an explanatory account about the duplicate systems paradox. In this respect, this research presents a unique explanation that focuses on the interplay of contradictory forces and how these forces collectively contribute to the emergence of an unintended consequence of the adoption and assimilation of IT. Thus, the combination and application of dialectics, contextualism and theory on organizational information management forms an analytical lens ideally suited to aid in the investigation of the relationship between organizations and IT. However, as discussed previously, applying other theoretical perspectives to the empirical data presented here would probably yield explanatory accounts that highlight different elements and/or forces, such as networks in the case of ANT, structures in the case of structuration theory, or path dependence in the case of information infrastructure theory. The overall objective of the research presented here has therefore been to provide a transparent account of the research process, in terms of meta-considerations and philosophical assumptions and, perhaps more importantly, in terms of the relationship between theory and empirical data. In this respect, the explanatory account not only provides a clear explanation of the duplicate systems paradox, but also enables that account to be contrasted with other theoretical perspectives.

Finally, this research highlights the complex relationship that exists between IT and information management. Although complex forms of IT, such as platform system technology, are specifically designed to manage information, they represent challenges to organizations as the relationship between the functional capabilities of the technology, and the operational strategies for information management may become complex and ambiguous. This happened

within HealthOrg. Indeed, platform system technologies represent a major challenge to organizations that use them since there is likely to be a continuous and potentially unrestricted development of applications on these types of systems.



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## APPENDIX 1

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### EXAMPLES OF INTERVIEW GUIDES

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The following two protocols represent examples of interview guides used in the collection of empirical data. The thematic questions were not presented to the respondents directly but were used to guide the overall interview process. Certain questions were adjusted and/or removed depending on the respondents' position and work.

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#### Interview guide, data collection phase 1, 2005

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- Background information
- Formal role and position?
- Describe a typical work day?
- Is there anything that you experience as problematic/challenging in your daily work?
- Is it possible to articulate a quality that is essential to possess in order to do your work?
- Previous work experiences (if any)?
- General questions pertaining to the organization and to use of IT
- How would you characterize HealthOrg as an organization?
- How would you characterize your own work within HealthOrg?
- Does IT constitute an important part of your daily work?
- If yes, in what way(s)?
- If no, why not?
- Questions related to system Beta
- What do you know about system Beta in general?
- What type of system is system Beta?
- What is the overarching purpose of system Beta in HealthOrg?
- Do you feel that system Beta requires you as a user to know certain things or have certain capabilities?
- If yes, which are those capabilities and how do they relate to system Beta?
- Who initiated the system Beta project?
- Why was the project initiated?
- Have you been formally introduced to the system (i.e. received training in the system)?
- Do you use system Beta (why and for what, or why not)?
- Has system Beta changed anything in terms of the work that you do (in what ways)?

- Do you think system Beta has had any impact on HealthOrg at large, and in that case how?
- How does system Beta relate to other IT systems within Health-Org?
- What are the main strengths with system Beta?
- What do you consider to be the primary weaknesses of system Beta (if any)?
- Who benefits from an increased use of system Beta (and why)?
- What would you like to change with system Beta (if anything)?
- Questions related to strategy
- Is there any formal policy and/or strategy related to the use of IT in HealthOrg?
- Is there any formal policy and/or strategy related to the production, distribution and access to information in HealthOrg?
- Who is responsible for developing and communicating such strategies (if existing)?
- Are there informal strategies (outspoken or not) existing in relation to use of IT and/or information management within HealthOrg (if so, could you provide examples)?
- Could you explain why and how system Beta is strategically important to HealthOrg?
- I will now read you some of the formal statements that exist in relation to system Beta. I would like you to indicate whether or not you are familiar with them or not.
- What would the perfect IT solution look like in relation to the work that you carry out?
- Other comments and or questions?

Interview guide, data collection phase 2, 2009 (guide for respondents in management positions)

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- Background information:
- Formal role and position?
- Time of employment?
- Previous work experiences (if any)?
- Work tasks:
- Describe a typical workday?
- Describe typical work tasks that the respondent engages in on a daily basis?
- Responsibilities in the organization (for example, what type of decisions are you responsible for)?
- General questions on strategic use of IT:
- In the administrative part of the organization, which are the most important IT systems and platforms?

- What is the formal strategy for managing the use of IT in the organization and who creates, implements and maintains that strategy?
- Who has the overarching responsibility for making sure that IT is used in a way that serves the organization?
- Does the respondent consider the organization to be well functioning in terms of efficiently using IT, why/why not?
- Is it possible to identify situations that are problematic in relation to the use of IT, and in that case, what are these situations and why are they problematic?
- Who makes decisions regarding which IT systems and platform to use in the organization?
- Are there systems and platforms in the organization that are overlapping in terms of functionality and in that case which systems? If there are, is that considered as a problem? If so, what has been done and what is being done in order to solve this situation?

#### Document and information management:

- What is the general policy regarding creation, distribution and access to information (internal) in the organization?
- Who owns information produced in the organization?
- Which programs, systems or platforms are currently used within the administrative part of the organization in order to distribute and access information?
- Who is chiefly responsible for information management in HealthOrg?
- How is information management related to the management of IT solutions in HealthOrg?

#### Future and vision:

- Is there anything the respondent would like to change in terms of use of IT?
- Is the respondent content with organizational policies and strategies regarding the use of IT?
- Other comments and/or questions?

## APPENDIX 2

### SCREENSHOT FROM ATLAS.TI

The below screenshot provides an example of the data coding activity as performed in ATLAS.ti. The screenshot demonstrates a primary document (to the left) and how codes have been applied to the text (codes are shown in the middle column). To the right, the code manager is shown. It contains all codes along with comments related to each code. In order to preserve anonymity, names in the primary document have been removed.

The screenshot displays the ATLAS.ti interface with three main panes:

- Primary Document (Left):** Shows a document titled "1.1 Vision Ärende- och dokumenthanteringsprocessen". The text describes the process of handling cases and documents in a municipal organization. Several lines of text are highlighted with colored markers.
- Code List (Middle):** A vertical list of codes applied to the document. The codes include "P1. System alpha usage-", "P2. System beta exploration-", and "S. IT strategit-", each with a small icon and a color-coded background.
- Code Manager (Right):** A window titled "Code Manager [HU: Kop...]" showing a list of all codes. The codes are organized into a tree structure. The visible codes include "P1. System beta implementation (5-0)", "P1(a) Duplicate system intervention (0-0)", "P1(b) System beta re-launch (8-0)", "P1(c) System alpha renewal (8-0)", "P1(d) 2009 (246-0)", "P1(e) Duplicate systems usage (445-0)", "S. IT strategit (137-0)", "S. IT user (270-0)", "S. Management (81-0)", and "S. System alpha owner (24-0)". A note at the bottom of the Code Manager states: "This code is used to denote events, issues and statements occurring after the launch of the new system up until the end of the study in December 09."

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