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Enterprise System Adaptation: a Combination of Institutional Structures and Sensemaking Processes

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ABSTRACT

In this paper we set out to investigate how an Enterprise System (ES) adaptation in a Scandinavian high-tech organization, SCANDI, can be understood using a combination of institutional and sensemaking theory. Institutional theory is useful in providing an account for the role that the social and historical structures play in ES adaptations, and sensemaking can help us investigate how organizational members make sense of and enact ES in their local context. Based on an analytical framework, where we combine institutional theory and sensemaking theory to provide rich insights into ES adaptation, we show: 1) how changing institutional structures provide a shifting context for the way users make sense of and enact ES, 2) how users' sensemaking processes of the ES are played out in practice, and 3) how sensemaking reinforces institutional structures.

Keywords

IS adaptation, Enterprise systems, Institutional structures, Sensemaking processes.

INTRODUCTION

Enterprise Systems (ES) have been a major trend in both private (Seddon, Willcocks and Shanks, 2003) and public sectors (Sia and Soh, 2007) over the past decade. They have been on the market since the beginning of the nineties (Jacobs and Weston, 2007) as an organizational solution to the growing trend of globalization, mergers, and acquisitions (Chang, Gold and Kettinger, 2003). ES can be defined as large-scale organizational systems composed of people, processes, and information technology (IT) enabling an organization to: 1) automate and integrate business processes, 2) share common data and practices, and 3) produce and access information in real time. ES cover various business areas and encompass a large range of products such as enterprise resource planning (ERP), customer relationship management (CRM), and supply chain management (SCM).

ES often trigger major organizational changes and at the same time introduce high-risk with a potential high reward (Markus, 2004). Despite many expectations of high rewards by investing in ES the reality often seems to be fairly different, indicating that the value of ES has been overestimated (Davenport, 1998).

In order to better understand the mechanisms at play when adapting ES in organizations, we argue that higher priority should be given to social and organizational aspects of ES adaptation (Barley, 1986; Vaast and Walsham, 2005). This suggestion is based on the understanding that an ES adaptation is influenced and created by those people in organizations who are going to use the system (Gosain, 2004). Similarly, institutional structures form the way users make sense of and enact ES in practice. Consequently we argue that ES emerge from and are subject to institutional structures that set the agenda for their implementation and use. In the local practice they are acted out by organizational members and this enactment influences back on the institutional structures. We use the term "ES adaptation" to imply that organization and ES *adapt* to each other in a reciprocal way during use (adapted from Henfridsson, 1999).

In order to examine the structures and processes that are at play in ES adaptations we draw upon institutional theory and sensemaking theory. Institutional theory is useful in providing an account for the role of larger social and historical structures of ES adaptations, and sensemaking theory is a central analytical perspective for investigating how organizational members make sense of and enact ES in their local context. We investigate the potential of combining the two theories with a case study in a large Scandinavian high-tech organization, SCANDI, where an ES was introduced and used by the employees in a financial department.

Next we present the foundations of institutional and sensemaking theories and outline an analytical framework for combining the two theories when investigating ES adaptation. This is followed by a methodology section and a presentation of the empirical findings. We analyze and discuss the findings and present implications.

INSTITUTIONAL THEORY AND SENSEMAKING FOR INVESTIGATING ES ADAPTATION

Both sensemaking theory and organizational institutionalism build on similar philosophical traditions inspired by Berger and Luckmann (1966) and Schutz (1967), which supports a combined view. In this section we first outline the foundations of each perspective and then combine them into an analytical framework.

An institutional perspective on ES adaptation

Institutional theory deals with the pervasive influence of institutions on human behavior including the processes by which structures as e.g. rules, routines and norms guide social behavior and how they are created and adapted over time. An institution can be perceived as a *state/result* of existing order (e.g. a society, a legal system, or an organization) or as a *process* of institutionalization and deinstitutionalization through either incremental or radical changes. We talk about institutionalization when actions are repeated and when shared meanings by actors are formed (Scott, 2008)

Scott (2008) presents two dimensions to describe the institutional perspective. One dimension relates to pillars; i.e. regulative, normative, and cognitive. The regulative pillar represents repeated actions because of explicit rules or laws, for example standardized work procedures. The normative pillar implies repeated actions due to values and norms. The cognitive pillar relies on repeated patterns due to a desire to be or look like other institutions. The three pillars exert institutional pressures on organizations leading to a process of homogenization captured as isomorphism, i.e. the desire to “*resemble other units that face the same set of environmental conditions*” (DiMaggio and Powell, 1991). Rational arguments are sometimes stated, also known as rationalized myths that are part of the institutional context.

The other dimension reflects how institutions are embedded in various kinds of carriers like symbolic systems, social structures, routines, ideas and artifacts (Scott, 2008), involving structure and action (Giddens, 1984) Carriers like ideas and artifacts move over time and place, thus being altered, modified and combined with other ideas and artifacts (Scott, 2008). ES are artifacts carrying institutional logics (Gosain, 2004), which are adopted in organizations but also customized to align with local requirements.

In IS adaptation research, institutional theory has been applied as an analytical tool to investigate for example transformation of an enterprise (Avgerou, 2000), implementation and use of CT scanners (Barley, 1986), and diffusion of mobile services (Knutsen and Lyytinen, 2008).

A sensemaking perspective on ES adaptation

Sensemaking theory provides a framework for focusing on the relationship between cognition and action in organizations. Weick defines sensemaking as the “making of sense” (Weick, 1995) where *making* refers to the activity of constructing or creating something and *sense* refers to meaning. Meaning is created when extracted cues are related to a specific frame, also known as enactment. For instance, implementing an ES in an organization may constitute the stimulus that the organizational members try to place in a frame (the organizational context) through a process in which they attempt to relate their understandings of the ES to the organizational structures, procedures, role responsibilities, tasks, etc.

Sensemaking is ongoing and grounded in the identity construction of the individual members. The need to make sense is intensified in circumstances when organizational members face new or unexpected situations and when high degree of ambiguity and uncertainty is present (Weick, Sutcliffe and Obstfeld, 2005). It is a retrospective development of a plausible story to explain why organizational members act the way they do. The individual interpretations are negotiated through social interaction, where the cognitive processes happen within the individual, but the individual’s meaning construction is reified through social construction processes (Kjærgaard and Vendelø, 2008).

Orlikowski and Gash (1994) suggest that sensemaking theory is a useful lens for studying how people develop particular assumptions, expectations, and knowledge of technology. Similarly, Bansler and Havn (2004) argue that a sensemaking perspective helps managers to clarify the values, needs, and priorities of users when implementing IS. Organizational members develop particular assumptions and expectations about the technology which then shape their actions towards it. It is when actions are repeated and when shared meanings by actors are formed that we talk about institutionalization.

An analytical framework for investigating ES adaptation

The focus in institutional theory is primarily on how institutionalized environments shape organizations, where actors are agents of institutional forces or rationalized myths (Fligstein, 2001). Less emphasis is on describing how the institutionalized structures are constructed in practice in the first place, and how social practices are internalized, changed, or reproduced through actions. Consequently, sensemaking theory is useful as it focuses on how and why organizational members act and make sense of IS in their local context. However, sensemaking theory does not explicitly conceptualize the institutional

structures within which these sensemaking processes take place. It only refers to the notion of *frame* as a way to explain how sensemaking occurs.

This calls for a combination of the two theories (see Jensen, Kjærgaard and Svejvig, 2008). Inspired by Weber and Glynn (2006), we introduce the following analytical framework:

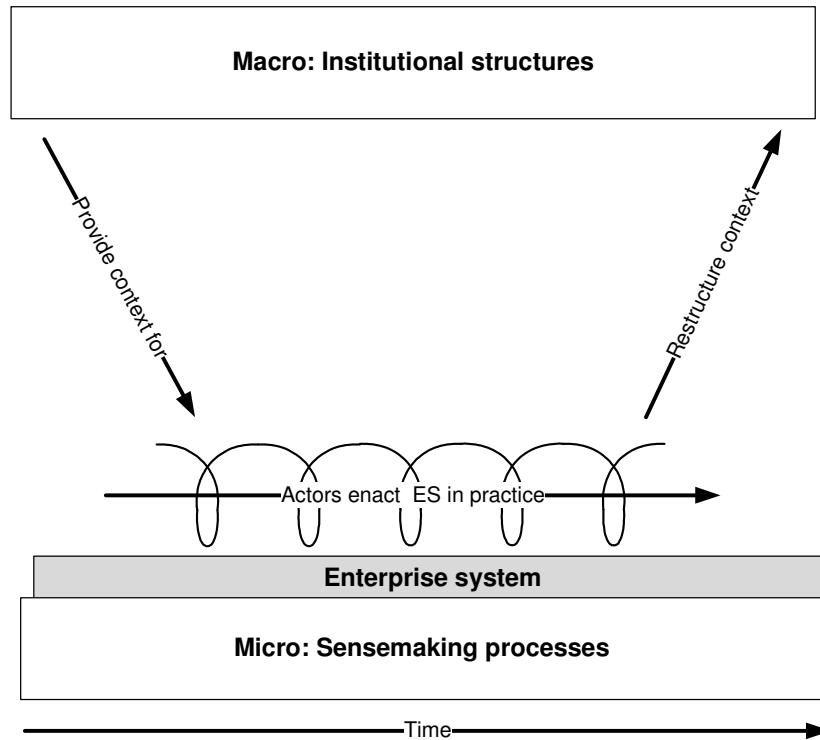


Figure 1. Enterprise System Adaptation

As illustrated in the figure, the institutional structures (macro level) provide context for the sensemaking processes and thus the enactment of the ES system in practice (micro level). These processes are ongoing and restructure the institutional context over time once they are repeated and shared by the organizational members.

RESEARCH METHODOLOGY

In line with our framework, we studied institutional structures and sensemaking processes that formed the ES adaptation in SCANDI. The methodology adopted was a contextualized, interpretive one, building on case study research (Pettigrew, 1990; Walsham, 2006). Interpretive research attempts to understand phenomena through the meanings that people assign to them, and access to reality is through social constructions such as language, consciousness, and shared meanings (Myers and Avison, 2002).

The study was designed as longitudinal, starting January 2008 and is still ongoing. A combination of data collection techniques has been used in different functional areas of SCANDI by one of the authors. Participant observation served primarily as a way to understand the context. The richest source of empirical data stems from semi-structured interviews with five employees in the financial department. Each interview lasted from 50-70 minutes where the accounts clerks and other finance personnel talked about their experiences with the ES adaptation. All interviews were taped and transcribed verbatim. They were analyzed by using institutional theory and sensemaking theory as sensitizing devices.

The aim of our fieldwork was to describe context, content, and process. Fieldwork is a valuable approach as it gives a more vivid and dynamic picture compared to a historical reconstruction with post hoc rationalization. However, no large organization starts out from scratch which means that some events in SCANDI took place before January 2008, prior to the initiation of our research. Therefore such events are necessarily historical reconstructions from archival documents and recollections from interviews.

THE SCANDI CASE STUDY

This section describes the empirical case study and provides a time-ordered process view of the ES adaptation.

Case introduction

SCANDI (a pseudonym) is a Scandinavian company with more than 10.000 employees. It belongs to the utility industry segment where it produces and sells high-tech services. The first company in SCANDI was established in the late 1890s, and the company today is a result of a merger between several companies.

SCANDI, and its predecessors, operated for many years as territorial companies in a context which was highly regulated, meaning that customers were only allowed to buy utility services from them (i.e. monopoly). This situation changed in the 1990s when the Scandinavian countries decided to deregulate and liberalize the utility market. SCANDI now faced higher competition although only few strong competitors exist today (i.e. oligopoly).

The low level of competition has marked SCANDI's culture. A consultant describes SCANDI as: "...a supertanker that does not have all the needed engines to react promptly enough or all the engines are not started simultaneously...or said more directly you cannot lay off more than a [certain] number of employees and SCANDI has a huge backlog". This statement indicates one of the business challenges that SCANDI faces where a truce between trade unions and SCANDI limits its maneuvering. A recent press release from SCANDI's CEO, however, responds to this by stating that: "[CEO] declines to...comment whether he expects to keep the earlier agreement between SCANDI...and the employees about the maximum yearly downsizing of 5-7 percent of the workforce". At the same time, the company benefits from its many years of monopoly by having a big market share and owing a considerable part of the utility infrastructure in the present market, so the shift from monopoly to competition implies both opportunities and challenges.

A storyline of the ES adaptation

In the mid 1990s SCANDI decided to implement one of the leading enterprise systems (ES) in the market. This was done to have an up-to-date and common system in the merged SCANDI.

The financial system (FinSys) was the first to be launched in 1996. FinSys covered financial management including general ledger, account receivables and payables etc. with around 40 heavy users. Subsequently, the supply chain system (SCS) was introduced and operational from 2002 and used by more than 100 users for purchasing and inventory management. Both FinSys and SCS were upgraded in 2003.

FinSys and SCS were technically implemented as two separate enterprise systems based on the same standard. Figure 2 below shows a timeline of the implementation and use of FinSys and SCS:

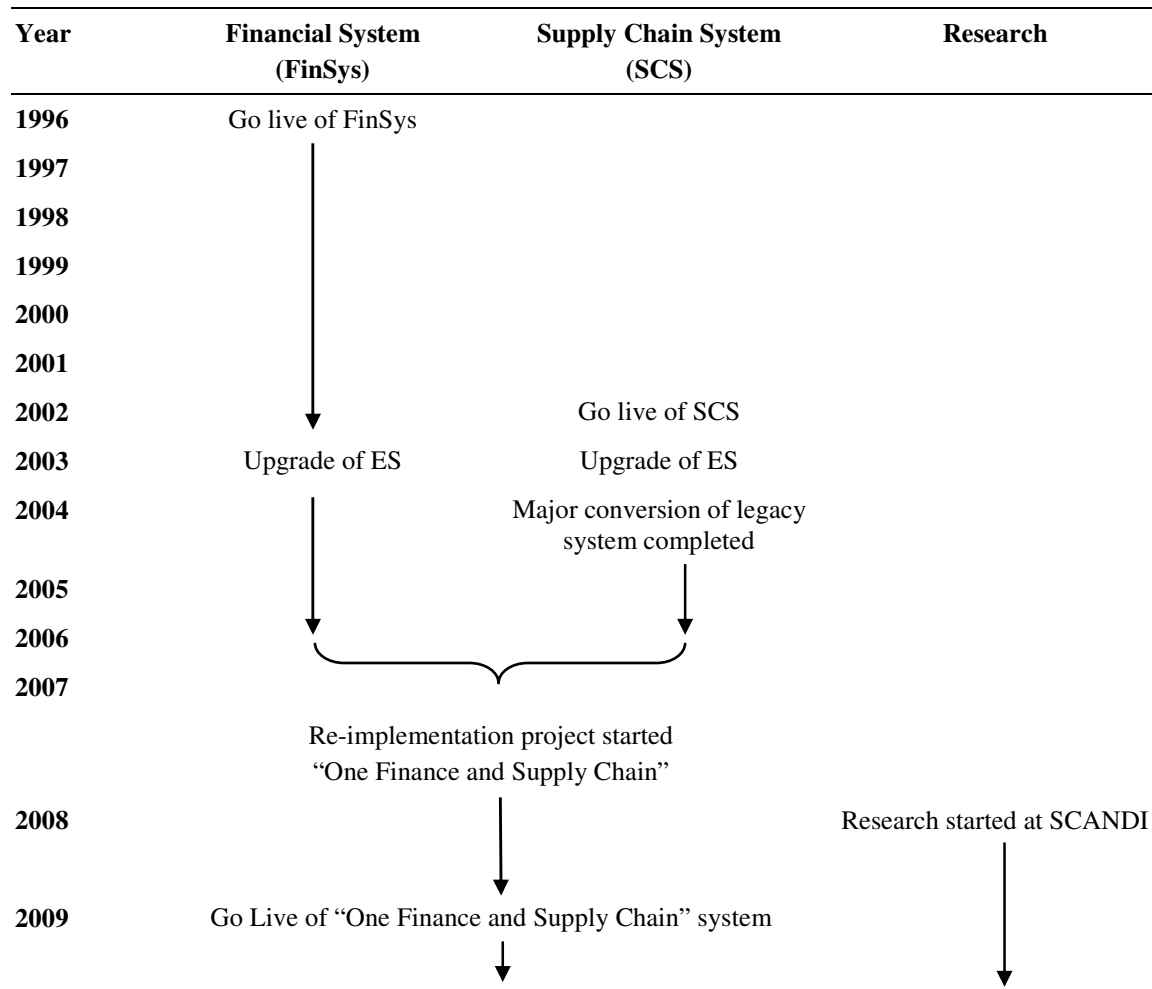


Figure 2. Timeline of the Implementation and Use of FinSys and SCS

The ES has evolved into a customized standard system since the first implementation in 1996. About 400 customizations were made throughout the years of implementation, leading to difficulties in upgrading the system and locking SCANDI into an old ES architecture – an untenable situation which had to be changed. Consequently, a re-implementation project (RE-ES project) started in the summer 2007 covering both FinSys and SCS functionality with the motto “one finance and supply chain”. The purpose of the project was primarily to: 1) reduce the number of customizations, 2) modernize the application architecture and prepare for future functionality, 3) optimize business processes, 4) utilize standard functionality, and 5) upgrade to latest version of ES. The RE-ES project was considered a technical re-implementation project with very few benefits for business. The launch of RE-ES was delayed several times, but in January 2009 the system finally went live.

The next section focuses on the adaptation of FinSys in the financial department.

Adapting the financial system (FinSys)

The financial department is a central function collecting data from several decentralized financial functions like approval of vendor invoices before payment. Some decentralized financial functions even run their own accounting system interfacing with FinSys. In 2006, the number of finance transactions amounted to 54 million.

Most of the accounts clerks have worked ten, twenty or more in SCANDI and have used FinSys since its launch in 1996. There are users of FinSys both inside and outside financial department fulfilling accounting work procedures. Interviews with the primary users indicate that FinSys is well institutionalized at SCANDI: “We are used to work with [FinSys] and this is part of one’s workday... it becomes a habit to use the system” (accounts clerk #1).

The management of SCANDI has accepted that each department has had its specific requirements and needs fulfilled by various information systems. Consequently many interfaces to FinSys exist as many departments (including daughter/sister companies) have their own decentralized financial systems. This has caused a complex technical infrastructure with more than 40 interfaces to FinSys, different work practices, and diverse interpretations of the system.

A typical work practice has the following steps: ① An accounts clerk receives an email from a feeding system indicating that a transaction file is ready to import, ② the file is pre-checked and reconciled, ③ the file is imported 5 to 6 times (one per legal company in SCANDI), ④ An error list is created which goes back to the feeding system, ⑤ erroneous transactions are corrected in a spreadsheet and then sent to the accounts clerk, and ⑥ the erroneous transactions are corrected in FinSys by the accounts clerk.

This work practice is so embedded in SCANDI that if you ask for ideas for changes or improvements, the answer is that step ③ could be optimized to one import instead of 5 to 6 imports (accounts clerk #2). The possibility to have one integrated financial system across SCANDI and avoid many of the interfaces is not considered a solution. This is probably not because the accounts clerks cannot see this as a possibility; rather, they perceive the structural setup of FinSys as somehow “fixed” and generally accept it as is.

The users seem satisfied with FinSys and even if they believe that there is room for improvement, the situation is described as: *“I can’t really immediately give you some examples [of improvement]...we have had [problems] on creations of multiple supplier records, where the system of course had to be adapted, and some system changes was made...but that is changed”* (accounts clerk #1). The accounts clerks are furthermore confident with FinSys and know how to correct errors.

The accounts clerks more or less take the system for granted: *“...I am very familiar with [FinSys]”* (accounts clerk #1). A new accounts clerk who was employed in 2007 states that FinSys is easy to get familiar with and especially the “multiple creations of supplier records” is a clever feature because you only need to access one screen display and fill in all information needed, and then press the button for the mass creation. This increases the productivity considerably. There are, however, many fields to access before starting a payment job, but this is not discussed as a problem since detailed business procedures support the process and compensate for the missing guidance in FinSys.

FinSys is not updated with new features as the users are awaiting the RE-ES project. There are few shortcomings, for instance a “notice of customers” that has to be done manually and it would increase the performance if it was done automatically by FinSys. This is to be implemented as a feature in the RE-ES project. Response times are generally good and FinSys has a high availability, *“but we have had unfortunate incidents where the system is down especially at month-end closing of accounts where there is a mad rush on the system and it can be frustrating”* (accounts clerk #2).

ANALYSIS AND DISCUSSION

Changing institutional structures: from monopoly to competition

As described in the case, SCANDI and its predecessors had for many years been public companies (or semi public concessionary companies) living in a monopoly. The institutional logic was characterized by security of supply, delivering standard outputs, and following agreed procedures, operating in a governmental regulated environment, enacting coercive institutional pressures (DiMaggio and Powell, 1991). The employees in SCANDI had stable jobs with reasonable salaries and good working conditions. According to a former employee the organizational culture was marked by pride and loyalty.

The consequence from an IS perspective was that diversity in applications was accepted. Each department had their own specific homegrown application(s) adapted to their specific work practices. Individual employees were allowed to make a demand on dedicated functionality without presenting a strong business case – the 400 customizations in the ES were a result of this practice. This was possible due to the monopoly status where focus on efficiency was less predominant.

Because of the shift from monopoly to competition in the 1990s and a more competitive market with few strong competitors, SCANDI now had to operate as a private company with focus on efficiency and profit. Consequently, the reduction of the workforce was 5% from 2000 to 2007 and increased to 15% from 2007 to 2008. The downsizing thus increased dramatically the last years and this trend seems to continue, impacting the financial department. This implies that employees live in uncertainty because of comprehensive and radical organizational changes. It shows how the competitive pressures are becoming stronger than the institutional pressures from a business context (Scott and Meyer, 1991).

The competitive pressures have had some advantages seen from an IS architectural point-of-view, because they have fertilized the ground for highly integrated applications like enterprise systems without many customizations, which is exactly the goal with the RE-ES project. Consequently, the ES has become the coercive force (DiMaggio and Powell, 1991), enforcing employees to adapt to its inscribed institutional logics (Gosain, 2004).

These changing institutional structures “provide the context for” the enactment of ES in the local practices (see figure 1) as described in the next section.

Enacting the ES in the local practice: accepting the ES as part of daily work practices

In the case description we outlined how the financial department was subject to the institutional structures in which SCANDI existed. The ES adaptation with a common financial system back in 1996 was considered a necessary precondition in a future competitive environment, but FinSys was first adapted with many customizations and interfaces. The much later RE-ES project was based on a rationalized myth of “an efficient ES” and was created as a response to the highly competitive market situation. This idea was “travelling” (Czarniawska and Joerges, 1996) into SCANDI as a way to optimize organizational work procedures, i.e. reduce the number of customizations, optimize business processes, modernize the architecture, and use standard functionality. The rationale of an effective ES was already in the employees’ mindsets who considered FinSys as “*part of one’s workday*”. There seemed to be a strong alignment between the management’s wish for efficiency and the employees’ satisfaction with the ES.

The case also showed evidence of how the employees made sense of their work practices in relation to the ES and how some of their enacted practices reinforced existing structures. FinSys constituted the stimulus that the accounts clerks tried to place in a frame (their organizational context) and they continuously tried to relate their understandings of the ES to their existing work processes, role responsibilities, and organizational structures. This had consequences for their actions. The typical work procedures with steps ① to ⑥ were neither questioned nor changed as they made immediate sense as “fixed” and rational procedures. This meant that the users re-enacted existing routines and procedures and thus reinforced the institutional structures.

The accounts clerks were the primary users and they interpreted, created as well as determined the use of the ES in practice (i.e. enacted), which to some extent is related to pre-established conventions of use and ways of thinking. They bracketed the flow of cues about the ES continuously available to them. In this way, they ‘discovered’ the system and made necessary changes to it. However, these changes were only minor, e.g. changes to the creation of multiple supplier records.

The clerks’ perceptions of and actions towards the system were also grounded in their identity construction as they continuously engaged in processes of association with the system in relation to their identities where they defined themselves in relation to the core of their work and their mission as clerks. They considered the ES adaptation an explicit way to improve the overall productivity in a competitive environment. Their perceptions of themselves were to be productive and this influenced the way they acted and reacted to the ES.

Restructuring the context: institutional structures are reinforced

In the two previous sections we have analyzed how the institutional structures of the market created the ES as a rationalized myth that travelled to the organizational as well as individual level in SCANDI. The market mechanisms with an increased level of competition influenced how the accounts clerks perceived and used the ES (i.e. as a way to increase productivity and become competitive) and this reinforced the structures of a competitive market. The ES became the coercive force, enforcing employees to adapt to its inscribed institutional logics.

The “enactment of ES in practice” is an ongoing process which “restructures the context” in which SCANDI is situated (see figure 1). The restructuring can either result in new institutional structures or in a reinforcement of existing structures. The employees will continue to relate their interpretations of the ES to their tasks and responsibilities, and they will act according to what makes sense. Only time will show whether the institutional structures will change or remain reinforced. As this study is still ongoing, we wish to follow the development of the ES adaptation in SCANDI with a particular focus on the development of institutional structures and local sensemaking processes. In this way we will be able to further develop our figure 1.

CONCLUSION AND IMPLICATIONS

The purpose of this study has been to investigate how the ES adaptation in SCANDI’s financial department can be understood using a combination of institutional theory and sensemaking. To answer the question we conducted a longitudinal interpretive case study which is still ongoing. Our analysis showed: 1) how changing institutional structures provide a shifting context for the rationale of implementing ES and for the way users make sense of and enact ES, 2) how users’ sensemaking processes of the ES are played out in practice, and 3) how the local sensemaking processes reinforce the institutional structure.

The practical implications emphasize that implementation and use of ES have to take the institutional structures and local sensemaking processes into account as they are providing the context for and use of the specific implementation. An ES

project cannot be planned *only* by focusing on the project processes but also by adapting and aligning with the broader context that the project is part of. This is where a combination of institutional and sensemaking theories proves useful.

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