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Two Perspectives on Information System Adaptation: Using Institutional Theory with Sensemaking

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TWO PERSPECTIVES ON INFORMATION SYSTEM ADAPTATION: USING INSTITUTIONAL THEORY WITH SENSEMAKING

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ABSTRACT

Institutional theory has proven to be a central analytical perspective for investigating the role of larger social and historical structures of Information System (IS) adaptation. However, it does not explicitly account for how organizational actors make sense of and enact IS in their local context. We address this limitation by showing how sensemaking theory can be combined with institutional theory to understand IS adaptation in organizations. Based on a literature review, we present the main assumptions behind institutional and sensemaking theory when used as analytical lenses for investigating the phenomenon of IS adaptation. Furthermore, we explore a combination of the two theories with a case study in a health care setting where an Electronic Patient Record (EPR) system was introduced and used by a group of doctors. The empirical case provides evidence of how existing institutional structures influenced the doctors' sensemaking of the EPR system. Additionally, it illustrates how the doctors made sense of the EPR system in practice. The paper outlines that: 1) institutional theory has its explanatory power at the *organizational field* and *organizational/group* level of analysis focusing on the role that larger institutional structures play in organizational actors' sensemaking of IS adaptation, 2) sensemaking theory has its explanatory power at the *organizational/group* and *individual/socio-cognitive* level focusing on organizational actors' cognition and situated actions of IS adaptation, and 3) a combined view of the two theories helps us oscillate between levels of analysis, which facilitates a much richer interpretation of IS adaptation.

Keywords

Institutional theory, sensemaking theory, information system (IS) adaptation, health care.

INTRODUCTION

In the information system (IS) field of research, much has been written about the implications of IS adaptation in organizational practices, e.g. how work practices are changed (Vaast and Walsham 2005), how traditional role relations are challenged (Barley 1986), and how structures around IS use are enacted by users (Orlikowski 2000). IS adaptation connotes how organization and technology adapt to each other in a reciprocal way during implementation and use (Henfridsson 1999). This implies a combined technical and organizational change process in order to reach “an institutionalized stage” where the IS are more or less taken for granted and embedded in the organization’s social practices (Silva and Backhouse 2003). Drawing on an institutional theoretical perspective, studies show how institutions are changed and maintained around IS adaptation (Avgerou 2000; Silva and Backhouse 2003). These studies look at the social, historical, and contextual influences on how IS are put into use and show how IS can be carriers of change in the existing institutional structures. It is argued that IS adaptation is mediated by normative, regulative and cultural-cognitive institutional pressures (Liang et al. 2007), and that IS carry institutional logics influencing the organizational practices (Gosain 2004).

Where institutional theory is well suited for explaining the effects or outcomes of institutional pressures (Suddaby and Greenwood Forthcoming), it largely ignores the question of how social practices are internalized and reproduced through actions which is highly relevant for understanding IS adaptation (Barley and Tolbert 1997). According to Fligstein (2001), institutional theory considers organizational actors as passive recipients or “cultural dopes” who use readily available scripts provided by government, professional, or other institutional carriers to structure their actions. The theory can therefore be criticized for lacking

explanatory power of organizational actors' motivation and why they act as they do which limits its use in explaining the dynamic and uncertain aspects of an IS adaptation process. So though institutional theory provides powerful explanations of the institutional structures around IS adaptation, it fails to describe in detail the social practices from which the institutions have been created.

To gain a richer interpretation of IS adaptation, we argue that researchers need to look for complementary theories to the institutional perspective. One alternative is sensemaking theory which can help explain the details of the practices that constitute the institutions in IS adaptation. Sensemaking theory is useful when investigating how and why organizational actors appropriate, act, and make sense of IS in the local context (Bansler and Havn 2004; Jensen and Aanestad 2007). It can help us focus on how IS adaptation is influenced by those organizational actors who are going to use the IS (Barley 1986; Orlikowski and Robey 1991) from a subjective and practice-based viewpoint (McKinley et al. 2000; Weber and Glynn 2006).

In this paper we explore the potential of combining institutional theory with sensemaking theory as an interpretive lens for understanding IS adaptation in organizations. We suggest that each theoretical perspective has its own explanatory power and that a combination of the two theories helps us oscillate between different levels of analysis which facilitates a much richer interpretation of IS adaptation. We argue that it is difficult to imagine that organizational actors' sensemaking of IS adaptation takes place as a context-free act. Similarly, it is hard to think of instances where actors' sensemaking of IS will *not* reflect back on the context and social institutions in question. Accounts of using a juxtaposition of institutional structures and sensemaking processes are few in existing research (Weber and Glynn 2006; Weick et al. 2005) which is why we wish to examine the usefulness of

combining the two theoretical perspectives when investigating IS adaptation in organizations. We explore the combination of the two theories with a case study in a health care setting where an Electronic Patient Record (EPR) system was introduced and used by a group of doctors. The study shows how the doctors' sensemaking of the EPR system was highly influenced by the institutional context in which the EPR system was introduced. Furthermore, it illustrates how the doctors' sensemaking of the EPR system was formed in practice.

In what follows, we present the research methodology of our study which includes a literature review and an empirical case study. Next, we introduce the theoretical foundation by looking at IS adaptation in organizations from an institutional and a sensemaking perspective. This is followed by a presentation of the findings from the empirical study of the EPR adaptation in health care. Based on our findings, we then discuss the explanatory power of the two perspectives. We conclude on the value of combining the theories when conducting research on IS adaptation and suggest directions for future research.

RESEARCH METHODOLOGY

To explore the potential of combining institutional and sensemaking theory into an interpretive lens for understanding IS adaptation, we follow a qualitative research approach. Our study is based on data from two sources: a literature review and an empirical case study.

Literature review

The literature review was conducted to create an overview of how institutional and sensemaking theories have been used in IS research. We undertook a review of seven IS journals representing top ranked US and European IS journals as well as journals which we would expect to publish studies using institutional and sensemaking theories (see table 1). We searched the journals using the search words indicated in table 1:

Table 1: Literature review: search words, sample sizes, and distribution of articles on journals*

Institutional Theory
Search words: Institutional theory, Institutional, Institution

	EJIS	I&O	ISJ	ISR	JAIS	MISQ	JIT	Total
Sample A**	131	20	11	23	18	56	118	377
Sample B	5	3	1	3	3	7	4	26

Sensemaking
Search words: Sensemaking, Enactment, Weick

	EJIS	I&O	ISJ	ISR	JAIS	MISQ	JIT	Total
Sample A	36	69	4	26	9	80	8	232
Sample B	2	11	0	5	3	14	0	35

*) Abbreviations: EJIS (European Journal of Information Systems), I&O (Information & Organization), ISJ (Information Systems Journal), ISR (Information Systems Research), JAIS (Journal of the Association of Information Systems), MISQ (MIS Quarterly), JIT (Journal of Information Technology).

***) This sample has not been checked for doubles caused by more than one keyword match.

Our search produced a total sample of 609 articles (sample A) which matched one or more of our search words. In a first read-through of the articles, we selected articles for closer reading and analysis if they used institutional theory or sensemaking as a central construct to explain and explore the relationship between IS and organizations (sample B). Relevant articles from other journals (for instance articles from journals like *Administrative Science Quarterly* and *Organization Studies*) were also included in the literature review on an ad hoc basis, if they e.g. were referenced by an article from sample B.

The findings from the literature study were analyzed using a classification approach where we investigated how the theory was used in the literature and if the patterns of use might contribute to explain IS adaptation. The findings from this part of the analysis are presented in the subsequent chapters where we look at IS adaptation from the two perspectives.

Empirical case study

The second source of data is an empirical case study conducted by one of the authors as part of a previous research project [study by present author 2007]. The study reports on the adaptation of an EPR system in an orthopedic surgery ward in a Danish hospital as it was perceived by a group of orthopedic doctors.

We have three main reasons for choosing a case from health care given our interest in studying the interrelationships between institutional structures and sensemaking processes with respect to IS adaptation: first, health care is a highly institutionalized field with a long history where different institutional logics exist (Currie and Guah 2007). Second, it is our assumption that sensemaking issues stand out more easily in a health care context since this is traditionally characterized as a professional bureaucracy where the professionals enjoy considerable autonomy leading to more explicit and expressive attitudes among the actors (Sandelowski 2000; Strauss et al. 1997). Third, health care has in the last decades faced an increased digitalization of its work practices (especially with the introduction of EPR systems) which makes it interesting to study IS adaptation in this context (Jensen and Aanestad 2007).

In order to understand how the EPR system became institutionalized in health care and explore the patterns of its enactment in the local clinical practices, data was collected during the initial period of the EPR adaptation. The study entailed observation studies in the orthopedic surgery ward and ten semi-structured interviews with doctors about their experiences with the EPR adaptation. Each interview lasted from 60 to 90 minutes and was taped and transcribed verbatim. The initial findings were reported back in writing to the doctors and followed by a focus group interview. The focus group served to elaborate and explain the data from the individual interviews. Finally, written material and documentation

such as the national IT strategy for health care in Denmark, project plans, organization charts, information from websites, EPR user manuals, newsletters, etc. completed the data material.

We coded our interviews and field data (observations and written material) by relying on established methods of handling qualitative data (Huberman and Miles 1994; Kvale 1996). Based on the data material, we constructed three narratives that present the process of adapting the EPR system (see the findings section).

TWO THEORETICAL PERSPECTIVES ON IS ADAPTATION

Based on our literature review, the main assumptions behind the two theoretical perspectives are now presented to provide an overview of their respective power of explanation when used to investigate IS adaptation in organizations.

An institutional perspective on IS adaptation

Institutional theory has been widely applied as an analytical tool to investigate a variety of topics related to IS adaptation, for instance transformation of an enterprise (Avgerou 2000), implementation and use of CT scanners (Barley 1986), and diffusion of mobile services (Knutsen and Lyytinen 2008). Institutional theory attempts to describe the deeper and more resilient aspects of how institutions are created, maintained, changed, and dissolved (Scott 1995; Scott 2004). Examples of institutions are societies, legal systems, organizations, and families. The ostensible focus of institutional theory is stability and order in social life and how these are created and maintained; however, also conflicts and changes in social structures are in focus.

We use Scott's analytical framework consisting of three pillars, i.e. regulative, normative and cognitive, to explain what happens when IS are adapted in organizations (see table 2 below (adopted from Scott 1995:52; Scott 2001: 77)):

Table 2: Institutional pillars and carriers

Pillars			
Carrier	Regulative (coercive mechanism)	Normative (normative mechanism)	Cognitive (mimetic mechanism)
Symbolic systems (Cultures)	Rules Laws	Values Expectations	Categories Typifications
Relational systems (Social structures)	Governance systems Power systems	Regimes Authority systems	Structural isomorphism Identities
Routines	Protocols Standard operating procedures	Conformity Performance Duty	Performance programs Scripts
Artifacts	Objects complying with mandated specifications	Objects meeting conventions Standards	Objects possessing symbolic value

The regulative pillar represents legally sanctioned elements like a management hierarchy (power systems) or a standard operating procedure for medicine prescription. The normative pillar implies values and norms, for instance “we treat our patients with respect”, and this pillar is morally governed. The last pillar is cognitive, based on symbols (words, signs, and gestures) to shape meaning of objects and activities through interaction (Scott 1995). One cognitive element is typifications (Berger and Luckmann 1966), which could be explained by a simple example: a ward round in a hospital is a “typified action” that is carried out by a nurse and a doctor as “typified actors”. The bases of legitimacy of the three pillars are different and sometimes in conflict (Scott 2001: 61). The three pillars exert institutional pressures on institutions leading to a process of homogenization captured as isomorphism, i.e. “a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions” (DiMaggio and Powell 1991: 66). Professionals

with a formal standardized education are important sources of isomorphism in organizations (DiMaggio and Powell 1991), for instance doctors in hospitals.

The pillars make up one dimension in the framework while the other orthogonal dimension is labeled carrier. Institutions are embedded in various kinds of carriers or repositories. The formation and development of these carriers can be viewed as involving structure and action (Giddens 1984). Structures (institutions) are thus both the result of past actions and the context in which ongoing actions occur (Scott 1995: 52). Institutions can be perceived as states (results) of existing order, but also as processes of institutionalization and deinstitutionalization through incremental and radical changes (Scott 2001: 50) – this implies a duality of structure and action. Carriers could be symbolic systems, relational systems, routines, and artifacts (e.g. information systems), and they are all viewed as consisting of structure and action, but relate to different subtypes of structures (Scott 1995).

To explain IS adaptation, institutional theory has been applied to varying levels of analysis describing a world system, a society, an organizational field, an organizational population, an organization, or an organizational subsystem (Currie and Guah 2007; Gosain 2004; Knutsen and Lyytinen 2008). At a macro level, institutional theory is used to describe the role that larger social, institutional, and historical structures play in relation to IS adaptation. For instance, Knutsen and Lyytinen (2008) describe how mobile services developed in Norway and Japan, revealed through an institutional analysis. Their analysis shows how specifications, properties, and gratifications became sedimented in the highly structured practices of social life (carriers), where Norway experienced that properties and gratifications remained disconnected, which inhibited mobile data service adoption. In studies at a macro level, attention is paid to institutional indicators for a given structure and the process remains a “black box” (Zucker 1991: 104).

Micro-foundational studies of IS adaptation focus on process (more than content), i.e. the dynamic behavior of organizations and groups (Barley and Tolbert 1997). Institutional creation and diffusion are nevertheless complicated reciprocal interactions between multiple levels (Scott 2001: 195), and in any given study it is probably beneficial to look at different levels in order to enrich the understanding of the phenomenon being investigated. For instance, there are studies on the implementation and use of single enterprise systems (ES) in business units “seen through” a micro-foundational institutional lens (Gosain 2004; Orlikowski 1992). An ES can be viewed as an artifact which is inscribed with institutional forces during design and implementation, and it then becomes a carrier of institutional logic enacting a constrained use of the system afterwards. The ES can even be seen as a “new iron cage” in a Weberian sense (Gosain 2004).

Within health care, which is the context for IS adaptation that we study in this paper, institutional theory has been applied in several studies (for general studies in health care see Scott et al. 2000). For instance, Barley’s seminal paper about CT scanners (1986) provides an instructive empirical study of how the adaptation of identical CT scanner technologies results in divergent changes in decision making and power structure for two departments (Barley 1986; Scott 2001: 81-82). The contradictory results emphasize the complicated reciprocal interaction between the institutionalized organization and the IS (object, artifact, or carrier of institutional logic), and that “just” because it is the same object, it does not imply that the institutionalization processes of two organizations will be similar.

Another health care related, but very different, example is a case study of the introduction of telemedicine in the jungles of north-eastern Peru (Miscione 2007) which stresses that the design process (inscribing routines and practices in IS) has to be embedded in the normal

patterns of action (i.e. the current local context in the jungle, which is an institution) in order to improve local health conditions.

Finally the organizational field of health care, i.e. a collection of diverse types of organizations engaged in competitive and cooperative relations (Scott and Davis 2007: 117), is analyzed by Currie and Guah (2007). Their study covers an institutional analysis of six National Health Service (NHS) organizations in the UK where conflicting institutional logics prevailed. For instance, the public sector ethos of professionalism and self-regulation (one set of past institutional logics in health care) collides with the private sector ethos of government policy, regulation, and efficiency (a new set of institutional logics imposed on health care) (Currie and Guah 2007: 244-246).

A sensemaking perspective on IS adaptation

While the institutional perspective has been used to describe and explain important effects or outcomes of institutional pressures in relation to IS adaptation, its explanatory power is limited when it comes to understanding how social practices around IS use become institutionalized (for exceptions see e.g. Barley 1986; Gosain 2004). We therefore need a complementary theory to study the attitudes or behaviors of individuals or groups in IS adaptation, and we suggest to use the theory of sensemaking proposed by Weick (1995) for this. Sensemaking focuses on the relationship between cognition and action in organizations, specifically addressing cognitive and social mechanisms for dealing with unexpected events (e.g. an IS adaptation). It is informative of institutional theory by focusing on the details of the social practices which constitute institutions in the first place.

Sensemaking originates from the field of organization studies where it was introduced by Weick. Sensemaking is defined as the “making of sense” (Weick 1995: 7) where sense refers

to meaning and making refers to the activity of constructing or creating something. Sensemaking involves placing stimuli in some kind of framework where meaning is created when extracted cues are related to a specific frame. For example, introducing a new IS in an organization may constitute the stimulus that the organizational actors try to place in a frame (the organizational context) through a process in which they attempt to relate their understandings of the IS to the organizational structures, work processes, role responsibilities, work tasks, etc.

Sensemaking is a retrospective development of a plausible story to explain the reasons for why organizational actors have acted the way they have. The meaning construction is ongoing and grounded in the identity construction of the individual actors. It is based on plausible interpretations of what the actors consider as reasonable explanations in the given situation in which they find themselves. The individual interpretations are negotiated through social interaction, founding the basis of social realities around IS use. In this respect, sensemaking is both an individual and a social activity. The cognitive process happens within the individual actor; however, the actor will reflect his or her “self” in other actors, according to how he or she believes to be perceived by others (Kjærgaard and Vendelø 2008). When sensemaking is referred to as being organizational, it is the inter-subjective processes among actors that are emphasized and not the ability of the organization to make sense.

Although sensemaking is an ongoing process, it is intensified in circumstances where organizational actors face new or unexpected situations and when there is no predetermined way to act (Weick et al. 2005). They thus engage in sensemaking when they experience a high degree of ambiguity or uncertainty. Ambiguous situations may arise when multiple and conflicting interpretations exist, when goals are unclear, or when roles are vague and responsibilities are blurred. Uncertainty on the other hand is caused by a lack of knowledge

where the actors are “... ignorant of any interpretations” (Weick 1995: 91) and have too little information. Relevant for this study, IS adaptation may cause an interruption of organizational actors’ current projects or situations, which activates the sense of ambiguity or uncertainty causing what Weick refers to as a “shock”, which again triggers an intensified period of sensemaking (Anderson 2006).

IS researchers have used sensemaking to examine social aspects of IS adaptation (Jaspersen et al. 2005; Vaast and Walsham 2005). For instance, Orlikowski and Gash (1994) suggest that sensemaking theory is a useful lens for this purpose: “To interact with technology, people have to make sense of it; and in this sense-making process, they develop particular assumptions, expectations, and knowledge of the technology, which then serve to shape subsequent actions toward it” (Orlikowski and Gash 1994: 175). They argue that organizational members act on the basis of frames of references that are implicit guidelines organizing and shaping their interpretations of various organizational phenomena. This is also known as enactment where actors produce part of their environment (or institutional structures) which they later have to respond to.

Weick refers to technologies as equivoques, meaning that they imply “[s]everal possible and plausible interpretations” (Weick 1990: 2). This indicates that technologies do not necessarily lend themselves to similar interpretations by different groups of actors and require ongoing sensemaking if they are to be contextualized, managed, and adapted to a specific context of use. When organizational actors interact with a technology, they single out items and/or events in order to connect and make sense of them; this is also known as bracketing (Weick 1979). In this bracketing process, the users of a given technology identify specific cues that signify desired preferences and ends. It is through their active attribution of meanings to and actions around the technology that users make sense of it. The interpretations that the users

create will guide their actions and attention in the situations that they face. Users will strive to achieve their goals and fulfill their needs by reflecting upon what makes sense to them.

Bansler and Havn (2004) encourage researchers to study how the sensemaking processes of actors influence the implementation and use of technology. Studying the implementation of groupware technology in an organizational setting, they argue that a sensemaking perspective will help managers in clarifying the values, needs, and priorities of users when implementing IS. Similarly, Henfridsson (1999; 2000) uses a sensemaking perspective for understanding IS adaptation in organizations by focusing on the dynamics in the meaning and creation processes among human actors. Technologies become useful in specific organizational contexts through actors' meaning production and actions.

Sensemaking theory has also been applied to study health care issues. Apker (2004) suggests in a study of managed care that sensemaking among nurses generates interpretations of change that are grounded in their care giving role. Apker thereby emphasizes the importance of identity construction. Similarly, in a study by Jensen and Aanestad (2007), we see how health care professionals' sensemaking of an EPR adoption process is related to their conceptions of the technology and to their role and identity.

Another study by Kohli and Kettinger (2004) investigates the introduction of technology in a health care setting among a group of physicians. They look at how the technology is enacted in practice; however, without mentioning sensemaking explicitly. The study emphasizes a careful consideration as to the interdependencies between actors, technology, and contextual factors. Similarly, it shows how the professional identity and autonomy of doctors both shape and are shaped by the adaptation.

Using institutional theory with sensemaking theory

Based on our literature review of the two theoretical perspectives, we draw attention to the differences in four overall dimensions when it comes to the theories' explanatory power of IS adaptation. These dimensions relate to their key assumptions, level of analysis, the main arguments in relation to the IS literature, and limitations (see table 3 below).

Table 3: Explanatory power of two perspectives on IS adaptation

	Institutional perspective	Sensemaking perspective
Key assumptions	<p>How institutions are created, maintained, changed, and dissolved.</p> <p>Three pillars: regulative, normative, and cognitive.</p> <p>Institutional carriers like symbolic systems, social structures, routines, and artifacts (objects).</p>	<p>Action and cognition.</p> <p>Meaning = cue + relation + frame.</p> <p>Sensemaking is characterized by being enactive, retrospective, social, ongoing, grounded in identity construction, focused on extracted cues, made up by plausible interpretations.</p>
Level of analysis	<p>World system, societal, organizational field, organizational population, organization, and organizational subsystem.</p>	<p>Organization, organizational subsystem, and individual.</p>
Main arguments in IS literature	<p>IS as artifacts that are inscribed with institutional forces during adaptation.</p> <p>IS become carriers of institutional logic.</p> <p>IS adaptation typically implies large-scale changes where the institutional structures to some extent are deinstitutionalized, followed by a re-institutionalization.</p> <p>Multiple institutional logics around IS adaptation and use.</p>	<p>Technology as equivoque.</p> <p>Actors develop particular assumptions, expectations, and knowledge of the technology that shape their actions towards it.</p> <p>Organizational actors enact the environment, which both enables and constrains future actions with respect to IS use.</p>
Limitations	<p>Does not explicitly examine how institutionalized structures are constructed in practice.</p>	<p>Does not explicitly conceptualize the institutional structures in which sensemaking processes occur. Only refers to the notion of <i>frame</i>.</p>
Examples of existing studies	<p>(Currie and Guah 2007; Davidson and Chismar 2007; Gosain 2004; Knutsen and Lyytinen 2008; Miscione 2007).</p>	<p>(Gosain 2004; Henfridsson 2000; Jaspersen et al. 2005; Jensen and Aanestad 2007; Vaast and Walsham 2005).</p>

Earlier studies have not systematically examined the usefulness of combining the two theoretical perspectives when investigating IS adaptations in organizations. In the existing literature, institutional theory has mainly been used as an analytical perspective to explain institutionalized structures around IS adaptation and the effects of institutional pressures (Liang et al. 2007). When answering the question of how social practices become institutionalized and why people act the way they do when interrelating with IS, it is less useful. Similarly, sensemaking does not explicitly conceptualize the institutional structures in which meaning constructions occur (Weber and Glynn 2006).

By combining the two theories, we will be able to address what we have presented as the limitations of each perspective in relation to explaining IS adaptation and thereby make use of the explanatory power of each perspective. We explore this with the case study of the EPR adaptation.

EMPIRICAL FINDINGS: CASE STUDY OF AN EPR ADAPTATION

In this section, we introduce the empirical case study and provide three narratives around the EPR adaptation in an orthopedic surgery ward.

Case introduction

In 1996, a report entitled *Plan of action for Electronic Patient Records* was introduced by the Danish Ministry of Health. The objective of the action plan was to promote the development of EPR systems by providing financial as well as other support measures to local and regional EPR implementation projects in Denmark. As a consequence of this action plan, the first EPR projects were initiated and several projects have followed since then. The majority of hospitals adopted standard off-the-shelf EPR systems, whereas other hospitals introduced module-based solutions, i.e. medicine modules, booking modules, clinical process modules,

laboratory modules, etc. Still other hospitals built their own EPR systems from scratch (Vingtoft et al. 2005).

As a consequence of the political agenda and the EPR action plan, the management in a medium-sized hospital in Denmark (the name of the hospital has been anonymized) decided to implement a standard off-the-shelf EPR system in the entire hospital. This initiative was taken in 2001 and it was decided that the first departments to get the EPR system should be the gynecological/obstetrics department, the organ surgery department, and the orthopedic surgery department.

We base our study on the EPR adaptation process in the orthopedic surgery ward which has an average of 3,000 admissions (emergency and planned) per year and consists of a standard ward, an outpatient clinic, and a secretaries' office. In the ward, orthopedic doctors and nurses make up the permanent staff, providing treatment and care in collaboration with staff from other departments: surgery, outpatient, physiotherapy, occupational therapy, rehabilitation therapy, and radiology. Ten consultant surgeons and one managing consultant surgeon are employed in the ward, who are specialized in shoulder, knee, and hip alloplastics as well as foot surgery.

Below, we present three narratives of the EPR adaptation project to describe how the EPR system was adapted and the consequences of this process.

Narrative #1: EPR systems on the political agenda in Denmark

Since the late 1990s, the Danish government has been keen to promote its national strategy for the digitalization of the health care sector, and the EPR system has been the most visible and comprehensive technological initiative on the political agenda. The Danish Ministry of Interior and Health stated in *The National IT Strategy for 2003-2007* that all Danish hospitals

should adopt an EPR system before 2006 or as soon as possible after this date. It was further stated that the records introduced should be based on a common standard for the benefit of the patients, the health care professionals, and the society in general.

EPR systems have been considered one way to solve many of the problems that the health care sector was and is still facing: long waiting lists, decreasing budgets together with an increase in the number of patients, and complaints about the quality of treatment and care. It was expected that the EPRs would improve patient quality and efficiency and enhance the sharing of data among health care professionals. While the government tried to create and communicate a positive picture of the visions, targets, and progress of the EPR strategy, newspaper headlines reflected disappointments involving EPR systems: “Hospital paralyzed because of EPR error” (Madsen 2006), “Millions of Danish kroner feared wasted. EPR implementation in counties has stopped” (Allingstrup 2006), and “Electronic records cause problems” (Rasmussen 2005).

The latest initiative is an updated strategy report, *The Digital Strategy in Health Care for 2008-2012* (Digital Sundhed 2007), where the visions and action plans for the Danish health care sector in general and for EPR systems in particular are outlined. This report discusses the challenges in consolidating and harmonizing the large number of different EPR systems that exist within the five new regions (these regions were created in Denmark in 2007 as a consequence of the Administrative Reform) so that each region will have *one* shared EPR system across hospitals.

Narrative #2: EPR system adaptation in an orthopedic surgery ward

The EPR system introduced in the orthopedic surgery ward was a standard off-the-shelf system and an electronic version of what is known as the patient’s paper record. It comprised

information in the form of patient notes (nursing notes, progress notes, and physiotherapists' notes), diagnoses, medicine schemes, X-rays, history data, laboratory data, as well as data on temperature and blood pressure, etc. The management of the hospital promoted the EPR system as an important and indispensable tool for optimizing the work procedures in the hospital and for providing the best possible treatment and care to the patients. Among the official reasons behind implementing the EPR system were the following:

- The electronic record will always be accessible and brought up to date.
- The patient will be treated on the basis of only one set of information.
- The medicine prescription will be safer as the risk of making mistakes is reduced.
- The quality of treatment will be better because of a unified documentation system.

The majority of the doctors in the orthopedic surgery department welcomed the new technology. They expected it to be a tool to support and facilitate their documentation procedures. The paper record that the doctors had used up till now had served as their daily tool for retrieving information about the patients and for documentation purposes. The doctors therefore naturally expected the EPR system to have the same features. In addition, the doctors anticipated that the EPR system would both facilitate and make more secure the medicine prescription procedures. The EPR system enabled the doctors to type in prescriptions directly as opposed to dictating them to secretaries who then typed them. Furthermore, medicine prescriptions would not be transferred to other systems, reducing the risk of errors. The nurses' paper-based note system would disappear with the introduction of the EPR system. Finally, the EPR system would make it possible to establish standard prescription procedures for some patient groups (e.g. those patients who had a hip replacement) so that the doctors did not have to prescribe each drug separately.

The EPR system would also allow the doctors to access patient information continuously

from different locations. One doctor stated: “It is of great help that I can sit here [in my office] and look up patient information”. This meant that no important information was missing, as might be the case before with the paper record. Some of the doctors were rather enthusiastic about the EPR system as it provided prospects for better performance and direct clinical benefits to their professional work.

Narrative #3: The doctors’ local adaptation of the EPR system

Many of the benefits that the doctors expected to be provided from the EPR adaptation were realized in practice. The EPR system led to more secure medicine prescription procedures and the standard prescription function in the system facilitated their work. Furthermore, the doctors were able to access patient information instantly. During the early use of the EPR system, the doctors sought to find out what affordances the EPR would bring to their work.

While the majority of the doctors emphasized the ways in which they believed the system supported their work, others criticized the system for leading to unnecessary and too time-consuming work tasks. They provided a number of examples to illustrate how the EPR system introduced new tasks to their profession that they did not consider their responsibility.

One example was related to medicine prescription. Even though the EPR adaptation had made the medicine prescription procedures more secure and introduced new standard procedures, the doctors now had to spend time on entering prescriptions into the system, a task which before was done by the secretaries on the basis of the doctors’ dictation. The doctors felt that they were spending too much of their “valuable time on this procedure instead of treating the patients”. They did not consider it to be their task “to sit around typing” and continued to dictate other types of notes to secretaries who then typed them into the system.

Another example was related to the X-ray system which was part of the EPR system. Previously, it was the nurses' task to put up X-ray pictures on the board in the outpatient clinic prior to patient consultations. Now the doctors had to enter the EPR system and retrieve the pictures themselves. The doctors believed that this new task was too time consuming and as a consequence some doctors asked the nurses to enter the system and find the pictures for them. Yet another new task for the doctors was to log on to the EPR system and refer a patient for an appointment with an occupational therapist or a physiotherapist. Previously, this was a task performed by secretaries or nurses. Again, some doctors arranged with the nurses or secretaries to carry out this task.

With the introduction of the EPR system, a majority of the doctors felt that their professional authority was challenged. They were not consulted in the selection of the EPR system, nor in the decision making process related to the implementation of the system. They consequently had the impression that their points of view were not taken into consideration, which led to some degree of skepticism and bewilderment. One doctor stated: "Of course it is not possible for everybody to participate in this decision making process, but it would have been nice to have the impression that you were involved somehow, and that it was not something that was implemented without our approval". Some of the doctors felt that they were "left out in the cold" contrary to before when they would have a say in the decision making processes.

The doctors also had the impression that their professional autonomy and identity as craftsmen were questioned and challenged with the EPR adaptation. As one surgeon expressed: "We are craftsmen. We need a hammer and a chisel to do our job. This [i.e. using a computer] is not really of interest to us". Some doctors also believed that the system led to more control as they were e.g. obliged by the EPR system to document each time they checked test results whereas before they just received the results on a piece of paper. The

doctors considered this control aspect an external influence on their work procedures, which previously were highly autonomous in nature.

DISCUSSION AND IMPLICATIONS

Together the three narratives present the process of adapting the EPR system on three levels: the organizational field level, the organizational/group level, and the individual/socio-cognitive level. For illustrative purposes, we present these levels as if they were distinct and easily separable which is only an approximation as they are intertwined and overlapping in practice. The three levels will be analyzed and discussed using institutional and sensemaking theories to explain IS adaptation and put forward the explanatory power of each theoretical perspective.

Organizational field level: changing the institutional environment of Danish health care – a rationalized myth about an efficient EPR system

In the first narrative, we described the political agenda behind EPR adaptations in Denmark. The national strategy reflected a new era with considerable changes in the institutional environment of health care, i.e. a change from paper-based patient records to electronic records, changes in the clinical tasks accomplished, and changes in the role relations between the health care professional groups. We witnessed the creation of a rationalized myth around the EPR system communicated in the national IT strategy for health care and in the expectations of the hospital management. The EPR system was represented as an artifact worth adapting based on its potential to make the clinical work more efficient. These benefits were mainly expressed from a political and a managerial point of view. The politicians and hospital managers considered instant access to patient data, more secure medicine prescription

procedures, and better quality in patient treatment as highly beneficial gains from an EPR system.

The decision in the hospital to adopt the EPR system was strongly influenced by a coercive force like “should adopt before 2006”, and a normative force, such as “adopting standard off-the-shelf EPRs as a technological trend”. Both forces created legitimacy for the hospital to be “compliant” with the wider societal or state expectations (Scott 2008). The strategic plan about EPR systems can be considered as a coercive force imposed by the government (Dobbin 1994: 126) causing a standardization of working procedures through implementation and use of EPR systems, leading to a higher degree of isomorphism among hospitals (the organizational field level) and isomorphism among wards in a single hospital (the organizational level). The idea that standardized EPR systems would imply more standardized practices was realized through the IS adaptation process, and this is an example of institutional pressures on the hospitals leading to isomorphism. This standardization was even stretched further by the harmonization effort mentioned in the updated strategy report (Digital Sundhed 2007) bringing isomorphism to a higher level (i.e. where it was agreed to have one single EPR system within each region).

The myth that the health care professionals would be able to optimize working procedures in hospital wards prevailed (i.e. a claim of efficiency). This was a powerful and well-institutionalized myth, meaning that it would probably endure even if (and when) doctors and other health care professionals expressed serious concern about the efficiency actually achieved: “Quite apart from their possible efficiency, such institutionalized techniques establish an organization as appropriate, rational, and modern ... Their use displays responsibility and avoids claims of negligence” (Meyer and Rowan 1991: 45). EPR systems can be considered as examples of institutionalized techniques.

The technological innovation in the form of the EPR system can be seen as an object carrying inscribed institutional logics (Gosain 2004) into the hospitals. At the same time, we saw that the public discourse reflected resistance to EPR systems, which might be explained by functional arguments, like errors in the EPR systems, but also by institutional arguments, e.g. that power relations between doctors and nurses were changed (see also Currie and Guah 2007: 236). The inscribed benefits of the EPR system versus the public discourse where the EPR systems were criticized show how various conflicting forces shaped the IS adaptation process.

Organizational/group level: institutional logics in the local context

In the second narrative, as the case description moved from a national to an organizational/group discourse, we were able to investigate the local adaptation of the EPR system in the hospital and in the orthopedic surgery ward, including the meaning constructions that were formed by the doctors as a professional group in relation to the EPR system. The hospital (including the orthopedic surgery ward) was subject to the institutional forces that existed at a national level. Czarniawska and Joerges (1996) designate this as the “travels of ideas”, meaning that an idea, such as “the efficient EPR systems”, travels from place to place – or as in this example from the health care discussion on the organizational field level, into this specific hospital, and further on to the health care professionals in the orthopedic surgery ward who were going to use the system. The positive expectations of and initial attitudes towards the EPR system, expressed by the doctors, showed how the rationalized myth about EPR systems “travelled” into the hospital.

The narrative showed evidence of conflicting institutional logics (Currie and Guah 2007). One institutional logic was the spreading rational myth about the efficient EPR system, reflecting

the cost efficient organization i.e. a private sector ethos. This was further backed by “real functional benefits” enforcing the institutional argument. The doctors had to accept the premises of the EPR system and perform what they perceived as administrative tasks, which was additional to what they had done in the past. A conflicting institutional logic was the doctors’ understanding of the typified role of doctors associated with typified actions: doctors treat patients and do not perform administrative tasks. This clash of institutional logics showed that multiple, and often conflicting, institutional logics lived side by side as contradictory forces. So where we saw how the institutional logic about an efficient EPR system was *shaped* at the organizational field level, we saw how the logic was *enacted* in practice at an organizational/group level.

In line with this, the narrative showed how the doctors’ sensemaking processes were intensified during the initial adaptation of the EPR system. There was a high degree of ambiguity and uncertainty among the doctors since their work responsibilities were questioned and challenged. The empirical findings showed evidence of actions where the doctors refused to accept the logics inscribed in the EPR system (e.g. that it was their job to log on to the EPR system and set up an appointment between a patient and a physiotherapist or that they had to find X-ray pictures in the EPR system). Their work-arounds were a solution to the institutional misalignment between the EPR system and the doctors’ understanding of the typified role (orthopedic surgeons) with typified actions (treat the patients) (Gosain 2004). In this way we see how the doctors’ cognitions (i.e. thoughts and interpretations about the EPR system) and actions (i.e. comply with the system or work-arounds) were related in practice. The narrative also shows evidence of how the doctors made sense of their work practices in relation to the EPR system and how some of their enacted practices reinforced existing structures (as we describe in further detail below).

Individual/socio-cognitive level: the doctors as active players in the IS adaptation process

As we have already mentioned above, one of the criticisms of institutional theory is that actors are often considered as passive recipients of institutions. They are looked upon as “cultural dopes” using readily available scripts provided by government or other institutional carriers to structure their actions (Fligstein 2001). We find evidence of the contrary in our case study. The doctors were actively engaged in defining what the EPR system represented in respect to their clinical practices. They also defined for what purposes the EPR system should be used (i.e. to facilitate medicine prescription procedures and more easily access patient data), and how it should be used (i.e. the doctors created so-called work-arounds if they believed that the EPR system imposed constraints to their daily work procedures).

From a sensemaking perspective (Weick 1995), the doctors in our case study cannot be considered passive recipients of the EPR system. Although they had not themselves made the decision to adopt the EPR system nor to choose the specific system, we argue that they actively formed the course and the outcome of the EPR adaptation. They were the primary users and they interpreted, created as well as determined the use of the EPR system in practice, which to some extent is related to pre-established conventions of use and ways of thinking. In some cases, the institutional logic built into the EPR system did not seem to “make sense” to the doctors who maintained their routines and ordinary work tasks. They used the system in ways that challenged its intended operation and created work-arounds, whereby they reinforced the old way of working before the EPR adaptation. The doctors can therefore be considered as neither ‘slaves’ nor ‘masters’ when it comes to the EPR adaptation (Weick 1995) as they themselves bracketed the flow of cues about the system continuously available to them. In this way they ‘discovered’ the system, which they either partly embraced or rejected, based on their own assumptions and expectations. This can also be referred to as

enactment of reality: the doctors created the system as part of the environment they faced.

Our empirical findings also showed evidence of how the EPR system had the characteristic of an equivocal (Weick 2001), lending itself to different interpretations among the doctors. Some of the doctors were in favor of the system while others opposed the use of the system. A majority of the doctors believed that the EPR system would hinder them in investing their energy in the primary part of their work practices; namely to treat patients. Too much time was to be used on what the doctors termed “administrative tasks in front of the computer”. They considered this as a misuse of their time and they noticed all features of the system which supported this belief thus confirming their own construction of the system as time-consuming. At the same time, the doctors were uncertain about the long-term consequences of the EPR system. In the early process of the EPR adaptation, multiple interpretations thus competed for legitimacy and were open for debate.

Some of the doctors also experienced that the EPR system introduced a control mechanism (checking test results) which challenged their expertise as well as their professional autonomy and clinical freedom. This shows that the doctors’ perceptions of and actions towards the system were grounded in identity construction as they continuously engaged in processes of association with and dissociation from the system in relation to their identity as doctors. We argue that the EPR system highly influenced the doctors’ perceived identity and authority. Whether or not the doctors followed the procedures set out by the EPR system or created so-called work-arounds, the system challenged their status in the organization. The doctors thus defined themselves in relation to the core of their work and their mission as a professional, namely to treat the patient. They did not consider the EPR adaptation as an explicit way to improve the overall patient treatment. They were very much aware of their identity and status in the hierarchy. This sense of identity construction, which was socially determined and

shared among the group of doctors, was reflected in the way they conceived their role in the adaptation.

The value of applying a combined theoretical perspective on IS adaptation

Whereas institutional theory has a strong explanatory power at the organizational field level, its explanatory power is limited at the individual/socio-cognitive level. To fully understand the EPR adaptation in the clinical setting, we therefore need to draw on both institutional and sensemaking theory. Institutional theory provides explanations of the outcomes of institutional pressures on IS adaptation, while sensemaking draws our attention to organizational actors’ cognition and situated actions around IS adaptation and shows how these cognitions and actions are made collective and reified through social construction processes. Although we argue that institutional theory and sensemaking theory are ample theories on their own, we stress the value of combining the two in order to oscillate between levels of analysis, which again facilitates a much richer interpretation and analysis of the case study. The result of applying the two theories to our case study is presented in Table 4.

Table 4: Explanatory power of two perspectives on EPR adaptation

	Institutional perspective	Sensemaking perspective
<u>Organizational field level:</u> changing the institutional environment of Danish health care – a rationalized myth about an efficient EPR system	Both strategic plans for EPR systems and the EPR systems themselves act as institutional forces leading to more isomorphism among Danish hospitals and wards within hospitals. The powerful rationalized myth about efficient EPR systems “displays” the hospitals as appropriate, rational and modern independent of actual achieved efficiency. Conflicting forces shape the IS adaptation process (the presented benefits of the EPR systems versus the public discourse).	

	Institutional perspective	Sensemaking perspective
<p><u>Organizational/ group level:</u> institutional logics in the local context</p>	<p>The idea of “the efficient EPR system” travels from the health care discussion on the organizational field level into this specific hospital, and further on to the health care professionals in the orthopedic surgery ward, who are going to use the system.</p> <p>The EPR system as carrier of institutional logic challenges the doctors’ authority and work responsibilities (a conflicting institutional logic).</p> <p>Work-arounds are a solution to the institutional misalignment between the EPR system and the doctors’ understanding of their typified role (orthopedic surgeons) with typified actions (treat the patients).</p>	<p>The doctors’ local adaptation of the EPR system shows a high degree of ambiguity and uncertainty since their work responsibilities are questioned and challenged.</p> <p>The doctors’ cognitions (i.e. thoughts and interpretations about the EPR system) and actions (i.e. comply with the system or work-arounds) are related in practice. Some of the doctors’ enacted practices reinforce existing structures.</p>
<p><u>Individual/socio-cognitive level:</u> the doctors as active players in the IS adaptation process</p>		<p>The doctors are not passive recipients of the EPR system, but active players deciding how, when, and why the system should be used.</p> <p>EPR systems as equivoques where some doctors are proponents of the system while others express a high degree of skepticism.</p> <p>The doctors can be considered as neither ‘slaves’ nor ‘masters’ of the EPR system as they themselves bracket the flow of cues, and in this way either partly embrace or reject the system (also known as enactment of reality).</p> <p>The EPR system influence the doctors’ perceived identity and authority. Whether or not the doctors follow the procedures set out by the EPR system, the system challenges their status in the organization. The doctors define themselves in relation to the core of their work and their mission as professionals (to treat patients).</p>

Institutional theory clearly offers strong explanations for addressing our case study at the organizational field level, providing concepts as isomorphism created by institutional forces (DiMaggio and Powell 1991) and rationalized myths (Meyer and Rowan 1991). At this level,

sensemaking offers very little detail in explanations, mentioning the concept of frame, which connotes past moments of experience with which present experiences are connected. But the origin or ‘substance’ of frames are not explained and are therefore left out in the table.

Both theories provide explanations at the organizational/group level as it appears from the table. Institutional theory refers to the travel of the efficient IS as an idea (Czarniawska and Joerges 1996), typified actors with typified actions (Berger and Luckmann 1966), and the IS inscribed with institutional logics (Gosain 2004) challenging the organizational actors’ authority and work responsibilities, e.g. the typified doctor. In a sensemaking perspective, the organizational level addresses how the IS adaptation implied uncertainty and ambiguity among the organizational members. Sensemaking theory also shows the social structures and it views actors as “fillers of roles and followers of rules” (Weick 1995: 71). This is what Weick, based on Wiley, describes as the level of generic subjectivity – what is known as typified actors from the institutional perspective.

At the individual/socio-cognitive level, sensemaking offers strong explanations of the inter-subjective processes among actors, e.g. how individual doctors are active players in forming the course and outcome of the EPR adaptation (i.e. enactment) and in bracketing and categorizing the stream of cues that they experience. It also shows how the EPR system challenges the identity and authority of the doctors. At this level, institutional theory offers very limited explanations, which is why we have left this cell of the table blank.

Both theories are well-established and proven theories which offer valuable explanations of IS adaptation. However, based on our analysis, we allege that by combining the theories, we attain even more valuable explanations of our research phenomenon.

CONCLUSION

When looking more closely at institutional and sensemaking theories, we discovered that they are both highly informative when investigating IS adaptation and that their underlying ideas and assumptions are compatible. Earlier studies have not systematically examined the value of combining the two theories (with the exception of e.g. Weber and Glynn 2006).

Through a literature review we concluded that the two theories differ in their explanatory power of IS adaptation with respect to key assumptions, levels of analysis, and main arguments. We explored the explanatory power of each theory with an illustrative case study of the adaptation of an EPR system in an orthopedic surgery ward. Based on three narratives of the EPR adaptation, we underlined that: 1) institutional theory has its explanatory power at the organizational field and organizational/group level of analysis focusing on the role that larger institutional structures play in organizational actors' sensemaking of IS adaptation, 2) sensemaking theory has its explanatory power at the organizational/group and individual/socio-cognitive level focusing on organizational actors' cognition and situated actions of IS adaptation, and 3) a combined view of the two theories helps us oscillate between levels of analysis, which facilitates a much richer interpretation of IS adaptation.

The findings suggest several avenues for future research. First, the case study has served illustrative purposes by highlighting the explanatory power of each theoretical perspective and the value of combining the two. It might be rewarding to make a more fine-grained and extensive empirical examination of this combination. Second, we do not propose specific methodological guidelines for *how* to investigate the interrelationship between institutional structures/logics of IS adaptation and how IS are enacted by organizational actors in practice. Future studies could investigate in more detail how to methodologically study this in practice (in line with the study by Barley and Tolbert 1997). Third, we have only drawn attention to IS

adaptation as a phenomenon in this study and we therefore suggest that future researchers extend the combination of institutional and sensemaking theories to other phenomena within the IS field. Finally, the findings from this study pertain to a health care context. Future research studies could extend the combination of the two theoretical perspectives to other contexts.

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