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Self-Determined Adoption of an ICT System in a Work Organization

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ABSTRACT

This interpretive single case study examines the process and implications of the self-determined adoption of an internet-based meeting system in a global company. Self-determination theory and structuration theory are used as theoretical lenses to understand the adoption and use of an ICT system. The data were collected using qualitative semi-structured interviews with eleven system users and analyzed using a content analysis approach. The research shows that the self-determined adoption of ICT systems has benefits like user motivation and satisfaction. Problems in such adoption relate to users' experiencing uncertainty regarding the organizational legitimization of the system and support for its use. Employees and organizations are likely to benefit from self-determined adoption because it promotes employees' motivation and initiative-taking. However, a shared understanding of self-determination and organizational support for it are required.

Keywords: Implementation of ICT Systems, Institutional Change, Interpretive Single Case Study, Self-Determination, Structuration Theory, User Adoption

INTRODUCTION

The implementation of Information and Communication Technology (ICT) systems is often described as a predetermined and controlled process. This paper documents an ICT system implementation process of a very different sort; we had an unexpected opportunity to study implementation as an organic and decentralized process. This opportunity came up while we were conducting a preliminary study for a research project focusing on the user and organizational factors and outcomes in ICT system adoptions. As appropriate in a preliminary study, we used exploratory interview questions that allowed the interviewees to broadly describe their experiences of why and how an ICT system was put into use, what problems and benefits the system brought along with it, how the system was used in the company, how the system assisted learning at work, and what kind of user support was available. An important interest area was the emergent learning processes, both

during the initial adoption and eventual day-to-day use of an ICT system.

After the whole research project was finished, one observation from this preliminary study remained unexplained. In this particular implementation process, addressing the adoption of an internet-based meeting system, most interviewees expressed satisfaction with the way the system was introduced, and they stated that the system was adopted successfully and in good spirits. According to the literature, such smooth adoption processes are rare, and the adoption of an ICT system often causes problems, especially in terms of user resistance (Adams, Berner, & Wyatt, 2004; Chen & Lou, 2002; Jiang, Muhanna & Klein, 2000; Klaus, Wingreen, & Blanton, 2007; Nunamaker, 1997; Orlikowski, 1993). This led us to explore further this successful adoption process in which the users interviewed expressed their willingness to use the system.

These explorations indicated that the users voluntarily adopted the internet-based meeting system and their interests guided its adoption and use. There was little organizational communication concerning the system, and many actually learned about the system from a peer. Each user was allowed to decide freely whether to use the system or not, and also to decide the purpose of its use. In short, the organization provided an ICT system for its employees and provided some information on different possible reasons for utilizing it, but allowed the users to decide if the system was beneficial for their work and whether or not to utilize it. Because of these characteristics of the adoption process, we started to call it self-determined adoption. Self-determined ICT system adoption thus means a process in which the system users decide on whether and how to adopt the system; the users also coordinate their own learning processes during the adoption in terms of learning strategies, resources, and situations. They also assess and control the outcomes of the adoption process and experience themselves as autonomous in the process (cf., Deci & Ryan, 2000; Knowles, 1975).

We therefore had in our hands a special single case of a self-determined ICT system adoption process that left the users satisfied with the system and motivated to use it. To describe this self-determined adoption process analytically and more formally, we articulated two new research questions and completely reanalyzed the data set (see Hinds, Vogel, & Clarke-Steffen, 1997; Thorne, 1994) to respond to two questions:

1) How does the self-determined adoption of an ICT system proceed?
2) What possibilities and problems do the users perceive in the self-determined adoption and use of an ICT system?

There are several descriptions of and models for the introduction and adoption of ICT systems in the literature. Most often, the models depict an implementation process proceeding step by step from the scanning of organizational needs to a full and effective use of technology in daily practices (see e.g., Cooper & Zmud, 1990; Kwon & Zmud, 1987; see also Orlikowski & Hofman, 1997, for the critique and an alternative view to change). This is the prevailing view of an ICT implementation process. However, the initial analysis of our case indicated that the adoption process in question could not be described as such a predetermined step-by-step process: an alternative theoretical framework was needed to capture the dynamics of the case. We found that the insights of Barley and Tolbert (1997), DeSanctis and Poole (1994), and Giddens (1984) concerning structuration theory and institutional change resonated in our case. Therefore, we decided to use their approaches as preliminary theoretical concepts (cf., Yin, 2003a) when describing our case.

A further element of theory relevant to our case was the autonomy or self-determination of the system users. An opportunity for self-determination, or autonomous regulation of one's activities, has a powerful impact on an individual's behavior and development (Deci & Ryan, 2000; Knowles, 1975). Having rec-

ognized the system users' autonomy in the case, we applied the self-determination theory to understand their reactions to the adoption process and the outcomes of that process.

The article is organized as follows: first, we present the two alternative models of the organizational implementation of ICT systems; second, we review the self-determination theory and consider its implications for ICT adoption. The paper then proceeds to our empirical case study of the self-determined ICT adoption process in a global technology company. Finally, we discuss the users' opportunities for self-determined behavior in ICT system adoption processes and the consequences of this self-determination. We conclude the paper by discussing our findings and outlining the practical and theoretical implications of a self-determined adoption of ICT systems.

Implementation of ICT Systems in Organizations: Two Alternative Approaches

The organizational implementation of an ICT system refers to "all activities related to deployment and adoption of a new technology, namely requirements specification, acquisition and/or design and development, installation, training and internalisation of routines for effective utilization" (Munkvold, 2003, p. 3). The adoption refers to individual acceptance and willingness to use the system. The implementation of an ICT system entails two adoption processes at the same time, namely, the adoption of technology and the adoption of new ways of working. The technological aspect of the adoption is usually rather straightforward, as employees are instructed and respectively learn the details of a system (i.e., which buttons to press). The technological tool, however, makes possible and demands new working methods, and it is more common to encounter problems when users start to learn and apply the new ways of doing their work (West, Waddops, & Graham, 2007; Wheeler, Dennis, & Press, 1999). A key challenge in ICT system implementation processes is, therefore, that users need to learn new

ways to perform their daily work, communicate (Andriessen, 2003), teach (West et al., 2007), and study. They cannot only start to use the system, but they also have to internalize new ways of working and thinking. During this process, users may also develop novel ways of using the system (DeSanctis & Poole, 1994; Orlikowski, 1993), not anticipated by the system designers.

The relevant literature distinguishes users' acceptance of a system as a vital characteristic of an implementation process. The way users assess the costs and benefits from the system affects their acceptance of the system and their decision on whether to use it (e.g., Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003). If users perceive the benefits offered by a system as being few, they will not accept it, even if the system developers thought that the system would be suitable for the work. Additionally, the match between the system and the tasks affects the users' acceptance of the system. Grudin (1989, 1994) argues that designers and managers often misjudge users' perceptions on the benefits of the use of the system. For example, these decision-makers see the potential benefits from their own point of view, but fail to consider whether subordinates will be able to perceive the direct benefits of the system. The decision-makers also tend to underestimate the amount of work the adoption requires from the users. Nevertheless, successful user adoption of an ICT system is vital as it enhances the productive use of the system (Andriessen, 2003; Grudin, 1994; Ehrlich, 1987; Kwon & Zmud, 1987; Orlikowski, 1993).

An organizational ICT system implementation process is usually conceptualized as a series of stages (see e.g., Orlikowski & Hofman, 1997). Kwon and Zmud (1987) developed a six-stage model of an ICT system implementation process (see Table 1). The model is based on the organizational change and innovation and technological diffusion literature. The stages replicate Lewin's (1952) change model from unfreezing to change and to refreezing. The model covers an implementation process from the scanning of organizational needs to a full and effective use of the technology in daily prac-

tices. Munkvold (2003) states, however, that an actual implementation process is rarely linear, but iterative, and the different stages partly overlap (Cooper & Zmud, 1990). The strength of the model is that it helps to understand comprehensively the different stages, the activities connected to each stage, and the prominence of each stage in an ICT implementation process.

However, alternative models for organizational change and especially for ICT implementation are also beginning to emerge. These models challenge the neat step-wise progression of a planned change and pay more attention to the unpredictable and emergent nature of social change (see e.g., Orlikowski & Hofman, 1997). In this paper, we propose that building on structuration theory, it is possible to outline such an alternative model for the ICT implementation. Structuration theory is founded on Giddens' (1984) conceptualizations of social processes as involving reciprocal interaction between human actors and institutions (loosely speaking, Giddens calls these 'structures'). Barley and Tolbert (1997) define institutions as "shared rules and typifications that identify categories of social actors and their appropriate activities or relationships" (p. 96). Human actions are thus enabled and constrained by institutions (the accepted ways of doing things). At the same time, the institutions emerge – over

time – from human actions (Orlikowski, 1992) that create and establish ever-new shared rules and typifications. Institutions, therefore, are created, maintained, and changed through action. According to structuration theory, the potential for both stability and change exists in any social situation: human actions may promote change while institutions promote stability.

Figure 1 depicts an ICT system implementation as a process of human actions and institutional change based on Barley and Tolbert (1997) and DeSanctis and Poole (1994). The model considers emerging and existing discrepancies between the concrete activity level and the more abstract institutional level. In the model, the *realm of institutions* refers to values, rules and norms on how things are and how they should be. ICT systems offer specific types of rules, resources, and capabilities, and govern how information can be managed by their users (DeSanctis & Poole, 1994). Values, norms, and resourses provide employees with an understanding of the environment they operate in (Furumo & Melcher, 2006), and show how they should act as members of a particular community. The *realm of actions* refers to daily activities at work (Kira & Forslin, 2008), especially those mediated by ICT systems. The model suggests that institutionalization is a continuous process, and the operations can be

Table 1. The model of an ICT system implementation process (based on Cooper & Zmud, 1990; reviewed by Munkvold, 2003; Kwon & Zmud, 1987) [1]

Stages	Activities
1. Initiation	Scanning organization needs and ICT solutions.
2. Organizational adoption	Negotiations to get organizational backing for novel ICT implementation.
3. Organizational adaption	Developing, installing, and maintaining the ICT system. Developing new organizational procedures. Training users both in the new procedures and in the use of ICT.
4. User adoption and acceptance	Including the members of the organization to use the technology.
5. Established use	Use the ICT system is encouraged among employees as a normal activity.
6. Infusion	The intended benefits of the technology are obtained through effective use of the technology.

observed only through time. The bold horizontal arrows in the figure stand for the temporality of the two realms of the social structure, namely institutions and actions.

The realms of institutions and actions 'communicate' via *scripts*. Barley and Tolbert (1997) define scripts as behavioral regularities; however, scripts may also be viewed as shared mental models that underlie behaviors. In Figure 1, a script refers to a mental model - a subcase of a schema - which describes a characteristic sequence of events in a particular setting (Gleitman, Fridlund, & Reisberg, 1999). For example, a script may be a mental model of the correct way of working.
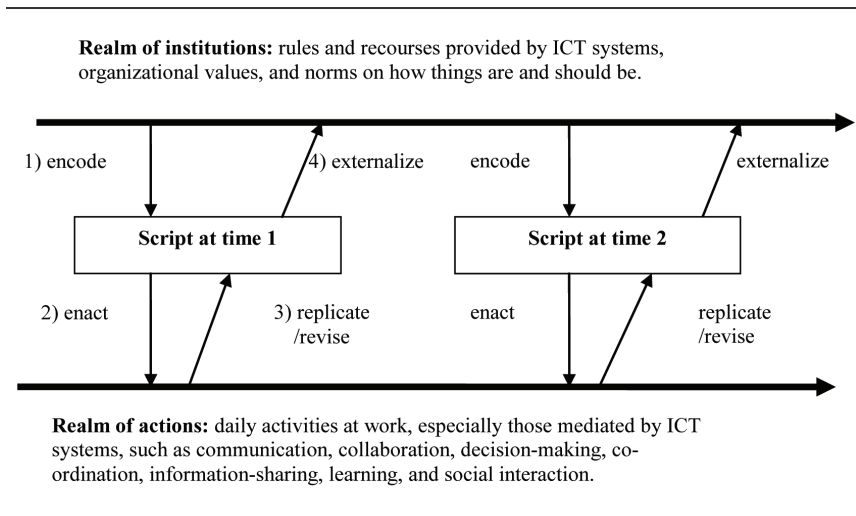
The first arrow refers to the *encoding* of institutional principles in the scripts to be used in specific situations. Encoding takes place in socialization as individuals internalize rules and interpretations of behavior appropriate for particular settings (Berger & Luckmann, 1967). The second arrow refers to action, in which individuals *enact* these scripts in their activities, for example when employees use an ICT system to perform daily work tasks. The third arrow refers to the choice of individuals: if they choose a different way, they *revise* the script, and if they choose the institutionalized way, they *replicate* the script. Barley and Tolbert (1997) state that a change in an organization's environment is often needed for employees to collectively question and revise scripted patterns of behavior; otherwise, actors are likely to replicate them. For example, changes in technology, such as the development and availability of new ICT-based tools, or changes in business conditions, such as economic downturns, increase the probability of individuals transforming a script.

The last arrow refers to the *externalization* of the patterned behaviors and interactions produced while posing questions and making innovations. Revised scripts may change the shared assumption of how things should be done, and these revised actions may become institutionalized. Most importantly for our purposes, new ways of using ICT systems discovered in daily activities may impose changes on institutionalized rules and beliefs.

Structuration theory has recently gained interest in information systems research (Jones & Karsten, 2003; 2008; Poole & DeSanctis, 2004). Two influential applications in information systems research are adaptive structuration theory, in which the impact of ICT systems on

Figure 1. Model of institutional change in the context of ICT systems (based on Barley & Tolbert, 1997) (© 1997, SAGE Publications, used with permission) (see also DeSanctis & Poole, 1994)

Realm of institutions: rules and recourses provided by ICT systems, organizational values, and norms on how things are and should be.

1) encode 4) externalize encode externalize

Script at time 1 **Script at time 2**

2) enact 3) replicate /revise enact replicate /revise

Realm of actions: daily activities at work, especially those mediated by ICT systems, such as communication, collaboration, decision-making, coordination, information-sharing, learning, and social interaction.

organizational change is examined (DeSanctis & Poole, 1994), and the structurational model of technology, in which structuration theory is used to theorize aspects of the information systems research field (Orlikowski, 1992, 2000; Orlikowski & Robey, 1991). Many researchers have also used structuration theory in the context of the organizational implementation of information systems (see e.g., Barley, 1986; DeSanctis, Poole, Dickson, & Jackson, 1993; Kouroubali, 2002; Walsham, & Han, 1993). These articles often use interpretive case analysis in order to illustrate the theory. However, the existing literature usually focuses on examining and explaining how social actions and structures affect the introduction and adoption of information technology in organizations. None of these studies address the dynamic process in which individuals actively adopt, enact, replicate, revise, and/or reject the institutionally grounded meanings and purposes of ICT systems. In this article, structuration theory is used to describe how people – through their daily actions and choices – can change scripts and institutionalized assumptions rather than only being confined by them. We were not able to find other articles in which the Barley and Tolbert (1997) model (Figure 1) was used to describe an implementation process of an ICT system as an institutional change in an organization.

The alternative ICT implementation models presented in Table 1 and Figure 1 can be examined in parallel. The stages from 'Initiation' to 'Organizational adaptation' in Table 1 may be carried out by the managers and system designers as planned but, from the phase 'User adoption and acceptance' on, such linear process may be interrupted. While users are exploring and learning to use the system, and also performing work tasks in the realm of actions, they may choose different ways of acting than those suggested by the existing institutional rules, resources, and values. The users may choose unplanned actions for many reasons but, in most cases, a contextual change is a strong trigger. Eventually, if carried out consistently, the unplanned ways of acting may revise the existing script and change the shared assumptions as to how things should be and should be done. The institutional realm may also start to change.

Self-Determination in the Implementation Process of ICT Systems

An implementation of an ICT system always entails both organizational and individual change. As employees adopt a new system, they need to learn its use, and the use of the system also changes their work. In a change process, it is important to consider what motivates people to change, and how this motivation can be influenced by others. Motivation concerns energy, direction, persistence, and all aspects of activation and intention to do something, for example to utilize technologies (Ryan & Deci, 2000). Theories on self-determination (Deci & Ryan, 2000), self-direction (Knowles, 1975), and decision latitude or autonomy (Karasek, 1979) offer an important perspective on human motivation. These theories point out that, for motivation to form, individuals need to be able to regulate their activities. For example, in the field of educational research, self-determination or self-direction has been shown to lead to motivated and effective learning. During self-directed learning, students take the initiative, diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes (Knowles, 1975). The learners take responsibility for their learning to construct a meaningful learning process (Garrison, 1997).

The self-determination theory of Deci and Ryan (2000) draws a distinction between autonomous motivation and controlled motivation. Autonomy or self-determination refers to acting with a sense of volition and experiencing the possibility of choice. Deci and Ryan show that self-determination induces interest in an activity and excitement about it, and boosts confidence, performance, persistence, and creativity. On the contrary, controlled motivation builds on the

pressure to engage in socially expected actions and/or actions that are not an end in them, but only a means to reach something else, e.g., rewards (Deci, Ryan, & Koestner, 1999; Gagné & Deci, 2005). Activities connected to controlled motivation can lead to amotivation or a total lack of motivation, as the person has few chances to regulate his/her behavior and experience the goals of his/her activity as being meaningful. The possibility of self-determination therefore supports employees' motivation at work, while the lack of this possibility undermines motivation and full engagement in work activities (see also Sundholm, 2000).

On the basis of such research, we propose that self-determination is also an important enabler in the implementation and use of an ICT system. The first approach to an ICT implementation, presented in Table 1, can be characterized as stable and predetermined. The user adoption and acceptance stage does not take self-determination into account very significantly: the developers of this model (Cooper & Zmud, 1990; Kwon & Zmud, 1987) notice that users do not adopt and accept new tools automatically, but they do not discuss that further. Thus, the model pays little attention to the possibility of people rejecting the system or using it in a different way than that intended by the designers and managers. As noted above, such user rejection or revision is likely, as the designers and managers are prone to misjudge users' reactions to the system. Users' desire for self-determination may cause problems if it is not taken into account in the implementation plan. On the contrary, self-determination fits well into the scope of the implementation model presented in Figure 1, which takes into account the fact that users actively enact institutional scripts in their daily work and may either replicate or revise these scripts.

METHODOLOGICAL APPROACH

We used a single special case study to describe the self-determined adoption of an ICT system

(Stake, 1994; Yin, 2003b). Siggelkow (2007) argues that a single case can be powerful, when it provides special insights into the phenomenon being studied that other cases would not be able to provide. A transformation in an organization at the level of institutional structures and assumptions is a situation in which a single case study can offer special insights. Indeed, Barley and Tolbert (1997) state that "an enormous amount of luck or prescience are required to recognize an emerging institution and then gather data on relevant, ongoing action and interaction" (p. 100). Thus, we were lucky to come across a single case of a self-determined and successful ICT adoption process where a change in an organization's institutionalized assumptions took place. We identified the case as a special opportunity to describe an ICT adoption process as an institutional change after the data gathering and initial analyses (Hinds et al., 1997; Thorne, 1994). However, it was possible for us to re-examine and re-analyze the case data thoroughly from this particular perspective because the initial interview questions were rather open and all 11 interviewees ended up describing their experiences with the self-determined adoption of ICT.

The study was conducted in a global technology company producing machinery and process technology on a large scale worldwide. At the time of the study, the company was operating in over 50 countries. This study focused on one business area in Finland, where most of the work carried out was office work.

An internet-based meeting system was put into use in 2002. The system made it possible to arrange live internet sessions for meetings or training, and it combined voice and video conferencing. Users participated in sessions by means of a PC connected to the internet. They wore headsets to listen and speak to each other. It was also possible to use a webcam. Among other things, the system supported file-sharing, and it was also possible to record and edit sessions. Data for this study were gathered in 2005 [2]. At the time of the study, almost all the employees in the case company had access to the system, but it was used by only a limited

number of employees. All in all, however, about 2500 members of the company's staff (and 500 external actors) had used the system and, each month, between 400 and 500 meetings were arranged. There were about 500 moderators who had the right to involve participants in meetings.

Data Collection and Analysis

A qualitative and interpretive research approach was chosen for the study, which initially was designed to be a preliminary investigation for a larger research project. The data were collected through qualitative interviews. A semi-structured interview protocol was devised, and the order, form, and extent of the questions varied from one interview to another (Miller & Crabtree, 1992). Semi-structured interviews provided freedom for the interviewees to describe the matters they found important while, at the same time, the loosely set themes in the interview protocol ensured that all the important issues were addressed.

Altogether, eleven volunteer office employees were interviewed in 2005, three females and eight males, aged from 28 to 43. The interviewees were selected from three different professions (see Appendix): support and HR persons, operational employees, and middle managers. The aim was to cover different viewpoints on the introduction and adoption of ICT in the company. Three interviewees could be called key informants: they had been involved in the selection and implementation process of the system from the very beginning, they were super users with all rights to use the system, and they trained and supported other users, and developed the use of the system. The rest of the interviewees were ordinary users who had made the decision to adopt and use the system. These ordinary users were on various levels of expertise in the use of the system. One interviewee had used the system only a few times as a participant in a meeting, while some had used the system regularly when organizing and participating in meetings. Three of the ordinary users said that they had had some reservations and doubts concerning

the system before actually trying it out. The 11 interviewees, therefore, formed a small but typical group of users (see e.g., Kuzel, 2000; Miles & Huberman, 1994, p. 27; Patton, 1990, p. 169); there were both interviewees who were highly interested in the use of the system and interviewees who had regarded the system with some reservations. Each interview lasted from 45 minutes to 60 minutes.

Organizational documents were also gathered and analyzed in order to get background information: for example, a report on a system test period evaluation conducted in 2002 was studied. At the time of writing of this case study, additional contacts were made with the three key persons to address some specific questions based on the theories of self-determination and institutional change and to clarify some remaining questions from the analysis of the original interviews.

The interviews were conducted by the first author. The interviews were recorded and then professionally transcribed. Content analysis was used to organize and describe the phenomenon being investigated and to express it in a compact form (Miles & Huberman, 1994). The analysis method was selected because it made it possible to sift through large volumes of data in a systematic and objective manner, and it suited the unstructured data (Weber, 1990). The analysis applied the systematic combining approach based on abductive logic (Dubois & Gadde, 2002): we continuously matched theoretical concepts with the empirical reality to form our emerging case description. In practice, the analysis process was conducted in three phases. First, the original interviews were examined from the point of view of self-determined adoption and institutional change theory. These theories were used as preliminary theoretical concepts to set a direction and boundaries for our description of the ICT adoption process (see Yin, 2003a). Second, the data were organized into categories that followed the Barley and Tolbert (1997) model of institutional change. Finally, the categories were further specified and finalized on the basis of this theoretical framework of the study.

To ensure the quality of this qualitative research, we paid special attention to three quality criteria: communicative validity, pragmatic validity, and reliability. Validity relates to the truthfulness of interpretations (Sandberg, 2005). Communicative validity refers to an understanding between the researcher and research participants about what both parties are doing (Apel, 1972). Communicative validity was ensured in two ways in this study: (1) the interviews were conducted in the form of a dialog; the interview questions were elaborated with follow-up questions, such as "Can you give me on example?", and the interviewees were made aware that the researcher was interested in their personal experiences; (2) in the analysis, the aim was to strive for coherent interpretations, which means that the parts of the studied phenomenon must fit the whole and the whole must fit the parts (Sandberg, 2005; Silverman, 2006). Pragmatic validity refers to testing knowledge produced in action (Kvale, 1989). In this study pragmatic validity was ensured by asking follow-up questions in the interviews which constantly embedded the statements in actual situations.

Reliability concerning the procedure for achieving truthfulness in interpretations (Sandberg, 2005) was secured in five ways: (1) the research process has been described carefully (Yin, 2003b), and the theoretical stance from where the interpretation of the results takes place has been expressed clearly (Silverman, 2006); (2) the interviews were recorded and transcribed word by word (Seale, 1999); (3) the data categorizations made by the first author were discussed and confirmed with other researchers in the research group. The other researchers challenged and asked for justification of the emerging categories until the categorization could be considered final (Miles & Huberman, 1994, p. 64); (4) the researchers stayed in contact with the case organization, and checked the findings with the three key informants, (Miles & Huberman, 1994, p. 275); 5) the reliability of analysis was examined by blind check-coding: two persons independently (the first and second authors) classified 18% of the data (Miles & Huberman, 1994, p. 64), and we found 82% agreement in our analyses.

The quality of the secondary analysis of the data set was ensured based on criteria distinguished in earlier literature (e.g., Heaton, 1998; Hinds et al., 1997; Thorne, 1994). Firstly, we reanalyzed our own data, which were recorded and transcribed; the new research questions arose directly from the primary data (e.g., Gladstone, Volpe & Boydell, 2007). Secondly, all the interviewees described their experiences of the phenomenon being studied, and consequently there were no missing data (Hinds et al., 1997; Thorne, 1994). Thirdly, we also reported the main methodological issues regarding the original study, together with the description of the processes in the secondary data (Heaton, 1998).

RESULTS

In this section, we first describe how the self-determined ICT adoption took place in the case company. We then outline the possibilities and problems the users perceived in this process. As we will discuss later on, the adoption of the ICT system in the case company cannot easily be fitted into the traditional ICT adoption process template summarized in Table 1. Instead, the process can be described by discussing its events within the framework of institutional change depicted in Figure 1. We therefore describe the adoption process as progressing from an initial script (Script 1) to a new, emergent script (Script 2) through the interaction between the institutionalized meanings of the system and the daily work activities of its users.

Script 1: The Internet-Based Meeting System is the Means to Train Customers in This Company

In 2002, the internet-based meeting system was put into use, primarily to provide a novel way for customer training and learning. Up until then, customers had participated on location in training provided by the case company; the aim was now to replace this face-to-face train-

ing with electronic learning (eLearning), made possible by the internet-based meeting system. The main aim was thus to develop cost-efficient customer training by reducing customer and expert travel. In the background, there was also an idea that the system could be used for the internal meetings of the company's staff.

Realm of institutions. There were several factors in the realm of institutions that directed the implementation process. The system implementation was organized in the same manner as that in which many previous ICT system implementations had taken place in the company. There was plenty of organizational communication on how and how much to use the system. One of the middle managers who were interviewed stated that "pedantic" classroom and internet-based training sessions and seminars were arranged for both employees and customers, and detailed time statistics were kept on the use of the system. At this point, the company sought to apply an implementation process corresponding to Table 1. The company's values and norms held large eLearning projects to be important ('eLearning' was the buzzword of the time); the report on a system test-period evaluation stated that the company had to make use of eLearning in various ways. In line with the generally prevailing enthusiasm for ICT, it was believed that live eLearning sessions increased the quality of learning, because they were interactive, learner-centered, and offered more on-demand knowledge sharing with experts. These assumptions became *encoded* in Script 1 as the project managers and ICT support staff of the company extensively informed other employees about the new meeting system, its use, possibilities, user training, and support functions. The *enactment* of the script took place as the employees in the customer training department familiarized themselves with the system

and started to use it as a new tool for customer training.

Realm of action. However, very soon, the tide turned for large eLearning projects in the company. Internet-based customer training was abandoned as the customers did not have the required equipment and facilities, or they were not interested in training via the internet-based meeting system. They preferred traveling to training sessions as it provided an opportunity to be away – for a change – from their usual workplaces. One support person who was interviewed stated that the customer trainers feared that the new system might cost them their jobs or create too high a workload. According to this interviewee, this was one reason for the failure of the adoption of the system. The internet-based training also proved to be more expensive than anticipated. However, a small group of managers and sales people of the company discovered the potential usefulness of the system in replacing face-to-face meetings, and saving travel costs. They discovered that the internet-based meeting system was much more useful than e.g., a videoconferencing system. It was simple and easy to use and made it possible to speak, show material, and work together on a document. All this coincided with the company setting a stricter budget that required reduced travel costs from staff and rationalized time management. Therefore, what initially was a secondary aim for the system – to use it for the company's internal meetings – became the priority. Because of their personal needs and contextual changes, the system users *revised* the script to emphasize the system as a tool for internal meetings rather than for customer training. As the users started to function according to this newly found meaning of the system, they *externalized* it to challenge the institutional assumptions concerning the ICT systems in the company. Customer reluctance, customer

trainer fears, and the high costs of internet-based training materials prevented the replication of the script of the use of the system for internet-based customer training, while some IT-enthusiastic managers of the company realized the potential of the system for reducing traveling time and costs in meeting team members in a geographically decentralized company. All the activities, events, and influencing issues at this time in the implementation process are depicted in Figure 2.

Script 2: The Internet-Based Meeting System Can be Used to Arrange Internal Meetings in This Company

A new script started to emerge for the internet-based meeting system. The system was now perceived as a tool for internal internet meetings, with a secondary emphasis on the possibility of using the system in in-house training. The goal was to reduce traveling costs, but also to get the company's expert knowledge to where it was needed. The employees' well-being at work was also emphasized; the system was seen to lead to reduced traveling and, thus, increased leisure time.

Realm of institutions. A profound change took place in how the internet-based meeting system was introduced to its users. The large-scale and formal introduction of a customer training system turned into a small-sized pilot project for an internal meeting system. The key characteristic of the adoption process was to provide users with a tool and let them decide whether the tool was useful for their work. The target was not to put the system into use in the whole company in one go, but to introduce the system gradually, to keep the expenses low, and to let users' experiences expand the use of the system. The new script (Script 2) was made visible, *encoded*, as the project managers and ICT

support staff made information available for employees on the system, its use, possibilities, user training, and support functions. This time around, however, colleagues and managers acted as active agents between the organization level and employees by providing information about the system. The emphasis all along was on the fact that the use of the system was voluntary and based on the employees' needs. The *enactment* of the script took place as each employee had the opportunity to decide whether to learn to use the system or not.

Realm of actions. The top management, starting from the managing director, decided to use the internet-based meeting system in internal meetings. This signaled to the employees that the system was useful and beneficial. Furthermore, the benefits and effectiveness of the use of the system were publicized, and statistics about cost savings were shown to the employees. At first, experienced and enthusiastic IT users started to use the system in their meetings. User training, manuals, and other official support activities were available, but users were not interested in using them, because they did not "have time". New, spontaneous ways to use the system emerged at this point; for example, one unit organized in-house product training with the system. In this phase, the users actually *replicated* Script 2, emphasizing the voluntary use of the system in internal meetings. In-house training was also tried out, with good results. The users also chose different roles during the adoption process. Enthusiastic users actively convinced other employees of the usefulness of the system. Experienced users guided novices, who were able to identify these experienced users by using information from the grapevine. These various roles in the system use reflect the users' autonomy, initiative, and self-determination in the use of the system.

Script 1 was, therefore, revised on two levels. The events in the company affected shared mental models on both how to use the system and how to take it in use. The whole process described here led eventually to a change in the realm of institutions: a new way of using the system (as a tool for internal meetings) and a new way of introducing the system to employees (voluntarily, in a self-determined manner) emerged. The events, actions, and influencing issues during the process described above are depicted in Figure 3.

Possibilities and Problems of the Self-Determined Use of an ICT System as Perceived by the Interviewees

Most interviewees perceived many possibilities in the use of the system. For instance, the system allowed employees to travel less and thus have time for other things, meetings became shorter but more efficient, expert knowledge was easily available, and all this allowed users to plan their working days more flexibly. All the interviewees also mentioned that the system would enable considerable savings in travel expenses. In addition, the interviewees described the introduction process as successful, and they also approved of the system as a whole, because it was easy and practical to use. All the interviewees also emphasized, in different ways, how the system allowed them to work more efficiently and in a more meaningful manner. This may also relate to the fact that the interviewees were able to choose for themselves the best possible way to apply the system. All these positive views were shared by the support persons, operational employees, and middle managers alike. In addition, the support persons emphasized that the system allowed them to learn more about modern technology. For example, they explained that the skills they developed when using the system contributed to their general competencies and understanding of computer tools that can enhance communication and interaction. They perceived the system as providing great new opportunities for the company by offering new perspectives on various ways to use ICT tools in the organization. The middle managers, moreover, emphasized that the system allowed more efficient operations to be achieved without the employees' well-being being forgotten. One middle manager, when interviewed again in 2008, deduced that a key reason for the interviewees' positive assessment of the opportunities provided by the system was that they had to think about these possibilities and opportunities more carefully, as they – personally – had to decide whether or not to use the system.
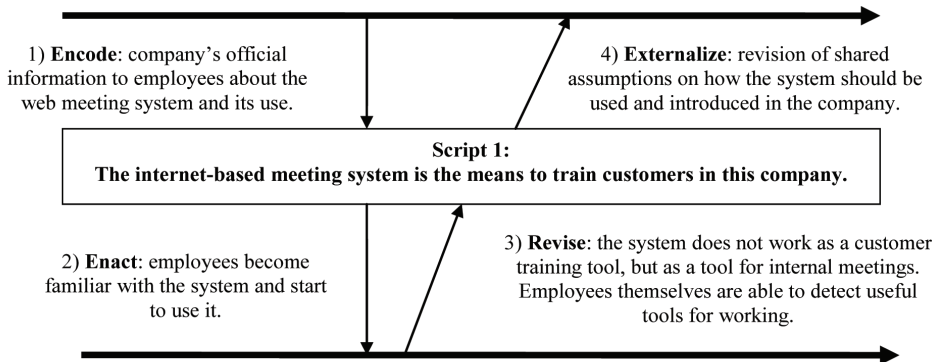
The interviewees also mentioned some problems with the use of the system. They all mentioned problems caused by the unfamiliar communication style and technology. The most disturbing factors in the new ways of communication were a lack of non-verbal communication and immediate feedback, and the technical problems concerning delays with voices and interruptions to internet connections. One operational employee who was interviewed also stated that initial problems and failures in the use of the system might discourage people from sticking with the system. Indeed, one support person and two operational employees said that they were initially afraid to use the system – "How can I handle work tasks virtually? Am I able to handle the technology?" – but became more confident after having tried the system out. The middle managers who were interviewed, furthermore, did not want to use the system for customer contacts or if dealing with sensitive matters with colleagues, because they felt that trust was difficult to achieve via the system. Instead, they used the system only when handling pressing matters with familiar colleagues.

Although all the interviewees were in general satisfied with the system and its introduction, some support persons and operational employees had hoped for more formal advice and support during the adoption process. For example, one support person stated that employees should be systematically trained to use the system so that the threshold to participation in meetings and arranging meetings would be lower. The support

Figure 2. Script 1: The internet-based meeting system is the means to train customers in this company

Realm of institutions:
- ICT systems are implemented in a traditional way.
- An internet-based meeting system is provided for customer training.
- Live eLearning sessions increase the quality of learning and save money and time.

1) **Encode**: company's official information to employees about the web meeting system and its use.

4) **Externalize**: revision of shared assumptions on how the system should be used and introduced in the company.

Script 1:
The internet-based meeting system is the means to train customers in this company.

2) **Enact**: employees become familiar with the system and start to use it.

3) **Revise**: the system does not work as a customer training tool, but as a tool for internal meetings. Employees themselves are able to detect useful tools for working.
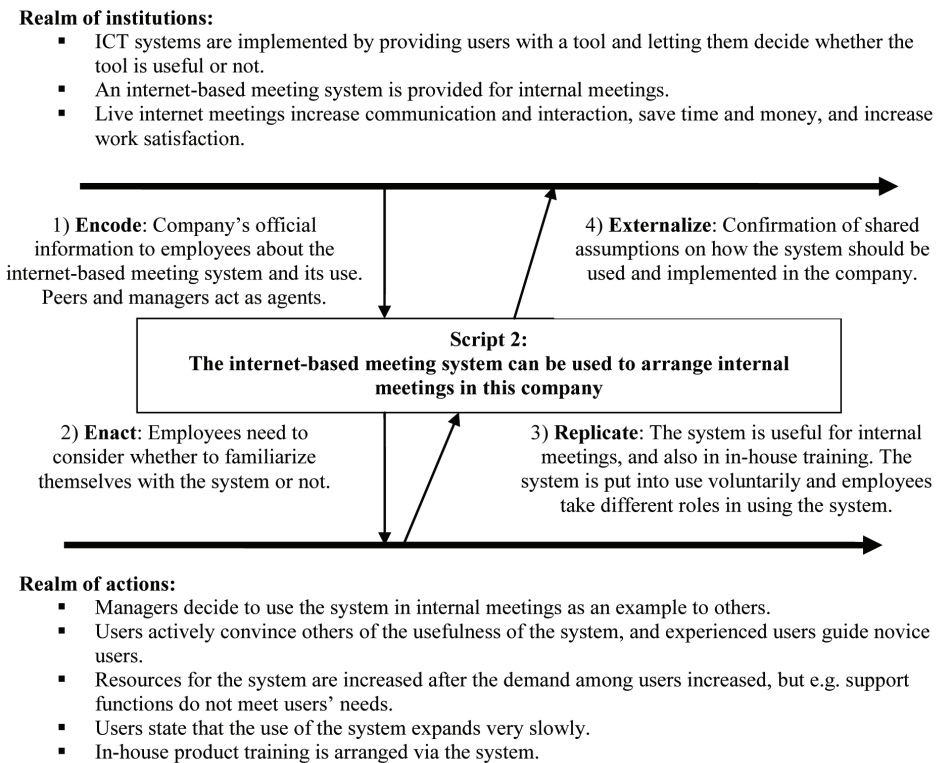
Realm of actions:
- Employees and customers are trained to use the system.
- Live eLearning customer training events are organized. Customers do not participate, and trainers have personal biases and fears about the consequences of the use of the system.
- The company's business is declining, and costs must be reduced.
- A small group of managers discover the system to be a good tool for internal meetings.

persons in general worried about user acceptance: without it, the system would not be used. One operational employee who was interviewed talked about "controlled compulsion", which meant that the organization should promote the system as *the* tool for internal meetings, and also advise and finally even compel employees to use the system. All types of interviewees (i.e., support persons, operational employees, and middle managers alike) also expressed concern about other employees who did not understand how to use this handy and beneficial meeting system. In short, all types of interviewees experienced the system as such a good tool that they would have liked all employees to use it! However, the voluntary, self-determined nature of the adoption of the system did not bring about such quick, widespread adoption, but led to a situation in which there were only a few users at the beginning. One operational employee who was interviewed said that he would use the system more, but it was impossible, because his co-workers did not use it yet.

DISCUSSION AND CONCLUSION

The ICT system adoption described in this article cannot easily be fitted into the traditional ICT adoption process template summarized in Table 1. The company originally devised formal plans for the utilization of the internet-based meeting system to enhance customer training. But the whole implementation process ran into difficulties, because customer preferences, trainer doubts, high costs, and business downturns prevented these plans from being fulfilled. The implementation process was interrupted in Stage 5 of Table 1. The implementation process succeeded, however, after the process was conducted differently: users were left to decide for themselves if they needed the system and how they would use it. The users were able to experience control over their work and freedom of choice in what and how to do their work, and in that way to experience autonomy and be intrinsically motivated. The interviewees'

Figure 3. Script 2: The internet-based meeting system can be used to arrange internal meetings in this company

Realm of institutions:
- ICT systems are implemented by providing users with a tool and letting them decide whether the tool is useful or not.
- An internet-based meeting system is provided for internal meetings.
- Live internet meetings increase communication and interaction, save time and money, and increase work satisfaction.

1) **Encode**: Company's official information to employees about the internet-based meeting system and its use. Peers and managers act as agents.

4) **Externalize**: Confirmation of shared assumptions on how the system should be used and implemented in the company.

Script 2:
The internet-based meeting system can be used to arrange internal meetings in this company

2) **Enact**: Employees need to consider whether to familiarize themselves with the system or not.

3) **Replicate**: The system is useful for internal meetings, and also in in-house training. The system is put into use voluntarily and employees take different roles in using the system.

Realm of actions:
- Managers decide to use the system in internal meetings as an example to others.
- Users actively convince others of the usefulness of the system, and experienced users guide novice users.
- Resources for the system are increased after the demand among users increased, but e.g. support functions do not meet users' needs.
- Users state that the use of the system expands very slowly.
- In-house product training is arranged via the system.

obvious enthusiasm about the system points out that the self-determined adoption truly led to intrinsic motivation. Revision of the initial script in Figure 2 was a crucial point in redirecting the whole implementation process towards new opportunities.

On the basis of the case study, we conclude that the self-determined adoption of ICT systems can have benefits. As employees are able to discover the benefits of the system by themselves and decide whether to use the system, they become motivated and committed. Freedom, voluntariness, and control over one's own work make employees satisfied and reduce user resistance. A self-determined employee may even transcend her work role, and show features of organizational citizenship behavior (Organ, Podsakoff, & MacKenzie, 2006). In the case study, some interviewees had obviously turned

into self-appointed advocates of the system and worried that other employees were not reaping the full benefit of the system. A self-determined implementation process may thus lead to a greater probability of success in the adoption and acceptance of an ICT system. Moreover, because the use of the system is based on the real needs of employees' work activities, the organization has invested in a meaningful and useful system.

However, self-determined adoption has problems as well. It is quite an unsystematic process; there are no clear signs for employees that the company considers the system important and beneficial. Employees might not receive consistent information on the system, and therefore they start to wonder whether other employees use the system and what the official recommendations concerning its use are. A slow

and unsystematic process may also appear too inefficient and risky from the point of view of management. Self-determined adoption may therefore work only when employees and managers are able to live with uncertainties.

The main theoretical implication of the study is that it seems fruitful to study ICT implementations as socially constructed, organic processes of which user self-determination is a vital part. The study shows that a realistic and rich understanding of the implementation of ICT systems can be attained by using structuration theory. In terms of practical implications, the study points out that organizations should also be open to self-determined processes in the implementation of ICT systems. However, self-determination needs to be accompanied by well-designed organizational support allowing employees to get the information and technical support they need.

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ENDNOTES

1. The name of the model is originally 'Model of information systems implementation process'.
2. The case study thus took place before free internet-based meeting and telecommunicating systems (such as Skype) became widely used.

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APPENDIX

Table 2. Participants in the study, their job titles and purpose of use of the system

Job Title	Purpose of use of the system
1. Support persons, who supported other's use of the system	
1. A customer training designer A, (a key informant of the study)	Participated in small, mostly internal meetings once a week, developed electronic customer training and trained users.
2. An office assistant	Coordinated global in-house product and sales training (organized training sessions, guided participants, tested web connections) 2-3 times a week
3. A customer training designer B, (a key informant of the study)	Participated in small internal meetings once a week with colleagues, guided other system users.
4. A human resource developer	Participated in small internal meetings once a month with colleagues, occasionally supported other employees' use of the system
2. Operational employees, who used the system actively in order not to travel to meetings and training	
5. A trainer and coordinator of global product training	Provided global in-house product training with the system for many years to a great number of participants at a time (about 300 trainees per year), edited sessions
6. A global technology coordinator	Participated in global web meetings, participated and trained others with the system in global in-house product and sales training 102 times a week
7. A product sales director A	Participated in global in-house product and sales training, and internal team meetings every other week
8. A product sales director B	Participated twice and trained once with the system in global product and sales training and participated a few times in internal web meetings
3. Middle managers, who used the system actively in order not to travel to meetings and training	
9. A manager in the IT department, the key advocate of the system (a key informant of the study)	Participated in global or internal web meetings every day, trained with the system to some extent, edited sessions, coordinated the implementation of the web meting system
10. A customer training manager	Participated in internal and global web meetings every other week with groups from the organization's different parts
11. A manager of a business line	Participated in global executive management team meetings: the team had three web meetings and then one face-to-face meeting