UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master Degree Project in Management

The Power of Human-Technology Interaction:

When new technology shifts the political landscape

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Master Degree Project No. 2014:80
Graduate School

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Abstract
The reliance on Information Technology (IT) within contemporary organizations has increased conspicuously within the past few decades, and this has changed the way in which work is conducted. In this article, attention is dedicated a case study of a company that recently went through a major technological change where several new IT solutions were implemented. The article investigates how tasks and formal roles of employees may change when new IT solutions are implemented, and how this in turn affects the employees' social roles and work politics. We illustrate, by applying concepts from Science and Technology Studies (STS), how administrative non-core business tasks can be replaced by IT-related non-core business tasks. We also demonstrate that the entrance of new technology is able to force a competence shift, in which some of the administrative formal roles are replaced by new positions obtained by individuals with high knowledge in IT. The competence shift generates in turn a shift in the workplace politics, since the organizational power structure is altered.

Keywords
Actor-Network Theory, Social Construction of Technology, Information Technology, Technological Change, Workplace Politics

Introduction
During the last decades, technology has developed faster and become more powerful than ever before in human history (Bijker & Law, 1992). Nye (2006) suggests that although technology is often believed to decrease the need for labor and in turn increase productivity, this is an oversimplification of how technology actually affects the workplace. Indeed, work is effectively taken away from the technically least skilled employees, but automation of certain tasks requires more technically skilled workers to maintain the new 'automated' machines (Nye, 2006). Fifty years ago, empirical studies had already identified that technical knowledge might be the base for organizational power (Mechanic, 1962; Crozier, 1964) and that the more advanced technology an organization uses, the higher is its demands for highly trained and educated employees (Blau, McHugh-Falbe, McKinley, & Phelps, 1976). According to Nye (2006), new machines are not just products of laboratories but also shapers of

political and social contexts, and can therefore be used for many different means. He adds that a workplace shift may take place where more technically skilled workers capable of understanding technology as a larger complex of tasks, become indispensable. These workers can sometimes even be considered more important than some of the managers, due to their set of skills (Nye, 2006).

In contemporary organizations, the most important technological components are no longer merely industrial machines of production. Instead, studies have shown that the reliance on Information Technology (IT) has grown during the last decades, and a company's IT system is often seen as one of its most critical components (Lai & Mahapatra, 1997). However, IT implementation may be problematic. Lai and Mahapatra (1997) conclude that human factors, as well as organizational culture and social issues, are important for the success of IT implementation. This has been shown in several case studies (e.g. Orlikowski & Gash, 1994; Diedrich, 2004; Eriksson-Zetterquist, Lindberg, & Styhre, 2009). For example, employees' formal roles, methods of working, and hence their professional identities, may change when new IT systems are implemented (Eriksson-Zetterquist et al., 2009). Empirical research has also shown that power struggles and controversies almost always take place when new technology is developed or put into use - in separate organizations (Eriksson-Zetterquist et al., 2009) as well as in whole industries (Misa, 1992) or even entire societies (Akrich, 1992).

This human-technology interaction in society and organizations described above has interested researchers for a long period of time, and various theoretical viewpoints on how technology and humans affect each other have been presented throughout different time periods (Orlikowski, 1992). During the 1960s and 1970s, numerous researchers (e.g. Perrow, 1967; Hickson, Pugh, & Pheysey, 1969; Aldrich, 1972; Blau et al., 1976; Shepard, 1977) advocated that technology was something external which, when implemented, had deterministic impacts on organizations. For example, these authors argued that technology itself is able to change organizational structures and increase employee productivity. However, they did not consider the fact that humans may choose how to interact with technology, something that was further elaborated by other researchers (e.g. Child, 1972; Markus, 1983). These scholars stated that technology should be seen as a product of shared human interpretation, and that humans are shapers of technology. Therefore, they argued that technology does not have such deterministic impacts as the first group of researchers had claimed, but rather that technologies are shaped by the people using them. However in the 1980s, both these viewpoints were criticized by a third school of researchers (e.g. Bijker, Hughes, & Pinch, 1987; Orlikowski, 1992; Akrich, 1992; Bijker & Law, 1992; Bijker, 1995) who argued that technology should be seen as a mix of the two earlier perspectives. This third view is today broadly referred to as 'Science and Technology Studies' (STS) (Orlikowski, 1992). This last group of researchers argued that technology affects social structure and that the people working in organizations simultaneously moderate the technology they work with. Bijker (1995) describes this as the two sides of a socio-technical coin that emerges during the construction processes of artifacts and social groups, and states that "the technical is socially constructed, and the social is technically constructed" (p. 273).

In this article, we study a major technological change that recently took place within the administrative department of an insurance company. The company went through a number of smaller reorganizations in which several new IT solutions were implemented between 2010

and 2013, and this event will henceforth be collectively referred to as the 'transformation program'. These changes affected the employees' work tasks and procedures and have also broadened their knowledge of IT since they needed to work in, and maintain, the IT systems – something that in turn has affected their social roles and workplace politics. Hence, the transformation program is relevant to study from a human-technology interaction perspective. The major purpose with the program was to increase the productivity of the company, and according to the management, productivity has increased by 70 percent since the program was first initiated. However, several aspects of the transformation program and its effects have not been looked into by the management, including the ways in which the work tasks have changed, how the employees interact with the new technology, and the consequences these changes have had on the social setting.

According to Bijker and Law (1992), it is important to study the social shaping of technology for several reasons. Technology shapes the way people conduct their lives at work and at home. It also affects people's health and consumption patterns, and the ways in which people interact with and control each other. Hence, Bijker and Law (1992) claim that the study of technology has both a political and social relevance. In recent years, it has been identified that there is still a need for including technology in management studies (Orlikowski & Scott, 2008). With this as a starting point, our first aim of this article is to investigate how the introduction of new technology can affect tasks and formal roles of employees, and how employees in turn can affect technology. This allows for an understanding of our second aim, which is to investigate how work politics and social roles can be affected by the implementation of technology.

This article will first provide a theoretical framework describing concepts from STS. Later, a description of the methods used to conduct and analyze the study will be provided, starting with a background description of the case company to provide the reader an overview of the context in which the company operates. Our findings have the following disposition: First, we describe the outline of the company prior to 2010 to provide the reader a fuller comprehension of the entire process of change within the organization. Second, the directly visible changes are described, that is, the formal changes within the different processes. Finally, we describe the altered workplace politics and the changes concerning the social roles of the employees. In our discussion we will first outline a descriptive result, and later analyze the technological change by using elements from the STS framework.

An Introduction to STS

STS includes different approaches, where Social Construction of Technology (SCOT) and Actor-Network Theory (ANT) are seen as major ones (Bruun & Hukkinen, 2003; Cressman, 2004). SCOT was first introduced by Trevor Pinch and Wiebe Bijker (Pinch & Bijker, 1984; Pinch, 1996), and the theory argues that technology is shaped by human action and cannot be understood without understanding the social context in which it is embedded. There are three central concepts of SCOT: 1) Interpretive flexibility, 2) relevant social groups, and 3) closure and stabilization (Pinch & Bijker, 1984). The second above-mentioned theory, ANT, has its origins in the work of Michel Callon, Bruno Latour and John Law (Callon & Latour, 1981) and does not differentiate between human and nonhuman forms of agency, or between science

(knowledge) and technology (artifacts). Latour (1987) explains that ANT is centralized around the terms of actors (active participators) and actants (passive participators), which together form actor-networks. Actors and actants can be in form of both people and artifacts, and it is important to note that not only humans, but also objects, can function as active actors (Latour, 1987). In ANT, the concepts of 'black boxes' (Latour, 1987), 'de-scription' of objects (Akrich, 1992) and 'obligatory passage points' (Callon, 1986), are central. All above-mentioned central concepts of SCOT and ANT will be described further down in the text.

The Design and Use of Technology

According to Orlikowski (1992), a technology may be designed by people in one organization, built by people in a second one, and finally, used by people in a third. When this is the case, the people involved in the development and design of the technology most often work under conditions that differ from that of the end users, and consequently these designers have differing perceptions of the technology as well (Orlikowski, 1992). In order to overcome this, Akrich (1992) explains that the designers of technical objects inscribe visions and competences into the objects they design. By this, she means that designers have visions of how the users should interact with the technical object that has been designed. In order to facilitate for the users and make them understand how to use the object as intended by the designer, 'pre-scriptions' in the form of contracts or instructions often accompany the object (Akrich, 1992). If the user has enough background information and/or knowledge regarding the object or its intentions, the script may be obvious and the object may be used in a way that does not radically differ from the intention of the designer. However, it is up to the users to decide if they will read the 'script', i.e. follow instructions, or 'de-script' it, which means not follow instructions but interpret the object in their own way (Akrich, 1992). According to Orlikowski (2000) the users sometimes ignore, alter, or work around the script either in error, or, intentionally. When users of the technical object interact with the object, a network between the human actor and the object is formed whether they are reading the script as intended by the designer or de-scripting it (Akrich, 1992). Technologies are socially constructed, which means that users can modify the object, for example when existing functions fail or when new standards are set – and in this way, it becomes possible to use it in a way that is not in accordance with what the designers intended (Orlikowski, 2000). However, it is worth noting that human agents always are influenced by the institutional properties of their environment when acting on technology – whether they are designing it, redefining or even resisting it (Orlikowski, 1992).

Akrich (1992) explains that technical artifacts can have inscribed competences that are able to measure the user's behavior, and that these objects are able to function as tools of control that promote a certain moral behavior of the user. She illustrates this with an example from a case study of hers, in which an electricity company provided their consumers with electricity meters that were supposed to function as moral delegators in order to measure how much electricity the consumer should pay for. However, some of the users in her case made illicit connections in order to steal the electricity, which was possible since the meters were not designed to measure illegal taps of electricity. Consequently, the company was unable to uncover illegal consumption, and the purpose of the meters as moral delegators failed

(Akrich, 1992). Orlikowski (1992) explains that the inscribed competences in technology both enable and constrain the activities of human agents. Relying on technical tools in a workplace may facilitate the work of the employees and enable them to perform certain tasks, but the tools may also hinder their ability to think outside the established boundaries. One of the respondents in her field study about an IT implementation made an analogy between the newly implemented workplace tools and a pack of cards: "[Y]ou have to pick a card out of the 52 available; you can't pick the 53rd" (p. 417). By saying this, the respondent implied that the tools could have a limiting effect on the employees and make them unable to see possibilities beyond the system. The ideology of the company and its employees, as well as already existing bases of expertise and power, significantly influence what technologies are used and how they are used (Orlikowski, 1992). To what extent the users have the possibility to refuse, ignore, reject, or adopt a technology is largely dependent on the context (Orlikowski, 1995), but also, how technology is perceived (Pinch & Bijker, 1984).

Perceiving the Artifact

Latour (1986) explains that different artifacts can make some people look powerful in the eyes of other people. Power can be transferred by technologies or objects in a network to strengthen the bonds between different actants. For instance, the clothes of a manager can be illustrative of power although they are nonhuman. Another example is the tattoos of a clan which define the power within that network and provides the definitions of the clan, i.e. different tattoos demonstrate the different statuses of the clan members. Power is, according to Latour, a consequence of an interaction between actants; it is never power itself that creates the turn of events, but rather it is the turn of events that define how and where power is created (Latour, 1986).

Law and Callon (1992) state that the same object may mean different things to different social groups, and that objects are shaped by their specific organizational circumstances. According to Pinch and Bijker (1984), technical artifacts are culturally constructed and interpreted, something they refer to as *interpretive flexibility*. By this, they mean that different people will think about and interpret the same technical artifact in different ways because of different backgrounds and earlier experiences. The authors also stress that different social groups may have radically different interpretations of one technical artifact. There is also flexibility in how technology is designed since different designers will have different viewpoints on what parts of a technical artifact are the most important ones (Pinch & Bijker, 1984). Pinch and Bijker (1984) illustrate an example of interpretative flexibility by investigating what the high-wheel bicycle, which was developed in the 1870s, meant to different groups of people. Younger men saw it as a virile, high-speed bicycle which they could use in order to impress, while groups of women and older men first and foremost saw the lack of safety and therefore regarded it as dangerous. Different social groups within the same organization can in similar ways have different perceptions of the same technological artifact (Pinch & Bijker, 1984). These groups belong to what Bijker (1987) refers to as different *technological frames*, and are defined by Orlikowski and Gash (1994) as the core set of assumptions, knowledge and expectations of technology that a group or community collectively holds. These interpretations are formed and constrained by the different groups'

purposes, setting, knowledge base and the technical object itself (Orlikowski & Gash, 1994). Hence, in the case of the high-wheel bicycle, it could be suggested that the younger men and the women/older men had different technological frames.

The success of a newly implemented technology is to a large extent dependent on how willingly *relevant social groups* adapt to it (Bijker, 1995). For a group to become a relevant social group, the artifact in question must mean something to all group members (ibid.). In the case of the high-wheel bicycles at the end of the 19th century, Pinch and Bijker (1984) provide an example of the 'anti-cyclists' as a group that became a relevant social group when the group members started to interact with the bicycles. This group had at first no direct contact with the bicycles, but started to demonstrate their dislike for the new invention by thrusting sticks into the wheels when other people were cycling down the street. This behavior illustrates that the bicycles indeed had become meaningful to them, albeit in a negative way, and the 'anti-cyclists' could now be considered a relevant social group (Pinch & Bijker, 1984). In situations where there are two or more entrenched relevant social groups with competing technological frames, an argument that is considered highly important in one frame may carry little weight in the other (Bijker & Law, 1992).

Bijker (1995) claims that political and power dimensions construct the formation of technological frames, and through the technological frame power can be exercised in two ways. The first way is through *micro-political power*, which can be interpreted as the power struggle going on between actors or relevant social groups before a dominant technological frame has been set. Power can also be exercised through *semiotic power*, which Bijker explains as when the power is fixed and the technological frame has been stabilized. If a technological frame has already been built up and stabilized during the interaction between the members of the social group and the artifact, this might limit the flexibility of later meaning attributions or at least influence it to a large extent. Bijker (1995) therefore points out that these two ways to exercise power influence each other; the micro-politics ultimately result in semiotic power, and subsequently the semiotic power influences new micro-political structures. This brings us to our next section; how networks are stabilized when the interpretation of an artifact made by a relevant social group becomes dominant, i.e., reaches closure.

Stabilizing the Network

The first step of semiotic power is when interpretive flexibility is reduced and one particular interpretation of an artifact or technology is 'locked in', i.e. the voices that may question the interpretation are silenced and controversy fades away. In this way, the interpretation reaches a stable state of *closure* (Misa, 1992; Bijker, 1995; McLoughlin, 1999; Bruun & Hukkinen, 2003). Misa (1992) explains that closure is a social process, which involves the creation or restructuring of power relationships between social groups. Before closure is reached, it is common that different actors struggle to achieve a state of closure that benefits themselves (Misa, 1992), something that could be related to Bijker's (1995) concept of micro-political power. More powerful and dominant social groups, or powerful members of relevant social groups, will establish their interpretations of the artifact as the most appropriate one, and when all competing solutions are eliminated as a result of the technological frame of this relevant social group, closure is reached (McLoughlin, 1999). Misa (1992) adds that because of

this, closure is not merely reached because someone has found the best technical solution; it is rather a reflection of the interplay of different interests and power.

The concept of closure within SCOT can be related to ANT's term *black box* (Pinch & Bijker, 1984; McLoughlin, 1999; Bruun & Hukkinen, 2003). Latour (1987) defines a black box as a term that refers to when many different elements combined act as a complete whole. This could be a car, a bicycle or any technical object that operates as it ought to, but the complex sociotechnical relationships that were combined or the ideas that took place prior to the technology becoming a stable entity, remain invisible (Latour, 1987). The concept is used to define an unquestioned acceptance of a combination or network of ideas, artifacts and elements that become objective truth (Cressman, 2004). When technology through fixed attributions becomes black-boxed, it loses its connection with the human agents who previously designed it (Latour, 1987; Akrich, 1992; Orlikowski, 1992). However, if the black box has not been closed yet, there is a need of a mediator who can create links between the technical content of the object and the users (Akrich, 1992). This mediator can be in form of both the innovator or the user (ibid.) Through this fixed technological frame the artifact cannot easily be moderated and forms part of a social institution – in a way, determining social development (Bijker, 1995). Orlikowski (2000) explains that when employees of an organization engage with a technology in similar ways, for example have comparable on-the-job experiences and shared socialization, the way in which they interact with a technology may become institutionalized and taken for granted within that organization. This may in some cases impede change, since the technology will function as a prescription for the social action of these people (Orlikowski, 2000). However, although technology is often treated as a black box by its users, the designers of the technology often adopt an open system perspective, i.e. tend not to regard it as a closed system or an objective truth (Orlikowski, 1992). Moreover, the more complex and darker the box, the more it has to be maintained by people (Latour, 1987; Nye, 2006). Akrich (1992) provides an example of a car to illustrate this. Today, cars are used more than ever before, and the Western society is nowadays built for car users. A large number of people are employed in car-related tasks, whether they are automobile insurance experts, policemen, mechanics or tax collectors. This was not the case when the first cars were introduced, and just functioned as means of transportation (Akrich, 1992).

If a crucial element within the black box fails, the box will not function as intended. This is similar to how any network will fail if one specific, crucial element within it stops functioning. Callon (1986) terms this crucial element as an *obligatory passage point*. Denis, Langley, and Rouleau (2007) define obligatory passage points as "the creation of nodes through which all actors must pass in order to obtain what they need" (p. 184). Without the obligatory passage point, the different actors in a network cannot interact in a proper way and the entire network breaks down (Callon, 1986). This way, the obligatory passage point becomes an indispensable actor to the other actants within the network, and Callon (1986) highlights that it can be in form of both human and non-human actors. A famous example illustrating this is Callon's (1986) study of an attempt to cultivate scallops in St. Brieuc Bay in France. Fishermen had for a long time fished scallops there, and the scallops had been systematically exploited to the verge of extinction. Therefore, a group of researchers were asked to help the fishermen to cultivate scallops by using a Japanese method. In this case, the network was composed by the researchers and the fishermen who were the human actors, and

the larvae that were planted in the bay in order to grow into scallops were nonhuman actors. All these actors were in fact obligatory passage points, since the cultivation of scallops would not be possible if any of them were to be removed from the network. However, this was what actually happened when the scallops refused to anchor in the bay, something that the other actors had not taken in account. Therefore, the entire project collapsed and the scientists failed in their attempt to bring together heterogeneous actants within the network and make them work together towards a common goal (Callon, 1986).

Theoretical Discussion

Previous research contains much debate regarding whether or not SCOT and ANT as constructivist theories are able to be integrated with each other (MacLaine Pont & Thomas, 2012). Research often highlights the main differences between SCOT and ANT, namely that the SCOT perspective considers humans superior to technology (Pinch & Bijker, 1984), while in ANT, human and nonhuman actors have the same status (Latour, 1987). However, general frameworks have been developed arguing that ANT and SCOT complement each other in important ways. Bruun and Hukkinen (2003) explain in their framework that SCOT identifies different social groups with different interpretations of a certain artifact as the primary driver of change; one that ultimately acts to stabilize the artifact after closure of controversy. ANT, on the other hand, identifies both humans and nonhuman elements as drivers of change and views technological change as a network that is created after actors have been successfully translated. The authors highlight that SCOT merely explains the notion of closure as a result of one relevant social group redefining the problem; it fails to explain the complexity of the action and interaction of the social groups. ANT offers in this way valuable insight into the mechanics of closure, since it cannot be assumed that the relevant social group shares the same coherent, homogeneous interests (Bruun & Hukkinen, 2003). Drawing on this research, other scholars (MacLaine Pont & Thomas, 2012) have demonstrated that concepts of ANT can be incorporated into SCOT through the notion of 'sociotechnical alliance', enabling an analysis with constructivist theory using both micro and macro dynamics. Integrating ANT into SCOT helps this way study the movement of sociotechnical practices between relevant social groups and across technological frames (MacLaine Pont & Thomas, 2012). Both SCOT and ANT perspectives, however, involve aspects of power struggles and politics (e.g. Latour 1987; Akrich, 1992; Misa, 1992).

Our case includes elements of both strong relevant social groups and strong agency of technology, and therefore we will discuss it from an STS viewpoint that includes elements from both SCOT and ANT. The objective of this article is not to discuss how SCOT and ANT are related to each other within STS, but rather we found it necessary to include elements from both these theories in order to make for a better analysis of our case. The reason for this is that SCOT focuses on interpretive flexibility and technological frames of social groups rather than independent actors, which allows for a better sociological understanding of the group dynamics within our case, in relation to the construction of technology. ANT does not, for instance, explain the action of different actors in relation to their social context in the way that SCOT does (Callon, 1999; Bruun & Hukkinen, 2003) and research has acknowledged that ANT is poorly equipped for addressing a critical account of organizations (Whittle &

Spicer, 2008). However, part of the case is also to a large extent focused on technology as an independent actor – often one that indicates more signs of agency within the network than some of the human actors. This makes an analysis of the case without including elements from ANT difficult. By analyzing our empirical material with concepts from both ANT and SCOT, we add a practical example to the STS literature of how ANT and SCOT may be included in the same study.

Methodology: Introducing the Case Company

The studied company, hereby referred to as AdmCorp, is formally a subsidiary of an insurance company, but functions as its administrative department. The insurance company is in turn owned by a large bank, which is also the exclusive customer of the services provided by both the insurance company and AdmCorp. The end-users of the services, however, are personal and commercial policyholders. A large part of the insurance sales to new policyholders is done by the bank, which functions as an intermediary between AdmCorp and the policyholders. The company offers, as indicated above, personal insurances (e.g. health and life insurances) and commercial insurances (e.g. group health insurances offered to companies) and holds approximately 80 employees, most of which work as underwriters or administrators. The administrators at AdmCorp register applications, change existing insurance terms, send letters to policyholders and can in some cases approve insurance applications immediately. However, if the potential policyholder indicates signs of health problems, the application is handed over for approval to an underwriter, who has medical expertise and is therefore able to perform risk assessments. If the underwriter is in need of more information than what is included in the application form, this can be obtained by phone interviews or patient records ordered from local clinics or hospitals.

The transformation program has changed how internal operations are run, but the company's core business - to administer insurances - remains to a large extent the same. Prior to the program, the employees had been working in the same manner for approximately 25 years and the transformation program was initiated to increase customer satisfaction in order to increase profitability. The transformation program included:

- *The implementation of new technology:* The reduction of physical case files in order to become 'a paperless office', the implementation of new IT systems, the outsourcing of all incoming and outgoing mail.
- *New work practices and overall streamlining:* Process mapping in order to reduce steps within end-to-end processes; the introduction of demanded improvement proposals from employees related to cost- and lead-time cutting; increased performance measurement of the employees; new areas of responsibility for the employees.
- *Shifting competences:* A shift in leadership; regroupings of personnel; competence mapping of all employees which resulted both in layoffs and new roles being added to the company – something that in turn demanded new recruitments.

Design of the Study

When studying human-technology interaction, a qualitative case study is preferable since it provides the researchers a deeper understanding of a specific phenomenon or situation

(Silverman, 2011). This makes it possible to examine how people interact with each other in different settings and allows the researchers to include several different data collecting methods in the same study (ibid.). In this study, we have alternately used interviews, observations and document analysis in order to obtain a complete picture of the transformation program and a better overview of the IT systems.

Our data collection period lasted for seven weeks and was divided into four phases, during which we visited AdmCorp's office. Phase one consisted of an informative meeting with our contact person who today is the overall manager of the company, but who initially was one of the three internal management consultants in charge of the transformation program. She provided us with an overview of the transformation by showing us internal documents and suggested four employees to interview in phase two. These interviewees had all worked for several years within the company, and in different groups. They were therefore able to provide us with a picture of what the situation had been like before 2010, as well as an overall comprehension of all simultaneous change initiatives. Since we felt a need to see the different IT systems with our own eyes, we also conducted observer-as-participant observations (Baker, 2006) during phase three and four, in order to see the functionality of the IT systems within all work groups. During these phases, we also conducted interviews with different employees and the former CEO. Currently, AdmCorp has appointed a Chief Legal Officer with no operational responsibility as CEO, and we therefore chose to interview the current overall manager, our contact person, who is responsible for the company's operations. In total, 17 interviews were conducted, 10 hours of observations were carried out and we studied 35 internal documents and 60 photos.

Data Collection

We conducted semi-structured interviews, which generate responses that are generally easy to compare, while still maintaining an open and flexible interview environment in which the interviewees share more detail in their stories (Knox & Burkard, 2009). During the interviews we used a list of subjects and questions that functioned as an interview guide (Bryman & Bell, 2011), ensuring that all topics had been covered by the end of each interview. The interviews lasted between 45-80 minutes, which made it possible to probe more deeply into the personal experiences of the employees. The four first interviewees mentioned some of their other colleagues and since we were allowed to pick and choose our interviewees within the company, we asked our contact person to schedule these individuals for interviews in our following phases. Hence, it could be argued that we chose our interviewees in accordance with the snowballing method (Bryman & Bell, 2011). In order to obtain a broader understanding of the transformation, we consciously selected employees from all different work groups (see table 1), of which some had worked in the company for many years and some had started to work in the company during the transformation program. This helped us to maximize the depth of the data (Dicicco-Bloom & Crabtree, 2006). Many of the interviewees hold new positions due to the transformation program. For example, two of the current employees were previously managers, and only one of the current managers has continued in her position as manager throughout the change. Two of the interviewees are Superusers, and three of the interviewees are improvement proposal responsible, which will be described in more detail in the empirical section.

Department	Position	# of interviews
Management	CEO (former)	1
	Overall Manager (current)	1
Internal Administration	Employees	2
Personal/Commercial	Managers	1
	Employees Personal	1
	Employees Commercial	1
Payout	Managers	2
	Employees	1
Risk Assessment	Employees Personal	2
	Employees Commercial	3
	Employees Insurance Claim	1
External	Risk Manager	1
TOTAL		**17**

Table 1. The chart shows the current, formal positions of the interviewees, however it should be noted that these position have shifted over the past years.

All interviews were recorded and transcribed, which is beneficial since it makes it possible for the researchers to concentrate on the interviewee and ask attendant questions rather than taking notes (Bryman & Bell, 2011). A general downside of interviews is that they are subjective and only include the interviewees' own interpretations of the world, and that people sometimes have trouble remembering (Czarniawska, 2013). Therefore, we also chose to conduct observations and study documents for a more complete picture than the interviewees were able to provide us with.

In total, we spent six entire work days at AdmCorp's office, which enabled us to conduct different types of observations. We conducted observer-as-participant observations (Baker, 2006) of people working in the IT systems, which included casual, informal conversation (Jorgensen, 1989). The employees showed us how they handle the case files, which gave us a picture of how they interact with the technology and how the systems are interlinked. This provided us with a better understanding of what the processes had looked like earlier and in what ways they had changed. During our last visit, we also attended one of their formal monthly meetings. Finally, in between interviews, we were given the benefit of participating in informal gatherings, for instance by attending lunches with the employees, being showed the different departments of the company or drinking coffee in the staffroom. This gave us valuable information about how the employees interact with each other, and functioned as a complement to what was said during the interviews.

To examine organizational documents can provide the researcher important background information about the studied company (Bryman & Bell, 2011). We were provided PowerPoint presentations from meetings, internal reports and photos of what the office had looked like before the transformation, which helped us create our first interview questions. Furthermore, the documents have functioned as a complement to the interviews and observations, and have given us a broader understanding of the change journey that the company had gone through. Especially the photos enabled us to conduct visual analysis (Czarniawska, 2013), and confirmed the disorganization that the employees spoke of in the interviews.

Data Analysis

The four phases of data collection made it suitable to use grounded theory, which is a constant comparative analysis when analyzing field material (Glaser & Strauss, 1967). In phase two, we conducted our first set of interviews which were coded and categorized into concept cards (Martin & Turner, 1986). The first data set resulted in 25 concept cards and included a wide range of themes. After careful consideration, we decided to focus mainly on how the entrance of new technology created new tasks and roles, and how the work politics shifted, which was a strongly recurring theme in all four interviews. We hereby altered some of the concept cards and re-categorized the data to better fit our study, and in phase three, our interviews focused mainly on the technology and how it had changed the working conditions and roles of the employees, also related to how the political landscape had changed. The data was re-categorized again between phase three and four and our final set of interviews mainly focused on the changes directly related to the removal of physical case files, the computerized systems and the tools used to affect technology in different ways (e.g. improvement proposals and process mapping). Other themes discussed included the social setting during and after the regroupings, the new skills that were demanded of employees and how the social setting was affected when new, more technologically curious employees entered the company.

Findings: Identifying a Need for Change

Before 2010, all documents and policies were stored in physical file cabinets. There was no direct order within the cabinets, and for instance some employees could sort the files in alphabetical order and others by personal identity numbers, something that complicated the process of quickly locating the correct case file. Employees also brought documents from the file cabinets to their own desks without notifying colleagues or indicate in any way that the document had been removed from the cabinet. This meant that if another employee were in need of the same document, for example when a policyholder or bank employee requested information from the policy, it was impossible to trace the document. As a consequence, the employees at AdmCorp wasted large amounts of time searching for papers, and in some cases lost documents were never found again. One of the employees illustrates the problem by explaining:

> We had huge piles of case files lying everywhere. It was insane. We ran around looking for the right document like lunatics!

The work processes included plenty of steps. The way in which incoming mail was received is an illustrative example (see figure 1): First, all incoming mail arrived at the bank's headquarter where it was opened and subsequently the documents were sent to AdmCorp by a special delivery car. Employees within the Internal Administration group at AdmCorp were responsible for sorting, scanning and distributing the incoming mail within the company to the different departments depending on the insurance type. The employees in the different departments took turns counting and sorting their group's mail and made sure that it was distributed to the right administrator or underwriter. As a result, it could take days from that a policyholder sent mail to AdmCorp until the case was examined. The sorting process also stole time from other work processes. Our interviewees estimate that the time spent sorting

the mail lasted between 45 minutes and two hours per group and day. The printing and sending of mail to the company's policyholders were also time-consuming tasks. The administrators could finish a case file, create a letter, print it, put it in an envelope and amass it with other envelopes on his or her desk. This meant that mail was sometimes not posted on the same day as it was created. Moreover, all computers in the office were connected to a single printer, causing a large backlog of print jobs which in turn decreased process efficiency.

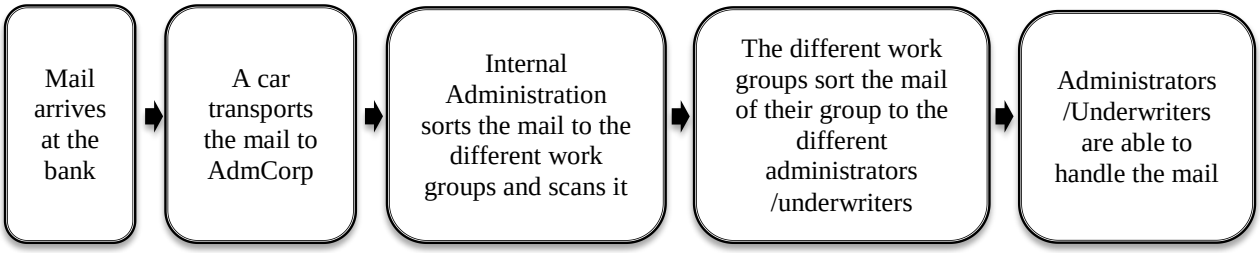

Figure 1. The process of receiving incoming mail prior to the transformation.

Also, the process of approving insurances was time-consuming, and the process surrounding health insurances is an illustrative example of that (see figure 2). Before 2010, the underwriters spent all their time assessing risks by verifying the health status of the policyholders. They did not perform any administrative tasks at all since they had administrative assistants working with them, so called 'risk administrators'. The process could be as followed: A prospective policyholder's application arrived, an insurance administrator registered it and handed it over to an underwriter, who did the first medical risk assessment. If more details were needed, the underwriter asked the risk administrator to order a phone interview transcript or a patient record. When these documents arrived, the risk administrator printed it and put it on the underwriter's desk. When the underwriter had decided whether the policy could be issued or not and on what terms, the risk administrator printed and sent the policy to the policyholder. This was a time-consuming process including many handovers between the insurance administrators, underwriters and risk administrators and consequently, the lead times of issuing policies were long.

Figure 2. The process of approving a health insurance application prior to the transformation.

However, the long lead times were not considered a large problem since most of the employees at AdmCorp were not given any personal directives or goals regarding how many cases they should perform in a day. The interviewees who worked at AdmCorp prior to the transformation program stated that they were unaware of their performance level and that they

considered their own and the company's performance as 'satisfactory'. Because of the general disorder and the long lead times, the customer service level was inevitably low. The bank employees, who were in direct contact with the policyholders, were dissatisfied with AdmCorp's performance and rated them poorly in recurring evaluations. Several interviewees have described this situation as a vicious circle: When the disorder became worse and the processes too slow, the bank employees called and complained, which gave AdmCorp's employees even less time to address the problem and perform the work tasks. Consequently, this led to even more irritation among the bank employees and policyholders.

Prior to 2010, the insurance administrators worked in groups that were divided according to insurance products, e.g. endowment policies, group health policies or pension policies. There was also an additional group consisting of underwriters that only handled the risk assessment for the different products. The risk administrators, who performed administrative tasks related to risk assessment, were also included in this group. One of the underwriters explains that the workplace politics at the time implied that some groups had more power than others:

> The underwriters formed a highly cohesive group. They had managed to get a lot of authority, and they used to have a manager back in the days that had supported that development. They had become very powerful.

The general perception regarding some of the underwriters prior to the change was that they had afforded themselves a 'higher status' than the risk administrators and insurance administrators. This was pointed out by many of our interviewees, including some of the underwriters themselves, and seems to have been directly related to their expertise and experience within the field of medicine. Before the transformation program started, the risk administrators were described by many of our interviewees to rather function as 'personal assistants' for the underwriters than equal colleagues, since the underwriters sometimes acted in a superior manner towards them. One of the former risk administrators explains:

> The underwriters often considered themselves to be 'better' than us. We ordered their patient records for them. They couldn't even scan their own documents. They sat right next to the scanners but walked all the way over to us so that we could scan for them - even though they were sitting right next to the machines.

The Introduction of New Technology and New Work Practices

The program was initiated in combination with the entrance of a new CEO who from the outset felt a large need to streamline and modernize the organization. She explains that there was no real structure, and although the employees themselves felt that they were in control of the situation it was impossible for her to get an overview of the operations or an idea of how long the lead times actually were. Assisted by three internal management consultants from the transformational department at the bank, the CEO begun mapping all work processes together with the employees. Another early initiative within the transformation program was the reorganization of physical case files and the move towards a paperless office. The first step was to add structure to the already existing filing systems in order to minimize the number of lost

case files and in turn, shorten the lead times. After the physical papers were better structured within the filing cabinets, the work towards becoming completely paperless began. The physical archives were gradually removed as more and more work processes became computerized.

Several technological solutions provided by different external providers have been implemented since 2010. Figure 3 provides an overview of the main systems, how they are related and a list with the acronyms. Incoming Mail (IM) is a company that scans physical mail and converts it into PDF files, which are sent to the Electronic Mail Handling System (EMHS), where employees at AdmCorp can access the files. The employees work in two different case handling systems, of which one, the Automatic Case Handling System (ACHS) was implemented in 2012. The other system, the Manual Case Handling System (MCHS), has been used at AdmCorp for several years, but has been updated to fit the new demands.

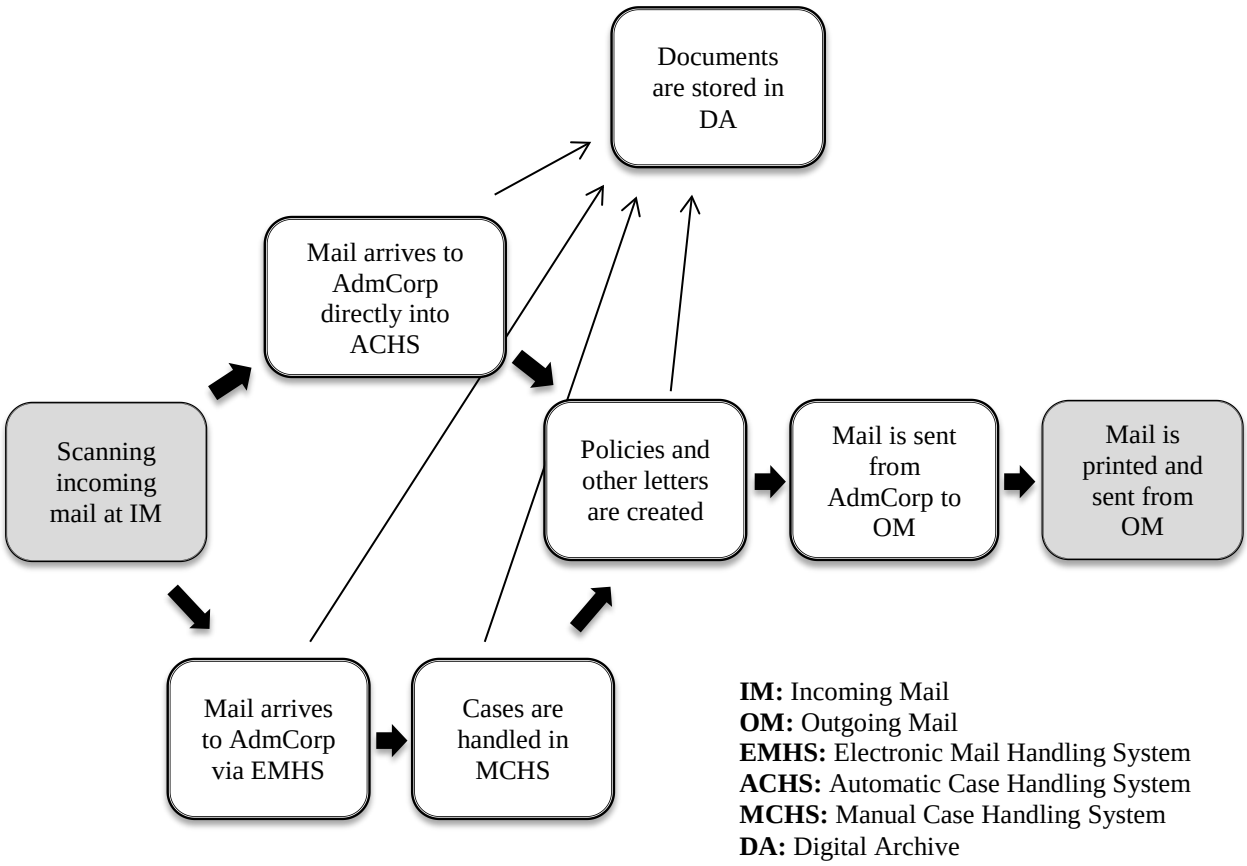

Figure 3. An overview of the new technological solutions. Tasks in the gray boxes are outsourced to external companies, while tasks in the white boxes are performed in-house.

Outgoing Mail (OM) is a company that prints and envelopes mail from AdmCorp, and sends it to the policyholders. Instead of having physical file cabinets, the documents are today archived in a Digital Archive (DA), which has taken over the role of the physical file cabinets. This way, when customers call, employees can easily access old documents via DA by just typing a customer's ID number in the computer system. Further explanations regarding EMHS, MCHS and ACHS will now follow.

In the summer of 2012, AdmCorp started to cooperate with IM in order to use the system EMHS, which removed the daily time-consuming process of receiving and sorting incoming mail. Today, all the incoming mail is electronically sorted and goes straight to the group of employees that are supposed to handle it. The employees working in ACHS receive their mail straight from IM without having it pass through EMHS, while employees working in MCHS receive it via EMHS (see figure 3). When a case is finished and a document should be sent to a policyholder, the employee today simply pushes a button on the computer screen and the document is automatically sent to OM, which prints, envelopes and sends it to the policyholder. This way, the employees save time since they do not have to print and envelope themselves. Another benefit is that the policyholders receive their mail faster than before, since the mail is sent out automatically, avoiding the risk of being piled up on a desk for hours. However, although the paperless office was intended to facilitate the workload, this is not always the case. Despite most of work processes being computerized today, the vast majority of them are still manually handled in MCHS. One of the commercial underwriters working in the MCHS provides an example of these manual tasks:

> I have my own little Excel sheet in which I manually add notes on what I have sent out to the policyholder to send back, and then I send an automatic email to myself saying I have to check whether the case files have been sent back from the policyholder or not. And then I manually check different places where the case file might have ended up, and if I can't find it, I send out a reminder to the policyholder.

As this example explains, the incoming mail is not matched automatically in MCHS, and the administrators and underwriters working in this system have to keep track of their incoming documents manually. When performing their tasks they use two computer screens where they have the documents from EMHS (e.g. customer applications) on one screen, as they work simultaneously in MCHS on a second screen. By doing so, they are able to copy-paste information from the applications (e.g. policyholders' social security numbers) straight into MCHS – something they had to type in manually before when they had the application in the form of a paper on their desk. Several of the interviewees state that the copy-pasting reduces the number of errors, but since the work within MCHS is manual, some of them do not feel that they gain much from the computerization. They feel that they would be able to work faster and handle a higher number of case files per day if they would work in a fully automated system, as the employees working in ACHS. The majority of the personal underwriters work in the ACHS, which is considered by all interviewees as much easier to work in than MCHS. One of the personal underwriters explains:

> Say for instance I need to read a patient record in order to be able to assess the risk of a policyholder. In ACHS I can just click a button, and the system automatically sends out a request instantly. I don't need to print anything myself, everything is printed by OM and sent out automatically. Then, when the clinic has sent the patient record to us, it is scanned at IM and automatically matched by the system with the policyholder's case files in ACHS, which in turn immediately notifies the underwriters that the record has been received.

Something the employees perceive as problematic with ACHS, however, is that the system is not very flexible. An illustrative example is the fixed letter templates that the system creates. During one of our observation sessions, we noted that a need sometimes arises to customize templates and add additional information to the policyholders, something that the system counteracts. The employee may try to add a note in the predetermined template, but this can become contradictory and thus confusing for the policyholder. One employee points out that some of the systems have a built-in function that prints documents although they have not been instructed to do so. Since this is not in accordance with the vision of a paperless office, the idea emerged to install so-called 'ghost printers', which the IT systems perceive as physical printers although no actual paper is printed.

One of the highest priorities within the company today is to continuously develop the operations, processes and systems in order to stay competitive and maintain a high level of service. In order to do so, AdmCorp is now working with process mapping. To map a process means that one investigates a process, for instance the process regarding health insurances that has been described earlier (see figure 2). All the steps within the process are traced and documented in order to become concrete, visible and understandable. The process mapping has been considered important for several reasons. First, to identify priorities in the development of the new IT systems in order to facilitate the work. Second, to obtain an overview regarding all processes with the goal of minimizing the number of steps in the end-to-end processes. Third, to act as an educational tool to facilitate the overall understanding of the work processes for the employees and to make them recognize the time wasted in unnecessary elements. To map the processes was also a demand from an external audit, who wanted to see what potential risks the processes contained. In 2010, one of the management consultants arranged process mapping workshops, in which employees were assigned the task to map the processes their groups were involved in. Processes are still mapped continuously at AdmCorp, and since 2010, over 80 processes have been mapped. The already finished process maps must be maintained and updated, therefore, the employees now have responsibility for a number of process maps that they need to update, preferably once a year. AdmCorp has plans to map all processes, a task which has not yet been accomplished - and for this reason one of the interviewees will receive additional education regarding the process mapping.

Today, a high priority at AdmCorp is to shorten and reduce the number of handovers in the end-to-end processes, since the process mapping has helped employees to understand that too many handovers create longer lead times. The way the risk assessment process has changed is one of the best examples of that. The handovers between risk administrators and underwriters (see figure 4) were time-consuming, so it was decided by the management that the formal role of the risk administrator should disappear and that the underwriters should start to perform a wider range of tasks, including administrative tasks. The result of this is that the underwriters today order the interview transcript and patient records themselves and also deal with other administrative tasks, such as sending policies to the policyholders when a decision regarding the policy has been made. As a result, the number of handovers has decreased drastically, something that has led to shorter lead times. This is shown in figure 4.

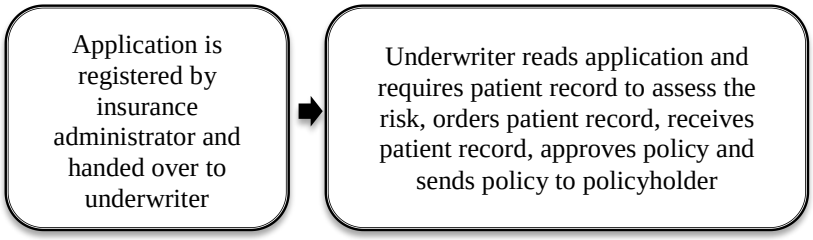

Figure 4. The process of assessing health insurances after the transformation. Compare to figure 2.

Another factor that has strongly affected the employees' productivity is the usage of more strict performance measurements that have been implemented in conjunction with the IT systems. Today, all employees have a personal performance development plan in which specific quotas for the number of cases that they must handle are clearly outlined, and consequently their salary is connected to how well they fulfill this goal. There is a function built into the IT systems that keeps track of each case file that an underwriter or administrator performs so managers can measure and track how many cases a certain employee has performed on a specific day. Many of the interviewees state that the process mapping, the improvement proposals and the increased performance measurements have created a much more performance-oriented culture than before.

AdmCorp has also introduced the concept of improvement proposals as a method to continuously improve the company's performance. The improvement proposals may regard the IT systems as well as the daily routines of employees, work processes or any minor changes that could improve the performance of the company and help cut costs. The improvement proposals force the employees to actively question and analyze their work and work processes on a daily basis, for instance "How can we perform this process even faster?" or "This error always occurs, how can we remove it?" During the time frame of the transformation program the employees have submitted 600 proposals on how to improve productivity, of which 40 percent have been fully implemented. All employees are required to deliver and fulfill a fixed number of proposals each year, which some of our interviewees feel positively about, while others describe it as a demanding task that adds extra pressure. Every group collects their proposals in a shared Excel spreadsheet, where the employees can add their proposals - a procedure that in itself has been perceived as demanding to some. One of our interviewees told us that she likes the idea of improvement proposals, but that she felt insecure about the idea of an electronic spreadsheet and had therefore told the manager that she could not deliver any improvement proposals:

> We can laugh about it now, but in the beginning I felt: "No, I don't think this will work. No, I can't learn this. No, I don't know how to fill in the spreadsheet. I'm not very good with computers." Then my manager decided to remove this part for me and told me "We'll meet once a week and you can tell me your proposals for improvement and I'll fill it in for you." and all of a sudden my problem regarding the improvement proposals disappeared.

Each group has appointed one employee Improvement Proposal Responsible (IPR). The IPR is responsible to collect the colleagues' proposals and decide if they can be immediately implemented, which often is the case when the proposal concerns minor improvements of a routine. When this occurs, the IPR makes one of the employees within the group responsible for the implementation of that improvement proposal. If the improvement proposal is related to the IT systems, the IPR transmits the proposal to the Superuser. The Superuser role was introduced in February 2013 as a response to the need for a position with knowledge in both the fields of IT and insurance. Prior to the transformation program, the employees' main work system was MCHS, and, by that time, one employee in each group was responsible for testing the new functions that were released from MCHS's provider four times a year in order to make sure that everything functioned as intended. When the new technological solutions and systems were implemented, this responsibility gradually expanded to include the other IT systems as well, and this way, the Superuser role was created. The role is assigned to one employee in each group who works partly with administration or risk assessment, just like his or her colleagues, but the role also includes the responsibility of testing new releases of the computer systems and of reporting incidents on malfunctioning systems. Other responsibilities include cooperating with the employees in all different work groups in order to write proposals of system changes, which is later on taken up with Organizational Development (OD). OD is a department within the insurance company that has among other things the overall responsibility of the different systems, and works as a link between the Superuser and the external system providers. The department existed prior to the transformation program but has now more technical responsibility than before. Employee questions regarding the systems are always first taken up with the Superuser who works closely with OD to improve the systems. One of the Superusers explains:

> OD does not work in the systems the same way we do on a daily basis. They don't work with new insurance applications or the changes of old applications in the systems as we do, so in a way our way of cooperating like this is a good thing because we think different.

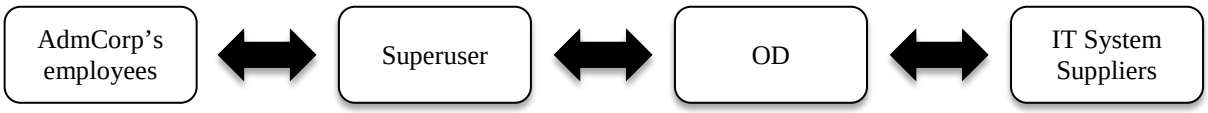

Figure 5. How different actors are related in the development process of the IT systems.

The transformation initiatives have been deemed as a success by managers within both the bank and AdmCorp, since it resulted in a productivity increase of over 70 percent during the time frame of the transformation program. Since the new technology and the new working processes created a need for other types of employees, this drastically changed the political setting and informal hierarchies for the employees.

A Changing Workplace Landscape

In December 2011, a strategic mapping of all the employees' competences was conducted by the managers to assess which employees were fulfilling the future competence requirements. After the competence mapping, it became clear that the company was in need of employees with other competences, and that there were some employees that did not fulfill the requirements. These individuals were in the end asked to leave to company. In combination with the competence mapping, it became apparent that a reevaluation of the existing leadership within AdmCorp was also necessary. All existing managers were asked to reapply for their own jobs, but in the end only one manager out of five was rehired to a managerial position.

In order to fill in the competence gap, new recruits were hired both for managerial and other positions. Among the new recruits were some experienced underwriters that were hired from other insurance companies and also younger applicants who were hired first via staffing agencies but were later offered permanent positions. One of our interviewees was a staffing agency recruit, and today he works as a full-time employee and a Superuser. He was temporarily hired to work at AdmCorp during the summer of 2012, since AdmCorp needed individuals who could work in ACHS which had just been implemented at that time. He explains that neither the ordinary staff nor the temporary workers, including himself, knew how to work in the system, but that he learned the system functions quickly. After the summer, he was asked to stay within the company and overtake the responsibility for testing the new releases of MCHS, even though he had never worked in that system or had knowledge about insurances. He explains how the managers encouraged him to stay:

> They were like "We think you can do this!" and I was like "Sure, fine, I'll try it and we'll see what happens." The first release came right after I was given the responsibility and I knew nothing! I had never worked with the administrative tasks, like all routines regarding new policies, changed policies, payouts... Then this new release came, and they started talking about the new payout function and I was like "What was the old payout function?!" I sat there like a question mark, I understood zero! But the CEO believed in me and gave me a chance. In March 2013, I was permanently employed and at that time, I also became a Superuser.

The other interviewed Superuser has a similar story. In a short period of time, he went from working hourly as a risk administrator to being permanently employed, and in addition he also became IPR for his group. He considers it beneficial and time-saving to hold both positions since it removes handovers and discussions between the IPR and the Superuser and provides him a better overview of the group's improvement proposals. He says that he can immediately see what proposals he should forward to OD, and what proposals can be managed within the group. Both Superusers that have been interviewed have explained that since they have more knowledge about the IT systems than their colleagues, it is easier for them to fix systemic problems that arise since they can either fix the problems themselves because of their technical knowledge, or solve it through their contacts at OD - while the other employees need to go through them if they want to solve a problem in a system.

During the time frame of the transformation program, AdmCorp underwent a number of regroupings. In October 2010, the first large regrouping occurred, and the company went from being product-oriented to process-oriented. With the first regrouping, all product groups

split into groups of processes, i.e. new insurance, change of insurance and payout. The group of underwriters was also split up and distributed within these new three groups. This resulted in changed tasks for all employees. The regrouping was done in order to make maximum use of the different competences, but the CEO explains that there was another underlying reason:

> The risk assessment group was split up before I entered, and this had been done since the cohesion had grown too strong within that group.

The new way of working with technology required the underwriters to perform administrative tasks (see figure 4), something they had not done before. In the beginning, some of the more experienced underwriters who had been in the company for many years found it difficult to adapt to the new tasks. They did not want to work with administration and continued to display old work patterns. For instance, they refused to use the printers or the computers, despite being told to do so by the managers, and they did therefore surreptitiously ask the former risk administrators, who now had been appointed new responsibilities, to administer their cases. At first, the risk administrators complied, but after a while, they grew tired of the underwriters' behavior and informed the managers about these incidents. As a response, the managers attempted to involve the underwriters in the transformation program by offering some of the more resisting underwriters increased responsibility, in the hopes that this would make the underwriters more engaged and willing to change. Seeing that this did not work, a few were offered early retirement and some of them voluntarily left the company.

In December 2013 the second regrouping occurred, going from process-oriented back to product-oriented and the groups were once again split up. Today the work groups are as follows: Internal Administration, Personal/Commercial, Payout and Risk Assessment. In the case of the underwriters, they are once again working together in one group, however with different tasks compared to before 2010. Since many of the underwriters have never done administrative tasks before, some of them feel that they rate poorly in performance relative to their colleagues. However, most interviewees agree that the benefits of working in this new organizational structure outweigh the drawbacks. Today, the underwriters have, according to our interviewees, not nearly the same level of pseudo-authority as prior to the first regrouping. Since most of the underwriters that were resistant to change have left the company and the formal role of the risk administrator has been removed, a feeling of solidarity has been established within the ranks of the workers. Both Superusers explain that they often ask their more experienced colleagues for advice regarding insurance issues, as they are always asked for help when their colleagues experience problems in the IT systems. One of the employees, who previously worked as a risk administrator, says that she feels more respected within the company than before:

> It was an 'us-and-them' mentality, because they thought that underwriters were a little bit better than everyone else. Today it is not like that. Today, all our professions are equally valued.

Discussion: Visible Effects on Work Tasks and Formal Roles

The implementation of the new IT solutions at AdmCorp has resulted in changed work tasks and new ways to run internal operations, something that also has been acknowledged by previous research (Diedrich, 2004; Eriksson-Zetterquist et al., 2009). The most visible effect is that the technology has helped the employees to eliminate many of the time-consuming tasks and procedures. Prior to the transformation program, work was to a large extent done manually by using physical case files. Today, all incoming documents arrive straight into the computer systems as scanned PDF files and are digitally archived. This has diminished the risk of losing important information, in turn decreasing the past dissatisfaction shown by the bank and policyholders since the procedure of finding the right document is quicker. EMHS has changed the manner of performing tasks within the Internal Administration group, since no physical incoming mail is received. Therefore, these employees are able to spend much of their time on other tasks, such as the process mapping. This has also resulted in that employees working in other groups have been able to, through the help of technology, focus a larger amount of their work time on tasks more directly related to insurance, and their productivity has therefore increased.

Although the technological solutions have reduced the total amount of time spent on administration, the time savings are not as high as could at first be anticipated. The maintenance and development of the IT systems require such large amounts of time that the management has considered it necessary to add the role of the Superuser. Also, the work with the improvement proposals requires time, since all employees are supposed to come up with proposals, and in conjunction with this, the IPR role was added. Hence, it could be argued that the implementation of the technological solutions and the improvement proposals have not resulted in actual time savings but rather in a redistribution of effective work time. This proves an illustration of the theories of Latour (1987), Akrich (1992) and Nye (2006); that more maintenance by people is required as technology becomes more advanced. Similar to Akrich's example of how the automobile has compelled the adaptation of entire societies, the new technological solutions at AdmCorp have changed the entire workplace, since the ways of working have adapted to the technologies.

All employees are required to have a broader set of skills today than they had some years ago, since the work processes are now computerized. Someone who is an expert in a specific field of insurance or risk assessment also needs to be able to navigate the systems. The Superusers, whose main expertise is the IT systems, must also have knowledge in policy issues since they perform administration and risk assessment as the rest of the employees, and need to know these tasks well if they should be able to function as intermediaries (see figure 5). Moreover, the formal role of the risk administrator has disappeared - something that has resulted in a wider range of tasks for the underwriters.

Interacting with the New Technology

According to Orlikowski (2000), users can choose if they want to use a technology and in what way they want to interact with it. However, we found that the employees at AdmCorp are unable to choose if they want to use the technology or not. Most of the physical file cabinets have been permanently removed, which requires employees to use the computerized

systems in order to fulfill their tasks. Nevertheless, it is important to note that the employees have in fact also been enabled to recreate the technology in ways that facilitate their work. The designers and builders (i.e. system providers) of the technological solutions that have been implemented at AdmCorp are not the same individuals as those ultimately using them (i.e. the employees), which is in accordance with what has been stated by Orlikowski (1992). Orlikowski (1992) highlights that the designers often work under conditions that differ from those of the users, which also can be noted at AdmCorp since the designers of the technology do not have any expertise within the field of insurance. It is therefore hard for them to know the specific needs and requirements of the employees at AdmCorp.

The IT systems at AdmCorp illustrate an example of a technology where the link between the designers and the users is not yet broken, hence, these IT systems are not yet black-boxed (cf. Latour, 1987; Akrich, 1992; Orlikowski, 1992). Hence, there must be, according to Akrich (1992), some kind of mediator who functions as a link between the technical content and the users. The way in which AdmCorp has arranged the forwarding of improvement proposals to the system providers via the Superuser and OD (see figure 5) can thus be seen as a way of maintaining this link. The improvement proposals can in turn be seen as a tool the employees use for co-designing the technology in order to adapt the systems more to their operations. Since the improvement proposals result in new releases with updated functions, the process surrounding the improvement proposals can be seen as an ongoing process of de-scripting and re-designing, as described by Akrich (1992). It can therefore be said that the majority of AdmCorp's employees have gone from being passive users who used to work in a system that was, what Latour (1987) calls, 'black-boxed' for them, to co-designers (cf. Akrich, 1992) who take an active part in the development of their IT systems, and the improvement proposals are their tool to do so. The improvement proposals have become a taken-for-granted part of AdmCorp's daily work, and the employees are well aware of how many proposals they are to give and fulfill each year. Drawing on Orlikowski's (2000) theories, we can see that the improvement proposals have become tools of shared socialization, and the process regarding how to write the proposals has been, to some extent, institutionalized. Although the improvement proposals are intended to help the users co-design technology and help keep the black box open, the process itself has become black-boxed (cf. Latour, 1987). This may constrain the underlying idea behind the concept of improvement proposals, since the proposals may be produced by the employees more to satisfy the process itself, than the actual demand for improvement.

The IT systems used at AdmCorp are provided by different external companies, and the systems' different functions are designed to complement each other with a common purpose which is to enable the employees to administer insurances. The systems form this way an actor-network that connects different actants and actors (see figure 3) (Latour, 1987; Akrich, 1992). Each IT solution in this network can be seen as an obligatory passage point (cf. Callon, 1986), ensuring that the employees are able to perform their tasks, and if one of the systems were to break down, the entire workflow in need of that system would stop. For instance, if IM stops working, AdmCorp is unable to receive incoming mail, and if MCHS and ACHS stop working, the employees are not able to administer insurances. Should this occur, the systems have made themselves indispensable actors within the actor-network, and as a consequence, they are afforded power within the network (cf. Latour, 1987). This can be com-

pared to how the scallops in Callon's (1986) example functioned as an obligatory passage point that ultimately broke down the entire actor-network. Bringing the discussion one step further, it must be noted that since the technological solutions become obligatory passage points, AdmCorp has become dependent on the system providers. If system updates are not performed in accordance with the needs of AdmCorp, the systems will malfunction, and as a consequence, AdmCorp's employees will be unable to perform. Since more automatized technology requires more people (Latour, 1987; Akrich, 1992; Nye, 2006) it can be argued that the more advanced the technological solutions become, the more dependent AdmCorp will be on these external system providers and their performance.

The IT systems function as performance measurement tools for the management, since the systems have inscribed competences that enable them to keep track more easily of how much is produced and by whom. As Akrich (1992) explains, some competences can be built-in into the technology in order to influence the users' moral behavior. In the case of AdmCorp, it was difficult for the management to maintain an overview on lead times and the amount of cases dealt with on a daily basis before the transformation program started, something that is now facilitated by the built-in functions counting how many case files are finished in a day. The employees cannot escape this inscribed competence of the system, knowing that the managers are able to control them. The systems pose as moral delegators, sending out signals regarding the importance of performing. Unlike in the case of Akrich's (1992) electricity meters, we argue that the case-counting function that is built-in as a moral delegator in the system works as intended since the employees worry they may underperform. These inscribed competences therefore afford technology power within the actor-network of employees and IT systems.

The fact that technology is afforded power could be one of the explanations to why young and relatively inexperienced individuals have managed to obtain influence to such an extent today. As previously mentioned, AdmCorp's IT systems have become institutionalized and indispensable. This way, the employees with technological knowledge are afforded more power within this actor-network. Both technology and the Superusers are therefore in a way becoming more of 'actors' rather than 'actants' in the network, since they are both holding competences that are associated with power. This can be compared to what Latour (1986) states; that power is created as a consequence of the interaction between objects and humans. In the same way as a certain tattoo can function as an object that provides clan leaders power and respect, power is created when the Superuser interacts with the technology. The Superusers function as a human obligatory passage point (see figure 5) (cf. Callon, 1986) in the network. All employees must perform a fixed number of case files per day, and if a function in one of the IT systems would stop working, this can have as a consequence that they cannot finish as many case files as they are supposed to. In this case, they will ask the Superuser for help, and it can therefore be argued that the other employees' results and productivity are dependent on the Superusers' ability to fix the problem. If we look at how power is created in the relationship between the Superuser, the computer systems and the other employees, we realize that power could also have been exerted by the other employees - if they had resisted the technology and decided to become actors rather than actants (cf. Latour, 1987). If the other employees would have ignored the importance of technology, and resisted it, neither technology nor those with technological competences would have been able to exert power

within the network. Since the only group of employees within AdmCorp that has shown signs of resistance towards technology has been deliberately eliminated, management has effectively strengthened their own technological frame (cf. Pinch & Bijker, 1984).

As explained by Orlikowski (1992), inscribed competences can have both enabling and constraining effects for the people working with the technology. We have seen several examples of that at AdmCorp. An example of an enabling inscribed competence is the automatic mail-sorting function in EMHS, which enables employees to spend more time working with insurance-related tasks. In ACHS, an enabling inscribed competence is the automatic matching of incoming documents, which results in that the employees working in this system do not have to keep track of all policyholders' case files manually. There are also inscribed competences that constrain the employees. Something that is a constraining built-in competence, which is not in accordance with the vision of the paperless office, is the excessive printing by some of the systems, which has been solved by the installation of ghost printers. We also note that some built-in competences can be enabling and constraining simultaneously. The letter templates that are an inscribed competence in ACHS may in some cases enable the employees to quickly produce letters to policyholders, hence work as a time-saving, enabling function. However, since sometimes, the information that the employee wants to send to the policyholder is not in accordance with any of the letter templates, it can also be constraining. The illustration provided by Orlikowski (1992) in which implemented workplace tools were compared to a pack of cards, it is explained that the employees are unable to see possibilities beyond the 52 cards. In the case of the letter templates at AdmCorp, we note that the employees are aware of the 53rd card, but are unable to use it due to the constraining built-in competences. The constraining competences hinder the employees from becoming actors in the network (consisting of employees and technology), since power is afforded to the system that is able to affect the employee.

A Changed Social Setting

As we have shown, the transformation program has created new ways of working, and new tasks and formal roles have been introduced. However, we have also noted that this new setting has led to changed social roles. We argue that there have existed, and still exist, different relevant social groups at AdmCorp with different technological frames, since the employees demonstrate that they perceive technology in different ways (cf. Pinch & Bijker, 1984) depending on their power and knowledge base (cf. Orlikowski & Gash, 1994).

Prior to the transformation program, the workplace politics allowed for one particular group, the underwriters, to grow powerful. The group shared a social meaning, in which knowledge about medical risk assessment was considered more important than technology and technological knowledge, and the underwriters viewed technology as something they did not want to interact with. Similar to Pinch and Bijker's (1984) example of the anti-cyclists, the underwriters formed a relevant social group that interacted with technology by refusing to use it. Since existing bases of power influence what technologies are used (Orlikowski, 1992), it can be assumed that the group's behavior was allowed by the other employees since their power base had grown for several years. As a consequence, the event of handing over cases to former risk administrators, added even more power to the underwriters' power base (cf.

Latour, 1986). However, the power structure shifted as the former risk administrators informed the managers what was going on. By this act, the former risk administrators were afforded power. The conflict illustrates how different groups of people within the same organization may have different technological frames (cf. Orlikowski & Gash, 1994). This also illustrates a power struggle between underwriters on the one hand and the former risk administrators and the managers on the other, which can be compared to what Bijker (1995) defines as micro-political power, which occurs when relevant social groups try to influence each other and challenge the other group's technological frame.

As Misa (1992) shows, closure is reached when the technological frame of one of the relevant social groups becomes dominant and the power relationships between the groups are restructured. At AdmCorp, the competing groups can be seen as those in favor of technology, and those against it. As described by Misa (1992), closure processes are almost always characterized by controversies, since different groups strive to achieve a closure that benefits their own group. This was indeed the case at AdmCorp, where individuals from both groups tried to battle each other. The case illustrates how members of groups with differing technological frames become locked in their own frame, unable to listen to the other group's arguments (cf. Bijker & Law, 1992). Those in favor of technology tried to explain its enabling effect, whereas those against it refused to embrace the new technology or concern themselves with administrative tasks. By the conscious decision to split the group of underwriters and ask some of them to leave, technology could be implemented and stabilized together with the new way of working. Closure was this way reached by first discarding the individuals whose technological frames were the most opposing ones (cf. McLoughlin, 1999). This in turn forced other individuals in that group to accept the technological change and adapt their technological frames, since the only other option was to leave the company. One way of changing the technological frame of already existing, technologically insecure employees was to involve them in the process mapping since this made them see potential benefits from working in new ways and implementing IT systems. Also, a deliberate competence shift took place when employees not willing to work within the new systems were outmaneuvered by more technically skilled employees (cf. Nye, 2006), having a technological frame more in accordance with that of the management (cf. McLoughlin, 1999).This can be directly seen by the entrance of the Superuser as a new role within the company.

Even though all employees today work in accordance with the vision of the paperless office, we argue that there still exist different social groups with different technological frames. For instance, the Superusers belong to a relevant social group that shows much interest in technology; they enjoy working with it and are curious to learn new things and solve problems that arise in the systems. Other interviewees have been more skeptical towards the new systems, for instance the interviewee who first said that she could not come up with any improvement proposals, even though it was the Excel sheet that was the real problem. This example illustrates the concept of interpretive flexibility (cf. Pinch & Bijker, 1984), since different employees at AdmCorp experience the technology in different ways, based on their knowledge and earlier experiences (cf. Orlikowski & Gash, 1994). However, our empirical data shows that it seems to be overall agreed upon today that the introduction of the new technological solutions have had positive results on productivity, and this way we argue that the concept of technology as a positive solution has in itself become black-boxed. By

exerting semiotic power (Bijker, 1995), the new dominating technological frame has reached closure (Misa, 1992). This may limit later meaning attributions regarding these new solutions (Bijker, 1995), for instance; if AdmCorp chooses to replace one of their system providers or re-design the process of the improvement proposals, the new solution will inevitable be affected by the already existing institutionalized structures.

Conclusion

Our first aim was to investigate how tasks and formal roles may be affected by the entrance of new technology, and how employees in turn can affect the technology. By studying the transformation program at AdmCorp, we found that the manner of how to perform the work tasks indeed changed due to the new technological solutions. Employees have been freed from many of the time-consuming administrative tasks, since the IT systems have inscribed competences that perform these tasks. This has had such prominent effects that the formal role of the risk administrator has been removed. In regards to how employees can affect technology, we note that the process surrounding the improvement proposals has made the employees active co-designers of the technology, and new tasks regarding the coordination of the maintenance of the IT systems have been added. This has led to the creation of new formal roles, such as the Superuser and the IPR, and we can see that the required competences have shifted towards an increased focus on technological skills. We also note that tasks regarding non-core business activities have not been eliminated, but rather changed as a consequence of the entrance of technology. Time that was earlier spent on manual non-core business activities, such as administration surrounding the mail, is now spent on technological non-core business activities, such as IT maintenance.

With regards to our second aim, which was to investigate how the entrance of new technology may affect work politics and social roles, it can be concluded that the competence shift together with the regroupings resulted in a changed social setting at AdmCorp. The entrance of technology has reinforced the managers' influence and control over the employees as a consequence of the built-in functions that control the amount of case files employees perform daily. We have also showed how different relevant social groups have dominated throughout the transformation program, and that the technological frames of those working in the company have changed. The most prominent change is perhaps that the pseudo-authority of one dominant social group has decreased, while more power has been afforded employees responsible over the indispensable technology. This occurred when the former risk assessment group was split up at the same time as a group of younger employees in a short time went from being employed by staffing agencies to holding positions that makes them responsible over the technology.

A limitation with the study is that we cannot fully analyze the shift since no interviews were conducted with employees who left the company due to the technological change. Also, as in most research done on organizational change, we were not able to study the micro-political power struggles of the different relevant social groups before closure of the new dominant technological frame was reached. Another limitation has been that the internal documents provided were chosen by our contact person, who belongs to the relevant social group whose members are in favor of technology.

This article illustrates how AdmCorp's employees have gone from being passive users of technology to becoming more active co-designers, which in turn has made them more critical to the computerized systems. Due to their increased demands for system improve-ments and their active work with improvement proposals, higher demands will unavoidably be placed on the system providers. Since more companies today assign the responsibility of their IT solutions to external providers, this opens up for questions of how power structures are affected and changed within these broader networks when more actors take an active part in the design process. It would therefore be of interest to further investigate how co-designing affects these relationships between customers, suppliers and technology.

The purpose with this article has not been to investigate the interrelation between ANT and SCOT, but in our decision to use elements from both theories when discussing our case, we have inevitably entered the debate on whether or not it is possible to combine these approaches. Therefore we would like to make some concluding remarks of what consequen-ces using both theories have had for our study. Studying the technological change from an ANT perspective proved to be advantageous since this allows for a viewpoint where techno-logical artifacts have agency over humans and influence their work. For instance, if the IT systems break down the employees are unable to perform their tasks, and ANT concepts such as that of the obligatory passage point illustrate this complexity to a larger extent than any of the concepts we found in SCOT. This can especially be seen in the second part of our dis-cussion, in which we more closely investigate the relationship between individual actors. SCOT, on the other hand, made it possible to adopt a viewpoint where the technological change could be studied from more of a sociological perspective, which is conspicuous in the last part of the discussion. This part shows how relevant social groups with different techno-logical frames reacted to the transformation program, and it also illustrates the interpretive flexibility of the IT systems. Hence, by using concepts from both SCOT and ANT we were able to conduct a broader analysis of our case than what would have been possible by solely using one of the concepts. However, the debate on whether or not ANT and SCOT are able to complement each other has only begun, and we look forward to more research being done within this field.

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