101. UNDERSTANDING INFORMATION SYSTEM CHANGE: THE RELATION BETWEEN REASONS, GOALS, AND TYPES

Krell, Katharina, The University of Queensland, 4072 St Lucia, Queensland, Australia, k.krell@business.uq.edu.au

Matook, Sabine, The University of Queensland, 4072 St Lucia, Queensland, Australia, s.matook@business.uq.edu.au

Rohde, Fiona, The University of Queensland, 4072 St Lucia, Queensland, Australia, f.rohde@business.uq.edu.au

Abstract

Global competition and continuous innovation frequently trigger firms to alter their information systems (ISs). Recent studies indicate that the reasons behind IS changes strongly affect the progress of the changes and the benefits from change for firms. Until now change reasons have mainly been neglected in prior research. Hence, it remains unclear which change reasons exist and how exactly they affect IS changes. This paper aims to address this gap. We argue that change reasons affect IS changes because particular reasons result in particular goals that firms pursue with the changes. The goals can only be achieved with certain change types. A change type is a class of changes with similar characteristics, e.g. IS extension or IS merger. The selection of the change type affects the further course of the change and the change benefits.

To provide justification for our argument, we first identify change reasons, goals, and types based on prior theory. Then, we develop a mapping that demonstrates the relations between reasons, goals, and types. Finally, we present three case studies to show that IS changes are more beneficial for firms if the reasons, goals, and types correspond with our mapping. Theoretical and practical implications are discussed.

Keywords: information systems change, change reason, change goal, change type.

1 INTRODUCTION

Global competition and continuous innovation frequently force firms to adjust to changing business environments. Changes to information systems (ISs) are thereby one of the greatest challenges that firms are facing. Marcus et al. (2000) conceptualised that every IS change comprises four sequential phases with the outcomes of each phase affecting the activities in the subsequent phase. In the first phase, the firm decides about the goals of the change and designs the change process. This phase is referred to as the chartering phase of the IS change. The second phase is called the project phase. Here, the new system is configured and rolled out. This is followed by the shakedown phase, during which the firm makes the new system part of its operational procedures. The change is finally ends with the onward phase, in which the firm uses the new IS and captures most of the benefits of the change (Markus et al. 2000).

So far, prior research has mostly assumed that the benefits of an IS change depend on decisions made during the project and/or shake down phases (e.g. Aladwani 2002). Nevertheless, this assumption has recently been challenged. Nordheim and Paivarinta (2006) report that benefits of IS change are strongly affected by the chartering phase which has mainly been neglected in prior research. Nordheim's and Paivarinta's study highlights the necessity for a deeper understanding of the chartering phase.

The chartering phase begins with the occurrence of the change reason (Markus et al. 2000) which is the motive behind why a firm initiates an IS change (Mohr 1982). To develop a deeper understanding of the chartering phase it is necessary to go back to this starting point and examine change reasons and their effect on change. Prior research has mainly neglected the change reasons. Hence, it remains unclear which reasons exist, and how they affect changes. This paper argues that change is driven by a variety of reasons. The reasons result in particular goals that the firm tries to achieve with the change. These goals can only be achieved if a change has particular characteristics, for example, if the change provides particular functionality. For the purpose of this paper, it is defined that IS changes that share particular characteristics belong to the same change type. Hence, certain reasons and goals require certain change types. To maximise the benefits of an IS change, a firm must analyse the change reason and goal, and select an appropriate change type during the chartering phase.

Consequently, this conceptual paper pursues two aims. The first aim is to identify change reasons, resulting goals, and change types. The second aim is to develop a mapping of change reasons, goals, and types. The mapping will show how particular change reasons and goals require particular change types and thus demonstrate how change reasons affect IS changes. In this paper, we present the conceptual stage of the research, i.e. we outline the identified change reasons, goals, and types, and we develop the mapping between them. Further, we apply our framework to three published case studies on IS change (Newswire 2007, Teresko 2004, Jesitus 1997) demonstrating the usefulness of the mapping. The presented case studies illustrate that IS changes that correspond with our mapping are more beneficial for firms than changes that contradict the mapping.

This paper contributes to theory as it is a first attempt to investigate IS change reasons and their effects on change. Thus, the paper provides a deeper understanding of the chartering phase of IS changes. In particular, we show that in the course of the chartering phase, the occurrence of certain change reasons leads to particular change types. This finding is important because the characteristics of a change type influence the project phase, the second phase of an IS change. Prior studies have demonstrated that decisions made during the project phase effect the outcomes of an IS change and the benefits of the change for the firm (Akkermans & van Helden 2002). Our research provides a first indication that these outcomes and benefits are already determined in the chartering phase of an IS change. This paper has implications for industry as it shows which change types firms need to choose to achieve the goals that result from particular change reasons. Hence, it provides guidance how firms need to design an IS change to achieve the goals behind the change.

2 REASONS AND GOALS BEHIND INFORMATION SYSTEM CHANGES

An IS change reason is defined in this paper as the decisive motive that triggers a firm to conduct an IS change. The change reason leads to the goal that a firm pursues with the change (Vibert 2004, Miles 1998). A particular IS change is always driven by one major reason and one major goal (McKendall & Wagner 1997). To identify change reasons and resulting goals, this paper draws on institutional theory, capability lifecycle theory, organisational fit theory, and interaction theory. These theories were chosen because prior research provides hints that IS change is underpinned by either a firm's strategy, or in political interests of individuals in the firm (Orlikowski 1992). The selected theories address both of these underpinnings. Institutional theory, capability lifecycle theory, and organisational fit theory offer explanations for change reasons and goals that are based on the firm strategy. Interaction theory explains how reasons and goals can be based on personal interests. Hence, the selected theories offer a comprehensive theoretical basis for the identification of change reasons and resulting goals. Based on the four selected theories we identified four change reasons, each of which leads to different goals (Table 1). The reasons are outlined in the following paragraphs.

IS Change Reason		Resulting Goals	Theoretical Foundation
Isomorphic Pressure	Coercive	Comply with external requirements	Institutional Theory
	Mimetic	Mimic an IS solution in another organisation	
	Normative	Fulfil an industrial norm	
Capability Design		Build a capability	Capability Lifecycle Theory
		Adjust a capability	
Organisational Change		Realign an IS to modified structures and processes	Organisational Fit Theory
		Support an organisational change process	
Power		Increase a personal span of control	Interaction Theory

Table 1. Reasons for Information System Changes.

2.1 Isomorphic Pressure

The change reason "isomorphic pressure" is derived from institutional theory. This theory assumes that a firm's activities are closely interconnected with the firm's environment. Changes in this environment put pressure on the firm. The firm responds to the pressure if it considers the pressure to be legitimate (Meyer & Rowan 1977). Different firms react to external pressure in similar ways and hence become more similar to each other. Therefore, external pressure is referred to as isomorphic pressure in institutional theory. DiMaggio and Powell (1983) identified three types of isomorphic pressure: coercive, mimetic, or normative pressure.

Coercive pressure arises when a firm is directly or indirectly requested by an institution in its environment, for example a governmental agency or major customer/supplier, to undertake certain activities (Dimaggio & Powell 1983). In the information age, these activities often require firms to change their ISs (Liang et al. 2007). For example, the Sarbanes-Oxley Act forced many firms to make changes to their accounting systems (Garcia 2004, Kim et al. 2007). The goal behind such IS changes is to comply with external requirements.

Mimetic pressure occurs when a firm is uncertain how to react to a particular problem and observes how another organisation has solved a similar problem successfully (Dimaggio & Powell 1983). Due to its own uncertainty, the firm mimics the solution of the other organisation (Burns & Wholey 1993). The implementation of the solution often requires IS changes (Benders et al. 2006). The goal behind these changes is the mimicry of the other organisation's solution.

Normative pressure arises when a firm has internalised industrial norms and considers the norms in decisions and actions. Decision makers perceive that the norm is "the right way to do things". In contrast to coercive pressure, the norms are not kept because of a perceived direct or indirect force. Rather, the firm attempts to conform with norms because it identifies itself with these norms (Dimaggio & Powell 1983). Nowadays, many industrial norms include IS specifications (Guler et al. 2002). To comply with these norms, firms make changes to their ISs and therefore, normative pressure results in IS changes whose goal is the fulfilment of norms.

2.2 Capability Lifecycle

The change reason "capability lifecycle" is based on capability lifecycle theory. According to this theory, a capability is defined as the ability of a firm to 'perform a set of coordinated tasks, utilising organisational resources, for the purpose of achieving a particular end result' (Helfat & Peteraf 2003, p. 999). Capability lifecycle theory states that capabilities follow a lifecycle during which are first constructed and build, and later adjusted to changes in the environment of a firm (Helfat & Peteraf 2003). In the information age, almost all capabilities of a firm require the usage of ISs. Thus, the capability lifecycle is an IS change reason. According to the capability lifecycle theory, this reason can result in two goals: First, to build a capability and second, to adjust a capability to changed environmental conditions.

2.3 Organisational Change

The change reason "organisational change" is rooted in the organisational fit theory. This theory states that firms aim to create maximum value from their ISs, that is only possible if the ISs are congruent with the organisational context in which they are applied. The organisational context is the business environment of an IS and includes, e.g., the internal and external firm processes that the IS supports. To maximise the value from their ISs, firms aim to maximise the congruence between their ISs and the organisational context (Hong & Kim 2002).

An organisational change is defined as a unique event in a firm during which organisational structures and processes are modified (Weick & Quinn 1999). These structures and processes are part of the organisational context of the firm's ISs. Therefore, changes to these structures and processes have a negative effect on the congruence between the ISs and the organisational context. To increase the level of organisational fit, the firm makes changes to its ISs. The goal of these changes is the realignment of the ISs with modified structures and processes of the firm.

A second goal arises from the complexity of organisational changes. The modification of firm structures and processes is a multifaceted project that requires appropriate project management (Weick & Quinn 1999). Many firms rely on IS-facilitated project management approaches to support organisational changes (Georgakopoulos et al., 1995). Because each organisational change in a firm is unique and requires a unique kind of IS support firms have to adapt their existing ISs for each change (Hartman & Ashrafi 2004). Therefore, many IS changes that are conducted because of organisational changes are driven by the goal to support the organisational change process.

2.4 Power

The change reason "power" is derived from interaction theory and describes a firm as a conglomerate of individuals who constantly struggle to increase their personal span of control (Lapointe & Rivard 2005). All actions of these individuals and all interactions between them are directed by this struggle (Markus 1983). IS changes can stabilise or shift the power balance in a firm and thus, can affect an individual's span of control. Consequently, powerful individuals in the firm deliberately initiate IS changes. The goal of these changes is to increase or defend their span of control (Rao et al. 2007).

3 TYPES OF INFORMATION SYSTEM CHANGES

For the purpose of this paper, the term 'IS change type' is defined as follows: two IS changes are of the same type if they are similar in three major change characteristics. The first characteristic is the extent of new IS functionality that is provided through the change (Markus et al. 2000). This characteristic ranges from no new functionality to minor functionality details and new major functionality. The second characteristic is the extent of redesign of organisational processes (Ettlie & Reza 1992). Process redesign includes changes to firm processes, changes to the way how ISs are applied in these processes, and, if required, necessary training (Changchien & Shen 2002). The third characteristic is the level of overall costs. The cost result from expenditures for the information technology (IT) infrastructure, training expenditures, and a temporary productivity loss during the IS change (Ryan & Harrison 2000, Keil 1995). Based on the three characteristics, five types of IS changes were identified and presented below (Table 2).

Change Type / Characteristic	IS introduction	Complete IS replacement	Partial IS replacement	IS extension	IS merger
Extent of new functionality (Scale: New major functionality, new functionality details, no new functionality)	New major functionality	New major functionality	New functionality details or no new functionality	New functionality details	No new functionality
Extent of process redesign (Scale: Very High, High, Medium, Low)	High	Medium	Low	Low	High to Low
Extent of overall costs (Scale: Very High, High, Medium, Low)	Very High	High	Medium to Low	Medium to Low	Very high to Low

Table 2. Change Types.

3.1 Information System Introduction

In the introduction of an IS, a firm implements a new IS that offers new major functionality not provided by any previous IS in the firm (Cooper & Garcia-Molina 2002). The extent of process redesign is high because the firm has no existing IS-facilitated processes (Orlikowski et al. 1995). The high extent of process redesign has two consequences. First, the change requires a high extent of user training (Davidson 2005). Second, the change causes a high productivity loss as existing processes are temporarily interrupted (Tan et al. 2007). Because of the high productivity loss, the high extent of user training required (Gerdes 2003), and the necessity to acquire hardware and software to develop new IT infrastructure, an IS introduction is associated with very high overall costs (Hitt et al. 2002).

3.2 Complete Information System Replacement

In a complete IS replacement, a firm substitutes an existing IS with a new IS that offers new major functionality (Swanson & Dans 2000). An IS replacement requires a medium extent of process redesign because IS-facilitated processes already exist in the firm (Haines et al. 2006). Consequently, productivity losses are limited (Mukherji et al. 2006) and user training costs are medium to low (Rajagopal 2002).

IT investments are usually high because a large number of IT infrastructure components need to be replaced (Davenport 1998). Hence, a complete IS replacement is associated with high overall costs (Robey et al. 2002).

3.3 Partial Information System Replacement

In a partial IS replacement, some of an existing IS is replaced (Crusciel & Field 2006). The new components facilitate the same overall functionality as the previous ones, but offer improved performance or new functionality details (Castner & Ferguson 2000). Process redesign is restricted to those departments, divisions, and hierarchy levels of the firm that use the new functionality (Vosburg & Kumar 2001). Thus, the extent of process redesign is low when evaluated on a firm level (Crusciel & Field 2006). Consequently, the extent of user training and the productivity losses are limited. Depending on the IT components required, related IT expenditures can vary (Haines et al. 2006). The overall cost of a partial IS replacement are medium to low (Mukherji et al. 2006).

3.4 Information System Extension

In an IS extension, an existing IS is expanded via new hardware and software components that provide new functionality details (Haines et al. 2006). In contrast to a partial IS replacement all prior components of the IS stay in place. Process redesign is restricted to those departments, divisions, and hierarchy levels that make use of the additional functionality (Huang et al. 2001). Consequently, the extent of process redesign, and the extent of user training are low when evaluated on a firm level (Georgiou et al. 2007). The costs for the additional hardware and software components are medium to low (Haines et al. 2006). Thus, productivity losses and training costs are limited. Hence, the overall costs of an IS extension are medium to low (Boddy & Paton 2005).

3.5 Information System Merger

In an IS merger two or more existing ISs are merged into one. An example is the merger of accounting systems in the aftermath of a firm merger (Wijnhoven et al. 2006). The merged IS does not provide new functionality (Robbins & Stylianou 1999). The extent of process redesign and user training varies from high to low, depending on which divisions, departments, and hierarchy levels are effected by the IS merger. Productivity losses and costs for user training also vary. Consequently, overall costs of an IS merger vary between very high and low (Couturier & Kumbat 2000).

4 MAPPING BETWEEN REASONS AND TYPES OF INFORMATION SYSTEM CHANGES

The relation between reasons, goals, and change types is illustrated in Figure 1. In the following, we present the mapping of the three phenomena (see Table 3). The development of the mapping is based on the theories that underlie the change reasons.

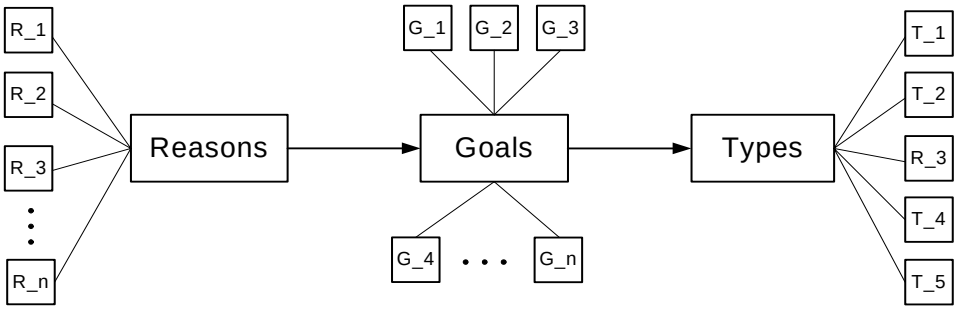

Figure 1: Relation between Reasons, Goals, and Types in IS Change Project

The mapping was developed line-by-line as follows: for each line, we analysed the respective reason and goal. We used the theory from which the goal and reason were derived to examine if the fulfilment of the goal depends on the change type characteristics described in Table 2. We then conducted a literature review on studies that describe IS changes that were conducted because of this reason, and pursued the analysed goal. The aim of the literature review was to find further evidence that the fulfilment on the goal is affected by the change type characteristics. We then used our analysis to conclude if the goal requires any particular change types. This procedure was repeated for each line of the table. In the following, we provide a summary of the analysis for each change reason.

			Change Type				
Change Reason		**Goal**	IS Introduction	Complete IS replacement	Partial IS replacement	IS extension	IS merger
Isomorphic pressure	Coercive	Comply with external requirements	**X**	**X**	**X**	**X**	-
	Mimetic	Mimic an IS solution in another organisation	**X**	**X**	-	-	-
	Normative	Fulfil an industrial norm	**X**	**X**	**X**	**X**	-
Capability Lifecycle		Build a capability	**X**	**X**	-	-	-
		Adjust a capability	-	-	**X**	**X**	-
Organisational Change		Realign an IS to modified structures and processes	**X**	**X**	**X**	**X**	**X**
		Support an organisational change process	**X**	**X**	**X**	**X**	-
Power		Increase a personal span of control	**X**	**X**	**X**	**X**	**X**

Table 3. Mapping between Reasons and Change Types.

4.1 Isomorphic Pressure and Related Change Types

The three types of coercive pressure lead to different goals that require different change types. According to institutional theory, coercive pressure occurs when an external institution enforces requirements upon a firm. Such requirements can be, for example, a new law, or new e-business specifications by a powerful business partner (Dimaggio & Powell 1983). Coercive pressure becomes a change reason if the firm realises that the functionality of its current ISs is insufficient to meet the requirements (Garcia 2004). In this case, the firm conducts an IS change driven by the goal to comply with the requirements. To reach this goal, the firm must implement new IS functionality (Kim et al. 2007). Therefore, firms that change their ISs because of coercive pressure engage in change types that provide some extent of new functionality; i.e. IS introduction, partial or complete IS replacement, or IS extension. An IS merger is not adequate because it does not provide new functionality.

A similar case occurs when an IS change is conducted because of normative pressure. In this case, the firm perceives that the current IS functionality is not sufficient to comply with an industrial norm (Dimaggio & Powell 1983). To comply with the norm, the firm must conduct an IS change that provides new IS functionality (Guler et al. 2002). Hence, the firm needs to choose an IS introduction, partial or complete IS replacement, or IS extension.

Mimetic pressure becomes a change reason when a firm realises a difference between its own IS functionality and the IS functionality of another organisation, and perceives the difference as disadvantageous (Dimaggio & Powell 1983). To mitigate the disadvantage, the firm conducts an IS change to mimic the IS functionality of the other organisation (Burns & Wholey 1993). Usually, firms can only observe major differences in the IS functionality of the firm and the IS functionality of the other organisation. Minor differences can rarely be detected because firms lack detailed descriptions of the IS in other organisations (Benders et al. 2006). For example, a firm can find out which enterprise resource planning (ERP) system a competitor uses but information about the detailed ERP functionality is rarely available. Consequently, if mimetic pressure is the reason behind an IS change the change is driven by the goal to bridge a major functionality difference. This goal can only be achieved through the implementation of new overall IS functionality, rather than new functionality details. Consequently, mimetic pressure is associated with two change types: IS introduction and complete IS replacement. Other change types are not adequate because they do not provide a sufficient level of new IS functionality.

4.2 Capability Lifecycle and Related Change Types

IS changes that are conducted in the course of the lifecycle can be driven by two goals: First, to build a new capability, and second, to adjust a capability. The goal to build a new capability can only be achieved if an IS change enables a firm to perform a new task (Helfat & Peteraf 2003). The performance of a new task requires new overall IS functionality (Hitt & Brynjolfsson 1997). Consequently, firms that implement IS changes to built a new capability initiate an IS change that provides new overall functionality. Thus, they conduct changes of two types: either IS introduction or complete IS replacement.

At a later stage of the capability lifecycle, existing capabilities are adjusted to changed environmental conditions. According to the capability lifecycle theory, the capability is thereby not fundamentally modified (Helfat & Peteraf 2003). Because the capability already exists in the firm, only a limited extent of new functionality is required (Coghlan 1998). Further, the IS change can only include a low level of process redesign. A high extent of process redesign would be dangerous because it might reduce the firm's ability to perform certain tasks and therefore, it might destroy the capability (Vosburg & Kumar 2001). Consequently, firms that conduct IS changes to adjust a capability will initiate changes that provide new functionality details, and conduct changes of two types change types: IS extension or partial IS replacement. Other change types are not possible because they would require an intolerably high extent of process redesign.

4.3 Organisational Change and Related Change Types

The change reason "organisational change" can result in two goals: First, the realignment of an IS to modified structures and processes and second, the support of the organisational change process itself. When an IS change is conducted to realign an IS to modified structures and processes, the extent of new functionality required strongly depends on the changes in firm structures and processes (Markus & Robey 1988). According to organisational fit theory, a major change in structures and processes requires a high extent of new functionality (Hong & Kim 2002). Consequently, such an organisational change leads to IS changes to two types: IS introduction or complete IS replacement. A major change in firm structures like a merger can also result in an IS merger (Johnston & Yetton 1996). A minor change in structures and processes requires a medium or low extent of new functionality. Therefore, all change types are possible.

Firms that initiate IS changes with the goal to support organisational change processes perceive that their current IS functionality is not sufficient to manage the process (Georgakopoulos et al. 1995). Consequently, the firms must engage in changes that provide new IS functionality.

4.4 Power and Related Change Types

Power becomes a change reason when individuals in a firm aim to use an IS change to increase their span of control (Pan & Pan 2006). According to interaction theory, this goal can be achieved by any IS change (Markus 1983). The adequacy of an IS change to increase an individual's span of control depends solely on the political situation in the firm. Arguments that refer to characteristics of the change and the new IS are sometimes used by political players to mask the intention to shift a power balance (Franz & Robey 1984). Nevertheless, as these arguments merely serve as a cover for political arguments, they do not affect the change process or the outcome of the change (Lapointe & Rivard 2005). Therefore, it is not possible to predict the change type when an IS change is conducted because of power struggles. All five change types can occur.

5 ILLUSTRATING THE MAPPING WITH THREE CASE STUDIES

This section presents three published case studies to demonstrate usefulness of our framework.

5.1 Polaris International

Polaris International is an international affiliation of 200 accounting and consulting firms in 90 countries. In 2007, the members of Polaris International decided to introduce new software to ensure compliance with the Sarbanes-Oxley Act (SOX), which is a set of government-imposed auditing standards. In most countries where the Polaris firms reside, SOX was legally compulsory by the end of 2007. The new software enabled the firms to comply with SOX regulations (Newswire 2007).

To place this case in the mapping, we need to identify the reason of this IS change, the goal behind the change, and the change type. Legal regulations represent a form of *institutional pressure*, in particular, *coercive pressure*. The goal behind the change was SOX compliance, which is a form of *compliance with external requirements*. The change type was *IS introduction*. The mapping shows that introduction is an appropriate change type for this particular change reason and goal. Hence, the change was adequate to achieve the goal of compliance.

5.2 Texas Instruments

Texas Instruments is a Fortune 500 technology firm based in Dallas, USA. One of the firm's core competencies is the production of semi conductor wafers. The manufacturing process of wafers is prone to errors in the production line. Therefore, the production depends on the capability to detect these errors and avoid them in the future. The process of error detection is complex and often delayed because it required data from databases in different production sites. In 2004, Texas Instruments planned to accelerate the error detection process and integrate the data. Initially discussions focused on integrating all data into a single data warehouse. However, the firm soon realised that the implementation of the data warehouse would require a redesign of the error detection process and would temporarily interrupt the processes. Further, the engineers responsible for the error detection process realised that a data warehouse would provide data analysis tools that were not actually needed. Thus, the idea of a single data warehouse was abandoned. Instead, the firm decided to add a new component to the existing databases allowing cross-database data analysis that could be customised according to the requirements of the error detection process. After the implementation of the component the error detection process was significantly accelerated (Teresko 2004)

The acceleration of the error detection process represents a stage in the capability lifecycle. The firm was already able to detect errors but wanted to increase the performance of this process. Hence, the change reason in this case is the *capability lifecycle*, and the goal is the *adjustment of a capability*. The originally planned implementation of a data warehouse is an *IS introduction*. Our mapping shows that

IS introduction is not adequate an adequate change type in this case. An IS introduction would provide new functionality that is not needed, and would be associated with an intolerably high level of process redesign. The implementation of the additional database component that was later pursued instead of the data warehouse is a form of *IS extension*. According to the mapping, IS extension is an adequate change type in this case. Due to the IS extension, the firm was able to fulfil the goal of accelerating the error detection process.

5.3 FoxMeyer

In the early 1990's, FoxMeyer was the fourth largest pharmaceutical supplier to hospitals and pharmacies in the US. To improve its order management and accelerate shipping times the firm opted to implement a new enterprise resource planning (ERP) system in 1993 (Jesitus 1997). The ERP system was to replace FoxMeyer's current order management system. FoxMeyer executives believed the current system was not able to handle increasing orders in the future (Macdonald 1998). FoxMeyer invested a large amount of financial resources, and contracted a consultancy firm to support the ERP implementation. In 1995, the ERP system went live. Nevertheless, the firm never managed to achieve improvements in order management or shorter shipping time. Instead, FoxMeyer struggled with exploding implementation costs and severe disturbances to its distribution processes that were a consequence of the process redesign associated with the ERP implementation. As a consequence of these problems, FoxMeyer finally filed for bankruptcy in 1996 (Jesitus 1997).

Order management and shipping were core capabilities of FoxMeyer. Improvements in order management and the acceleration of shipping times represent modifications of these capabilities. Hence, the change reason in this case is the *capability lifecycle*, and the goal behind the IS change is the *adjustment of capabilities*. Because FoxMeyer already had a running system, the change type was *complete IS replacement*. The mapping shows that complete IS replacement is not an adequate change type in this case. A complete IS replacement requires a comparably high extent of process redesign, which resulted in critical disturbances to FoxMeyer's delivery processes and high costs. Consequently, the firm could not achieve the goals that had driven the IS change.

6 CONCLUSION

This paper developed a mapping of IS change reasons, resulting goals, and change types. Three case studies were presented to illustrate the usefulness of the mapping. Our research is a first attempt to investigate change reasons and their effects on change. We demonstrated that during the chartering phase of an IS change, the reasons affect three main characteristics of change types, i.e. the extent of new functionality, the extent of process redesign, and the overall costs of the change. Prior research has shown that these characteristics affect the outcomes and benefits of IS change (Aladwani 2002, Nelson et al. 2005). Thus, our results confirm Nordheim and Pairavinta's observation that the chartering phase is of major importance for IS changes (Nordheim & Paivarinta 2006).To further validate and develop the mapping, we plan to conduct a series of case studies This paper has implications for industry because it provides guidance which change types firms need to select in to achieve the goals behind a particular change.

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