

# **Dynamic Process of User Adaptation to Complex Mandatory Information Systems**

**Paweena Wanchai**

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**Department of Business Information Systems**

**Supervisors**

**Dr Antonio E. Díaz Andrade**

**Dr Angsana A. Techatassanasoonporn**

## Abstract

The introduction of a complex system, such as an Enterprise Resource Planning (ERP) system, requires users to adapt to the simultaneous requirements of the new system and the associated organisational and business process changes. Unsuccessful adaptation to complex mandatory systems generates significant financial and opportunity costs to organisations and makes some employees feel dissatisfied with their jobs. Previous information systems (IS) research provides important insight into IS use. However, there is a lack of an in-depth study of the process of user adaptation that explains how user adaptation behaviours change over time and what triggers users to modify their system use behaviours. This study unveils the dynamic adaptation process and offers an explanation of how adaptation behaviours unfold over time.

The fieldwork was conducted in four organisations in Thailand: one private, one state-owned, one non-profit and one multinational. An embedded multiple-case study design was applied in this research. Using the critical incident technique, 46 in-depth interviews were conducted with ERP users, managers and IT specialists. Grounded theory informed both the method of data analysis and the technique for theory building. As a result of an inductive theorising process, three intertwined core themes emerged. The first theme, user adaptation behaviours, reflects the different ways in which users respond to the evolving work practices that an ERP system imposes. The second theme, situational conditions, reveals the underlying conditions that influence the user adaptation process including social-task-user conditions and system-business process comprehension. The third theme, triggers, refers to events that change user perceptions towards the system or changes in the work environment.

This study produces an emergent, substantive theory that explains how individuals dynamically adapt to complex mandatory IS. These adaptation behaviours, which are shaped by situational conditions, manifest in the form of reluctant, compliance, faithful and enthusiastic adaptation behaviours. Through their interaction with the system, individuals are constantly assessing the system in relation to the existing situational conditions. The adaptation behaviours espoused at any given time can be subsequently modified through task-related, organisational-related and system-related triggers.

**Keywords:** *Adaptation behaviours, ERP system, grounded theory, mandatory systems*

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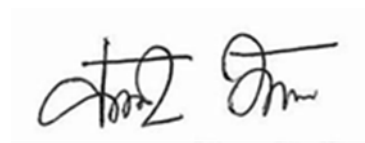
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## Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed:

A handwritten signature in black ink, appearing to be 'J. J. J.', written over a horizontal line.

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## Chapter 1 Introduction

### 1.1 The need to study the dynamics of user adaptation

It is a mandatory situation. Like it or not ... we are employees and we cannot say no. We have to adapt or move out. The [ERP] system is way too complicated and work processes have radically changed. It was a nightmare and a mess after rollout.... Although, I have been using it for more than four years now but I still have to adapt and deal with it. It is like a never-ending cycle of adaptation.... It is interesting to say that at first I did not want to use the system but now I like it and I have become an expert user here.

Anuroot, an enthusiastic user

The above interview excerpt illustrates the intricacy of the user adaptation process to a complex mandatory information system (IS), which is the phenomenon of interest to this research. Previous research suggests that Enterprise Resource Planning (ERP) systems are underutilised (Jones, Zmud, & Clark Jr, 2008; Robey, Ross, & Boudreau, 2002) and more than 80 percent of ERP systems are not effective due to employees' underutilisation and inappropriate use resulted from their negative reactions towards these systems (Boudreau & Robey, 2005). In addition, much of the installed ERP functionality goes unused and less than 30 percent of users have actively sought ways to make use of the functionality (Jones et al., 2008). Unsuccessful adaptation to complex mandatory systems generates significant financial and opportunity costs to an organisation and causes some employees to feel dissatisfied with their jobs (Jones et al., 2008; Markus, 2004). A systematic investigation of the user adaptation process will add new theoretical understanding and practical insights to help organisations promote a successful adaptation process among users (Benbasat & Barki, 2007; Ortiz de Guinea & Markus, 2009; Ortiz de Guinea & Webster, 2013; Sun, 2012).

Information technology (IT) has become an essential component of organisational life. In particular, organisations pursue improvements in their daily work practices by

implementing an ERP system (Wang, Hsieh, Butler, & Hsu, 2008). The evolution of ERP system deployment, mainly developed by large organisations in the West, has been a highlight in the IS literature since the early 1990s. An ERP system, as a business solution, aims to help management by setting better business practices and equipping them with the right information to make timely decisions. However, the benefits of IS are reliant upon how the systems are used by individuals. The major challenge for these organisations is to ensure that the systems are fully and appropriately used, which requires providing support to staff in order to adapt to the inevitable major technological and work practice changes.

This study focuses on the process of adaptation to complex mandatory systems. The adaptation process is conceptualised as the interaction between users and a system characterised by the degree to which individuals make an effort to learn about and use the system as well as adjust their work practices accordingly. Different users are likely to engage in different adaptation behaviours depending on their perception of the system, knowledge and skills, and support and pressure from organisations. Individuals usually go through multiple adaptation sequences in an adaptation cycle (Ortiz de Guinea & Webster, 2013; Sun, 2012; Tyre & Orlikowski, 1994). An outcome of one adaptation sequence along with other changes can trigger a new series of adaptation efforts (Beaudry & Pinsonneault, 2005; Jasperson, Carter, & Zmud, 2005; Leonard-Barton, 1988). This research defines a complex system using two dimensions. First, a complex system is defined as a system that provides a high level of integration across organisational functions. It requires major changes in organisational business process, work routines, work practices, roles, and structures (Markus & Tanis, 2000; Soh, Kien, & Tay-Yap, 2000; Volkoff, Strong, & Elmes, 2007). Second, a complex system requires users to have domain knowledge to effectively use the system.

Specifically, adaptation to an IS goes beyond technical adjustments; it entails inevitable changes in employees' work practices. Complex systems impose significant challenges for users by overwhelming them with novel features and new learning requirements (Kanter, 2000). Likewise, the introduction of new systems tends to bring a disruptive workplace change (Orlikowski, 2000). The use of enterprise systems is characterised by high levels of task interdependency that involve multiple users performing various tasks that are components of broader interdependent business processes (Sharma & Yetton,

2003). As a result, the introduction of an enterprise system requires users to adapt to the simultaneous requirements of the new system and the associated organisational and business process changes. The problem is exacerbated for ERP systems because these systems often allow little customisation (Davenport, 2000a). This situation is not easy to overcome, even where formal training is available. Users may be unable to acquire the knowledge necessary to adapt to the system. As a result, users are likely to develop a sense of nervousness and uncertainty which may lead to resistance, system avoidance and, in some cases, reinvention of ways to work around the system (Boudreau & Robey, 2005). It is plausible that enterprise system implementation will induce different adaptation behaviours from employees.

Organisational-level research on ERP systems has provided rich insights on how an ERP can be successfully implemented (cf. Hong & Kim, 2002; Liang, Saraf, Hu, & Xue, 2007; Markus & Tanis, 2000; Soh et al., 2000), organisational-level changes due to ERP implementations (e.g., Boudreau, 2006; Gosain, 2004; Volkoff et al., 2007), and impacts of ERP systems on organisational outcomes (e.g., Cotteleur & Bendoly, 2006; Gattiker & Goodhue, 2005; Rai, Patnayakuni, & Patnayakuni, 2006; Ranganathan & Brown, 2006). Individual-level research has examined the factors that lead to greater adoption and success of ERP systems (e.g., Hwang, 2005; Lim, Pan, & Tan, 2005) and employee reactions to these systems (e.g., Boudreau & Robey, 2005).

Both organisational-level and individual-level research suggest that an ERP implementation is a major organisational change event that can potentially create confusion and uncertainty in employees' work environment (e.g., Boudreau & Robey, 2005; Soh, Sia, Boh, & Tang, 2003; Volkoff et al., 2007). Due to the magnitude of changes in their work environment, employees may develop negative reactions towards these systems and engage in unintended use behaviours, such as workarounds and shortcuts (Boudreau & Robey, 2005; Volkoff et al., 2007). Users typically resist an ERP implementation and associated business process changes fearing that their work routine will be radically different after the implementation (Lapointe & Rivard, 2005; Volkoff et al., 2007). Notwithstanding the cumulative understanding that an ERP implementation can cause major changes or disruptions in employees' work routine, there is limited research on how employees adapt to an ERP system during the post implementation stage.

Previous research has reported different patterns of IS use at the post-adoptive stage. Concepts related to the dynamics of post-adoptive system use include IS use continuance (Bhattacharjee & Premkumar, 2004; Karahanna, Straub, & Chervany, 1999; Parthasarathy & Bhattacharjee, 1998), unanticipated use (Singletary, Akbulut, & Houston, 2002), feature extension (Jasperson et al., 2005), trying to innovate (Ahuja & Thatcher, 2005), coping behaviours (Beaudry & Pinsonneault, 2005), deep use (Wang & Butler, 2006), habitual use (Limayem, Hirt, & Cheung, 2007) and task-technology adaptation behaviours (Barki, Titah, & Boffo, 2007), among others. Despite their differences, these concepts share one assumption: users adapt their work practices and system use through their interaction with the system. For example, users may revise the system functions in ways that allow them to best complete their task (Sun, 2012). This happens to almost all types of IS, including ERP systems, which are known for their inflexibility (Boudreau & Robey, 2005).

The body of literature provides important insight into IS use and an organisation's ability to reap benefits from IS. However, little is known about users' reactions to IS over time. Among other issues, there is a lack of an in-depth study of the process of user adaptation that explains how individuals modify and adjust their use of a given IS over time. In addition, previous research has not shed light on how user adaptation behaviours change over time and what triggers users to modify their system use behaviours. Previous research explains adaptation at a specific point in time. This study proposes to examine a dynamic aspect of the adaptation process. This research offers a process explanation of how adaptation behaviours unfold over time.

## **1.2 Research objectives and questions**

This study aims to develop a better understanding of the process of individual adaptation to complex mandatory IS. Its focus is on post implementation, which goes beyond the study of initial technology acceptance. This research explores various IS use behaviours and their patterns of change that highlight the dynamic nature of user adaptation (Jasperson et al., 2005). The objective of the study is to build a process theory (Markus & Robey, 1988) that explains how users change their adaptation behaviours over time. The theory of the user adaptation process is an explanatory process theory that aims “for analysing” and “for understanding” (Gregor, 2006). The

theory is a substantive and emergent one that explains the user adaptation process to mandatory IS and the contextual conditions that influence behavioural changes over time. Specifically, the objectives set out for this study are as follows:

- To investigate the process of user adaptation to mandatory IS;
- To reveal the underlying contextual conditions that influence the process of user adaptation to mandatory IS;
- To develop a substantive and emergent theory of the user adaptation process associated with mandatory IS and how user adaptation behaviours, in turn, impact subsequent IS use.

Thus, the research questions are:

- **How do users dynamically adapt to complex mandatory IS in organisations in the context of ERP use?**
- **How do organisational contexts play a role throughout the user adaptation process?**

This study adopts qualitative interpretive research methods and a grounded theory approach towards developing a process theory of the user adaptation process. An embedded multiple-case study was used. The embedded case study design is appropriate for this study, where the goal is to describe the context and process of user adaptation. It also provides robust and rigorous grounds for quality research derived from corroboration of evidence. The iterative collection and analysis of empirical data gathered from fieldwork spanned five months with 46 participants from four organisations in Thailand.

### 1.3 Thesis structure

This thesis is organised into seven chapters. The following outline gives the reader an overview of what is entailed in each chapter.

Chapter One – *Introduction* explains the research problem and offers a brief synthesis of post-adoptive IS use and the gaps it entails. It defines the research area, the context in which this study is placed, and the key issues being explored.

Chapter Two – *Literature Review* presents a critical review of current research on ERP systems, IS acceptance, IS resistance, post-adoptive IS use, user adaptation and coping theory. This literature is revisited and theoretically integrated in Chapter Six in relation to the research findings.

Chapter Three – *Methodology* discloses the researcher's philosophical assumptions. It explains and justifies the chosen case study methodology, the embedded multiple-case study research design and discusses the data collection and analysis techniques used. Specifically, it describes the use of grounded theory for the data analysis and theory development.

Chapter Four – *Case Study Contexts* describes the background of the four organisations and the individual participants in this research. It provides an overview of the ERP projects with regards to the motivation and objectives of the implementation. This chapter not only provides a description of the organisations but also includes my interpretation of the contexts as well.

Chapter Five – *Research Findings* presents the results according to the tenets of grounded theory from the data, showing the categories developed from the grounded theory coding process.

Chapter Six – *Analysis and Discussion* presents the underlying themes and their relationships with the emergent and substantive theory. A cross-case analysis of the four organisations is also discussed. The theory is then presented and discussed in relation to the extant literature.

Chapter Seven – *Conclusions* outlines the emergent, substantive theory developed as a result of the analysis that addresses the research questions. An overview of the implications that can be drawn from this research is also provided. The chapter concludes with the limitations of this study and suggests future research avenues.

## **Chapter 2 Literature Review**

### **2.1 Introduction**

The purpose of this chapter is to present the literature relevant to the subject of this thesis in order to set the context for the subsequent analyses and discussions (in Chapter Six), as well as to get a theoretical understanding of the problem that this thesis is undertaking. As this study applies grounded theory as a method for theory building, relevant literature and the theories discussed in this chapter are used as a “sensitising device” (H. K. Klein & Myers, 1999, p. 75) guiding the analyses.

The chapter starts by reviewing the relevant body of knowledge on ERP systems, IS acceptance and resistance and post-adoptive IS use. As the focus of this thesis is on individual adaptation behaviours, a summary of the literature on adaptation is then reviewed and discussed. Then, the coping theory is presented. The concepts used as sensitising devices in this research are finally elaborated.

### **2.2 Overview of ERP systems**

In this section, a critical literature review of the relevant body of knowledge on ERP systems is presented.

#### **2.2.1 ERP use in organisations**

In the past, organisations fulfilled their information needs by adopting IT by developing disparate systems. Recognising the weaknesses in the fragmented systems, as well as the increased competitiveness in the business environment, organisations were prone to consider IT-enabled integration (Rockart & Sbordt, 1989). Finally in the 1990s, an integrated software package, the ERP system, was developed (Markus & Tanis, 2000).

This process of evolution started from the internal standard inventory control packages, material requirements planning (MRP) and manufacturing resource planning (MRP-II). The underlying assumption was that IS use automatically coordinated the activities among the production control, inventory and accounting departments (Markus, Tanis, &

Van Fenema, 2000). Later, the scope of this integrated system evolved and extended to include functions related to marketing, sales, human resources, distribution and the supply chain network. As a result, ERP has now become an enterprise-wide information system that uses database technology to control and integrate all the information related to an organisation's business including customer, supplier, product, employee and financial data. Public and private organisations using ERP systems have almost all of their business transactions (e.g., inventory management, customer order management, production planning and management, distribution, accounting, human resource management, etc.) entered, recorded, processed, monitored and reported through ERP functions (Davenport, 1998; Gefen & Ragowsky, 2005; Raymond, Uwizeyemungu, & Bergeron, 2006). ERP is viewed as a system that provides a high level of integration across all enterprise functions.

ERP systems are viewed as an important development in the corporate use of IT (Davenport & Prusak, 1998). For the first time, these systems integrate all information flow seamlessly across business functions, units, and geographical boundaries (Davenport, 2000b). ERP systems do not only solve the information fragmentation problem (Davenport & Prusak, 1998), but can also be considered as one of the most effective ways for organisations to conduct information tracing activity (Rizzi & Zamboni, 1999). More importantly, a successful ERP project can save a company millions of dollars in the long run as it can reduce operating costs, improve production cycles, generate more accurate demand forecasts, and greatly enhance customer service (Umble, Haft, & Umble, 2003). Another benefit of ERP is that it provides organisations with direct access to a wealth of real-time operating information (C. V. Brown & Vessey, 2003; Davenport & Prusak, 1998). These benefits can be translated into dramatic gains in productivity and speed for organisations (Davenport & Prusak, 1998).

The benefits of ERP systems, primarily reported by large Western organisations, have stimulated many organisations elsewhere to adopt this system. Organisations worldwide continue to implement ERP systems to improve productivity and gain competitive advantage (Gregor, Martin, Fernandez, Stern, & Vitale, 2006). ERP systems can be implemented in two ways: organisations can either custom-design their own ERP software or purchase software from an ERP vendor. The development of custom-designed software is often costly and may be subject to a series of problems and



uncertainties with regard to development, updates and cost assessment (Shehab, Sharp, Supramaniam, & Spedding, 2004). Many organisations, therefore, are more likely to purchase standard ERP software from vendors such as SAP, Oracle, JD Edwards, PeopleSoft and BAAN (Botta-Genoulaz & Millet, 2006).

### **2.2.2 ERP systems post-implementation**

ERP systems are built to support generic business processes that may differ quite substantially from the way any particular organisation conducts its business activities (Markus & Tanis, 2000), making the standard ERP software package too rigid (Davenport, 2000b). Its proprietary systems are not compatible with open system architectures (Umble et al., 2003). Companies have to change their existing business practices in order to fit into the new systems (Kawalek & Wood-Harper, 2000; Umble et al., 2003; Yakovlev, 2002).

While there are success stories (e.g., improved operational efficiency, high return on investment) of ERP system implementations and business process changes (Ranganathan & Brown, 2006), the failure rate of ERP implementation is alarmingly high (Jaspersen et al., 2005; Soh & Sia, 2005). Previous research suggests that many organisations fail to realise benefits from these systems due to employees' underutilisation. For example, about 80 percent of ERP systems are not effective (Chew et al. 2001) and only a small percentage (less than 30 percent) of users have actively sought ways to make use of their functionality (Jones et al., 2008).

After two decades of experience, organisations are still facing many problems with ERP implementations (Liang, Xue, Boulton, & Byrd, 2004; Rabaai, 2009). Implementation of ERP systems is challenging because it requires major changes in organisational business process, work routines, work practices, roles and structures (Markus & Tanis, 2000; Soh et al., 2000; Volkoff et al., 2007). It is more than installing a computer system: it entails a significant change in the way an organisation functions. From a technical perspective, ERP systems have changed the conventional style of IT from an artefact that may be tailored to different needs to a standard inflexible package.

In some cases, ERP implementation is perceived as an act against the prevailing company culture (Davenport, 2000a). The increase in reported ERP implementation

failures suggests that the problems are beyond technical issues; rather, they encompass broader socio-cultural and behavioural factors, particularly in those countries in which culture, organisational structures and business practices are different from the West (Nandhakumar, Rossi, & Talvinen, 2005; Rabaai, 2009; Rajapakse & Seddon, 2005; Skok & Döringer, 2001). For example, the combined effects of culture and process changes in ERP implementations can produce serious detrimental effects on employee attitude towards the system (Skok & Döringer, 2001).

Research suggests that most ERP implementation project teams encounter a certain level of organisational resistance during the post-implementation stage due to the disruptive change to users and organisational process (Hong & Kim, 2002). A disruptive innovation is “a novel idea or behaviour that, when introduced in organisational settings, causes dramatic changes in the structure of work processes” (Sherif, Zmud, & Browne, 2006, p. 341). Disruptive IT innovations involve pervasive and radical changes in an organisation and its business processes (Lyytinen & Rose, 2003). ERP systems can be viewed as disruptive technologies since work processes in an organisation almost always needs to be overhauled during the process of implementation (Davenport, Hammer, & Metsisto, 1989; Hammer, 1990).

Because ERP systems are usually highly integrated and inflexible, they impose particular patterns of use. One of the inherent characteristics of ERP systems is the complexity of these systems compared to other types of IT that employees use. ERP systems are multi-module systems that span across different functional areas of a business. Using these systems requires substantial knowledge about how the system handles various aspects of a business process. Users may be unable to acquire the knowledge necessary to work effectively with the system. Consequently, users may resist or avoid using the system or may work around system constraints in unintended ways (Boudreau & Robey, 2005). Previous research suggests that it may take years after ERP implementation for users to assimilate the system’s full potential (Robey et al., 2002).

Simply implementing an ERP solution does not automatically provide an organisation with benefits (Stratman, 2007). As with any information system, an ERP system must be utilised in order to provide those expected benefits (Jasperson et al., 2005).

Utilisation is the extent that software features and capabilities are used by users to perform a task (Burton-Jones & Gallivan, 2007). When users fail to utilise the full breadth of features, the system is considered underutilised (Jasperson et al., 2005). Underutilisation is partly due to inadequate training and the failure to ensure that process and system changes are well communicated to, and understood by users (Jasperson et al., 2005; Robey et al., 2002). Limited training or ineffective change management can obstruct a user's ability to understand and exploit available system capabilities and thus limit utilisation of the system (Jasperson et al., 2005).

Previous research suggests that a key reason for ERP system post-implementation failure and ineffectiveness is inadequate change management during implementation. Specifically, organisations often lack the ability to forecast the specific nature of changes caused by a new ERP and/or to manage how employees will react to these changes (e.g., Jasperson et al., 2005). Employees typically resist an ERP system and associated business process changes fearing that their work routine will be radically different after the implementation (Lapointe & Rivard, 2005; Volkoff et al., 2007). Therefore, a deeper understanding of how users respond to these changes is an important first step towards developing effective change management practices in order to reduce ERP post-implementation failures and ineffectiveness.

Research has suggested that organisations should not undermine the importance of training when implementing ERP systems (Grossman & Walsh, 2004). When users do not receive the proper training, they are not able to use the functions in the system properly and are incapable of using the system effectively to gain the expected returns (Beatty & Williams, 2004). In addition, the lack of training can cause cultural and operational issues that affect individuals' behaviour in the organisation and result in poor performance and increased resistance to change (Hwang & Grant, 2011; Metaxiotis, 2009).

Notwithstanding the cumulative understanding that an ERP implementation can cause major changes or disruptions in employees' work routine, there is limited research on how employees adapt to an ERP system during the post-implementation stage.

## **2.3 User reactions to IS**

A number of studies have investigated individual reactions to IS. Clear advances have been made in understanding IS acceptance and use. The literature also shows increasing interest in resistance to IS and several authors have attempted to adopt classification schemes of IS resistance. The following two subsections present a critical review of the literature on acceptance and resistance.

### **2.3.1 IS acceptance**

Over time, numerous theoretical models have been proposed and used to study usage and acceptance of IS. In particular, IS adoption and initial use have been extensively studied (Venkatesh, Morris, Davis, & Davis, 2003). Studies conducted under the variance approach mostly rely on models such as the technology acceptance model (TAM) (F. D. Davis, 1989), the modified TAM2 (Venkatesh & Davis, 2000), theory of planned behaviour (TPB) (Ajzen, 1991) and unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). Several factors that influence user technology acceptance and use have been identified. These include perceived usefulness, perceived ease of use (F. D. Davis, 1989), perceived enjoyment (F. D. Davis, Bagozzi, & Warshaw, 1992), social influence, and other facilitating conditions (Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Venkatesh et al., 2003). The fundamental concept underlying the majority of these models is that user perceptions about an IS influence behavioural intention to use the IS, which, in turn, drives actual IS use behaviour. As a corollary, IS acceptance has mainly been measured either by using items based on Davis's behavioural intention instrument or by assessing the quantity or frequency of use.

Recently, research has raised concerns that these existing models may not be valid across all conditions. As a result, subsequent research has added conditional factors that offer a better understanding of factors that motivate individuals to use IS. This body of work has also yielded insights into the contingencies influencing IS use. These factors are individual factors, including gender (Gefen & Straub, 1997; Venkatesh & Morris, 2000; Venkatesh et al., 2003), age (Venkatesh et al., 2003), cultural background (Igbaria, Iivari, & Maragahh, 1995; Straub, Keil, & Brennan, 1997), computer self-

efficacy (Compeau & Higgins, 1995a, 1995b), intellectual capabilities (Chau & Hu, 2001, 2002; Hu, Chau, Sheng, & Tam, 1999), intrinsic motivations (Venkatesh, 1999, 2000), personal traits (H. G. Brown, Scott Poole, & Rodgers, 2004), subjective norms (Venkatesh et al., 2003), trust (Pavlou & Fygenson, 2006; Pavlou & Gefen, 2004) and experience with IS (Taylor & Todd, 1995; Venkatesh, 2000; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh et al., 2003). Organisational factors include whether there was a mandate to adopt the new IS or not (Jeyaraj & Sabherwal, 2008), top management commitment (Lewis, Agarwal, & Sambamurthy, 2003) and organisational support for change (H. G. Kim & Kankanhalli, 2009). System factors, including technical complexity (Subramanian, 1994) and hedonic characteristics of the system (Van der Heijden, 2004), also influence users' reactions to IS. In addition, task, including fit between the task and the technology (Goodhue & Thompson, 1995) and type of task (Fang, Chan, Jacek, & Xu, 2005), has also been identified.

However, there is a need to go beyond what the technology acceptance models and their variants afford in order to reveal the complex process of adapting one's working practices to a disruptive technology, like an ERP system. Firstly, the traditional technology acceptance model may not be a good explanatory fit in mandatory usage contexts (Agarwal & Prasad, 1997; S. A. Brown, Massey, Montoya-Weiss, & Burkman, 2002; Karahanna et al., 1999). Much of the prior research on IS acceptance has been conducted in the context of voluntary adoption of a new IS using either the usage or the intention to use it as a dependent variable. For example, models derived from the theory of reasoned action make the underlying assumption that system use is voluntary (Karahanna & Straub, 1999; Straub, Limayem, & Karahanna, 1995). In practice, IS usage in organisations is often mandatory which means that users are required to use the system to perform their work (S. A. Brown et al., 2002). Moreover, the concept of intensity, frequency or duration used as proxies of system usage lacks contextual validity in a mandatory context.

Secondly, the intention-behaviour gap in the traditional technology acceptance model has not been properly addressed. Intentions are made prior to taking action, and the gap in time can be relatively large, with many intervening steps needed and unanticipated obstacles occurring (Bagozzi, 2007). Therefore, it is important to consider emerging

psychological and influential steps between intention formation and action initiation (Bagozzi, 2007).

Thirdly, most technology acceptance models assume that users face no impediments in the course of their system usage. However, in practice, users face many situations that are beyond their control (Bagozzi & Warshaw, 1990). In models based on the theory of reasoned behaviour, users are assumed to enjoy a trouble-free implementation process when they decide to use a new system (Bagozzi, Davis, & Warshaw, 1992), which may not always be the case.

Fourthly, the traditional acceptance model may not apply well to complex systems such as an ERP system. An ERP system requires high levels of coordination across multiple users and users may adapt differently to more complex technologies than to less complex ones (Gallivan, 2001). Large integrated system implementation can also contradict the existing organisational structures and culture. For example, an ERP system embeds a transversal, process-oriented vision of the organisation. When implemented in a bureaucratic organisation characterised by top-down decisions and multiple layers of authorisation, ERP implementation can face significant user resistance to change (Lowe & Locke, 2008). In such context, it is critical to understand how users adapt to radical IS change.

Finally, Bagozzi (2007) points out that TAM neglects the influence of group, social and cultural factors on decisions to use the system. A significant body of knowledge indicates that social influence and peer pressure have a direct effect on the intention to use the system in mandatory use contexts (Venkatesh & Davis, 2000; Venkatesh et al., 2003). In addition, culture may exert a significant influence on the intention to use the system (Srite & Karahanna, 2006; Straub, 1994; Straub et al., 1997).

Although acceptance models and their empirical testing provide useful snapshots of IS acceptance, they do not explain the underlying adaptive process that most users have to go through once the system has been implemented. The purview of IS acceptance models has typically been restricted to measuring use/non-use immediately following adoption or, in some cases, merely intention to use (Agarwal & Karahanna, 2000; Agarwal & Prasad, 1998; Bhattacharjee, 2001; Venkatesh, 2000). While certainly

appropriate for capturing pre-adoption and adoptive behaviours, this perspective yields limited insight into the complexities of post-adoptive behaviours (Jasperson et al., 2005).

In summary, most IS acceptance research has focused primarily on the initial stages of adoption and early use behaviours. By not taking into account the dynamic aspect of adaptation, existing models may not allow us to fully understand user experiences in the course of their IS use. Some scholars argue that more research is needed in order to produce rich theory and conceptualisation of individual adaptation processes (Benbasat & Barki, 2007; Burton-Jones & Straub, 2006; Fadel & Brown, 2010; Jasperson et al., 2005). A deeper understanding that takes into account a broader range of behaviours beyond direct relationships between use behaviours and their antecedents is needed in IS research.

### **2.3.2 IS resistance**

Resistance is defined in the organisational change literature as any conduct that serves to maintain the status quo in the face of pressure to change the status quo (Zaltman & Duncan, 1977). In the psychology literature, resistance is conceptualised along a continuum from active to passive (Bovey & Hede, 2001). Active resistance implies undertaking actions intended to prevent change, such as voicing concerns, refusing to cooperate, lowering quality of work, sabotaging and quitting. In contrast, passive resistance involves refraining from actions in order to prevent oneself from being affected by change, such as withdrawing from conversations about change, avoiding the necessary training, neglecting work assignments, increased absenteeism and requesting job transfer. Resistance can also be categorised as overt or covert. Overt resistance behaviours may include openly obstructing change in a visible manner such as through direct opposition or sabotage, while covert resistance is less obvious such as relying on inertia to stall change (Hirschheim & Newman, 1988). Hence, overt and covert resistance is similar to active and passive resistance respectively.

According to Dewan, Lorenzi and Zheng (2004), there are two types of resistance: resistance to a particular change or resistance to the perceived changer. When the resistance is directed towards change of the system, then the resistance is considered

towards a particular change. However, when resistance occurs because of negative feelings towards an organisation, specific units or specific managers, then it is viewed as resistance to the perceived changer. Previous research suggests that users may engage in various forms of resistant behaviours associated with the introduction of a new IS. Some of these behaviours include not attending new IS training classes, complaining about the new IS, refusing to use it (Martinko, Henry, & Zmud, 1996), and refusing to share knowledge an organisation needs for the new IS during the implementation process (Rees, 1993).

In an IS context, workforce resistance has largely been viewed as the negative behaviour of system users that may prevent system designers from achieving their objectives, or affect the success of system implementation (Ferneley & Sobreperetz, 2006). Researchers have been aware of problems relating to user resistance to new IS since the early 1960s (Lin & Ashcraft, 1990). To solve such problems, a number of different models and perspectives have been developed to help organisations overcome user resistance or gain user acceptance of new IS. For example, Marakas and Hornik (1996) propose that users may comply with a system that they know to be flawed without highlighting those flaws. They suggest that while the user may be compliant with the IS, they also exhibit resistance to their employment; they are not acting in the best interests of the organisation by failing to highlight the system's shortcomings. Prasad and Prasad (2000) propose that resistance may take place at an individual level continuously throughout the organisation.

Joshi (1991), Webb and Palmer (1998), Rosenthal (2004) and Lapointe and Rivard (2005) have all developed multilevel models of user resistance showing that resistance can take place at the individual, group or organisational level. Joshi (1991) suggests that users will resist if they perceive inequity at individual, peer group or organisational level, while Webb and Palmer (1998) posit that supervisors may collude in resistant behaviours. Rosenthal (2004) proposes that workers may manipulate systems to satisfy their self-defined interests. Lapointe and Rivard (2005) conceptualise resistance to IS implementation as behaviours that occur following perceptions of threats associated with the interaction between an object and initial conditions. The model suggests that resistance can manifest itself as apathy, passive resistance, active resistance and aggressive resistance. The authors also note that resistance evolves over time across



different stages of the implementation process, and that resistance behaviours are exacerbated by perceived threats among adopter groups, such as loss of power and reorganisation of work (Lapointe & Rivard, 2005). During implementation, some triggers can either modify or activate initial conditions; a modification of the object of resistance may ensue. From the interaction of this new object and a new set of conditions, different resistance behaviours may follow.

The antecedents of user resistance to new IS may expand over time as individuals start to use IS on a regular basis (Karahanna et al., 1999). Evidence from the literature suggests that user resistance to a new system can be attributed to many factors. Some of these factors are users' fear of losing their jobs because of the introduction of the new system (Gill, 1996; Yoon, Guimaraes, & O'Neal, 1995), bad experiences with IS changes (Adams, Berner, & Wyatt, 2004; Martinko et al., 1996), lack of user involvement and fear of cultural changes (Gill, 1996) as well as political concerns (Lin & Ashcraft, 1990). Individuals may also resist new IS through fear of a loss of prestige and status in the organisation (Adams et al., 2004). This loss may be associated with a lack of knowledge about the new IS, pressure to develop new skills, pressure of higher performance expectations, loss of social interaction with other workers, previously negative experiences with IS effort, and unclear benefits of new IS to the user. To overcome the resistant behaviours, organisations should focus their efforts on communication, user involvement and training (Adams et al., 2004).

Yoon et al. (1995) suggest that organisational adaptation of a new IS always results in changes in the way in which decisions are made, work activities are performed, and power is allocated. These changes may be viewed as positive for some workers and negative for others. As a result, when users begin to fear that they will not be able to acquire the necessary knowledge to utilise a new IS, this fear will ultimately lead to the fear of losing their jobs, which, in turn, may generate resistance towards new IS (Yoon et al., 1995). Previous research also implies that user resistance to new IS leads to various problems such as system failure, staff turnover, complaints, low morale, scheduling delays and decreases in job performance (Adams et al., 2004; Timmons, 2003).

Kobayashi et al. (2005) and Petrides et al. (2004) propose an alternative scenario of user resistance. Despite their engagement with a system, users fail to conform to the prescribed rules of engagement. They define this behaviour as workaround. Indeed other authors, while they do not use the term workaround explicitly, also provide examples of workaround behaviours that emerge after system rejection or resistance. For example, as highlighted by Button et al. (2003) and Lankshear and Mason (2001), in environments with insufficient data, individuals may compensate by creating idiosyncratic methods of data collection, data management or working practice to overcome hindrances or ensure essential task completion. Similarly, Robey et al. (2002) found that, instead of learning the new system and work processes, some users of an ERP system tried to return to what they had done in the past, including workarounds. They also found that some users pulled data off the new system and used their old desktop software for analysis.

Klein and Sorra (1996) suggest that some users will try to avoid an innovation or use it unenthusiastically. In the context of a banking system implementation, Beaudry and Pinsonneault (2005) found that some employees did not use the system at all because they thought that they would be able to accomplish their tasks efficiently without using the system. Typically, users who exhibit avoidance behaviours feel threatened by a new system and believe that the system does not provide any instrumental benefits to them.

To sum up, the literature review on user acceptance and resistance and the associated behaviours and consequences suggests that acceptance and resistance represent a complex and multifaceted phenomena that has traditionally been studied independently. Although these studies have been very useful in furthering our understanding of user reactions to IS, they do not account for the overall complexity of these phenomena. In this regard, the literature review reveals the extent to which IS research implicitly takes for granted that acceptance leads to use and resistance results in non-use. For instance, acceptance and use are often used interchangeably in the literature (Sykes, Venkatesh, & Gosain, 2009; Venkatesh et al., 2003). These assumptions do not take into account the fact that, in some cases, acceptance may involve misuse and that resistance does not always imply non-use. Despite their acceptance of IS, some user behaviours may deviate from the IS terms of use by engaging in abusive use (Kuheli, 2010) or compulsive use (Davidson & Walley, 1985). Similarly, misuse (Marakas & Hornik,

1996) and deliberate errors (Ferneley & Sobrepez, 2006) also imply resistance even though they involve system use. On the other hand, some forms of resistance such as gossiping or bashing may be associated with use behaviours done in compliance with social pressure (Lapointe & Rivard, 2005). In a mandatory situation, one's intention to use a system is not always representative of acceptance or resistance. As a result, there is a need to introduce theoretical foundations that focus on explaining behavioural processes. These are likely to help us explain and better understand user behaviours during IS use.

## **2.4 Post-adoptive system use and user adaptation**

Several researchers have proposed useful concepts to explicate the dynamic of post-adoptive IS use. The first section starts with reviewing research on post-adoptive behaviours in the current literature. The second section reviews and discusses existing studies of the user adaptation process in the contemporary IS literature which is the focus of this research.

### **2.4.1 Post- adoptive behaviour**

The post-implementation stage represents the longest stage in the IS life cycle, the stage during which the system is actually being used by employees. As a result, the ways in which individuals use IS have been identified as critical for linking organisational investments with their corresponding benefits (Jasperson et al., 2005). Post-adoptive system use is believed to help organisations enhance their employees' job performance and thereby reap the full benefit from the high costs of IT infrastructure (Cooper & Zmud, 1990).

While research primarily focuses on IS adoption and the initial phase of IS use, there is growing interest in studying post-adoptive phenomena (e.g., Jasperson et al., 2005; Limayem et al., 2007). Post-adoptive use can be classified into two research streams. First, research on IS use continuance – also referred to as continued use – has generated a number of propositions concerning the factors that lead individuals to keep using (or discontinue use of) an IS once it has been adopted (Bhattacharjee & Premkumar, 2004; Karahanna & Straub, 1999; Parthasarathy & Bhattacharjee, 1998). Second, habit

formation in IS use, which refers to individuals' tendencies to use IS automatically (Limayem et al., 2007), has also been studied. This literature emphasises the antecedents and consequences of habitual use as well as the influence of habit on users' interactions with an IS (e.g., intention to use, innovation) (S. S. Kim & Malhotra, 2005; Limayem & Hirt, 2003; Limayem et al., 2007; Ortiz de Guinea & Markus, 2009). While the studies on IS use continuance and habit are important to IS research, they do not provide sufficient insight into the nature of post-adoptive IS use particularly how system use dynamically changes over time.

To explore the dynamic nature of IS use, contemporary IS researchers have called for useful concepts to explicate the dynamic of post-adoptive IS use. Based on research in innovation diffusion and creativity, Ahuja and Thatcher (2005) propose a concept called trying to innovate. This concept is defined as an individual's goal of finding novel uses of information technologies. Ahuja and Thatcher (2005) suggest that trying to innovate is a kind of post-adoptive behaviour whereby individuals attempt to find new patterns of technology use such as repurposing system features. Similarly, Jasperson and colleagues (2005) synthesise existing conceptualisations of post-adoptive IS use behaviours and propose three types of these behaviours: feature adoption, feature use, and feature extension. In a similar vein, some researchers call for an expanded behavioural view of system use to capture what "users do in and around the notion of system use", arguing that "the advantages of an expanded behavioural view of IS use include a more faithful representation of usage activities that users engage in" (Benbasat & Barki, 2007, p. 215). More recently, Burton-Jones and Grange (2012) put forth the concept of effective use, which refers to the use of a system "in a way that helps attain the goals for using the system" (p. 2). Their definition of use draws on information theory to integrate the nature and purpose of an information system, and thus is inclusive of not only the system, but also of the user and the tasks.

Table 2.1 summarises existing conceptualisations of post-adoptive system use. Several researchers have defined characteristics of post-adoptive system use. These concepts contribute to our understanding of how users interact with and use IS to reinvent new work practices after an introduction of a system. As presented in Table 2.1, there is no agreed upon definition of post-adoptive system use. Researchers have studied it from various perspectives and at different levels of analysis.

**Table 2.1: Various Conceptualisations of Post-Adoptive System Use**

Concept	Definition	Authors
Extended use	Using more of the technology's features in order to accommodate a more comprehensive set of work tasks.	Saga & Zmud (1994)
Integrative use	Using the technology in order to establish or enhance work flow linkages among a set of work tasks.	
Emergent use	Using the technology in order to accomplish work tasks that were not feasible or recognised prior to the application of the technology to the work system.	
Unanticipated use	"Voluntarily extending the use of a software product to new tasks and new settings after mandatory adoption for a specific task in a specific setting".	Singletary et al. (2002, p. 651)
Trying to innovate	An individual's goal of finding novel uses for information technologies. This is considered to be a particularly suitable volitional post-adoptive measure.	Ahuja & Thatcher (2005)
Post-adoptive behaviour	"The myriad feature adoption decisions, feature use behaviours, and feature extension behaviours made by an individual user after an IT application has been installed, made accessible to the user, and applied by the user in accomplishing his/her work activities".	Jaspersen, Carter, & Zmud (2005, p. 531)
Deep structure use	Deep structure use indicates the extent to which system features have actually been used by a user.	Burton-Jones & Straub (2006)

### **2.4.2 User adaptation process**

Implementation of a new IS in the workplace alters the nature of work, requiring employees to learn new ways of performing their jobs (Patrickson, 1987; Pulakos, Arad, Donovan, & Plamondon, 2000; Thach & Woodman, 1994). ERP system implementation causes disruption in employees' work environment that provokes various responses. These responses reflect adaptation behaviours. Such adaptation is a key process to understand because it describes how individuals change or adjust their behaviours to adapt with changing and uncertain work situations (Chan, 2000a, 2000b). Implementation of an ERP system requires users to be adaptive in terms of how they use it to accomplish their tasks (Boudreau & Robey, 2005).

Major studies dealing with user adaptation to IS have defined user adaptation at an individual level using different yet conceptually linked terms such as adjustment, appropriation, and even adaptation. As presented in Chapter One, this study conceptualises the adaptation process as the interaction between users and a system characterised by the degree to which individuals make an effort to learn about and use the system as well as adjust their work practices accordingly. Table 2.2 shows how adaptation has been defined in previous studies.

**Table 2.2: Various Conceptualisations of Adaptation Behaviour**

Concept	Definition	Authors
Adjustment	“Have four different aspects: changes in job satisfaction, work commitment, psychological and stress problems, and perceived quality of life”.	Majchrzak & Cotton (1988, p. 48)
Adaptation	“The reinvention of the technology and the simultaneous adaptation occurring at multiple levels within the organisation”.	Leonard-Barton (1988, p. 253)
Adaptation	“Refers to the adjustments and changes following the new IT implementation. The adaptations may concern the physical aspects of the technology as well as the procedures, beliefs, knowledge, or relationships of the users”.	Tyre & Orlikowski (1994, p. 99)
Adaptation	“Modifications brought to the technology, working, procedures, and users’ beliefs”.	Tyre & Orlikowski (1996, p. 791)
Appropriation	“The continuous, progressive, and mutual adjustments, accommodations, and improvisations between the technology and the users”.	Orlikowski (1996, p. 69)
Adaptation	“The cognitive and behavioural efforts exerted by users to manage specific consequences associated with a significant IT event that occurs in their work environment”.	Beaudry & Pinsonneault (2005, p. 496)
Reinvention	“Users deviated from prescribed work processes and ‘tweaked the system’ to make it respond to their needs. Through such tweaking (also called ‘workarounds’), users sought to circumvent the rigid work	Boudreau & Robey (2005, p. 13)

Concept	Definition	Authors
	processes embedded into Compass's software routines, thereby making the system work in ways that they could better understand and control".	
Technology interaction behaviours	This category includes all IT interactions undertaken with the purpose of accomplishing an individual or organisational task.	Barki et al. (2007)
Task-technology adaptation behaviours	This category includes all behaviours directed at changing or modifying an IT and its deployment and use in an organisation.	
Individual adaptation behaviours	The behaviours of this category reflect modifications that individuals make to themselves in order to adapt to the IT.	
Adaptation	"The process by which individuals learn, negotiate, enact, and maintain the behaviours appropriate to a given organisational environment".	Bruque, Moyano, & Eisenberg (2009, p. 178)
Adaptive system use	"User's revisions regarding what and how features are used".	Sun (2012, p. 455)



User adaptation has been the subject of several studies over the past few years. Different studies emphasise different aspects of user adaptation. Tyre and Orlikowski (1994) observe that users' adaptation to a new system influences their system use and subsequent outcomes. For instance, some users may integrate the IS into their work processes according to the organisational expectation. Others may mis-adapt to the system resulting in loss in work efficiency or effectiveness. Yet others may abandon the system altogether. Some users engage in unexpected patterns of system use through, for example, reinvention (Boudreau & Robey, 2005).

Barki et al. (2007) have proposed an expanded behavioural conceptualisation of individual-level information system use, labelled IS use-related activity (ISURA). ISURA identifies technology interaction behaviours (e.g., problem solving, exchanging with people, planning or following up, coordinating activities), task technology adaptation behaviours (e.g., improving functionalities, interfaces, hardware) and individual adaptation behaviours (e.g., reading manuals, learning from an IT specialist) to define the use of a technology with greater consideration for the activities surrounding IS use. However, it does not provide an explanation of the process through which post-adoptive use is enacted.

In a similar vein, Sun's (2012) theory of Adaptive System Use (ASU) takes a closer look at individual appropriation, focusing on the user's behaviour of modifying the feature set in an adaptive manner. Sun (2012) suggests that contextual factors such as novel situations (e.g., changes in the system's hardware, software, peripherals), discrepancies between the expected and actual functioning of features, as well as explicit demands to try out new features are all likely to trigger more individual user's sensemaking. Sun (2012) categorises how users adapt their IS use at the system feature level into two dimensions: revising the content and revising the spirit of features in use. The first dimension refers to what features are being used, and includes moves such as the exploration of features and the substitution of features with others presenting similar functions. The second dimension pertains to how features are being used, and comprises the moves of combining features for the first time, or repurposing features through innovative uses.

Individual characteristics may also affect the adaptation process. For instance, it has been shown that computer self-efficacy, which is defined as the perceived ability to learn, use and interact with systems, influences how individuals interact with IS (Compeau & Higgins, 1995a, 1995b). Similarly, personal innovativeness in IT use – the “individual trait reflecting a willingness to try out any new technology” (Agarwal & Karahanna, 2000, p. 677) – shapes how individuals perceive and respond to a new technology. For instance, individuals with higher personal innovativeness exhibit positive beliefs about IS (Agarwal & Karahanna, 2000; Lewis et al., 2003), are likely to tolerate the risk associated with changes and adapt well when faced with a new situation (Sun, 2012).

Collectively, these studies suggest that when a new system is implemented, individuals may act in different ways and adaptation behaviours may change over time. Adaptation behaviours are not deterministic but are instead constrained by existing contextual structures in the environment such as work tasks and systems (DeSanctis & Poole, 1994). For example, in some cases, users may change the new system to fit their current tasks, while in other situations they may modify work routines and procedures to fit the new system. Additionally, users may engage in behaviours directed at facilitating their adaptation, such as attending training sessions or seeking additional knowledge through support documentations. If users believe that the IS offers benefits such as improved work effectiveness or efficiency, or if there is considerable social support for the IS, the users are likely to perceive it positively (F. D. Davis, 1989; Moore & Benbasat, 1991; Taylor & Todd, 1995; Venkatesh et al., 2003). Conversely, a belief that the IS will hamper productivity or be difficult to use will likely induce a stress reaction to the IS.

Adaptation behaviours have implications on the way in which IS are used, benefits derived from their use, and individual and organisational outcomes (Beaudry & Pinsonneault, 2005). For instance, an individual who feels threatened by a new IS may learn only basic system functions and engage in superficial use that produces minimal performance benefits of the system capabilities. In contrast, when a new system is perceived to be providing opportunities, and users believe they have control over the situation, they are more likely to adapt their work procedures in order to take full advantage of the system capabilities.

In summary, research on IS adaptation has demonstrated that adaptation of the user, IS and the work context are key factors governing the successful integration of a new technology into an organisation's work systems. However, in spite of various findings that can be related to the essential concept of user adaptation, an integrated theoretical foundation for understanding user adaptation process and how adaptation behaviours evolve over time has not been developed in the IS literature.

In addition, little is known about what triggers people's modifications to their system use behaviours. Some have suggested conditions in which people change their current use of IS. For instance, tasks have been theorised as an essential part of system use (e.g., Barki et al., 2007; Beaudry & Pinsonneault, 2005; Saga & Zmud, 1994; Singletary et al., 2002). In other words, tasks could be a condition that trigger users to change their current ways of system feature use. Beaudry and Pinsonneault (2005) further argue that such changes in system use are also constrained by the consequence of the IT event and control over the change, suggesting the importance of individual and contextual conditions. Yet, no systematic treatments of triggers and contextual constraints of user modifications in IS use have been conducted.

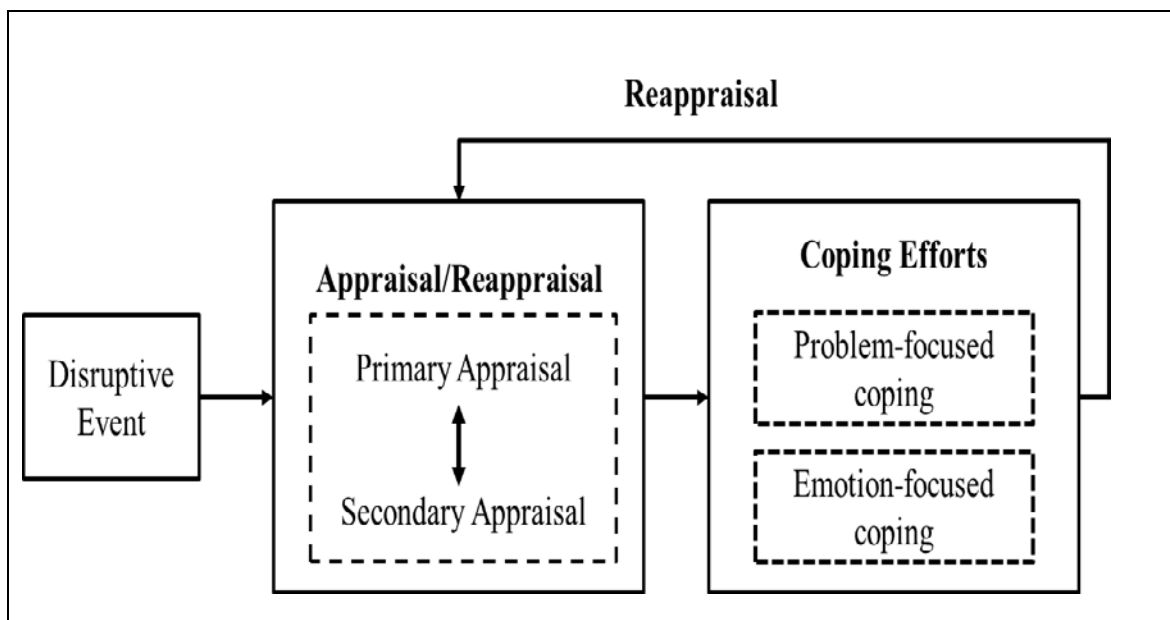
Coping theory has emerged as a preliminary theoretical lens for understanding users' adaptations to an IS (Beaudry & Pinsonneault, 2005). Coping theory provides a general framework for understanding how individuals respond to disruptive events in their environment (Lazarus & Folkman, 1984), and has recently been adopted by IS researchers seeking to understand users' reactions to new IS in the workplace. The next section presents an overview of coping theory. This review is followed by a summary of coping research in the IS domain.

## **2.5 Coping theory**

Introducing a new system is a disruptive event for users, especially when it is mandated. Coping theory has been used to explain how users adapt to a disruptive IS in an organisation. The theory deals with the adaptation acts that an individual performs in response to a disruptive incident.

### 2.5.1 The coping process

Coping is defined as “constantly changing cognitive and behavioural efforts exerted to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p. 141). During the coping process, individuals deal with a disruptive event in two sequential stages: appraisal and coping effort (see Figure 2.1). In the appraisal process, individuals evaluate the potential consequences of an incident and the coping resources available to them. Next, in the coping effort process, the individual chooses to apply two mechanisms to deal with the new situation: problem-focused and emotion-focused coping efforts.



**Figure 2.1: Coping process, adapted from Lazarus and Folkman (1984)**

#### Appraisals

As shown in Figure 2.1, coping process begins when a person becomes aware of a potentially disruptive event. An individual first evaluates the potential consequences of the situation through a process of cognitive appraisal. Appraisals are cognitive evaluations of the situation, as the user categorises the stressor – e.g., a new system – and its various facets with respect to the user’s well-being (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) explain that the cognitive appraisal process mediates

reactions and that each user may appraise a situation differently. They identify two types of appraisals in the coping process: primary appraisals and secondary appraisals.

Individuals engage in primary appraisal as they assess the personal importance and relevance of the situation (Lazarus & Folkman, 1984). There are two possible outcomes of the primary appraisal process: challenge or threat. Challenge refers to a situation that has been assessed as having positive outcomes for an individual and invokes emotions of excitement and anticipation. Some IS literature refers to this outcome as an opportunity (Beaudry & Pinsonneault, 2005; Ortiz de Guinea & Webster, 2013). To match the existing terminology and to avoid further confusion, this assessment will be referred to as an opportunity hereafter. A threat refers to a situation that is perceived as having negative consequences for an individual (Lazarus & Folkman, 1984). In practice, situations are multifaceted and are usually perceived as comprising some aspects of opportunities and threats.

In the secondary appraisal, in addition to assessing the importance of a situation, individuals also determine the level of control they exert over the situation and evaluate the coping resources available to them (Lazarus & Folkman, 1984). This complex process takes into account coping options as well as their likelihood of accomplishing the desired results (Lazarus & Folkman, 1984).

### **Coping efforts: Adaptation behaviours**

During the coping process, the appraisal (and reappraisal) processes result in the selection of adaptation behaviours (Lazarus & Folkman, 1984). These adaptation behaviours directly affect implementation success. The resulting behaviours generally fall into either problem-focused or emotion-focused coping solutions (Lazarus & Folkman, 1984). Problem-focused coping aims at solving problems and managing the situation by changing environmental pressures, barriers, resources or changing oneself (Lazarus & Folkman, 1984). Problem-focused coping occurs primarily when individuals feel that they are in control of the situation. Emotion-focused coping aims at changing one's perception in order to reduce emotional distress. Emotion-focused coping occurs mainly when individuals feel that they have limited control over the situation (Lazarus & Folkman, 1984). Emotion-focused adaptation is oriented towards minimising

negative consequences of threats, selective attention, avoidance, situation redefinition and passive acceptance, distancing, seeking psychological or emotional support and positive comparison to other users (Lazarus & Folkman, 1984). As a consequence, individuals use this kind of coping mechanism to mitigate the emotion barriers so that they can easily adapt to the new IS.

### **Reappraisal and triggers**

Coping is a dynamic process. It entails a dynamic interaction between an individual and the incident, including attention to how circumstances and behaviours change as the situation develops over time (Lazarus & Folkman, 1984). After initial coping efforts are exercised, reappraisal and additional coping efforts may take place. The adaptive behaviours determined by initial primary and secondary appraisals will result in a modified situation that may require additional appraisals.

### **2.5.2 Coping theory in IS research**

Drawing on coping theory, and key concepts from the technology acceptance and adaptation literature, Beaudry and Pinsonneault (2005) propose the Coping Model of User Adaptation (CMUA) to explain how users cope with an IT event in their work environment. CMUA conceptualises user adaptation as a coping behaviour that is defined as “the cognitive and behavioural efforts exerted by users to manage specific consequences associated with a significant IT event that occurs in their work environment” (Beaudry & Pinsonneault, 2005, p. 496). Consistent with coping theory, the basic thesis of CMUA is that individuals will appraise an IT event (implementation of a new IT or modification of an existing one) based on two dimensions: (a) perceived consequences (e.g., opportunity or threat); and (b) perceived control over the situation.

In an IS context, at the stage of primary appraisal, users determine the expected consequences of the new IS implementation and their likely effects on personal well-being and professional growth (Beaudry & Pinsonneault, 2005). Users assess whether the IS event constitutes an opportunity or a threat. For instance, if users evaluate the fit between their work and the IS to be high, the new IS is recognised as an opportunity; otherwise it is recognised as a threat. Secondary appraisal may involve three types of controls: work, self, and technology (Beaudry & Pinsonneault, 2005). Work control

refers to the feeling of sufficient autonomy related to a job and the ability to modify tasks. Self-control involves individuals' belief that they can adapt themselves to the new environment. Technology control refers to the ability to manipulate features and functionalities of the new IS.

Based on whether they appraise an IT event as an opportunity or threat and perceived control over the situation as high or low, individuals, according to CMUA, will engage in one of four different adaptation strategies (Beaudry & Pinsonneault, 2005). These strategies are benefits maximising, benefits satisfying, disturbance handling and self-preservation. Individuals adopt a benefits maximising strategy (e.g., to take full advantage of the opportunities offered by the IT event and maximise personal benefits) when the system is perceived to be providing opportunities and users believe they have a high level of control in the situation. With an appraisal of opportunity associated with system use and a perception of low control, users adopt a benefits satisfying strategy (e.g., individuals satisfy themselves with the limited benefits the IT offers). Two other strategies are adopted when the system is thought to be a threat. When users believe they have a high level of control in the situation, they adopt a disturbance handling strategy (e.g., restoration of personal emotional stability and minimisation of the perceived negative consequences associated with an IT). On the other hand, with low control perceptions, users espouse a self-preservation strategy (e.g., restoration of emotional stability with little or no impact on individuals' work performance).

CMUA asserts that adaptation behaviours employed by an individual will impact individual-level outcomes, for example, individual efficiency and effectiveness, minimisation of the negative consequences of an IT, and restoring personal emotional stability (Beaudry & Pinsonneault, 2005). However, CMUA does not explicitly incorporate or explore contextual factors that influence how users appraise an IS and does not deal with how these contextual factors may influence user adaptation (Beaudry & Pinsonneault, 2005). Although CMUA identifies an appraisal of an IS as a determinant of subsequent adaptation behaviours, CMUA does not explain how adaptation strategies dynamically evolve over time as users' work environment or their perception of the system changes (Beaudry & Pinsonneault, 2005).

In their study, Ortiz de Guinea and Webster (2013) identified two main IS use patterns: automatic and adjusting. The automatic IS use pattern takes place during an expected IT event, which is characterised by a match between the expected and the actual performance of the system. In contrast, users adjust IS use patterns when facing problems or difficulties with the system being used. These two patterns appear and disappear over time as different events occur. However, their study heavily focuses on technology-related events, while putting less emphasis on other events that may shape user adaptation process.

Overall, coping theory provides a preliminary framework for examining a full range of individual factors. It does not provide, however, the conceptual tools for understanding the interaction between individual and contextual factors and how they are interwoven along the adaptation process. In addition, coping theory is silent on what attributes of a disruptive event shape one's primary appraisal (Beaudry & Pinsonneault, 2005). It is plausible that the same IS may be viewed as an opportunity by some users and as a threat by others within the same organisation, resulting in divergent appraisal patterns within the user population. Furthermore, since primary appraisal takes place within an organisational context, it may also be influenced by social and institutional factors, such as subjective norms (what peers and/or superiors think about the technology), top management support regarding the IT implementation effort, and organisational culture towards new technologies (F. D. Davis, 1989; Thompson, Higgins, & Howell, 1991).

Although coping theory and its extension offer useful insights on adaptation behaviours, very little is known about how social, organisational and technological factors influence users' appraisal of a system and their ensuing adaptation behaviours. In addition, prior research has not paid much attention to subsequent triggers that shift user adaptation behaviours over time. Changes in systems use, shift in work roles and other organisational conditions may shape user adaptation behaviours (Barki et al., 2007; Beaudry & Pinsonneault, 2005; Singletary et al., 2002; Sun, 2012). Sun (2012) suggests that changes in the underlying technology, discrepancies between the expected and actual functioning of features and mandate for users to try out new features are likely to trigger users' re-evaluation of the system and, as a consequence, change their system use.



This research posits that the user adaptation process does not entirely depend on a person's efforts. To contribute novel insights to the adaptation process, this research pays attention to how social, organisational and technological conditions shape adaptation trajectories in a dynamic fashion.

## **2.6 Chapter conclusion**

This chapter presented a review of previous research on ERP systems, IS acceptance, IS resistance, post-adoptive behaviours, adaptation and coping theory. The IS literature clearly highlights IS use and adaptation as important phenomena in IS implementation contexts. Long term viability of an organisational IS critically depends on how well individual users adapt to it and how they use it in their work practices. However, in spite of various findings that are broadly related to user adaptation, an integrated theoretical foundation for understanding the user adaptation process and how adaptation behaviours evolve over time has not been developed in the IS literature.

## **Chapter 3 Methodology**

### **3.1 Introduction**

The purpose of this chapter is to present the overall research approach adopted in the current study. The chapter starts with the underlying philosophical assumption that guided the study. The case study approach of this research is described next, followed by the research design and the description of the unit of analysis. In the next section, I introduce the grounded theory method that is used for data analysis and theory development. Following this, I describe in detail the data collection and analysis procedures undertaken throughout the study.

### **3.2 Philosophical approach**

All research is based on some underlying philosophical assumptions about what constitutes valid research and which research methods are appropriate. These assumptions and research methods fed into the ways in which my research questions were formulated and the research was eventually carried out (Bryman & Bell, 2011). The following subsection presents the underlying ontological and epistemological assumptions of this research.

#### **3.2.1 Ontological and epistemological assumptions**

A paradigm choice is influenced by the basic belief system of the researcher, the research questions and the nature of the phenomenon of interest (Guba & Lincoln, 1994; Orlikowski & Baroudi, 1991). Ontological and epistemological assumptions guide the choice of methodology and method employed in an investigation (Guba & Lincoln, 1994); therefore it is essential to explicate my philosophical position regarding the research problem. Philosophical assumptions relate to my view of the social world and how it may be studied (ontology); and my understanding of how knowledge can be obtained (epistemology).

My ontological assumption is that social reality is locally and specifically constructed or interpreted (Guba & Lincoln, 1994) “by humans through their action and interaction”

(Orlikowski & Baroudi, 1991, p. 14). Reality is subjective and likely to differ with circumstances and time. Reality is complex and multi-layered in nature. It is interpreted and constructed by individuals in their interactions with one another and the way they perceive social situations (Guba & Lincoln, 1994). Reality for me as a researcher is such that I have a role to play in the phenomena I am investigating, my understanding of it and the way I present my findings. I see my research problem not as external reality that acts on and constrains people; rather, it is an emergent reality that is in a continuous state of construction and reconstruction (Bryman & Bell, 2011).

I believe that individuals experience reality in different ways; reality is subjective and its meaning is varied and depends on its context (Myers, 2010). My epistemological assumption is that “findings are literally created as the investigation proceeds” (Guba & Lincoln, 1994, p. 111) and that “understanding social reality requires understanding how practices and meanings are formed and informed by the language and tacit norms shared by humans working towards some shared goal” (Orlikowski & Baroudi, 1991, p. 14). When I was undertaking fieldwork, I interpreted what was occurring in a social situation with the assumption that there were multiple valid realities.

### **3.2.2 Interpretive approach**

My underlying philosophical stance is interpretivism. I attempted to understand the dynamic process of user adaptation to complex mandatory IS through participants’ understanding without predefining dependent and independent variables. I argue that adaptation behaviour is a socially constructed process. The interpretive research approach offered the potential to develop deeper insights into IS phenomena by providing me with a better understanding of individual thoughts, behaviours and actions in social and organisational contexts (H. K. Klein & Myers, 1999; Orlikowski & Baroudi, 1991; Walsham, 1995b). Arguments supporting the interpretive approach as a valid basis of inquiry into the social implications of IS in organisations are well documented in the IS literature (Doolin & McLeod, 2005; Nandhakumar & Jones, 1997; Orlikowski & Baroudi, 1991; Walsham, 1995a, 1995b, 2006).

I believe that “our knowledge of reality is gained only through social constructions such as a language, consciousness, shared meanings, documents, tools, and other artifacts” (H.

K. Klein & Myers, 1999, p. 69). In other words, to comprehend phenomena, it is necessary to access and assess the meanings that people assign to them (Orlikowski & Baroudi, 1991). As an interpretive researcher, my goal is to provide a deeper meaning or comprehension of social phenomena, and such deep meaning can be obtained from the perspectives of people towards reality. As such, my aim is to provide rich interpretations that bring subjectivity to the fore and support it with quality arguments rather than statistical exactness (Garcia & Quek, 1997). In order to grasp the meaning of phenomena, I had to scrutinise the social world as closely as possible in its natural situations. During the fieldwork I devoted a great deal of time to interviewing participants and observing their behaviours in their organisational contexts. During this process, I was able to examine and interpret participants' actions from their perspectives in order to understand what meanings they ascribed to them.

Orlikowski and Baroudi (1991) suggest three criteria of interpretivism: (1) evidence of a nondeterministic perspective, where the intent of the research is to increase understanding of the phenomenon studied, within contextual situations; (2) the phenomenon of interest is examined in its natural setting and from the perspective of the participants; and (3) researchers do not impose their outsiders' a priori understanding on the situation. The current research meets these criteria for the following reasons: (1) the purpose of the research is to increase understanding of the process of user adaptation to mandatory IS, within the context of the use of an ERP system in an organisation. (2) This phenomenon was examined from the perspective of the users working with the ERP system in the organisations where the system was implemented. (3) I avoided imposing the researcher's own knowledge of the situation; instead, the interviewees were encouraged to express their own thoughts and ideas.

### **3.3 Case study research design**

Field study is appropriate to generate a well-founded interpretive comprehension of human/technological interaction in the natural social setting (Orlikowski & Baroudi, 1991). The case study strategy was adopted in this study for several reasons. Case study methodology allows the researcher to capture real-life events and their significant characteristics, providing a deep and broad view of a particular phenomenon (Creswell, 1998; Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Hence, I was able to gather

sufficient material for subsequent interpretation (Miles & Huberman, 1994). This methodology is useful to answer ‘how’ and ‘why’ questions (Benbasat, Goldstein, & Mead, 1987; Yin, 2003), especially when the researcher has little control over the events and the focus is on a real-life and complex social phenomenon.

Case studies not only provide avenues for theory building, but also successful opportunities for developing concepts, drawing specific implications, and contributing rich insights (Walsham, 1995b). Consequently, case study methodology supported my research in its attempt to develop a theory for understanding how users adapt to complex mandatory IS and how adaptation behaviours evolve over time.

### **3.3.1 Case study selection**

The research settings of interest were large organisations in Thailand which had more than 500 employees and which had mandated the use of an ERP system for at least three years (both national and international organisations). The reason was that large organisations were considered more likely to have an ERP system from big vendors (such as SAP, Oracle) installed, as opposed to smaller companies or SMEs which may use smaller scale or open-source ERP systems. The reason for choosing ERP systems from big vendors was that the effects of their use would be more accentuated than would be the case with smaller scale ERP systems. In addition, organisations from a variety of sectors were targeted, in order to avoid potential bias from examining only one sector.

In order to identify relevant organisations, listings of clients from the websites of big ERP vendors such as SAP and Oracle were examined. In addition, news and information from the Internet about the installation of ERP systems in large organisations in Thailand during the period 2000-2010 were also examined. This resulted in an initial list of 32 organisations. All of those organisations were then contacted by phone and subsequently by email, in order to explain in more detail the purpose of the research and the effort that would be required. Then, I visited 10 organisations which had responded in order to present the research plan in more detail.

After discussions with all of the identified organisations with regards to their participation in the research, four organisations provided the empirical grounding for

this study. They included one private (called here, MP), one state-owned (BT), one multinational (ES) and one non-profit (IM) organisation. This spectrum of organisations increased the comprehensiveness and diversity of the data and enabled a broader theoretical elaboration (Eisenhardt & Graebner, 2007). The fact that SAP had been implemented in these organisations for at least three years prior to the fieldwork gave participants a considerable amount of time to experience the system. Different organisational strategic focuses and practices also helped to diversify the data, which allowed me to scrutinise contrasting patterns and observe the influence of various socio-organisational conditions on the adaptation process. Details about the modules implemented, organisational contexts, history of SAP implementation in each organisation and participants' information will be explained in the next chapter.

All four organisations used SAP version 7.0. SAP is an ERP system developed by SAP AG, a German-based software corporation. Most studies on ERP systems have been conducted in Western countries whose environments are similar to those where the systems were created. The aim of the current study is to produce rich insights into how users adapt to ERP systems in Thailand, a context that differs from the West.

### **3.3.2 Unit of analysis**

There is a difference between macro-level and micro-level analyses. While macro-level analyses focus on large-scale units such as organisations, populations and societies, micro-level analyses focus on individuals and small groups (Markus & Robey, 1988). The nature of IT is neither solely macro-level nor micro-level (Markus & Robey, 1988). As a result, a mixed-level analysis may be appropriate for studying multi-level phenomena such as IT use in an organisation. Taking this perspective allowed me to analyse and explore the dynamic relationships and interactions between individuals, system and social structures. As I argue, adaptation behaviours are a socially constructed process. Therefore, social structures and other macro contextual elements within the analysis are particularly significant because they serve as conditions of possibility, structuring individuals' intentions and actions (Kling, 1987; Knights & Murray, 1994). By recognising that individual actions are embedded in social systems (Avgerou, 2013), my analytical process paid special attention to the complexities and interrelationships among influences, events and effects that occur in the user adaptation

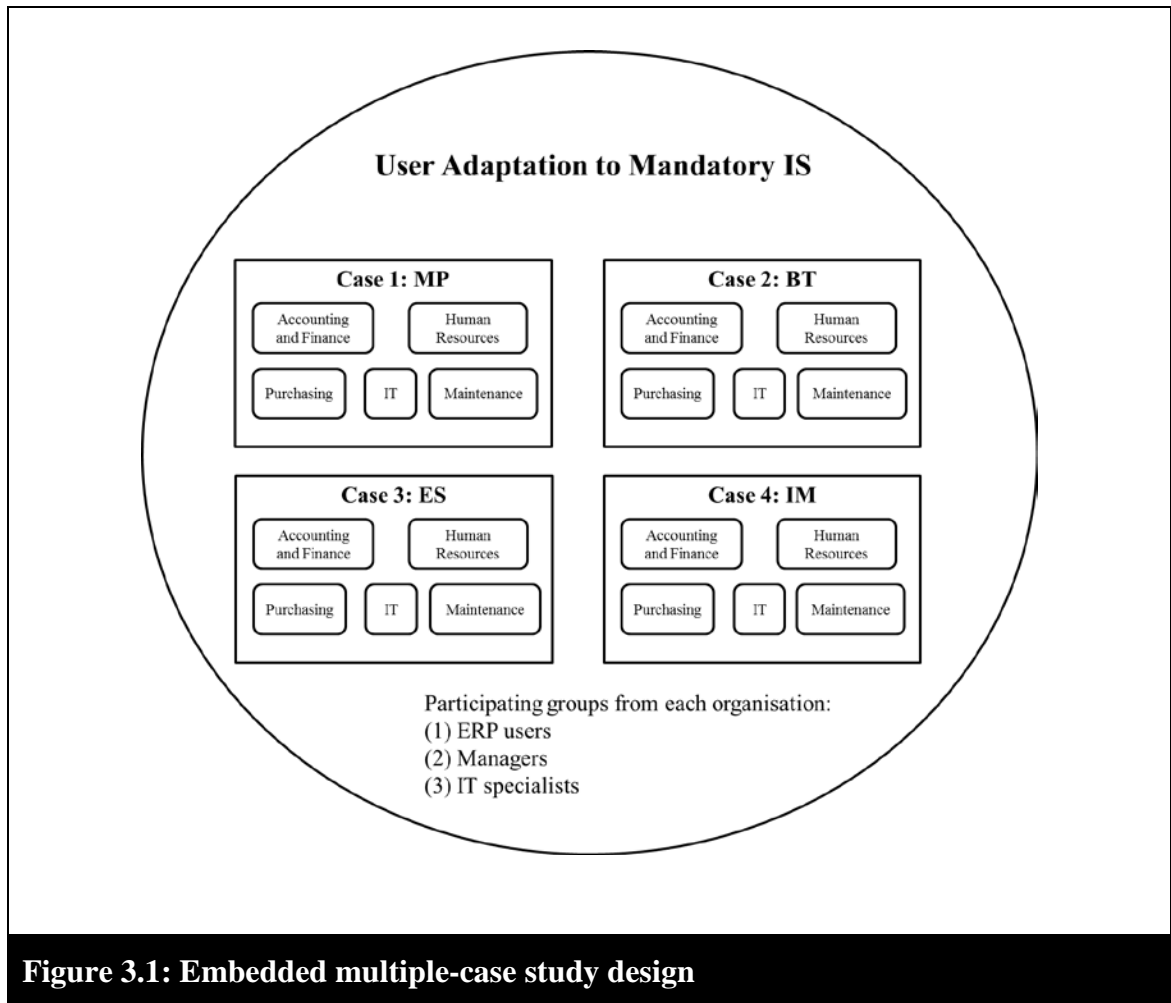
process. I pursued a mixed-level analysis in which I theorised that the user adaptation process involves the “dynamic interplay among individuals, technology, and larger social structures” (Markus & Robey, 1988, p. 596).

In this research, the event to be investigated – that is, the unit of analysis – was the interaction between the individual and the system in each of the organisations. This study recognised the multi-faceted and dynamic process of IS use and avoided treating IS use as a linear trajectory with a narrow focus on individual dimensions of the phenomenon (McLeod & Doolin, 2012). While the focal actors of analysis was the individual users of ERP systems, consideration was also given to the multiple contextual layers in order to develop a more holistic understanding of the user adaptation process.

### **3.3.3 Embedded multiple-case study design**

I applied embedded multiple-case study design in my research. Embedded multiple-case design contains a number of cases wherein each case includes multiple units of analysis. The embedded case study design was appropriate for my study, where the goal was to describe the context and process of a phenomenon (Yin, 2003). Additionally, the embedded multiple-case design was preferred over the single case design because it provides robust and rigorous grounds for quality research derived from the corroboration of evidence (Eisenhardt, 1989).

In order to observe the influence of tasks on the adaptation process, the data were collected from multiple departments where the nature of tasks was different. These departments were accounting and finance, purchasing, human resources, maintenance and IT. In this research, each department was considered as a single sub-unit of analysis under the embedded multiple-case study design (Yin, 2003) as is shown in Figure 3.1.



### 3.4 The theory building process

Grounded theory was the chosen method for theory building in this research. Its inductive nature allowed meaningful categories to emerge from the data, enabling me to identify patterns and develop theories to explain the user adaptation process associated with mandatory IS. Indeed, the main advantage of grounded theory method is to produce “theory closely related to the phenomenon being studied” (Creswell, 1998, p. 56).

#### 3.4.1 Grounded theory method

Grounded theory arose from a need in social science to generate theory and deemphasise the common practices of validation and testing (Glaser & Strauss, 1967). Grounded theory was created from the constant comparative method which alternated theory building with comparison of theory to the reality unveiled through data



collection and analysis (Glaser & Strauss, 1967). Rather than beginning with a pre-conceived theory in mind, grounded theory evolves during the research process itself and is a product of continuous interplay between data collection and analysis of that data. The grounded theory approach is considered to be flexible enough to handle diverse types of data and accommodate varying modes of inquiry (Glaser & Strauss, 1967).

The concept of “emergence” is central to Glaser and Strauss’s (1967) purpose for grounded theory that offers an alternative to the hypothetico-deductive approach widely applied in social science research. The central argument is that a theory discovered during data collection will better fit a situation being researched and work better when put into use than a theory identified before a study begins. The objective is to explain a basic social process through a constant comparative analysis of coding, in which incidents are compared to incidents, incidents to categories and categories to categories (Glaser & Strauss, 1967). The focus is on letting a theory emerge throughout the process (Glaser, 1978, 1992; Glaser & Strauss, 1967).

The two major features of grounded theory that differentiate it from other qualitative research approaches to data analysis are (1) “the researcher has to set aside theoretical ideas”, and (2) the “constant comparison” of data (Urquhart, 2001). Unlike other approaches, grounded theory research advocates not to exhaust literature prior to the research. The reason behind this idea is that a thorough literature review would influence the researcher to impose preconceived ideas on the data that would restrict the emergence of a pure theory (Urquhart, 2001). However, Urquhart and Fernández (2006) argue that a preliminary literature review works well as long as it “is conducted on the understanding that it is the generated theory that will determine the relevance of the literature” (p. 5). Thus, it is acceptable to review the existing literature so long as the researcher ensures theoretical sensitivity (Urquhart, 2001), meaning “the researcher takes an inductive rather than deductive approach, and listens to the data rather than imposing preconceived ideas on the data” (Urquhart, 2001, pp. 107-108). The generated theory is then engaged with the preliminary literature review in a critical way (Urquhart & Fernández, 2006).

I conducted a literature review before the analysis because it allowed me to create “a sensible theoretical basis to inform the topics and approach of the early empirical work” (Walsham, 1995b, p. 76). The literature review, in Chapter Two helped inform my ideas and allowed me to maintain the focus during the data collection process. The literature did not prevent me from being theoretically sensitive and self-aware when evaluating the relevance of the theory to the actual data (Urquhart, 2001, 2007). Theoretical sensitivity represents the personal characteristic of the researcher which informs the dynamic interplay between a researcher, data and phenomenon studied. Glaser and Strauss (1967) define theoretical sensitivity as “the researcher’s ability to have theoretical insight into his area of research, combined with an ability to make something of his insights” (p. 46). I used the literature review as a “sensitising device” (H. K. Klein & Myers, 1999, p. 75). My aim was to set aside prior concepts and theories and generated new ideas in the field with a fresh and open mind. I also revisited the literature review and contrasted it to the emergent theory from the data.

Secondly, constant comparison is the process of constantly comparing instances of data that are identified as a particular concept with other instances of data, to see if these match and are workable (Urquhart, 2001). The main phases of this constant comparison of coding and analysis of data as described by Glaser and Strauss (1967) and later elaborated by Glaser (1978) are comparing incidents applicable to each category, integrating categories and their properties, and developing concepts and theoretical sampling. In the current study, these four steps were iterated until the main categories identified reached what Glaser and Strauss (Glaser & Strauss, 1967) call a “theoretical saturation” or the point where no new data changed the emergent concepts. This information was analysed through the use of open coding techniques (discussed in the next section) which allowed me to identify theoretical samples or the kind of data that could be obtained to give more weight to the emerging theory. Grounded theory advocates that this theoretical sampling be continued until theoretical saturation is reached or there is no additional information to look for in the data.

### **3.4.2 Which version of grounded theory?**

Since its development by Glaser and Strauss (1967), diverging approaches of grounded theory have evolved which have caused a great deal of discussion among researchers.

While Glaser continued on in the spirit of the first publication, Strauss, in conjunction with Corbin, advised a new direction for grounded theory. They advocated more rigid coding guidelines, specifically “axial” coding, which prescribes a structure for the development of codes around an “axis” (Strauss & Corbin, 1990; Strauss & Corbin, 1998). This type of coding was designed to identify areas for theory development and guide researchers towards identifying theoretical constructs (Strauss & Corbin, 1990; Strauss & Corbin, 1998). The authors emphasised a more prescriptive form of grounded theory, one with predetermined categories and a focus on validity and reliability.

More recently, a third grounded theory approach has arisen. Charmaz (2000) has developed what she calls constructivist grounded theory, combining elements of the Glaserian and Straussian schools. Constructivist grounded theory seeks to develop theory about participants and the world they have constructed, an objective consistent with the two major schools of grounded theory (Charmaz, 1990). The constructivist approach maximises the researcher’s role in the process by using his or her own values, experiences, and priorities to help in determining categories and by asking questions about the data (Charmaz, 2006).

These different approaches of grounded theory have created vigorous debates in the field regarding the merits of each variation. With this separation, there is a veritable split in strands of grounded theory and it is now generally accepted that – prior to embarking on a grounded theory method – one must select a school (Stern, 1994). The choice of one will influence the way data is collected and analysed, the motivations of the research and the final theoretical outcome.

For the purpose of this study, the Glaserian school of grounded theory (Glaser, 1978, 1992; Glaser & Strauss, 1967) was adopted and adapted for the following reasons. Firstly, in the Glaserian approach, the production of theory is reliant on what is in the data. This is opposed to the Straussian method of questioning, which may reflect prior knowledge and shape the theory. Secondly, Strauss’s approach places more emphasis on validation criteria. The Glaserian approach is less prescriptive, offering more flexibility. Glaser adheres to the original purposes of grounded theory, placing emphasis on induction and emergence, and encouraging the novice researcher to learn by doing rather than being constrained by methodological anxieties (Heath & Cowley, 2004).

Although grounded theory was born from the medical and health sciences disciplines, it has no disciplinary boundaries (Glaser, 1992). Because of this boundary-less nature of grounded theory, it is gaining ground in IS research, and it has been increasingly used and discussed in IS research over the past decade (Bryant, Hughes, Myers, Trauth, & Urquhart, 2004).

This study produces a substantive, emergent theory that “has been generated from within a specific area of enquiry using grounded theory methods” (Urquhart, Lehmann, & Myers, 2010, p. 363). The substantive theory offers insights into observed patterns of behaviour, focusing on the process by which the participants become their own particular reference point. The substantive theory of the user adaptation process in this thesis (presented in Chapter Seven) explains the adaptation process to mandatory IS and the complex interplay of situational conditions that influence adaptation behaviours over time. The focus of the study is on developing a context-based, process-oriented description and explanation of the phenomenon. This substantive theory looks at ‘how’ and ‘why’, providing insights into the initiations of such practices and technological artefacts as well as analysing the reasons why particular patterns happen. The substantive elements examine not only what particular patterns are chosen but also the reasons and perhaps even motivations behind them.

### **3.5 Data collection**

Grounded theory is inductive and data-driven. Questions and problem areas are initially broad, narrowing down as the study progresses. In this study, the data collection and analysis process was iterative whereby participants were continually added as theory developed through the research process. I moved from the broad initial research question to the refined core categories that integrate the findings. Data was considered through the production of theoretical memo (mind-maps, notes, diagrams, etc.) where I constantly compared incidents and started to connect emerging concepts. This recursive activity employs theoretical sampling, whereby further data collection builds around the emerging findings and narrowing scope of the study, until theoretical saturation is reached (Glaser & Strauss, 1967). This is the end point of theory-building and development. Once concepts are ‘saturated’, a substantive theory emerges. As Glaser and Strauss (1967) state “no additional data are being found whereby the sociologist can

develop properties of the category. As he sees similar instances over and over again the researcher becomes empirically confident that a category is saturated” (p. 61).

This process is shown in Figure 3.2. In the following subsections, the data collection process is described.

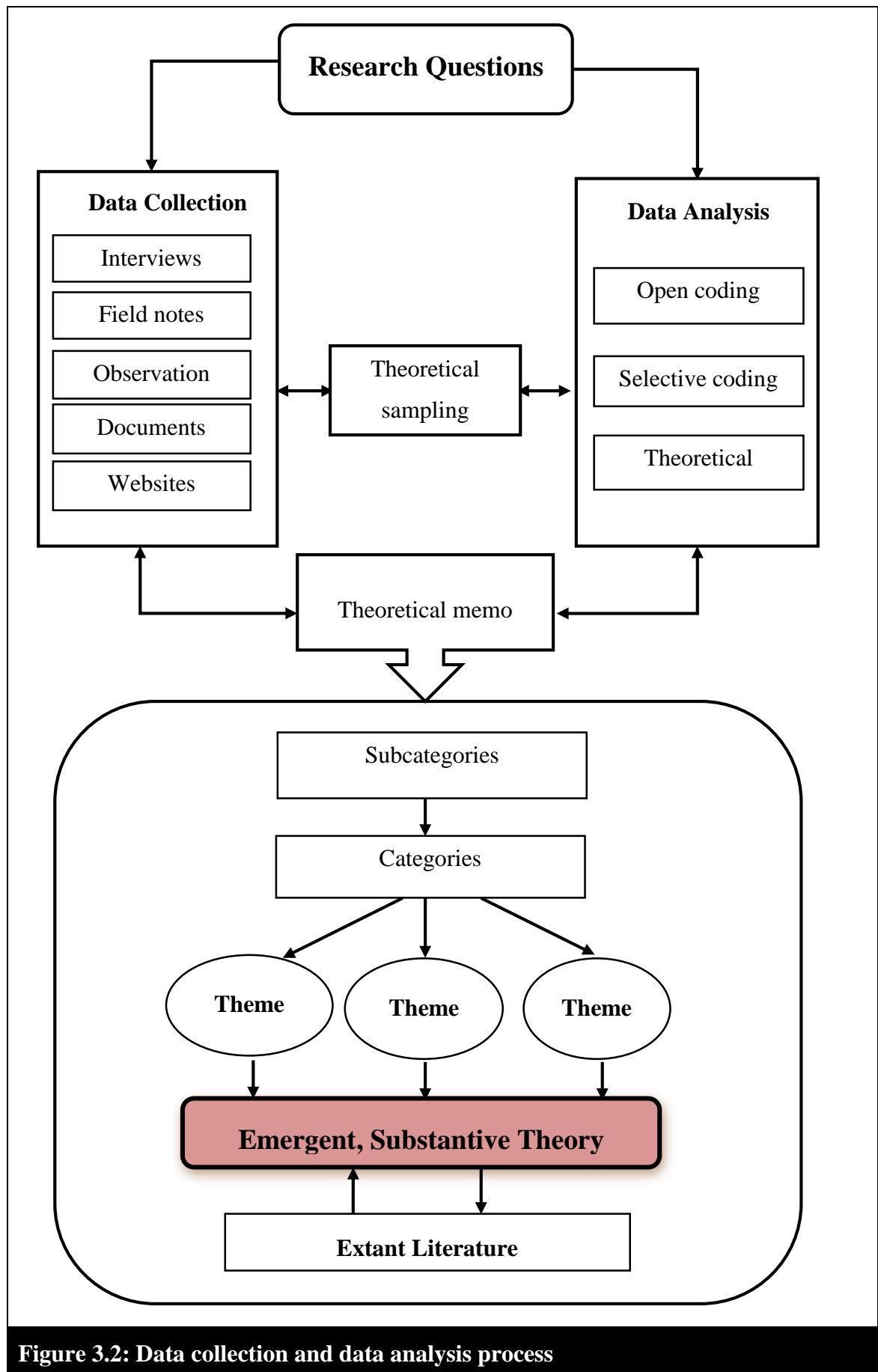


Figure 3.2: Data collection and data analysis process

### 3.5.1 Multiple sources of data









Multiple data sources were used in this study to establish a more elaborate chain of evidence between data and conclusions. The value of different sources of data was to corroborate my findings so that they complemented one another during the subsequent process of analysis (Creswell, 1998; Yin, 2003). I used in-depth interviews, field notes and observation as primary sources of data. The in-depth interviews were key elements for this research. I tried to uncover understandings, meanings, stories, experiences, feelings and motivations. My field notes contained detailed descriptions and explanations of the observed phenomenon during the fieldwork. I used field notes not only for recording observable facts but also for developing my ideas and registering my interpretations.

My secondary sources of data were organisational websites and documents including SAP user manuals, training documents, SAP implementation plan, policies, procedures and mission statements. I also reviewed the material available on-line from organisational websites such as SAP E-learning and online tutorials. Every new accumulated source of evidence was recorded, organised and carefully analysed. Both primary and secondary data were collected during five months of fieldwork in Thailand from July to November 2012. This corroboration across various techniques of data collection is particularly valuable in theory building because it offers multiple viewpoints on the subject, provides more information on emerging concepts, permits cross-checking, and yields stronger substantiation of theory (Glaser & Strauss, 1967).

During my fieldwork, I spent approximately one month in each organisation to collect data. However, it was not a sequential data collection process. I had to revisit and collect more data from all organisations. I visited the organisations in the following sequence (see Table 3.1): MP (2-30 July); BT (3-31 August); ES (3-28 September); MP (1-3 October); IM (5-30 October); BT (5-7 November); ES (12-15 November); and IM (22-24 November). Before starting the interview in each organisation, I spent about one week on site to observe the organisational environment, daily activities and participants' everyday work life. The managers at each organisation helped to lay the groundwork for my visit to various departments and to establish contact with the staff. They also provided me with a work desk where I sat and observed participants. A preliminary

period of observation allowed me to begin to build a sense of the context and the people, and to allow the staff a chance to get used to my presence. Gaining some familiarity with the staff also helped me to identify appropriate potential interview participants. During the interview, I also observed how participants used the system to perform their work tasks.

**Table 3.1: Fieldwork Itinerary**

<b>Organisations</b>	<b>July 2012</b>	<b>August 2012</b>	<b>September 2012</b>	<b>October 2012</b>	<b>November 2012</b>
<b>MP</b>					
<b>BT</b>					
<b>ES</b>					
<b>IM</b>					

### 3.5.2 Participant recruitment process

The principle of theoretical sampling guided the participant selection based on the likelihood that they would offer theoretical insights (Glaser & Strauss, 1967). Theoretical sampling is “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges” (Glaser & Strauss, 1967, p. 45). In contrast to other qualitative methods where participants are selected beforehand, there is no set limit or number of participants with grounded theory. I did not pre-determine interviewees and participants and there were no limits or number set on how many should be selected, with participants pursued until theoretical saturation was reached.



I applied a two-layered cycle of theoretical sampling (Fernández & Lehmann, 2011). The first within-case theoretical sampling aimed to maximise theoretical depth in the case story and the second between-case theoretical sampling attempted to move the overall theory forward. In intra-case sampling, the theoretical focus was on selecting more ‘slices-of-data’ from within each case and using their incidents to saturate categories and maximise their conceptual yield. Once new data no longer added more properties and began to repeat existing ones, then no more useful data could come out of the current case. A second round of sampling needed to occur. In inter-case sampling, the status of the theoretical framework, which was the result of all the previous cases’ categories and concepts, was assessed for theory saturation.

I collected, coded and analysed data simultaneously so emerging concepts and categories drove the sampling process, with the selection of participants or sources of data dictated by what was required (e.g., level of experience, work role) to investigate, confirm or saturate particular phenomena. Additional research sites and participants were selected as the study progressed. Emerging concepts, relationships, categories and theoretical relevance guided my inquiry, enabling me to choose further data sources based on whether they allowed development, extension or comparison of concepts.

I started the interviews with a key informant, one who had experience and knowledge in their profession and had the ability to articulate their thoughts and a willingness to participate. I applied snowball sampling in some cases by asking some participants to suggest other participants who could give me rich information on ERP perceptions and adaptation behaviour during the implementation and post-implementation phase. Additional participants were selected on the basis of their likelihood to contribute information to key categories and concepts that evolved during analysis (Glaser, 1998). In total, I interviewed 46 participants who had been exposed to the system since its implementation, including ERP users, managers and IT specialists. Table 3.2 shows the number of participants within each organisation and the departments they worked for at the time of the fieldwork.

**Table 3.2: Number of Participants by Organisations and by Departments**

Department	MP	BT	ES	IM
Accounting and Finance	4	4	3	3
Purchasing	3	3	3	3
Human Resources	2	2	2	2
Maintenance	2	2	2	2
IT	1	1	1	1
<b>Total</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>11</b>

### 3.5.3 Overview of the interview process

There were three main steps taken in the interview process in each organisation. The first was group discussions with key informants including key users, managers and IT specialists who were at the pre-implementation, implementation and post-implementation stages. Key users (called key users at MP and BT, power users at ES, super users at IM) are users who have in-depth knowledge of a specific functional domain, know the business processes of that domain and have worked together with the consultants to setup that domain within the application during ERP implementation. They are the first point of contact for the other users who have questions regarding the functional domain they are covering. In this study, key informants were involved in SAP implementation, process mapping and legacy system to SAP data migration. The goal of the group discussions was to gain an initial understanding of organisational and system implementation contexts. This step also helped users to recall the major issues and critical events related to adaptation that arose during pre-implementation, implementation and post-implementation phases. The sessions lasted from two to over three hours. The second step was one-on-one in-depth interviews with participants. The third step was follow-up interviews with some participants in order to corroborate the findings.

In-depth and semi-structured interviews were used to collect data for analysis. Semi-structured interviews have the flexibility to follow up on new information presented in the context of an interview and to follow the leads that emerge in the course of the interview. Since this study is retrospective in nature, I integrated the critical incident technique (CIT) into the interview protocol to minimise the recall bias from

participants. The use of CIT facilitated the exploration of significant events and processes identified by participants, the way they are managed, and the outcomes in terms of perceived effects (Chell, 1998; Flanagan, 1954). I used CIT in order to gain an understanding of the incident from participants' perspectives, taking into account cognitive and behavioural elements (Chell, 1998; Flanagan, 1954).

I also applied CIT in order to explore and discover the incidents that influenced, facilitated and/or hindered user adaptation behaviours that occurred in relation to the system and other events that induced them to change their adaptation behaviours. During the interviews, I was able to narrow the type of incidents down while simultaneously involving participants in the selection of incidents that they thought were important. Incidents were covered in considerable detail, and participants were probed to give an account of how significant incidents related to their work circumstances and attitudes towards the system (Chell, 1998; Flanagan, 1954). I allowed the participants to expand on their views with quite a high degree of freedom.

The interview questions represented the substances embedded in the research questions and were mainly of an exploratory nature, such as 'what?', 'how?' and 'why?' The interview questions were largely an attempt to elicit answers to the following research questions: How do users adapt to mandatory IS? Why do users respond to the system in different ways? How does the adaptation process evolve over time? What are the critical incidents that induced users to adapt to the system and/or to change their adaptation behaviours? Participants shared their experiences with critical incidents and I urged them to describe the circumstances that made them aware of system problems, uncertainties or challenges that might affect them. Interview questions helped frame the participants' reflection and confirmed the details of critical incidents. The sequence of the interview questions varied from participant to participant and I could ask further questions when something important was presented (Bryman & Bell, 2011). Probe questions were used to elicit more information and to keep the discussion focused when necessary. Participants had the opportunity to add further information at their convenience during the interview. They were free to elaborate on their own thoughts and digress when it was necessary. In response to those digressions, I then adapted the questioning, in order to encourage the participants to elaborate more on their views and ideas.

Each interview began with an orientation that briefly gave an introduction about my study and an informed consent process. I reminded the participants of confidentiality, and their option to withdraw at any time from the study. In addition, participants were encouraged to ask any further questions about the study to establish understanding. Participants were then asked to give a brief description of their demographic information, their educational backgrounds, position in the organisation, work experience and system experience. I also asked participants to summarise how much of their tasks involved working within the SAP system. Participants also provided background information on the history and environment of the organisation that led up to the SAP implementation and their previous experiences before system implementation. Appendix 1 presents a list of indicative interview questions I used in the field.

After the introduction, I then clarified the nature of the events to be reported with the following statement:

An incident includes any event that may have influenced your adaptation to the system and your system use in relation to your work. These events might have taken place at work. Think as broadly as you can about what happened, what led up to the event, what actually happened that helped or hindered, and how it turned out.

This statement was followed by a time of clarification if needed.

After the introduction and the clarification of events, participants generally moved on to describe various incidents that they had encountered with the ERP system and provided details on the issue they faced and their perception towards the system. They then proceeded to describe how they developed their various responses to the system and situations and how the system affects their work performance. I also prompted the participants to recall events that might have triggered them to change their adaptation behaviours. I used the following remarks to elicit the background from the early adaptation process up to the time of the interview:

I would invite you to think back to the first time you heard about the system that was going to be implemented at your work. Can you describe what it was like for you at the office, what you thought, felt and/or did, before you heard about the system? What happened just after you heard that the system would be implemented? What were your reactions? And then, what happened after that until now?

I then allowed the participants to tell their stories. I encouraged the participants to reflect and freely express their experiences about how they responded to the system and situation. This reflection by the participants was useful in helping participants orient themselves and reflect and focus upon their own experience, which is the purpose of this study.

Prudence was exercised and no leading questions were asked after the main question. However, if a participant had difficulty identifying an incident, a prompting statement was used to help elicit an incident. For example, “Think back to a time when things were happening. Trace back to anything that was particularly significant. Trace back to anything that might have influenced that time”.

Once the participants had exhausted their immediate memory of incidents, I began to systematically ask them to describe each incident in detail. The questions had to be sufficiently precise to focus on the purpose of the study, but vague enough to allow the participants to relive their own experience so that a full and rich description could be obtained. General active listening skills were employed. The following illustrative questions were used to elicit detailed, vivid accounts of each incident:

- Please walk me through the actions you took. Which was the most significant incident for you? Why?
- Did you respond to this incident?
- What was the general situation surrounding this incident before, during and after?
- What exactly was it about this incident that influenced your adaptation to the system?

- What made you realise that you needed to adapt to the system or needed to learn how to use the system?
- How did this incident make you more aware of the system?
- What were the problems that you confronted during the incident? How did you cope with these problems? Were they successfully addressed?
- Can you remember any other details about the event?
- Does this bring to mind any other incidents?

Through these means, the participants were guided towards a full elucidation of all incidents.

During the interviews, I tried to build up trust with the participants. For instance, I talked about my past personal experience in the IS field as an IT consultant, a system analyst, an end-user and even a lecturer. Often, this initial conversation allowed participants to trust me and feel more open about sharing their experiences, allowing me to probe participants for more personal accounts of several situations that happened in the past.

I asked all participants similar questions in order to have multiple accounts of each aspect of my interest, but very often I added new questions that helped me to reconstruct past events as they emerged from interviews or to investigate perceptions that seemed to be hidden or taken for granted. Most of the time, the interviews were preceded and followed by informal conversations and tours of the organisations, and many times I was introduced to the participants' colleagues and we had informal discussions about their organisational context and the history of their ERP projects.

Since participants were Thai, the interviews were conducted in Thai and were recorded using a digital recorder with the permissions of participants. Field notes were also taken during the interviews to supplement the transcripts of the recording. The interview data were transcribed and analysed in Thai; those interviews presented in this thesis were translated into English by the researcher who is fluent in Thai and English. The duration of the interviews ranged from forty-five minutes to three hours.

After each interview was concluded, I transcribed and analysed the interview data either immediately or within three days of the interview. This enabled me to add my analytic memo regarding my impression of interviewees' body language, tone of voice and attitude. Every interview provided insight into how future interviews would go. I decided to do my own transcription for several reasons. Confidentiality was a major concern so I wanted to avoid having others hear the taped conversations with all the names and identifiers. Listening to the interviews carefully enabled me to develop a rich account of the voices, intonations, facial expressions and gestures as I read the transcripts. I felt a compelling need to remember their expressions, tone and liveliness (or lack thereof). It felt important to hang on to the memory of voices as they replayed in my head.

Most interviews were conducted either in private meeting rooms or at participants' work desks in their workplace, according to their preference. Two participants from ES expressed that they felt more comfortable taking part in an interview outside the workplace. Therefore, one interview was conducted at a café nearby the organisation and the other was conducted at the participant's home. In some cases, follow-up interviews were conducted in person, or by phone or e-mail, to check interview details or to provide additional information when something important emerged during the data analysis stage. Appendix 2 presents detailed information about the in-depth interviews.

This research involved human participants and their personal and organisational knowledge; therefore, Human Ethics Committee approval from AUT University was necessary before a formal data collection process was undertaken in any of the organisations (see Appendix 3). Throughout all phases of the study, care was taken to remain sensitive to ethical considerations. Prior to each interview, participants were informed that they could choose not to answer any question and could end the interview at any time (see Appendix 4 and 5). Following the principle of informed consent, all participants signed the consent form. The interview and data analysis process strived to protect the anonymity of the interviewees in the study and preserve the confidentiality of the information they provided. Photographs and documents do not identify participants or contain any identifying details of the organisation. Pseudonyms are used throughout the thesis when describing participants.

### 3.6 Data analysis

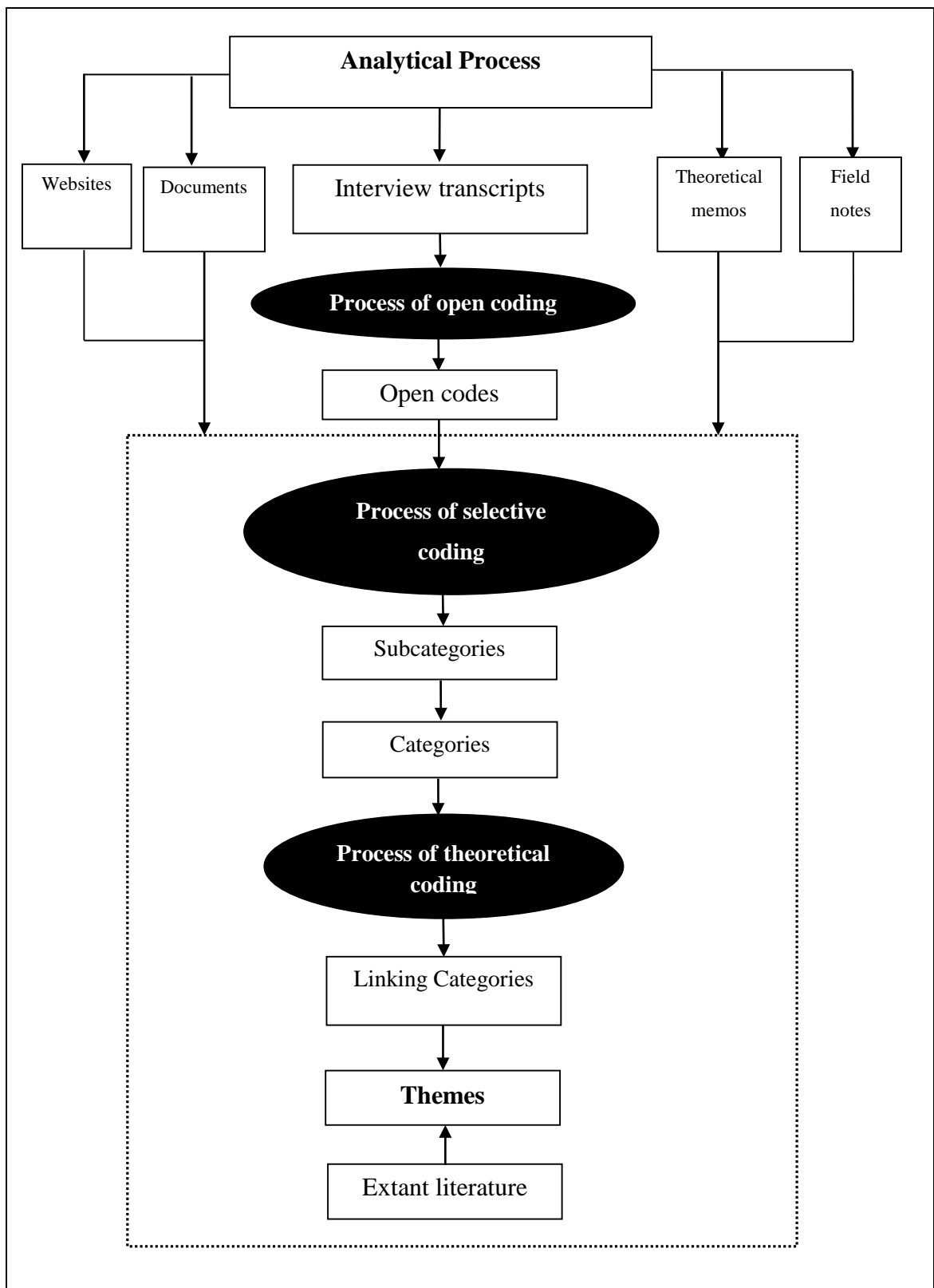
In grounded theory, coding is a process of conceptualising data by constant comparison of incident with incident, and incident with concept to reveal more categories and their properties (Glaser, 1978, 1992, 1998). Incident refers to an occurrence in the data, whether a sentence or paragraph from an interview transcript or an observed pattern of behaviour. A concept is the underlying meaning, or pattern within a set of descriptive incidents. A category refers to the type of concept that is usually reserved for higher level abstraction. A property is a sub-concept that is a conceptual characteristic of a category.

Alongside the coding procedure, I created analytic memos and theoretical notes in order to build theoretical ideas around the identified codes. Memos are “the theorising write-up of ideas about codes and their relationships as they strike the analyst while coding” (Glaser, 1978, p. 83). Memos drive the interplay between data collection and data analysis, providing the link between theoretical sampling and conceptualisation. Approximately 300 memos helped elaborate the relationships among the codes and ultimately gave shape to the key themes which will be discussed in Chapter Six. My analytic memos allowed me to consider codes as they emerged and to consider relationships between codes by comparing incidents and concepts. They were not only valuable in the coding process but also during the process of writing the results of the research.

All interview records were fully transcribed and the files transferred into a NVivo software package (version 10). Although I began with the logical steps of the grounded theory method and wanted to use the software for all the steps, the actual analysis process was not that straightforward. It was circuitous, iterative, messy, and sometimes confusing and I also used coloured pens to think through the diagrams of relationships amongst concepts. NVivo was very useful in maintaining the chain of evidence for the large amount of data. The analysis took place in my mind. NVivo was indispensable for the coding and for managing the primary documents and retrieving quotations and writing memos, but my inclination to think by pencil and colour won over for certain stages of this analysis. Figure 3.3 below depicts how the coding process was undertaken



for this study. The data analysis process is discussed in more depth in the following subsections.



**Figure 3.3: Analytical process used for this study**

### **3.6.1 Open coding**

Open coding is the initial stage of coding and entails identifying, labelling, and categorising phenomena. For the open coding, I broke data into ‘slices’ or ‘incidents’ (Fernández, 2004) in order to seek in-depth analysis and the interpretation of the data. In this step, I began the analysis with no concepts and fractured data into incidents. These incidents formed the basis of analysis and were examined and constantly compared against one another, looking for similarities or differences. Open coding extracted significant substances that were relevant to this study’s research questions and objectives from the textual data in the transcripts, and developed concepts in response to the substances in each research questions.

The interview data were analysed in Thai. The concepts and dimensions that emerged from the data as well as significant key phrases were then translated into English. Therefore, to avoid inconsistency in the various meaning of Thai phrases, the Thai expressions that share similar meanings were categorised into groups. Each group was labelled according to its concepts and dimensions, and then translated into English expressions or words. This helped me keep a truthful interpretation of the data without interfering with the implied concepts behind the participants’ expressions. This consolidating technique was useful as it reduced redundancy, while refining concepts and themes that emerged from the data.

During the open coding progression, I applied Glaser’s (1978) concept-indicator model. I constantly compared pieces of data against other pieces of data and looked for similarities or differences until the initial codes emerged. Constant comparison proceeded by coding items in the data and returning to previous coded data with which to compare my latest set of codes. This required me to frequently return to the data. I constantly read the transcripts, listened to the recordings and reviewed my field notes simultaneously in order to capture the nuances in the participants’ interviews and the participants’ points of view.

The open coding exercise was not constrained by any set categories or concepts; the codes were “provisional, comparative, and grounded in the data” (Charmaz, 2006, p. 48). At this stage, I did my best to put myself aside from my own prejudgements

(Urquhart, 2001), both from the literature review and from my life experiences. This coding approach encourages broad discovery and exploration of theoretical possibilities. The focus of this exercise is to describe and label what is found in the data. When naming the codes I used in-vivo words, “essentially the terms used by actors” (Strauss, 1987, p. 33) in order to be firmly attached to what the data were saying (Glaser, 1992).

This first interview transcript was subjected to at least 10 rounds of open coding to make sure the important concepts in the data were captured and represented as much as possible by the open codes. In this process, several memos were generated that recorded my initial thoughts and interpretations of the codes and relationship between the codes. In addition, the use of integrative diagrams (Glaser & Strauss, 1967) during this process as well as throughout the research helped to determine links between codes. Open coding of the first transcript was followed by the rest of the transcripts, comparing the existing codes with the emerging codes, and modifying and/or adding new codes as the coding progressed from transcript to transcript. Each of these remaining transcripts were subjected to at least seven rounds of open coding to make sure that the concepts represented true interpretations of the data that could be carried over for the analysis of the subsequent cases. An initial set of 225 codes were emerged from the first round of open coding procedure for all cases. Following the development of a set of general codes, I shifted towards coding and comparing incidents. These incidents were primarily focused on how users adapt to the system. It was at this point I thought more about the adaptation process and how the pieces fit together. Eventually, after several rounds of open coding procedure, a set of 95 codes was developed that were grounded in the data.

The open coding stage also identified areas where data were lacking. During the open coding process, I was able to identify areas in which I needed to collect more data. One of the advantages of grounded theory strategies, and the process of simultaneous data collection and analysis practices, is the early discovery of areas where more data collection is needed and the ability to make adjustments allowing for the collection of that data (Glaser, 1978, 1992).

In the open coding, codes proliferated quickly initially, and then slowed as verification of their fit within the emerging pattern occurred. Open coding was lengthy since all

incidents in the data could be analysed a number of times until saturation was reached. I went back and forth to constantly modify and evolve the theory. Eventually, a code yielded what was thought to be the core categories that summed up the research pattern. Codes were placed into the theory in terms of relevance to these core categories via the next step of selective coding analysis. Table 3.3 shows examples of open codes generated for the first case. The evidence of these codes is seen in the detailed write-ups in Chapter Five.

**Table 3.3: Examples of Open Codes Generated from an Interview for the First Case**

Examples of interview excerpts	Examples of open codes
<p>“I just made a little use of the system to create requisitions. But I still prefer a paper form [which] is much easier and faster. I learned the system when I had to. Most of the times when I had to use it I had to refer to the manual or asked my colleagues for help . . . I still had to write on a paper form first and entered the data into the system later. . . . My requisition forms were rejected often. . . . They said I did not check stock overview before requesting material and did not enter all the required fields”.</p>	<p><i>superficial learning; superficial use; lack of attention</i></p>
<p>“The key user trained me how to use SAP. Then, I created my manual in Excel that exactly followed what she taught. I added all screens that I had to use and included step by step notes. I was afraid that I would forget, so I needed to add every detail here. You know, I had my routine. First, I turned on my computer; second, I opened SAP; then I opened my manual. I had to make sure that I did everything correctly. I did not want to make a mistake”.</p>	<p><i>training, producing a personal manual; follow step-by-step instructions</i></p>

### 3.6.2 Selective coding

Once the open coding was completed, I proceeded to identify the subcategories and the subsequent categories at a higher abstract level that would lead me to substantive theory (Glaser, 1992). The second stage of data analysis involved coding around the large number of open codes to further conceptualise them into patterns, groups or sub-categories, which were then linked together through a set of common properties to form categories, and this to core-categories or themes, via a process of selective coding. During this stage, the process of consolidating similar terms occurred. This core concept became a guide for further collection and sampling through related conditions and consequences (Glaser, 1998).

The process of moving from the open coding to the selective stage was not linear, as I moved back and forth between the coding types as needed. During the selective coding process, I continued applying Glaser's (1978) concept-indicator model. Using this model, comparisons were made between open codes and between each open code and the emerging concepts, once they were generated. These comparisons were made in terms of similarities, differences and degrees of consistency of meaning between them. I always made comparisons, asked questions constantly, built on ideas and looked for fresh possibilities to refine my emergent categories through the scaling-up course of action. This constant comparison of indicators required me to revisit the data throughout the study, refining codes and seeing incidents in a new light as further concepts emerged. I was confronted with similarities, differences and consistency of meaning. At this stage, the documents and observational notes were analysed for supplementary evidence of the emerging categories from interview transcripts. Eventually, this process results in 12 substantive codes or subcategories which were the initial stages of the construction of categories and their dimensions.

Table 3.4 presents an example of the process for generating the user adaptation behaviour category, after the completion of selective coding for all four cases. The full analytical development of all categories will be presented in Chapter Five.

**Table 3.4: Examples of how Categories were Generated from the Process of Open and Selective Coding**

Examples of open codes	Examples of selective codes	
	Subcategories	Categories
<i>unwilling to learn, unwilling to change work routine, comparing the new system with the old system, refusal to use the system, delaying system use, continuing to use the shadow systems</i>	<b><i>Reluctant Adaptation</i></b>	<b>User Adaptation Behaviours</b>
<i>superficial learning, lack of attention, inaccurate data entry, superficial use, the parallel use of shadow systems, duplicate work, partial use of the system</i>	<b><i>Compliance Adaptation</i></b>	
<i>adapting work practices, follow step-by-step instructions, follow instructions faithfully, producing a personal manual, true to the letter use, learning by repetition</i>	<b><i>Faithful Adaptation</i></b>	
<i>inquisitively exploring the system, trying out new functionalities, adjusting the system to fit particular needs, trying to enhance system utilisation, seeking new knowledge</i>	<b><i>Enthusiastic Adaptation</i></b>	

### **3.6.3 Theoretical coding**

The final step in the theory generation process was theoretical coding or figuring out the interrelationships among and between substantive codes, generated in the first two steps described above. Theoretical coding integrates the theory by weaving in fractured concepts and demonstrating the main concern of the participants (Glaser, 1978). This grounded integration is not forced but, like substantive coding, emerges from the constant comparison of data in field notes and analytic memos. Through the process of theoretical coding I began to identify core categories or themes.

From this point, I began integrating concepts and shaping the substantive theory. I continued applying the constant comparison procedure, which now included contrasting codes to categories and categories to categories, while still revisiting the earlier comparisons of incident to incident, incident to code and codes to codes. I looked for similarities and differences among them and also relationships between categories. This task was an iterative process where some selective codes – and even open codes – were elevated to categories, while others were merged – and sometimes downgraded. Frequently, I had to compare raw data to the new categories because some category boundaries were fuzzy.

At this point, the relationships between the major categories suggested the emergence of three theoretical themes, which related back to the research problem and the questions raised out of the problem. Themes represent the underlying meaning or patterns found in the categories (Charmaz, 2006). During data analysis, I constantly looked for main themes that best explained the patterns of behaviour and gave the developing theory substance. I followed the four steps in constant comparative analysis suggested by Glaser (1998): (1) comparing incidents applicable to each category; (2) integrating categories and their properties; (3) defining the theory; and (4) writing the theory. Essentially, the emphasis was on category and theory development. I repeatedly compared analytic memos with developing categories, relational statements and other data to determine relevance to each other.

At this point in the process, the role of the extant literature became very important. I began to do the process of theoretical integration by comparing extant literature against

patterns found in the emergent themes. At this stage, the theory became dense with concepts and enriched by relevant extant literature. Three conceptually linked themes emerged, which will be discussed in Chapter Six. After the initial identification of themes, there were multiple iterative rounds of analysing the themes that emerged and reclassifying statements according to what emerging themes improved the classification. The three themes explain the process of user adaptation and answer the research questions. The themes are the central concept that accounts for the patterns and behaviours uncovered during the investigation and integrate the theory by ensuring relationships between concepts are relevant.

### **3.7 Chapter conclusion**

This chapter described the research paradigm and the research methodology used to address the research questions. This study adopts qualitative interpretive research methods and a grounded theory approach towards developing theory as a way of addressing the research objective. The choice of interpretive embedded multi-case study method was justified followed by a description of the overall research process. All aspects of the case study including unit of analysis and data collection were fully described. This chapter provided a justification of why grounded theory was chosen for this study as a data analysis approach along with a detailed description of grounded theory techniques and the process that was adopted to analyse the data.



## **Chapter 4 Case Study Contexts**

### **4.1 Introduction**

This chapter provides the context of each of the four organisations I have investigated. It is worth mentioning that all of the organisations examined in this study are different from each other, both in terms of the nature of business they are in, the experiences and uses of their ERP system, as well as the organisational context where the ERP system is used. As such, the examination of the four case studies can together offer significant insights regarding the user adaptation process and ERP use across disparate contexts. In addition to the description of the organisations, this chapter also offers my understanding of the nature of the research sites. My understanding of the context of the four organisations was developed through the interactions with organisational members.

The presentation of each of the organisations starts with a general description of the organisation and its activities, as well as the main characteristics of the work environment among the employees. A brief narrative of my interactions with participants in each organisation during the fieldwork is included. Next, I provide an overview of the ERP project with regards to the motivation and objectives of the implementation and the ensuing strategic and operational challenges. The description includes a discussion of the post-implementation outcomes and user experiences. The research participations' information is then presented.

Participants used the SAP Financials module (FI) and/or the Material Management module (MM) on a daily basis as a part of their jobs across the four research sites. These participants were from multiple business units and were operational-level employees, other than a few supervisors.

The SAP FI is a comprehensive financial management system that supports business processes in the following areas: (1) financial and management accounting (e.g., general ledger, financial reporting); (2) financial supply chain management (e.g., credit, collections, dispute resolution, electronic invoicing, and electronic payments); and (3) corporate governance (e.g., internal control, auditing). The SAP MM is the application module that supports the procurement and inventory functions in day-to-day business

operations. This MM module supports many business activities in the following areas: purchasing, goods receiving, material storage, consumption-based planning, and inventory management.

The research was conducted in Thailand, which is also my homeland. Being a Thai gave me a deeper understanding of the nuances I encountered in the fieldwork. Thailand has a homogeneous population in terms of religious beliefs and ethnic background. About 93.6 percent of Thais are Buddhists, 4.9 percent are Muslim, 1.2 percent are Christian and others are 0.3 percent (CIA, 2014). Thai is used as the country's official language.

## **4.2 Case 1: MP**

MP was founded in 1946 as a company operating in the cane and sugar industry. MP is Thailand's largest sugar producer and the leader in the Thai sugar industry with world-class standard operation. In 2011, MP was ranked as the world's fifth largest sugar producer and the largest producer in Asia. In addition to Thailand, MP has operations and investments in China, Lao People's Democratic Republic, Cambodia, Vietnam and most recently Australia. Its key business units include sugar, ethanol, biomass energy, fiberboards, logistics and paper. Within Thailand, MP has six sugar factories, with a total production capacity of 166,500 tons of sugar cane daily. All mills have refineries attached and produce white sugar. The locations are Suphanburi province, Singburi province, Chaiyaphum province, Khon Kaen province, Loei province and Kalasin province. Participants in this study were from the company subsidiary in Khon Kaen province.

Several discussions that I had with the IT manager gave me basic orientation about MP before I visited their office in Khon Kaen. In addition, I had several conversations with friends who worked as consultants in the MP ERP project. In July 2012, I received an official agreement from the CIO to visit and collect data at MP. Consequently, the semi-structured interviews involved the IT manager, who worked closely with the SAP consultant company during the implementation, one manager, one super user and nine users. In addition to the interviews, I had access to project documents, the organisation's website, training documents and user manuals and visited some of the buildings and facilities.

In terms of the social relations between the employees, my first impression on visiting and interviewing MP employees was the informality. Their interactions were casual. Since there are no partitions between employees' work spaces, the conversation and communication among employees is open and easy and I could hear laughter and conversations from other rooms.

At MP, employees can express their opinions regarding their work context because the atmosphere is very friendly and open in nature, thus encouraging everyone to speak out. MP is characterised by few hierarchical levels. Numerous posters on the walls proclaim the value of individual responsibility and autonomy. The mission and goals of the company are posted in all departments. Figure 4.1 shows the MP work environment and the posters in red circles.



**Figure 4.1: MP employees' workspace**

### **4.2.1 The history of SAP implementation**

At the time of the interviews, MP was using the SAP R/3 ERP system, version 7.0. The modules under examination in this study were FI and MM. The impetus for installing the ERP system at MP was the fact that the company needed an integrated system that could manage its whole business. ERP implementation was motivated by a decision to replace numerous legacy systems and paper-based processes in the key administrative functions of accounting and finance, purchasing and materials management. The role of the SAP system was seen to be strategic, in the sense that it allowed the business to roll out the entry of orders and the recording of stock movements. The ERP project was also seen by top management as an opportunity to review their business process and management practices with the goal of increasing and improving their services to their clients. In other words, MP took advantage of the introduction of a new IS as an opportunity for organisational change.

The organisation, however, continued to use several legacy systems such as the human resource management system. MP employees offered the explanation that managing Thai human resource data related to legal requirements, tax, and benefit practices that were complex and unique. They further argued that local software better supported all the needs of standard reports.

Important guidelines characterised their ERP project: (1) to have the initial support of a consulting firm; (2) to adopt a standard package of the system, in order to benefit from future upgrades; (3) to train key users before the beginning of the implementation phase in order to ensure that they would lead the configuration process; and (4) to use the already-trained key users for transferring the knowledge to all other employees. The ERP project planning started in 2007. The implementation took place between October 2007 and April 2008 when the system went live and became mandated. SAP replaced MP's previous legacy system called Navision, which was developed specifically for the accounting and purchasing units. The data migration (for the financials part) from Navision to SAP took place in March 2008. However, after the system went live, the Navision system was used in parallel with SAP for four months. The phase-out of the Navision system was done in stages, as data from Navision were still being used in some areas. All of the installed modules were a standard, off-the-shelf SAP package.

The system was purposefully not customised, as that was considered costly, making subsequent upgrades difficult. However, after going live, some degree of customisation, especially regarding reporting functionalities, was allowed.

During the initial stages of system implementation, there were four weeks of intensive testing, trying to examine the processes in SAP and their fit with the existing business processes in MP. For this purpose, representatives from accounting and finance and purchasing departments worked together with the SAP experts from IT One Consulting Company, the consultancy company that was hired to implement the system.

The organisation provided formal training for employees before the system went live. The training was largely focused on developing the capability of users to use the systems. Frequently, there was conflict between the view of the instructor and that of the trainees. An IT specialist who was involved in training sessions saw things positively: “Oh definitely, they seemed to be going very well from my understanding” [MP12]. However, many users complained that the training was simply too fast, too short and presented too much information about the system. Users did not like their passive roles in training sessions. In addition to the training, user manuals were provided to employees to cover the training session and other uses of the system. Also, the organisation developed a website to assist users in using the system. The features of the website included online help, computer based training and SAP news. However, most employees were unaware of the website and never bothered to check it.

MP also used key users who were the functional representatives on the project configuration team as their direct link to offering one-to-one communication with the end users. These key users also acted as coaches and helped the end users become familiarised with the system when the system went live. A respondent who was a key user recalls, “The organisation provided training during the post implementation by bringing people in house to do training, sending them to training, and expecting those key people to come back and train everyone else while they were doing their regular job” [MP1].

The organisation faced several challenges in managing the change as the users were rarely part of the early decision making process. After the system went live, the users

were not familiar with the system and this resulted in their frustration with the system. Most respondents felt that the frustration was due to the lack of user ownership, accountability and involvement during the project and poor training. Also, the organisation did not offer a strong mandate in the first stages of implementation. It appeared to be an on-going challenge throughout the project. As the manager recalled:

It seems that our intention was not clear enough. I had some talks with my employees and it seems that they had the feeling that we did not care much about their use of the system, training or feedback on the system. According to them, our only concern was to roll it out as soon as possible. After rollout, they continued using the legacy system and paper based forms [MP2].

After the system went live, many users continued using the old system that was previously in place because they did not know how to perform new processes using the new system. This resulted in a number of data issues. Users did not feel at ease with the system, even with the assistance of the ERP functional consultants (hired from an external IT company) for two weeks after the system went live. The main complaint was about system complexity and inflexibility as well as the lack of fit of the new processes with the system. One user recalls the early days:

We were pushed by our managers to use the new system but even with the help of SAP consultants, we did not find out how to handle some exceptions or to get some intermediary reports without using external spreadsheets. The system was also way too complicated and inflexible. Then after going live, we were still using both systems in parallel. All the missing information in the ERP system was managed through our legacy system and then loaded manually via spreadsheet files. It was extremely time-consuming but we had no other choice to satisfy daily business activities [MP4].

The satisfaction level of users was very low in the first few months after implementation. The organisation had to go through a lengthy process to increase user

buy-in to the system and make sure that the system delivered the expected organisational benefits. Eventually, as many of the respondents acknowledged, several benefits were realised. One of the respondents summarised the implementation process as “a long, strenuous, painful experience but worth it” [MP12].

#### 4.2.2 Participant information

Data were collected from 12 participants. Table 4.1 provides a list of the participants that were interviewed. The table specifies the role of the participants in the organisation, gender and time in the organisation.

**Table 4.1: MP Participants**

Participants	Gender	Group of stakeholders	Departments	No. of years in the organisation
MP1	Female	Key user	Accounting and Finance	10
MP2	Female	Manager and user	Accounting and Finance	12
MP3	Female	User	Accounting and Finance	7
MP4	Female	User	Accounting and Finance	20
MP5	Male	User	Purchasing	15
MP6	Female	User	Purchasing	17
MP7	Male	User	Purchasing	8
MP8	Female	User	Human Resources	18
MP9	Male	User	Human Resources	7
MP10	Male	User	Maintenance	8
MP11	Male	User	Maintenance	11
MP12	Male	IT manager	IT	12

### **4.3 Case 2: BT**

BT was first set up as the Thai National Banking Bureau. The BT Act was promulgated on the 28th of April 1942 vesting upon it the responsibility for all central banking functions. BT began its operations on the 10th of December 1942. BT's mission is to provide a stable financial environment for sustainable economic growth in order to achieve continuous improvement in the standard of living of the people of Thailand. Participants worked for BT's Khon Kaen units.

As a public organisation, BT does not compete directly with other organisations, but rather enjoys a monopoly status for the types of services it renders. The lack of a competitive economic environment reduces the pressure to be efficient because survival is not at stake. Despite this, the organisational context seems quite formal. Regarding social relations, employees emphasised the hierarchy in the organisation and the respect offered to those of higher rank. For this reason, BT usually takes longer in their decision making since the process may involve many people and needs approval from multiple layers of within the organisation.

Workers at BT enjoy job security as a result of the government's human resource policies, which allow employees to reach tenured status after serving probationary periods of employment. Tenured employees are entitled to considerable job security and are protected by due processes from arbitrary layoffs.

#### **4.3.1 The history of SAP implementation**

At the time of the interviews, BT was using the SAP R/3 ERP system, version 7.0. The modules under examination in this study were FI and MM. Before using SAP, most business transactions were conducted through paper-based processes: the DOS based system and Excel spreadsheets. SAP was viewed as a back-office tool used to facilitate day-to-day operations. In other words, the ERP system was used to organise, record and control data. The ERP project planning started in early 2007. The implementation took place between March 2007 and April 2008. The system went live and was mandated in May 2008. When SAP was initially implemented, the FI module was installed first followed by the MM module after six months.



Before the implementation, the organisation selected users in each business unit and assigned them as key users. Those key users were sent for one-week intensive training at the headquarters in Bangkok. To prepare future users, training sessions were made available to each department. However, training attendance was compulsory for users in the accounting and finance department but optional for users in other departments. This may be because, according to users, the accounting and finance department is the core business service of the organisation and users in this department are heavily reliant on the system to do their tasks. This laissez-faire training strategy was adopted because the project leaders wished to alleviate potential user resistance to the new system. One way to facilitate the system's early acceptance, they reasoned, was to promote a voluntary approach, where users would not be forced to attend training. Members from the implementation team explained, "We did not want to force people to do it; we feared that it might cause more resistance" [BT12].

However, as it turned out, most users decided not to attend training sessions or attended only a few of the sessions. The unexpected lack of user participation in training was extremely disappointing for the project leaders:

There were so many people did not come to training. It blew my mind when I found out that so many people did not come. It was really sort of disheartening. . . . We did so much that the people could not say we did not try to train them [BT12].

Along with training, the organisation developed an internal website which included online help, SAP e-learning and SAP news to assist users in using the system. In addition, the training that was provided to employees in the organisation was accompanied by a manual to cover the training session and other uses of the system. However, as mentioned by the users, the manual was too long for them and they never bothered to open it after the training sessions. The following comments from one of the participants who attended the training illustrate this issue:

We got a training document with the step-by-step direction on how to use the system, and for the most part, that is how I received training. I received a packet on how the system is supposed to work

and what to do. But it is too long with too many details. Most of them are not really relevant to what I really need to do. It was really a waste of my time reading the manual [BT4].

After the system went live, there were differing degrees of reluctance to use the system. Some middle managers and users did not use the system fully and consequently there was much less enthusiasm in supporting it. The support staff faced a barrage of technical issues along with many calls from users who found it difficult to navigate their way through the new system. Many users continued to use the shadow system based on Excel spreadsheets. The organisation faced several problems in institutionalising the ERP system. The organisation also took several months to improve the system configuration and their IT infrastructure after going live. Even after technical stability was achieved, the system was not understood very well by the end users.

Overall, the implementation of ERP at BT was a challenging process. One of the limitations was the relatively slow change process of a highly bureaucratic government organisation. In order to enhance their ERP capabilities, employees were encouraged to participate in external networking events such as seminars and user group meetings organised by the organisation.

#### **4.3.2 Participant information**

Data were collected from 12 participants. Table 4.2 provides a list of the participants that were interviewed. The table specifies the role of the participant in the organisation.

**Table 4.2: BT Participants**

Participants	Gender	Group of stakeholders	Departments	No. of years in the organisation
BT1	Female	Key user	Accounting and Finance	17
BT2	Female	Manager and user	Accounting and Finance	35
BT3	Female	User	Accounting and Finance	35
BT4	Female	User	Accounting and Finance	12
BT5	Male	User	Purchasing	32
BT6	Male	User	Purchasing	15
BT7	Female	User	Purchasing	23
BT8	Female	User	Human Resources	22
BT9	Female	User	Human Resources	16
BT10	Male	User	Maintenance	17
BT11	Male	User	Maintenance	25
BT12	Male	IT specialists	IT	10

#### 4.4 Case 3: ES

ES is an industry leader in the global energy and petroleum and petrochemical business. It operates a full range of downstream businesses ranging from an ultra-modern refinery and a network of distribution terminals to nation-wide service stations. ES's predecessor, the Standard Oil Company of New York, was established in Thailand in 1894. ES's primary products include a variety of fuels, chemical feedstock and lubricant

oils. Participants in this study were from the company subsidiaries in Bangkok and Chonburi provinces.

The company has a high level of unity. Teamwork, tradition, hardwork, trust and loyalty to the organisation prevail throughout the organisation. All employees are expected to observe the highest standards of integrity in their business conduct and must comply with the Standards of Business Conduct. ES has long established “Standards of Business Conduct” consisting of various policies and guidelines that apply to all employees. All employees are expected to review these policies annually, and to provide their written confirmation of compliance. At ES, employees typically work as a team. Time consciousness is important for everyone. Punctuality is expected when they have a meeting as it demonstrates a high level of responsibility and respect of team members.

ES offers both a competitive salary and welfare to their employees, compared with other big companies in Thailand. Participants shared their opinion that it is not only the attractive salary or other benefits which keep talented people working for ES, it is also because of the company’s culture and brand values.

Regarding social relations, I found that the communication among employees was casual. Since the workspace is open plan with low partitions, conversation and communication among employees was both fluid and open. Figure 4.2 shows the ES work environment.



**Figure 4.2: ES work environment**

#### **4.4.1 The history of SAP implementation**

At the time of the interviews, ES was using the SAP R/3 ERP system, version 7.0. The modules under examination in this study were FI and MM. The implementation of the ERP system took place between November 2005 and September 2006, and SAP went live in October 2006. The implementation type was big bang and the organisation immediately used a strong mandate once the system went live.

Worldwide, ES previously used a number of different financial information systems in their offices. As the company grew very quickly, the individual business units within different countries built up their own infrastructure, which included the systems and the processes that they used to support their business. ERP implementation in this

organisation was motivated by a desire to transform the organisation through a replacement of multiple legacy systems with a single integrated enterprise system. The organisation embraced ERP systems as a way to introduce process orientation and a more effective business structure. The project kicked off with a workshop on process orientation that was presented to all the organisation's executives and senior managers by a world leading expert on process re-engineering. The project was supported with a well-defined business case that included adequate support from the board for changing the organisational processes to achieve e-business and business transformation objectives.

Before the system went live, the organisation also instituted a centre of support for ERP systems at the headquarters in Bangkok where new modules were piloted and tested before being introduced throughout the organisation. The organisation recruited employees from various functional units to this centre. These employees brought functional expertise to the centre and were further trained to become power users who consequently provided coaching to their colleagues when they went back to their respective functional areas. The centre also developed in-house training programmes that were extended when the system was upgraded or a new module was introduced.

The ERP power users were subject matter experts in all functional teams and were not only critical in interpreting and personalising ERP related information for their team members, but they also provided a direct link to ERP-related resources for the team. Users were encouraged to call the well-trained power users to guide them through their problems. The role of ERP functional area power users was found to be significant due to the advanced specialisation in the organisation. One of those power users took the lead for the purchasing functionality of SAP. This gave him the benefit of understanding the SAP system on a broader basis than some of the people who worked for him. This meant that he could offer relevant advice if these users had problems with the system. The following comments were made by this power user:

Typically, they have a power user who was part of the SAP implementation. So these individuals may have gone through the testing, they have reviewed the training documentation, and also the tips and tricks kind of thing. Those people who had been part of

the implementation became the subject matter experts for their department [ES4].

Training was provided to employees; however, users who attended the sessions complained that the training only focused on the technical aspects of the system and was too short. Most sessions lasted about two to three hours depending on the topic. The training was accompanied with manuals to cover the training session and other uses of the system. However, the manuals were in English which represented a challenge for the Thai employees. Users had difficulty in understanding the manuals because of the language barrier and they never bothered to open their manuals again after the training session.

The organisation faced serious problems as employees lacked proper training when the system went live. The main complaints about the system were that the system was difficult to use, was not user friendly, and users did not understand what all the fields and text in SAP were used for. These problems were considered normal by the IT specialists who claimed that they could be overcome once the users had more knowledge and felt more confident with the system. The following comments were made by the one of the IT specialists:

That was just the normal resistance to a new system, because a lot of people here had used other systems, which they knew and they were confident with, and they knew what they could get out of them. And so it was just this transition to another system that they have to learn and understand. But I am sure once they can understand it, once they can use it, they will be quite happy with it [ES11].

The organisation could not realise some of the potential benefits extended by the ERP system because most users did not use the system enthusiastically. The organisation had to initiate several changes and intervention programmes to improve the situation.

#### 4.4.2 Participant information

Data were collected from 11 participants. Table 4.3 provides a list of the participants that were interviewed. The table specifies the role of the participants in the organisation.

**Table 4.3: ES Participants**

Participants	Gender	Group of stakeholders	Departments	No. of years in the organisation
ES1	Female	User	Accounting and Finance	16
ES2	Female	Manager and user	Accounting and Finance	21
ES3	Female	User	Accounting and Finance	10
ES4	Male	Power user	Purchasing	20
ES5	Female	User	Purchasing	18
ES6	Male	User	Purchasing	30
ES7	Male	User	Human Resources	11
ES8	Female	User	Human Resources	8
ES9	Male	User	Maintenance	15
ES10	Male	User	Maintenance	9
ES11	Male	IT specialists	IT	15

#### 4.5 Case 4: IM

Established in 1951, IM is the leading inter-governmental organisation in the field of migration and works closely with governmental, intergovernmental and non-governmental partners. With 146 member states and offices in over 100 countries, IM is



dedicated to promoting humane and orderly migration for the benefit of all. It does so by providing services and advice to governments and migrants. IM works to promote international cooperation on migration issues, to assist in the search for practical solutions to migration problems and to provide humanitarian assistance to migrants in need, including refugees and internally displaced people. The IM Constitution recognises the link between migration and economic, social and cultural development, as well as the right of freedom of movement.

Since 1975, IM Thailand has been assisting migrants, refugees and the Thai Government in various fields including facilitating the resettlement of refugees out of Thailand, promoting the rights of migrants, improving migrants' access to healthcare systems, assisting the victims of trafficking in return and reintegration, and assisting the Thai Government in developing policies on migration. Presently IM Thailand is active in 17 provinces, namely Bangkok, Chantaburi, Chiang Rai, Chiang Mai, Kanchanaburi, Mae Hong Son, Nakhon Phanom, Nong Khai, Tak, Sa Kaew, Sakon Nakhon, Saraburi, Sangklaburi, Ratchaburi, Ranong, Phang Nga and Phayao.

Before going on the Bangkok site, I had some knowledge of the organisational context and ERP project through several conversations with a friend who is working at IM. When I was visiting and interviewing people at IM, each unit seemed to be a different organisation, with different social relations. Regarding the social relations between the employees, the degree of closeness in terms of collaboration appeared quite low. In my nearly one month interaction with the employees during my fieldwork, I felt that the organisation had a very quiet environment and I heard very little conversation or communication among employees. Employees work in cubicles in an open floor plan. Figure 4.3 shows the IM work environment.

There are both Thai and non-Thai staff at IM. When asking about the language obstacle, participants answered that it was a barrier at times. Although English is the official language used in this company, Thai staff communicates with each other in Thai. Participant stated that this can sometime cause misunderstandings among team members due to the barrier of different languages.



**Figure 4.3: IM employees' workspace**

#### **4.5.1 The history of SAP implementation**

At the time of the interviews, IM was using the SAP R/3 ERP system, version 7.0. The aim of the company's worldwide ERP programme was to implement a global ERP template based on SAP R/3 architecture. SAP was replacing IM's previous application called Pass2000, which was developed in-house specifically for the accounting and finance departments. By rolling out a global information system template across all its subsidiaries, the company aimed to create efficient and standardised processes worldwide. The organisation implemented the system to overcome the limitations of fragmented and incompatible legacy systems. The system was designed by Geneva, Switzerland headquarters working together with SAP experts from Tata Consultancy Services (TCS), the consultancy company that helped to implement the system. All the decisions regarding this project (i.e., the package selection, the outsourcing firm selection, the project team composition, the project schedule, etc.) were basically top-down: even middle managers did not participate in the discussion before the decisions were officially communicated and the project was launched.

The SAP system is designed to support IM's commitment to accountability and transparency in relation to its member states, donors and other stakeholders across the globe. It aims to improve reporting times and to support the adoption of International Public Sector Accounting Standards (IPSAS). With regard to the technology infrastructure, SAP servers are located in Switzerland and use a private network connection to the workstations in Switzerland and foreign sites. The modules of SAP that were used at the time of the interviews were FI and MM.

In terms of system deployment, the company employed two different IS teams of ERP consultants for the rollout of each module. One team of consultants was based at the company headquarters and was responsible for the worldwide adoption of the standard processes embedded within the global ERP system. Another team was the local project team which was responsible for the functional and technical settings of the global solution. IM rolled out SAP to the first six locations – Geneva, Manila, Moscow, Skopje, Sarajevo and Budapest in January 2008. Subsequently, IM Thailand was one of the second wave roll-out locations in April 2008 when the system was mandated.

Before the rollout, IM Thailand selected functional representatives called super users and sent them on a two-week intensive training course at the headquarters in Switzerland. When the SAP system was installed at IM, all of the users had to attend training sessions on the specific tasks that they had to carry out in the system. The group training was provided by staff from the Philippines and was conducted in English. In addition, there were management communication briefs to explain the need to use the system and the associated benefits. This training was a combination of using existing documentation and peer-to-peer training.

After IM Thailand went live with SAP, they provided a 24-7 helpdesk in the Philippines, in order to help users with any problems they encountered. There were also training materials in English that users could refer to if needed. As an international organisation, the organisation expected that English should not be an issue for their staff. However, it was mentioned by the users that they had difficulty in understanding the training and manuals. The organisation also developed a website to assist users in using the system. The features of the website included online help, computer based training, SAP user manuals and SAP news. The organisation also created operational

champions within each division in order to make sure that there was always a person responsible for SAP in case problems arose. These champions tended to be in a senior position in the organisation. As such, they appeared to have decision-making authority concerning SAP. Even though SAP use is mandated for employees, the organisation continues to allow employees to use paper-based processes, if necessary.

#### 4.5.2 Participant information

Data were collected from 11 participants. Table 4.4 provides a list of the participants that were interviewed. The table specifies the role of the participant in the organisation.

**Table 4.4: IM Participants**

Participants	Gender	Groups of stakeholders	Departments	No. of years in the organisation
IM1	Male	Super user and Manager	Accounting and Finance	9
IM2	Female	User	Accounting and Finance	6
IM3	Female	User	Accounting and Finance	5
IM4	Female	Manager and user	Purchasing	10
IM5	Male	User	Purchasing	8
IM6	Female	User	Purchasing	9
IM7	Female	User	Human Resources	7
IM8	Female	User	Human Resources	7
IM9	Male	User	Human Resources	5
IM10	Male	User	Maintenance	6
IM11	Male	IT specialists	IT	8

## **4.6 Chapter conclusion**

This chapter provided the organisational contexts of the research. The cases described above provided a rich picture of the organisations' context, ERP system implementation context, training and social context. This was necessary in order to understand the contextual conditions that could impact on the user adaptation process and the use of the ERP system. Table 4.5 provides a summary of contextual conditions in each company.

**Table 4.5: Summarised Contextual Conditions for each Organisation**

<b>Org.</b>	<b>Degree of mandate</b>	<b>Role of ERP</b>	<b>Organisational culture</b>	<b>Competitive environment</b>	<b>Role of super users</b>	<b>Social and work atmosphere</b>
<b>MP</b>	Soft -> Strong  (the degree of mandate changes over time)	Core business  Reduce time, cost and streamline operations  Use ERP for competitive advantage	Cohesive and collaborative	High competitive	High influence on users  Coaching by super users is a big influence in increasing the use of the system	Participative context and dynamic communication  The work relations are relatively informal and without many hierarchical levels.
<b>BT</b>	Varies among departments Strong in accounting and finance department  Moderate in purchasing, human resources & maintenance department	Reduce cost and streamline operations	Divisional form; with business units having significant autonomy	Low competitive	Medium influence on users	Autocratic context, top-down decisions

Org.	Degree of mandate	Role of ERP	Organisational culture	Competitive environment	Role of super users	Social and work atmosphere
<b>ES</b>	Strong  Standardised firm methodology, mandated on all departments	Core business  Reduce time, cost and streamline operations  Uses ERP for competitive advantage	High expectation  Competitive culture reinforced by up or out career path	High competitive	High influence on users	Strong corporate culture and strong top management involvement in the project
<b>IM</b>	Varies among departments Strong in accounting and finance department  Moderate in purchasing, human resources & maintenance department. Each team adopts own approach	To support IM's commitment to accountability and transparency in relation to its member states, donors and other stakeholders across the globe	Low competitive among employees  Individualistic  Independence	Low competitive	Low influence on users	Very complex context; each unit seems to be a different organisation, with different social relations

## **Chapter 5 Research Findings**

### **5.1 Introduction**

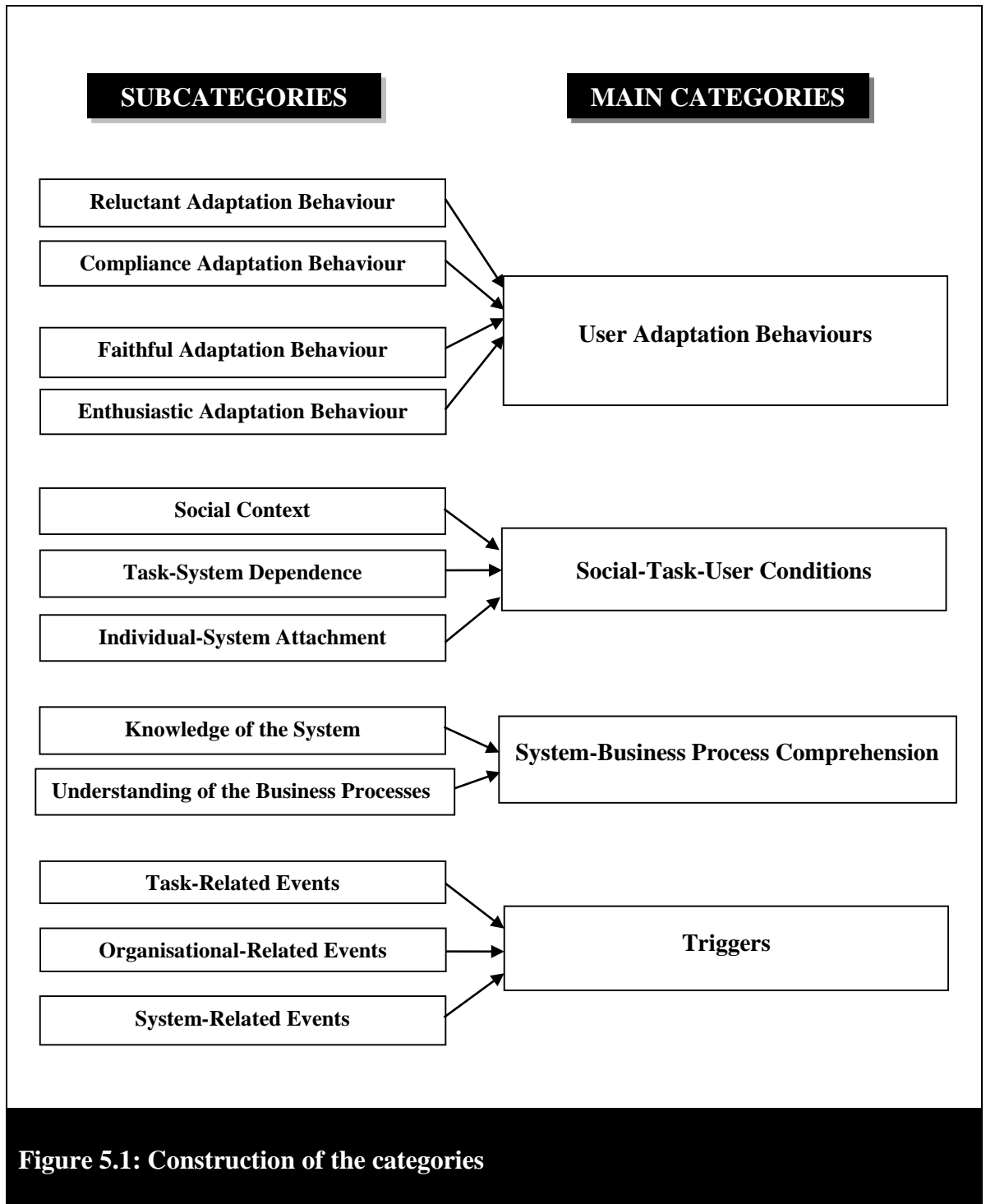
In this chapter, I lay the foundations for the construction of the emergent and substantive theory from the collected data. This chapter is organised as follows. In the next section, the discovered categories are introduced. The discovery path from the collected data is progressed through the open codes to the subcategories. When presenting the evidence, I make an effort to show all the relevant data for this study so that the reader can follow my reasoning when I label the emergent codes and categories along the scaffolding process.

The four categories arising from the data analysis process are user adaptation behaviours, social-task-user conditions, system-business process comprehension and triggers. The findings will be organised and presented in light of the research questions:

- **How do users dynamically adapt to complex mandatory IS in organisations in the context of ERP use?**
- **How do organisational contexts play a role throughout the user adaptation process?**

These categories represent user adaptation behaviours and various situational conditions that influenced the user adaptation process. All the cases produced the same subcategories but there were some differences in open codes. In order to avoid repetition, I present my findings by categories rather than by organisations. In the following subsections, I present and explain the bottom-up process for the construction of the aforementioned categories based on the discovery of the sub-categories and their constitutive open codes. Thus, the categories are introduced first. As was explained in Chapter Three, the main category construction is the outcome of moving to a higher level of abstraction while grouping conceptually-related subcategories. Eventually, four main categories emerged from this inductive theorising process as shown in Figure 5.1.





For reader clarity, the resulting open codes, subcategories and main categories generated from the data analysis are *italicised*, ***bold-italicised***, and font-changed respectively, throughout the sections of this chapter.

## 5.2 Category: User adaptation behaviours

User adaptation behaviours explain the different ways that individuals responded to the evolving work practices mediated by the ERP system. The evidence suggests that when the system was introduced and mandated, users responded to the system in different ways. There are four different patterns representing the user adaptation behaviours that emerged from all four organisations; *Reluctant Adaptation Behaviour*, *Compliance Adaptation Behaviour*, *Faithful Adaptation Behaviour* and *Enthusiastic Adaptation Behaviour* subcategories. These related adaptation behaviours makes up the user adaptation behaviour category.

Interestingly, my analysis also revealed that for most users, their adaption behaviours evolved over time. Through ongoing interaction with the system and the occurrence of triggers that provoked changes in the system or in the work environment, users modified their adaptation behaviours. I will describe the behaviours I observed in a static fashion first. The transition and its triggers will be explained later.

Table 5.1 shows the analytical development of this main category. I present the construction of this category, its constituent subcategories and open codes. I next explain the discovery of the subcategories around their related open codes.

**Table 5.1: Analytical Development of User Adaptation Behaviour Category**

Open Codes	Subcategories	Main Category
<i>complaining about the system, unwilling to learn, unwilling to change work routine, fear of making mistakes, lack of confidence, comparing the new system with the old system, refusal to use the system, delaying system use, continuing use of shadow systems, resistance to change, rejecting the system, persistence of work practices, relying on other people to complete tasks</i>	<b><i>Reluctant Adaptation Behaviour</i></b>	<b>User Adaptation Behaviours</b>
<i>superficial learning, lack of attention, inaccurate data entry, superficial use, limited understanding of the system capability, printouts for overseeing the process, the parallel use of shadow systems, duplicate work, making partial use of the system</i>	<b><i>Compliance Adaptation Behaviour</i></b>	
<i>learning efforts, adapting work practices, following step-by-step instructions, following instructions faithfully, producing a personal manual, true to the letter use, learning by repetition, routinising the use of the system</i>	<b><i>Faithful Adaptation Behaviour</i></b>	
<i>inquisitively exploring the system, trying out new functionalities, modifying system screens, adjusting the system to fit particular needs, personal/professional gratification, perceiving the potential of the system, trying to enhance system utilisation, seeking new knowledge, seeking efficiency, perceiving benefits of the system</i>	<b><i>Enthusiastic Adaptation Behaviour</i></b>	

### 5.2.1 Reluctant adaptation behaviour

*Reluctant adaptation behaviour* describes the situation in which individuals made no effort to learn how to use the system following its introduction; in some cases, individuals even showed hostility to the system. Even though the system was mandated, users were unwilling to change their work routines to conform to those imposed by the system. Users found the procedures and associated tasks embedded in the system incompatible to their prior work practices. *Reluctant adaptation behaviour* manifested in different ways. It ranged from delaying system use for as long as possible and persisting in old work routines, to relying on other people to complete the tasks associated with the system.

Some individuals perceived that the system, which had embedded pre-defined work practices that may have been different from their previous work practices, had significantly decreased their control over their jobs. This group of users perceived the system as an impediment that affected their ability to work. As a result, they were less motivated to adapt to the system. As one of the participants from IM organisation explained,

I felt that I no longer had control over my job. Entering data into this form takes a lot of time. I spent more time on getting my work done than before [*complaining about the system*] . . . I was too busy to spend time trying to figure out how to use it [IM10, *unwilling to learn*].

Typically, participants who exhibited reluctant behaviours felt threatened by the system and believed that the system did not provide any benefits to their activities. As a result, they regarded the system is not important to them. The main complaints about the system were that the system was not user friendly and difficult to use. Users did not understand what all the fields and text in SAP were used for.

Some participants revealed that they found that doing their job with SAP took longer than before the system was implement, as explained by a participant from ES: “It is taking more time to do my tasks than I am used to do. I used to do them quickly” [ES9, *complaining about the system*]. One of the participants from MP also expressed his

negative feeling towards the system: “I did not like the system at all. It probably tripled the amount of work necessary to get the job done. And I did not see how any of those steps could be streamlined” [MP10, *complaining about the system*]. Similarly, another participant from BT complained: “It takes much longer to get my tasks done. To me, I mean, honestly, I cannot think of any benefits of the system” [BT10, *complaining about the system*].

In a similar way, a participant who adopted a reluctant adaptation behaviour recalled feeling miserable: “At that point, I thought, oh . . . another change. I did not want to adjust to it. This whole SAP, to me, was blindsided. Then I had to totally learn a whole new system. I felt so miserable” [MP9, *unwilling to change work routine*]. Some participants also revealed that they were reluctant to use the system because they worried that they would make a mistake. One participant revealed his feelings: “I was fearful of the new system and I was afraid that I was going to make a mistake” [ES9, *fear of making mistakes*]. Some participants also revealed that they lost confidence with the system. For instance, one participant said: “No, it did not work out well at all. Unfortunately, I lost confidence in using the system . . . completely [*lack of confidence*]. Umm . . . somehow I was afraid of making mistakes. I did not like it” [BT11, *fear of making mistakes*]. After admitting her own struggle with the system, a participant recalled,

I was really, really struggling. So it definitely made my job more time consuming. More frustrating also . . . what I used to be able to do in a short amount of time took much, much longer . . . you still had the same amount of work to do, and it was just taking more time to do it [MP6, *complaining about the system*].

At the same time, some users were anxious about abandoning the legacy system, with which they had become very comfortable over the years. Many users were content with the status quo and not ready to adapt to new work practices. As one participant comments: “I have been here for 30 years, and I did not want to change the way I have been doing it” [BT5, *unwilling to change work routine*]. In a similar way, another participant who preferred the legacy system disclosed,

Well, it was apprehension at first. There always is when somebody tells you it is going to be better for you and you are hearing people saying, how could it be? I was happy with what I had. I think it was a comfort level. I was comfortable with what I did. I got comfortable with doing what I was doing. It is just like if somebody came in today and said – you are not going to be doing that anymore. You are going to be doing something that is totally different. I was like why? [BT8, *unwilling to change work routine*].

Another participant at MP recalled,

This process requires me to change . . . [and] I need to shift my thinking process and, for some people including me, this is a little difficult, since I have been doing it one way for a long time and do not want to change how I work [MP6, *unwilling to change work routine*].

Similarly, some users not only continued to complain about the new system but also kept comparing the new system with the old system. One participant described his feelings towards the old system in the following manner: “The old system was so much better. It was an easier system to learn and use” [ES9, *comparing the new system with the old system*]. Another participant stated that, “We knew it [the old system] was better. It was much easier to use than SAP” [IM10, *comparing the new system with the old system*]. One participant who was also reluctant to move from the legacy system to the new system revealed that, “It took much longer to do the same thing; to get a requisition in here takes many steps. . . . The previous system was very easy. . . . It was very, very different” [MP8, *comparing the new system with the old system*]. These users resisted change and found using the ERP system to be difficult.

This negative feeling towards the system could have been responsible for discouraging users from modifying work routines to accommodate the system and, in the worst case, leading some to abandon the system. One of the participants explained his previous experience: “I just got so frustrated and I was just so overwhelmed. So I did not use the

system at all” [BT5, *refusal to use the system*]. Another participant recalled his negative feeling in the early days:

I was so frustrated with it. I refused to use it and did not even want to look at it. I was feeling stupid, discouraged – all of those things! And you know how that makes you feel about your job, you just want to go home and quit. . . . It was just that this initial phase was awful [MP7, *refusal to use the system*].

Feelings of hesitation, reluctance, worry and a desire to reject the system reflected an underlying unwillingness to fully espouse the system. Questions were asked; the benefit of the new system was not properly understood. Some reluctant users were not willing to attend training sessions and were not willing to change. One active user had witnessed these behaviours and stated, “I think people could do what they needed to do in the system, but were somewhat afraid. They avoided what they needed to do in the system” [MP2, *delaying system use*]. Another participant at BT revealed, “They [users] would like to complain that they could not do it. They would not go to the training, but they would also complain” [BT3, *unwilling to learn*]. An IT manager at MP who observed other participants exhibiting the reluctant adaptation behaviour explained,

They [users] did not like it at all. They said . . . “it is more complicated, there are more steps now”. . . . They are responsible for the data entry . . . they are disappointed, they are not eager to change [MP12, *resistance to change*].

A key user at MP, in talking about other users claimed,

They were not willing to change [*unwilling to change work routine*] and not willing to go to training for the change [*unwilling to learn*]. They complained so much that they did not know this, they could not produce this type of report or query [*complaining about the system*], but they had never attended training sessions, therefore they did not know how to use it [MP1, *unwilling to learn*].

Another participant added: “I saw people become impatient especially in the training. ‘Okay, just show me; just get it over with, why does it take so long?’ [*unwilling to learn*]. . . . And made little jokes and gossiped about the system that it was really slow” [IM1, *complaining about the system*]. Similarly, one participant at BT recalled,

They [users] were waiting until the very last moment to go to training [*unwilling to learn*]. The organisation had to extend the training sign-up time since nobody signed up for training until the last two weeks. So they had to redo their whole schedule and assigned more trainers to do the training, so it was kind of procrastinating [BT4, *delaying system use*].

The following expression reflects one participant’s unwillingness to change her work routine:

I definitely do not like change [*resistance to change*]. I am very, very structured. I am very much a creature of habit and I did not even like going to the first training meeting because I did not know what I was doing, it was all new and different. So it was pretty stressful for everybody because you were all trying to learn things you did not know how to do. So the change was hard [BT7, *unwilling to learn*].

It can be inferred that users who engaged in reluctant behaviours did not want to adapt to the system. Rather, the negative feelings towards the system lead some users to reject the system, if they had a choice. While some users did not use the word “reject” or “resist” the system, this was still the underlying meaning in the language that they used: “If the system was taken away, it would help my job; however, that will never happen [BT10, *rejecting the system*]. Another participant recalled her feeling: “I was not trying to be resistant, but if, given the choice, I would prefer it was not here [*rejecting the system*]. It was a whole six or seven months of I did not like it, I was not going to use it” [BT9, *delaying system use*].

Some participants revealed that they did not use the system at all because they thought that they would be able to accomplish their tasks without using the system. They tried to



delay using the new system for as long as possible by using the legacy system or, in some cases, continuing to use the paper-based process. One participant who desired to hold on to the legacy system stated, “After the system went live, I continued to run the old system and I kept using it for a year until they took it out from my computer!” [BT5, *continuing use of shadow systems*].

I also found that instead of learning the new system and work processes, some users tried to return to what they had done in the past. They continued to perform the previous work practices that were in place before the implementation of the system. One participant expressed his desire to use the codes in the old system:

I still wanted to use M-codes [codes in the old system] instead of T-codes [codes in the new system]. It was hard for me. When I was talking to someone, like (a co-worker) in the office, I said M-code, when actually I meant T-code. But, my brain still saw M-code. See, the code used to be number MXX. Now, it is N-TT-XXXXXXXXX plus all of the other codes. I thought it was too complicated [MP11, *persistence of work practices*].

One participant witnessed similar behaviours and stated, “They did not want to change their work routine [*unwilling to change work routine*]. They tried to work in the old work practice; even bringing the codes from the old system” [MP1, *persistence of work practices*]. Another participant, in talking about other participants within the organisation, stated, “They resisted by just not doing it the way we wanted them to [*resistance to change*]. They tried to keep doing things in the old ways” [ES3, *persistence of former behaviour*].

Some users tried to keep away from using the system while accomplishing their portfolio of tasks by relying on other people to complete the tasks associated with the system. They avoided interacting with the system by entering transaction data on paper forms or continuing to use the old system prior to SAP. Users acquired the paper forms relevant to a particular transaction, filled in the required information, obtained the necessary signatures for its approval, and asking power users or key users to type in the data in the form for them. One of the participants who exhibited reluctant adaptation

behaviour recalled the early days: “I was not doing things online yet. I was doing things by printing off a copy [of a form], and then I filled it in and then sent it to the key user” [MP11, *relying on other people to complete tasks*]. Another user who was also reluctant to use the system disclosed, “I relied on the people initially designated as key users for help with SAP. I filled in paper forms and then sent them to the key users to enter them into SAP for me” [MP10, *relying on other people to complete tasks*].

A key user at MP recalled the situation when she had to enter transactions for users who were unwilling to use the system after the system went live: “I knew that a lot of people were still filling out paper forms, they were all going over to key users, including me, and we basically had to key them in” [MP1, *relying on other people to complete tasks*]. Another participant who was also a key user at BT experienced a similar situation and revealed, “They spent a year after the system went live sending up paper copies to me. They thought it was easier to do it that way” [BT1, *relying on other people to complete tasks*].

While some users relied on key users, other users relied on their colleagues to complete their tasks. The comment of one participant illustrates reluctant adaptation behaviour: “The system is way too complicated. . . . I always get lost whenever I use it. Figuring out where to get these fields [of data] is such a pain. I eventually end up asking my colleagues for help” [BT9, *relying on other people to complete tasks*]. Similarly, another participant revealed, “I went to my colleagues for help to create a requisition form in SAP for me whenever I needed to request new material” [BT11, *relying on other people to complete tasks*].

To sum up, reluctant users did not make an effort to learn how to use the system following its introduction. They found the procedures and associated tasks embedded in the system incompatible with their prior work practices. They were unwilling to change their previous work routines to adapt to the ones imposed by the system. Reluctant adaptation behaviours ranged from non-use to relying on other people to complete tasks. These behaviours impeded the proper execution of organisational tasks.

Figure 5.2 shows the construction of the *reluctant adaptation behaviour* subcategory with its corresponding open codes and selected participant quotes.

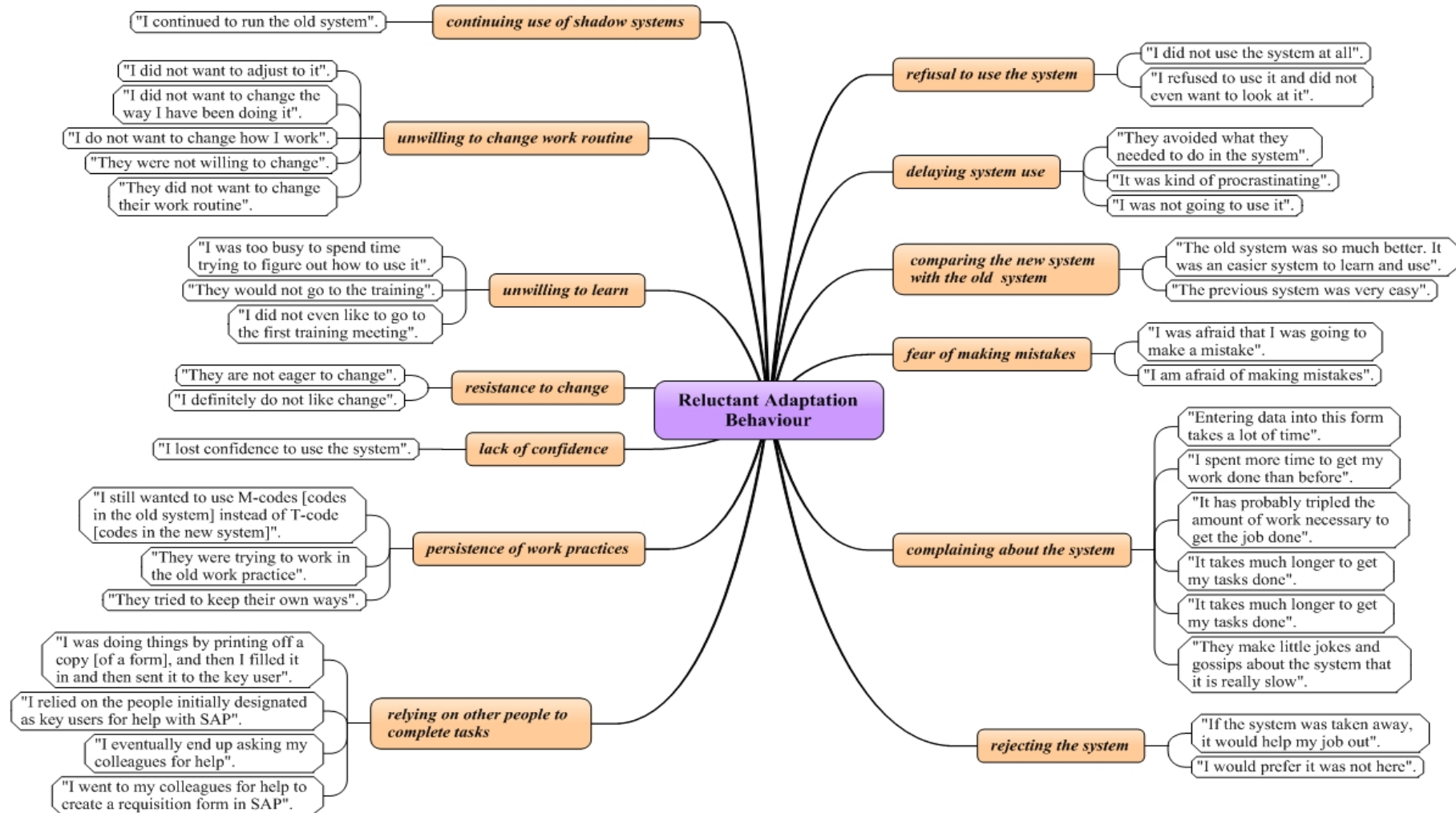


Figure 5.2: Construction of the reluctant adaptation behaviour subcategory

### 5.2.2 Compliance adaptation behaviour

*Compliance adaptation behaviour* was characterised by individuals making limited efforts to use the system and adjust work practices to those imposed by the system, while avoiding the consequences of complete resistance. Individuals who exhibited this behaviour engaged in a half-hearted system use. Their knowledge of the system was superficial and they did not exploit its full functionalities to support their work; just enough to satisfy their most immediate work demands while trying to minimise changes to their work routines. Users restricted themselves to using the system in a way that somewhat fit their prior work practices. In some cases, the ERP system was concurrently used with shadow systems (e.g., spreadsheets, legacy systems).

The following reflection by a participant describes his initial reaction to the system and his subsequent adaptation behaviour, which reflects compliance adaptation behaviour:

SAP was so complicated. I had to go through many steps in order to create only one form that I needed. I was so frustrated with it. I felt I did not want to spend my time away from my main job to figure out how to do it. But the organisation forced me to use SAP, so I learned how to use it just enough to do my tasks [*superficial learning*]. I did not pay much attention to it [ES8, *lack of attention*].

In many cases, some users intentionally used the system in ways that were just enough to satisfy their immediate work demands. One participant's comment exemplifies this behaviour:

I spent a little time learning how to use it but only basic things that I really have to use. I just want to get my work done. I do not want to know more [*superficial learning*] . . . I do not enter all these data into the system right away; I do it when I have to . . . like when my manager needs these data. I still think it does not help me to become more productive [IM7, *lack of attention*].

Some users entered data that they knew were incomplete or that did not reflect the data codification in a format that was appropriate for the system. One participant's approach exemplifies this behaviour: "When I entered data into SAP and there were so many data fields that I have to fill in, most of the time I did not really care much. I just kept entering data into the system until it was enough to finish the process. Sometime, I got a complaint from my colleagues that I did not enter all data they needed" [ES5, *inaccurate data entry*]. One participant who witnessed the behaviours of others revealed:

Even though they knew it was wrong, instead of figuring out what was happening with the wrong data, they would just go on, making enough changes just to make the transaction go through. As far as they were concerned, they considered their work done, but then we had bad data out there and no one's gone back to correct those bad data [ES2, *inaccurate data entry*].

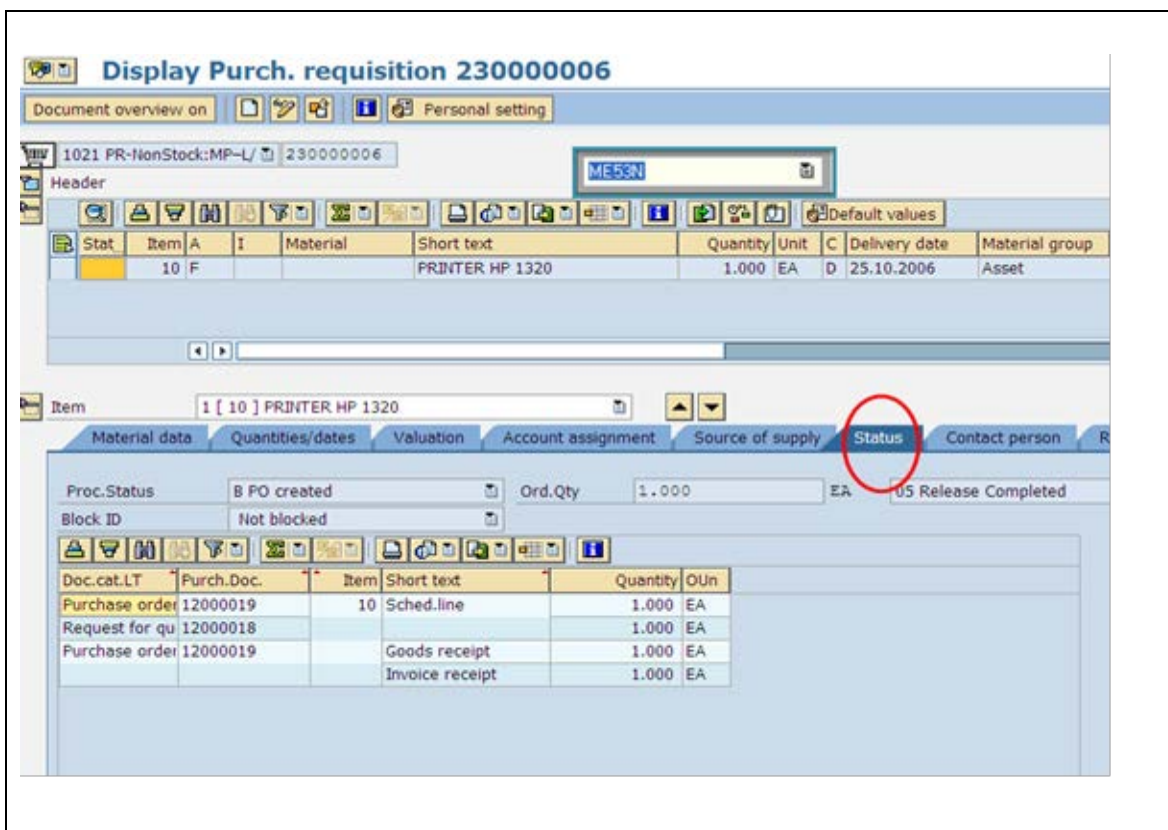
One participant who observed other participants who exhibited the compliance adaptation behaviour explained,

Usually, they tended to forget to enter data or enter incomplete data into the system. I remember a few times when we were pressed to figure out the missing data for our monthly closing. All the reports were wrong and the top management was blaming my team [MP3, *inaccurate data entry*].

Because of superficial learning, users forfeited the opportunity to become more knowledgeable of the system and were not able to retrieve necessary information to effectively perform their tasks. For example, in some cases, users in the maintenance department could not verify that a purchase requisition had been approved. They did not realise that this information could be obtained from the system directly. They had to verbally ask the assistant purchasing manager in the purchasing department to check their purchase requisitions status. The assistant purchasing manager then had to check the status for them and repeatedly explain to them how to check the purchase requisition status in SAP, as shown in Figure 5.3. One participant who did not exploit full

functionalities of the system and was incapable of checking the purchase requisition status explained,

I did not really know how to go back to check and see if my purchase requisition went through. If I ordered something and it never arrived, I did not know if somebody down the line was having problems with the system or if the system failed because I did not put in the order correctly. So, I wondered, did my order work? [ES10, *limited understanding of the system capability*].



**Figure 5.3: Purchase requisition status screenshot from ES**

In other cases, some users did not check the stock overview screen, as shown in Figure 5.4, before creating a reservation for required materials, as shown in Figure 5.5. The expressions of one participant illustrate compliance adaptation behaviour:

I just made little use of the system to create requisitions. But I still preferred a paper form [which] was much easier and faster. I learned the system when I had to [*superficial learning*]. . . . Most of the times when I had to use it I had to refer to the manual or asked my colleagues for help. . . . I still had to write on a paper form first and entered the data into the system later. . . . My requisition forms were rejected very often. . . . They said I did not check stock overview before requesting material and did not enter all the required fields. . . . There were so many steps and I had to work on many screens. So, I forgot some of the steps. It was just a waste of my time to redo it again and again [MP8, *lack of attention*].

Figure 5.4 shows the step-by-step screenshots of the stock overview that MP8 found complicated. Figure 5.5 shows the step-by-step screenshots of how to create a reservation of materials.

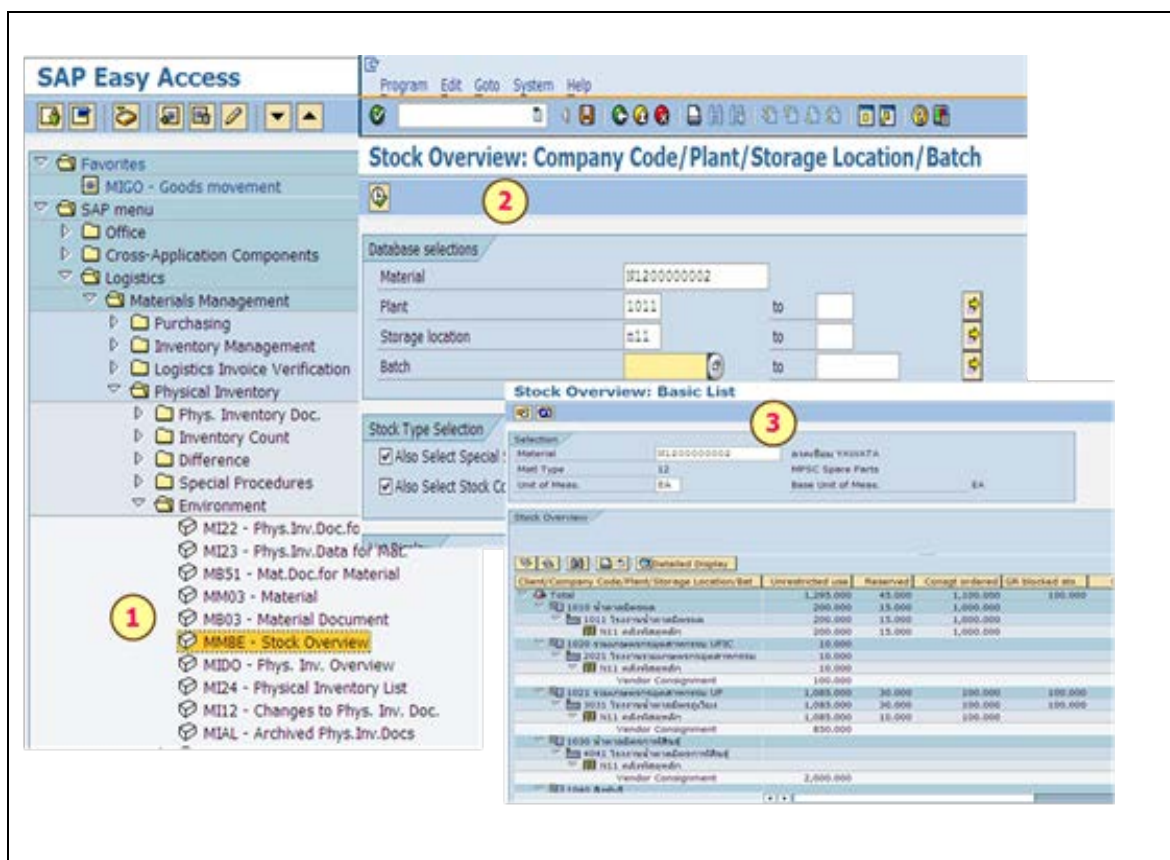
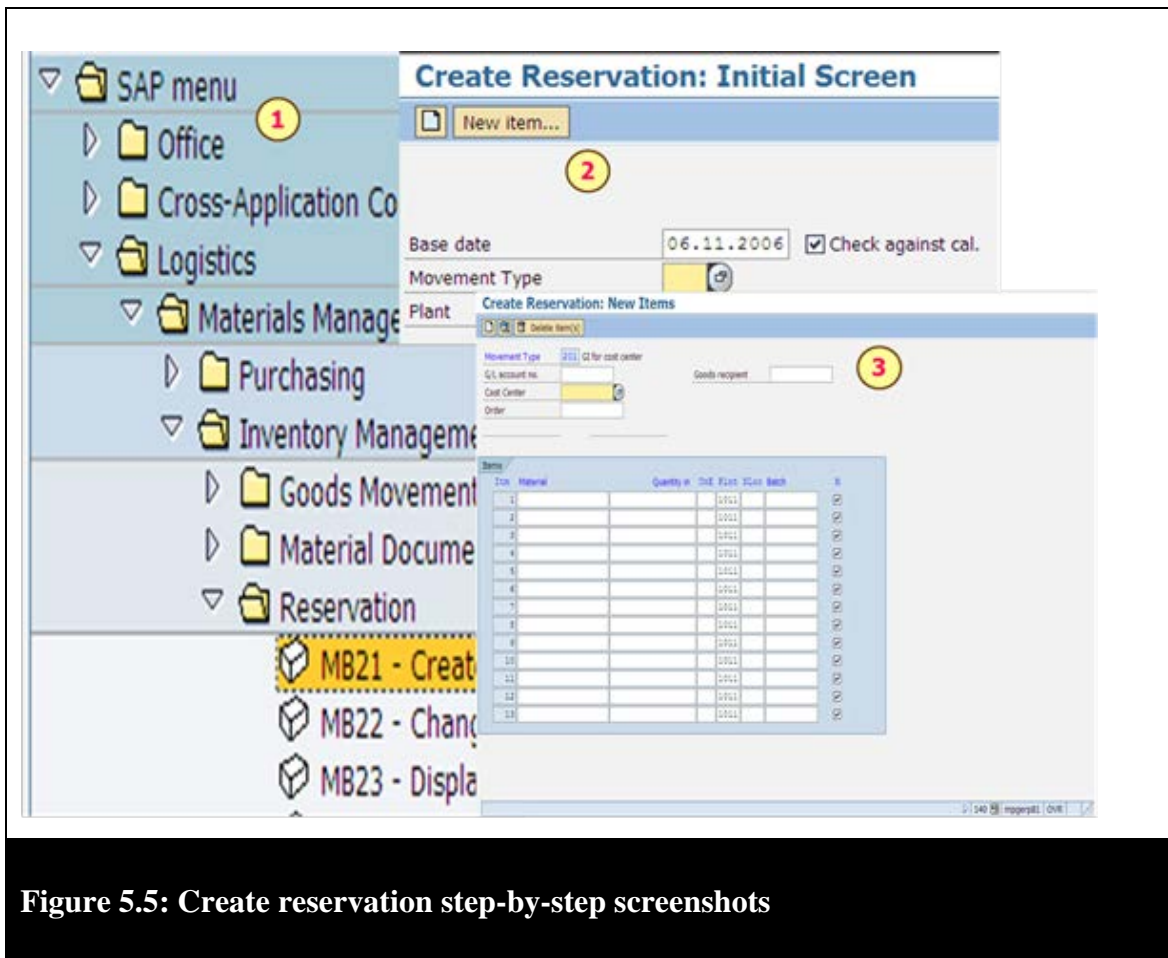


Figure 5.4: Stock overview step-by-step screenshots





**Figure 5.5: Create reservation step-by-step screenshots**

The fact that users did not know how to appropriately track the status of their work processes had many unanticipated effects. Some users, for example, began to print a record of each transaction that they entered into the system. Although this practice was not formally encouraged, some users viewed printing is necessary. It gave them a sense of control over their work. The following example demonstrates a participant's reflection on her needs and attempts to keep paper forms: "I had to print everything I did in order to keep records. So, you see, I had these huge folders. I had to print everything because I had to be able to trace the records" [MP8, *printouts for overseeing the process*]. Figure 5.6 shows participant-MP8's work space with volumes of paperwork that she did not need because the same data were readily available in the system.





**Figure 5.6: MP8's cluttered workspace with a pile of unnecessary SAP printouts**

Another participant at IM who followed a similar practice of record keeping demonstrated,

There is much of the system that I do not understand. I do not really use [most of the functionalities]. I understand bits and pieces here and there [*limited understanding of the system capability*]. Even now, after I have been using it for more than three years, I am still producing hardcopies. You see, I have heaps of paper here behind me [IM8, *printouts for overseeing the process*].

Figure 5.7 shows participant-IM8's workspace.



**Figure 5.7: IM8's workspace with a pile of unnecessary SAP printouts**

Another form of compliance adaptation behaviour was the use of backup systems. Some backup systems kept duplicate records and used spreadsheets. Backup systems included the parallel use of shadow or legacy systems. Some users were accustomed to the legacy system and found it difficult to break their old habits. Confronted with the complexity of SAP, users elected to use the system as little as possible, often by recreating the way they processed their tasks under the legacy system. One user at BT recalled,

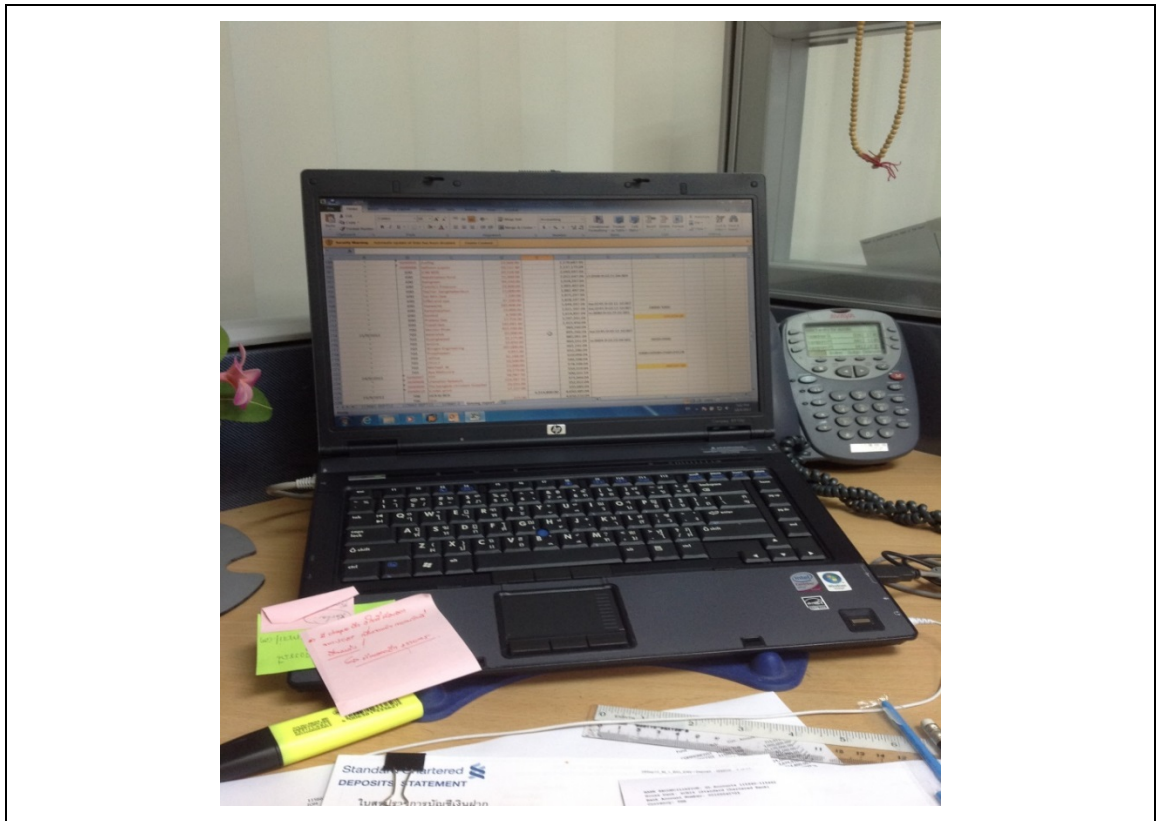
After the system went live, I still used it [the legacy system] concurrently with SAP. I felt I could not survive without it. It took a while before they removed the shadow system from my computer [BT8, *the parallel use of shadow systems*].

Another participant who also relied on her shadow system expressed her feelings: “I wanted to keep my legacy system, because I knew what was in this [*the parallel use of shadow systems*]. It doubled the work, and we were encouraged to get rid of the legacy system, we needed to quit this double data entry” [MP4, *duplicate work*].

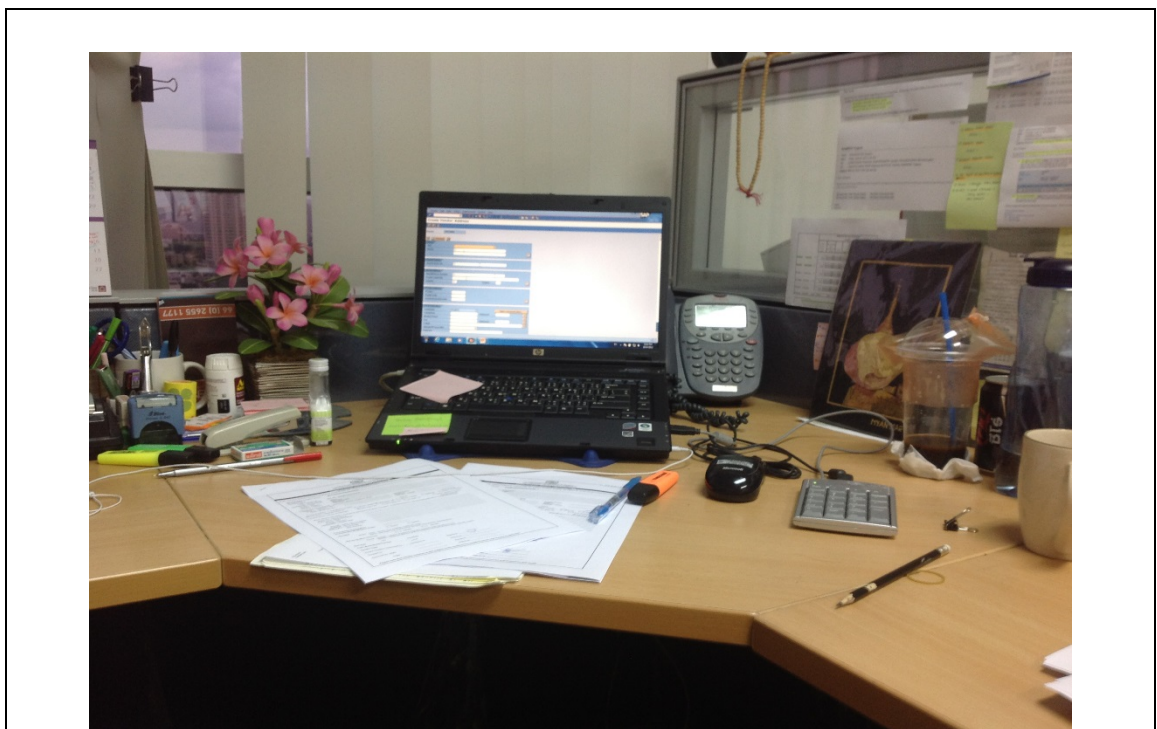
The following quotation reflects a participant’s needs and attempts to duplicate work in spreadsheet form, which reflected compliance adaptation behaviour.

I am still using Excel concurrently with SAP [*the parallel use of shadow systems*]. I know how to use SAP but very superficially [*superficial use*]. I still feel that it is too complicated and distracts me from my main job. I feel more comfortable with Excel. I usually work in Excel first then I enter data from Excel into SAP. I want to make sure that I do everything correctly before entering data into SAP [IM7, *duplicate work*].

Figure 5.8 shows an MS Excel screenshot and Figure 5.9 shows SAP screenshots that were captured when the participant was explaining how she worked on both MS Excel and SAP during the interview.



**Figure 5.8: Shadow system. MS Excel spreadsheet that participant IM7 used to support her work**



**Figure 5.9: The SAP screenshot of participant IM7**

Participants from all four organisations agreed that the reporting functionality of the SAP system was quite poor. This is because the system offered a set of standard reports which did not support the needs of the users. Although some of the reports included all information needed, the report layout was not appropriate to pass on to management. SAP in fact allows the output of required data in a format ready to be imported into Excel. SAP has a reports tree which users can navigate in order to select the reports that they want to see from the system. Once they navigate to the required report, they can then specify parameters such as the dates and range of data, among others. However, users have to know SAP quite well in order to produce the appropriate report in SAP. Participants in this study preferred to focus on the main job that they should be doing, rather than having to learn complex functions in SAP. Participants referred to MS Excel as their chosen alternative tool to generate reports in the format that was needed, especially for analysis, budgeting and planning. SAP was only used to initially get the data out. Any changes or updates were made directly on the Excel spreadsheet outside SAP. The comment of one participant illustrates this compliance adaptation behaviour:

I just have to use the SAP's reporting functionality to create reports for my manager. I have not used its full functionalities [*making partial use of the system*]. My colleague taught me how to use it. She told me that I could produce a good report in SAP. But I think MS Excel is much easier. I am too busy with other tasks to waste my time to generate reports from the system . . . I use both SAP and MS Excel. I extract relevant data from SAP to MS Excel in order to produce reports in a format that is too complicated and time consuming to produce with SAP [IM6, *the parallel use of shadow systems*].

Another participant who was unwilling to fully use the system stated:

I was pushed by my manager to use the new system but I found it difficult to handle some exceptions and challenging to produce some reports without using external spreadsheets. So, after SAP went live, I was still using both systems in parallel. All the data in SAP was managed through my legacy system and then loaded

manually via spreadsheet files. It was extremely time-consuming [IM8, *the parallel use of shadow systems*].

Overall, compliance users avoided the negative consequences of complete resistance or irresponsible behaviour by making limited efforts to adjust their previous work practices to those introduced by the system. They were likely to engage in superficial use, which according to them, only produced marginal performance benefits. The following quotation demonstrates a participant's view of compliance users: "They were not as productive as they should have been from the organisation's standpoint because they did not use the system to the fullest capability" [IM1, *superficial use*].

Figure 5.10 shows the construction of the ***compliance adaptation behaviour*** subcategory with its corresponding open codes and selected participant quotes.



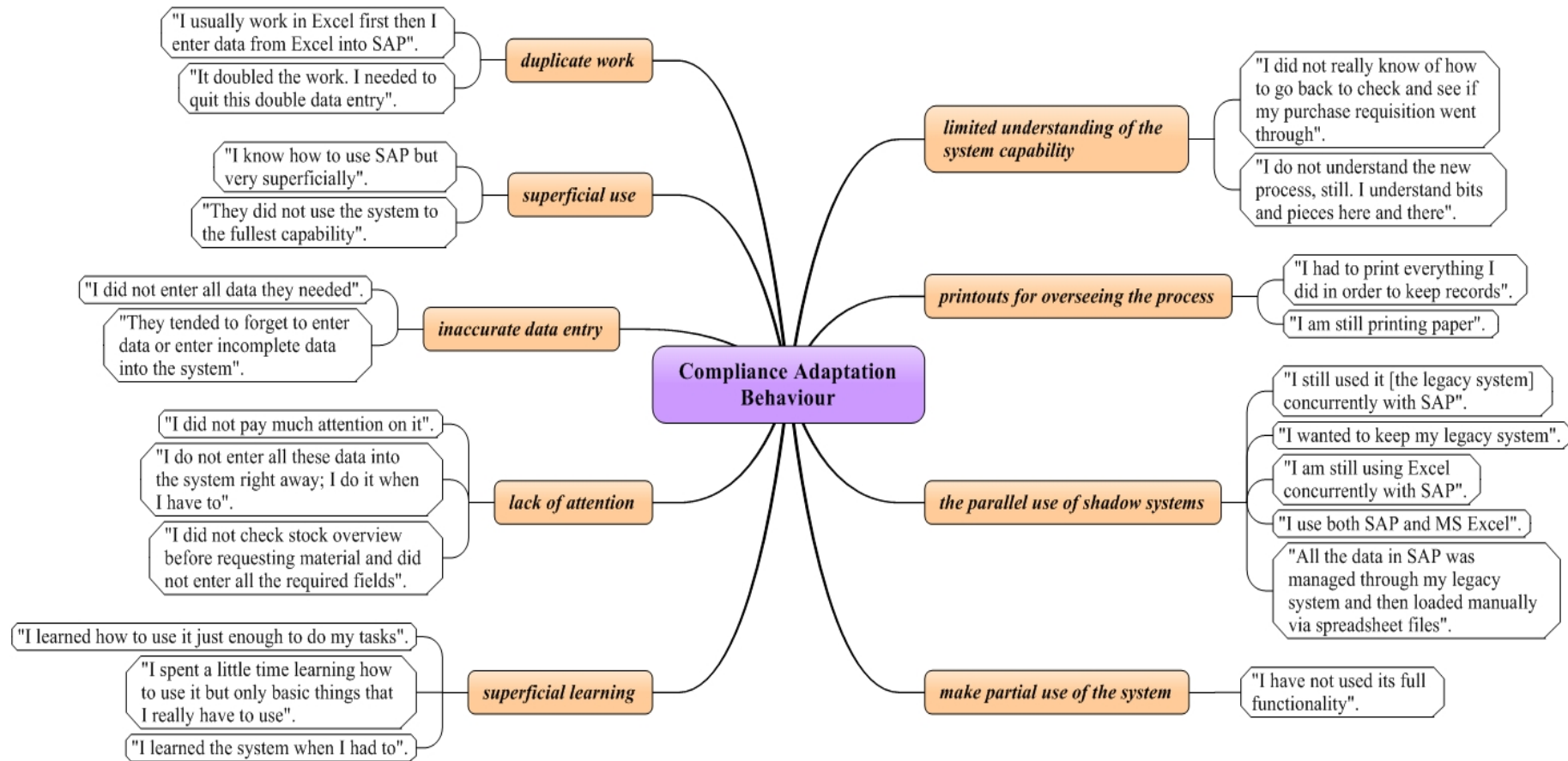


Figure 5.10: Construction of the compliance adaptation behaviour subcategory

### 5.2.3 Faithful adaptation behaviour

When users introduced changes to their work routines and procedures to fit the functionalities embedded in the system, they adopted *faithful adaptation behaviour*. This behaviour was characterised by learning efforts to use the system. However, users used system features in a true-to-the-letter fashion based on what they had learned in the training they received. Despite their active engagement in the use of the system, these users did not explore features beyond those that they had learned in order to execute tasks in an innovative way.

These users decided to learn the system for the sake of their job. As users went through the training process, they tried to learn the system and attempted to incorporate what they learned from training into work routines. One participant's comment exemplifies this behaviour:

I have to use it all day and it is the main system for my job. They said, 'It is too expensive to customise the system'. So, I had to change my own practices [*adapting work practice*]. I learned by attending training sessions and reading the manual. . . . After that, it was just a matter of repeating it. After experiencing it for a while, it became my routine and that is it [MP2, *routinising the use of the system*].

Another user who exhibited faithful adaptation behaviour recalls the early days of training. Her expectation of training outcomes was to understand the new system in order to know how to do the day-to-day part of the job. She recalled,

Well, we were introduced to the system through overview sessions. These overviews were like nothing we had seen. It was like nothing made any sense. . . . At that point, it really caused me concern because it was so different from anything we had ever dealt with and it seemed so confusing. Of course, they told you that it would be easy, but I was thinking, 'really?' Because it was so complex, and yet everything you tried to learn and take in was hard. I was looking at this from my day-to-day perspective of what I needed to



do, what I had to change and I tried to remember all the steps they taught [IM4, *following instructions faithfully*].

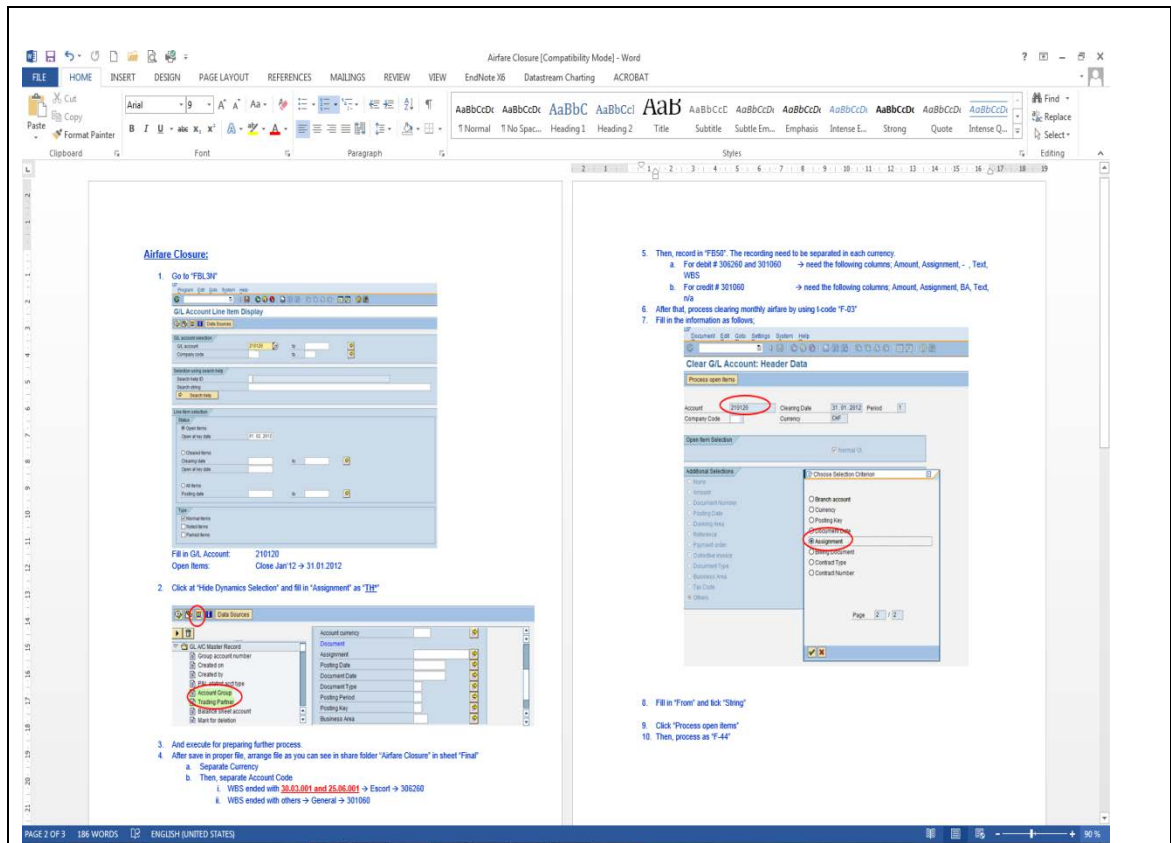
Some users were ambivalent. They did not enthusiastically embrace the system but were aware that they needed to use it in order to keep their jobs. One participant revealed her feeling: “SAP is fine with me. I am not happy with it, but it is no big deal to me. I had to spend my time to learn how to use SAP and figured out how to get things done in the least amount of time because I had to do my tasks” [BT4, *learning efforts*]. Another participant expressed her feeling in the following way:

I am somewhat ambivalent about the situation. It [the new system] is already here and I have no choice. I have to move forward and I have to do my job . . . I have to adapt to it [*adapting work practices*]. So I have to learn how to use it [ES2, *learning efforts*].

Users simply imitated the steps they learned from training and the manual provided by the organisations. The user manual offers a step-by-step process and does not explain why one has to follow these steps. To circumvent the situation, many users opted to create their own manuals and follow steps in their own manuals. Many users created manuals in Microsoft Word or Excel by capturing SAP screenshots and added annotated step-by-step instructions. Some users printed SAP screenshots and put them in a notebook with handwritten notes explaining the steps. One participant at IM produced her own manual and followed steps in her manual faithfully when she used the system. She revealed her practice:

I was pretty optimistic going into training. I was really nervous. Actually, they provided a manual but it was too long with too much information that I did not need. So, I created my own manual in Microsoft Word [*producing a personal manual*]. And I still have to follow my script; I mean I have to follow my manual every time that I do something with the system. I just go step by step [IM3, *following step-by-step instructions*].

Figure 5.11 shows participant IM3’s manual creation in Microsoft Word.



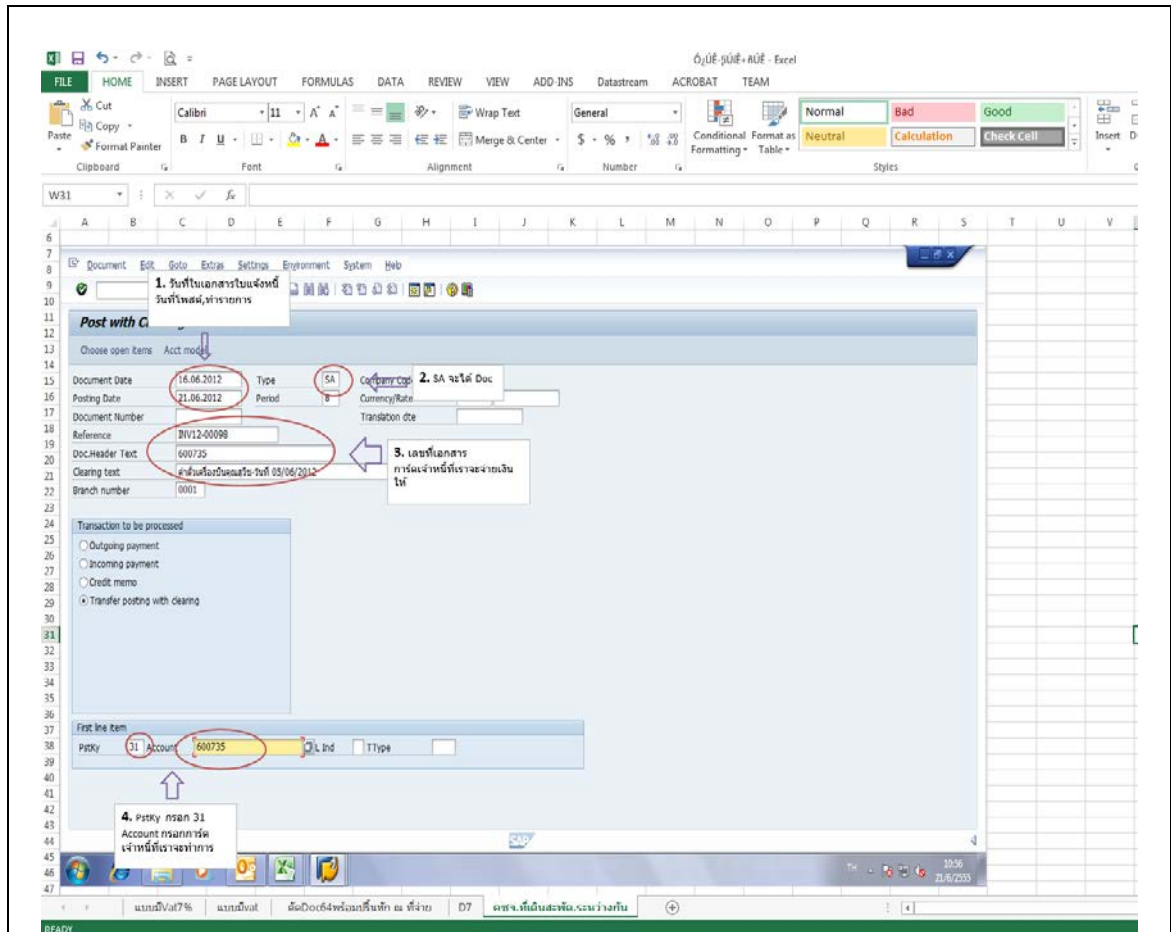
**Figure 5.11: Participant IM3's SAP manual created in Microsoft Word**

Another participant at MP also produced her own script and followed it faithfully. She produced a manual for different tasks in different worksheets in MS Excel. For each task in each worksheet, she captured all SAP screens that she had to go through. Her script included a high level of detail that explained a step-by-step process. She also noted down the Thai description of fields that appeared in English in SAP. She recalled,

The key user trained me how to use SAP. Then, I created my manual in Excel that exactly follows what she taught. I added all screens that I have to use and included step-by-step notes. I was afraid that I would forget, so I needed to add every detail here [*producing a personal manual*]. . . . You know, I had my routine. First, I turned on my computer; second, I opened SAP; then I opened my manual. I had to make sure that I did everything

correctly. I did not want to make mistakes [MP5, *following step-by-step instructions*].

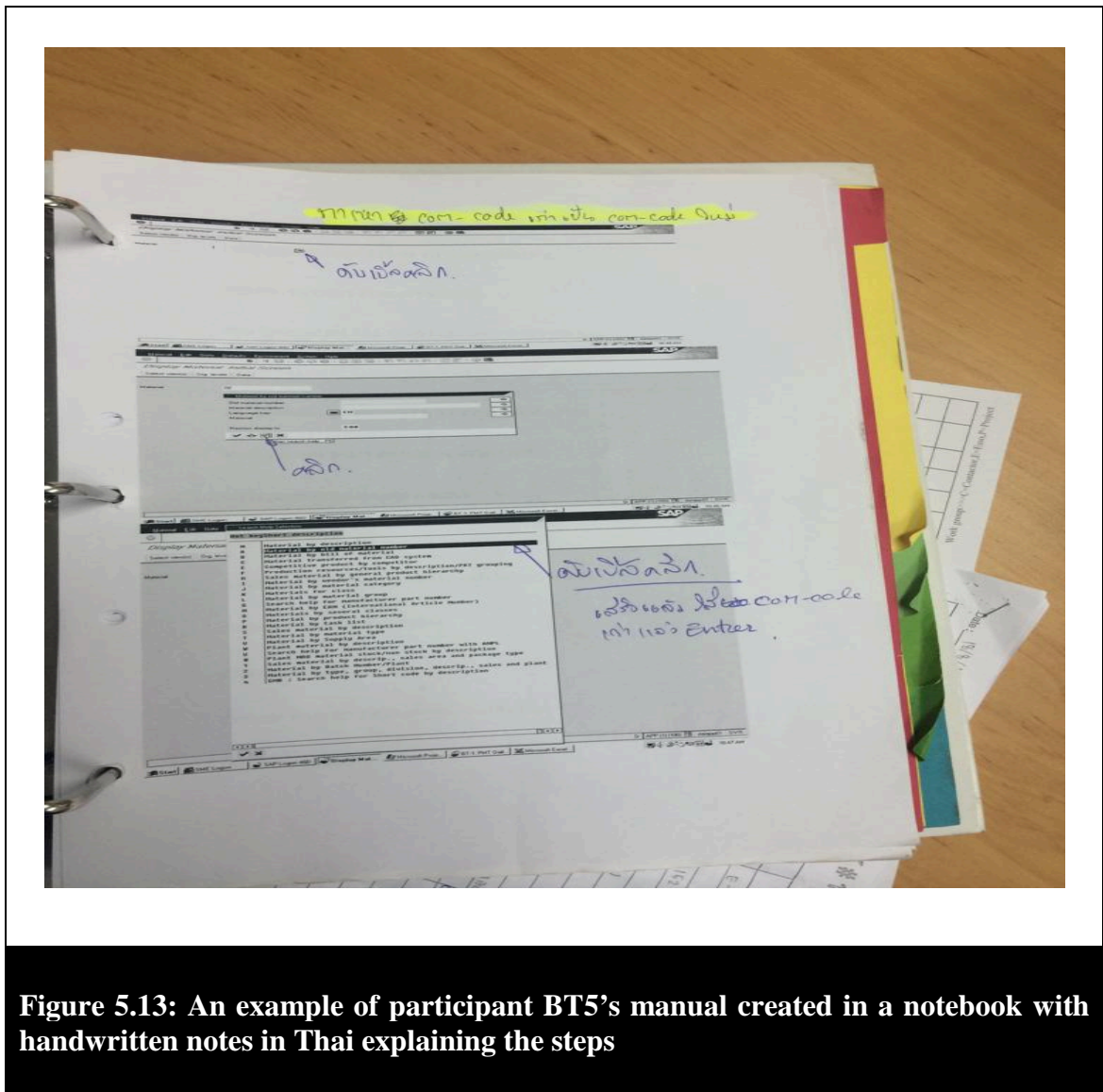
Figure 5.12 shows the script that MP5 produced in MS Excel with Thai descriptions.



**Figure 5.12:** An example of participant MP5's manual created in Excel with notes in Thai explaining the steps

Another participant at BT also created his own manual in a notebook with handwritten notes in Thai explaining the steps, as shown in Figure 5.13. He produced this manual once he started using SAP. Although he has been using the system for many years, he still refers to his manual and follows steps in the manual. He described his practice as follows:

I am old-fashioned. I like to write and read in a notebook. You see, I printed out all screens and put them here with my notes [*producing a personal manual*]. I have been using it since I started using SAP. I use it almost every time I work with SAP. I always put it beside me here, beside my computer. . . . I think if I lost it, I might not be able to work [BT5, *following step-by-step instructions*].



**Figure 5.13:** An example of participant BT5's manual created in a notebook with handwritten notes in Thai explaining the steps

More specifically, users adopted a set of features that they learned from training and/or from others to accomplish their tasks. One user recalled her use of the system and stated, "The way I know is the way I was told" [ES9, *true to the letter use*]. One participant who exhibited faithful adaptation behaviour explained,

Most of us used the system like a robot, we were pushing buttons. We had directions in front of us, that said ‘Push this button, click that button’ . . . we did not try pushing other buttons. We were afraid of pushing the wrong buttons [BT7, *true to the letter use*].

Another participant admitted, “I do not really have to think when I want to create a transaction. I have an instruction here to tell me what I have to do, like steps 1-2-3-4. I just feel like I have become a machine” [BT6, *true to the letter use*]. The following example demonstrates a participant’s reflection on his adaptation behaviour:

I knew very little about SAP. I gained some confidence with it over time, but it was like doing it by rote. If I deviate from these steps, I am afraid I will get lost . . . I had a hard time finding what I needed [ES9, *true to the letter use*].

These users actively adapted to the system after the system was introduction in order to deal with their tasks’ requirements. Once the work became routinised, they tended to stop exploiting the system further. Adaptation activities such as exploration, or experimentation as a means of learning about the system virtually ceased after the first few months, once they established the routines for using it. Their adaptation activities decreased after a period of time because these users had already found a way to meet their immediate needs. One participant’s approach exemplifies faithful adaptation behaviour:

At first, I spent quite a lot of time with it, trying to figure out how to do things. Then, I just kept practising until using it became automatic. I used to call helpdesk and read the manual very often. I can remember all the steps I have to do now, so I do not really need to call them [IM3, *learning by repetition*].

The reflections of one participant also revealed faithful adaptation behaviour:

It is the only system that I use for my job. If I were not able to use it, I could not do my job. The only thing I could do was to learn how to use it as fast as possible because there was so much pending

work waiting to be processed [*learning efforts*]. During the first few months, I quickly learned how to exploit the system. After using it almost every day, it was just a matter of repeating the same steps. It is becoming my routine [IM5, *routinising the use of the system*].

To summarise, faithful adaptation behaviours describe the situation in which individuals made an effort to learn how to use the system. Faithful users implemented changes to their work routines and procedures to fit the system functionalities. However, they used system features in a true-to-the-letter fashion based on what they had learned in the training they received. While users actively engaged in the use of the system, they did not venture into exploring non-taught features to execute tasks in an innovative way.

Figure 5.14 shows the construction of the *faithful adaptation behaviour* subcategory with its corresponding open codes and selected participant quotes.

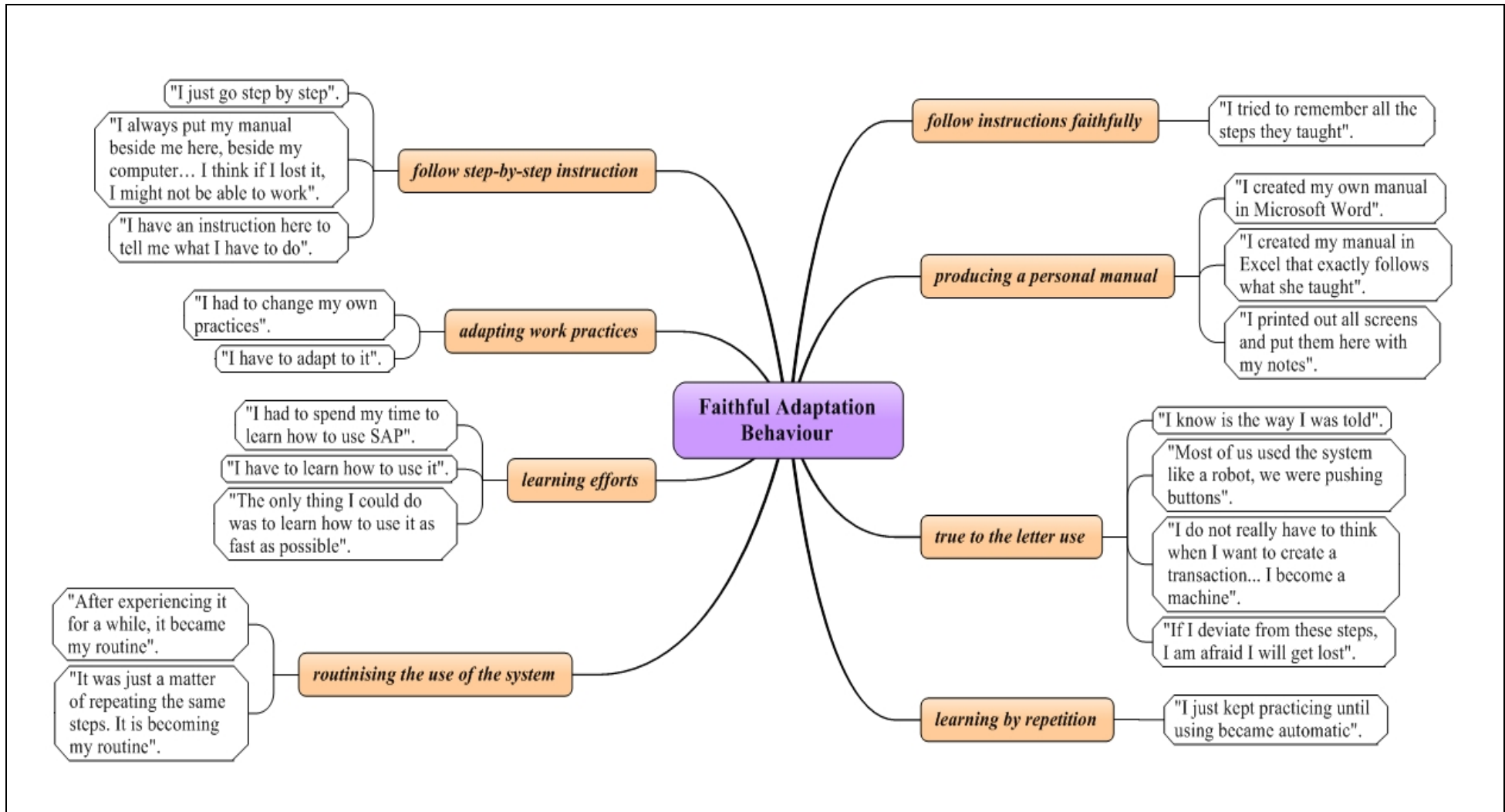


Figure 5.14: Construction of the faithful adaptation behaviour subcategory

### 5.2.4 Enthusiastic adaptation behaviour

*Enthusiastic adaptation behaviour* manifested when individuals were keen on not only using the learned features of the system but also investing time and energy to explore and experiment with functionalities not initially covered as part of the training. Users exhibited this behaviour when they sought to improve their level of expertise in their use of the system. Enthusiastic users understood how to use the system to complete the tasks necessary for their job and also understood the way the system worked in relation to the business operations and how their work tasks were interrelated with other tasks. One participant's expressions towards the system symbolised this behaviour:

I was sent to get intensive training. It was great; I learned a lot. . . . I really enjoy playing with the system [*inquisitively exploring the system*] and trying out new functionalities [*trying out new functionality*]. . . . I modified screens to better fit with my tasks [*modifying system screens*]. I created my favourite menus and shortcuts [*adjusting the system to fit particular needs*]. . . . I found a better way to do my job, much faster than what they said during the training class [MP1, *perceiving the potential of the system*].

Some users indicated that they were still asking questions about additional functionalities and new ways to take advantage of the ERP system. Thus, these users were constantly looking for better ways to engage with the system. The reflections of one participant expressed this behaviour:

I call the key users at the headquarter who have responsibility for this module every now and then asking them about new functionalities, like can I do this, can I do that [*trying out new functionalities*]. I also check the SAP e-learning website quite often in order to keep myself updated about the system. . . . I want to make more use of it [BT4, *inquisitively exploring the system*].

The following remark illustrates a participant's approach that exemplified enthusiastic adaptation behaviour:



I am always finding new features that are great about the new system [*inquisitively exploring the system*]. . . . Yes. I think that there are a few things that the system offers that we were not able to do before, like being able to run reports to show the entire department's performance provides you with a fund equity report, sorted by department, and you can get the whole division sorted by department. I could not do that in the old system [MP2, *perceiving the potential of the system*].

In a similar way, the expressions of one participant illustrated enthusiastic adaptation behaviour:

I spent numerous hours trying out everything in each menu on SAP, using online help and reading manual [*inquisitively exploring the system*]. I called SAP helpdesk many times when I encountered problems or wanted to know new things [*trying out new functionalities*]. The organisation spent a lot of money on it. It is very expensive. I feel that we should get more benefit from it. I want to understand how it works and want to know more. If I understand more, I can make more use of it [*trying to enhance system utilisation*]... I learned how to personalise the screen to make it easier for me [ES2, *modifying system screens*].

Some users tried to find, extend, and/or change features and functionalities of the system to accomplish his or her portfolio of tasks in novel or innovative ways. One enthusiastic user exposed,

As I am a power user here, users always come to me when they have any problem with SAP. I try to explore new things, new features and new functions [*inquisitively exploring the system*]. Some of the features that I do not use in my regular tasks, I learn how to use them just for helping my colleagues. . . . I enjoy helping them. It can also help me increase my proficiency in SAP too [*personal/professional gratification*]. . . . Now, I can work

with the system faster than before. After all, I changed a lot of things in my work. The system really helped me improve my performance [*perceiving the potential of the system*]. . . . I'm still playing with it [ES4, *trying out new functionalities*].

The following demonstrates a participant's attempt to proactively seek out new knowledge and resources, which reflected enthusiastic adaptation behaviour:

I always attend refresher trainings. I also check SAP Learning Hub [organisational e-learning website for SAP] regularly to see if there are any updated resources [*seeking new knowledge*]. I find that it is very useful for me [*perceiving benefits of the system*]. I try to find new functions that help me to perform my tasks faster [*seeking efficiency*]. I even try out other screens that I did not use in order to help my co-workers [BT1, *personal/professional gratification*].

Thus, these enthusiastic users were continuously learning the key aspects of their job associated with the new system. Yet, these users also attempted to understand not only the basic system functionalities, but also developed a deeper understanding of how the system worked in relation to their and other interrelated tasks. The comments of participants illustrate this behaviour: "The system is so complex and in a way so powerful that once we understood how it works, we found our own way and better way of using it" [IM1, *perceiving the potential of the system*]. Similarly, another participant described it in this way:

Previously, I did not understand how the system works. I was wondering and sometimes annoyed why I had to enter all these fields, why I had to enter a large amount of data in the system. And I did not use much of these data. It is a lot of work and time consuming for me. Once I understood how it works and how all tasks from all parts of the organisation are integrated by the system, I had no doubt and I am happy with it. It is very beneficial for the organisation in the long run [*perceiving benefits of the system*].

And once I understand more, I also want to explore more features  
[MP4, *inquisitively exploring the system*].

Through continuing to explore the system, users were able to see the benefit of the system not only to themselves but also to the organisation as a whole. A participant who was still exploring the system features and appreciated the value of the system stated, “So, there comes a point in which I am so well adapted to the day-to-day stuff that I am able to appreciate what the system is capable of doing when I can drill down into the more detailed aspects of the system” [ES3, *perceiving the potential of the system*]. One participant who also valued the system put it this way: “I discovered that I could use the system to do many more things than what I have been trained for. I can complete my tasks much faster than before” [BT3, *perceiving benefits of the system*].

Similarly, one enthusiastic participant said:

I do like the new system now. Initially, I did not like it. I am very pleased with the progress I have made so far. I am looking forward to having a few more things implemented so that everything is on-line. That would make my job a lot easier [MP6, *trying to enhance system utilisation*].

To sum up, enthusiastic adaptation behaviour manifested when users were keen on using the system and also investing time and energy to explore and experiment with functionalities in innovative ways that went beyond the standardised training. Enthusiastic users actively tried to maximise the use of the functionalities the system offered. Users exhibited this behaviour when they customised the system to fit the unique characteristics of their tasks, while seeking to improve their level of expertise in the use of the system.

Figure 5.15 shows the construction of the *enthusiastic adaptation behaviour* subcategory with its corresponding open codes and selected participant quotes.

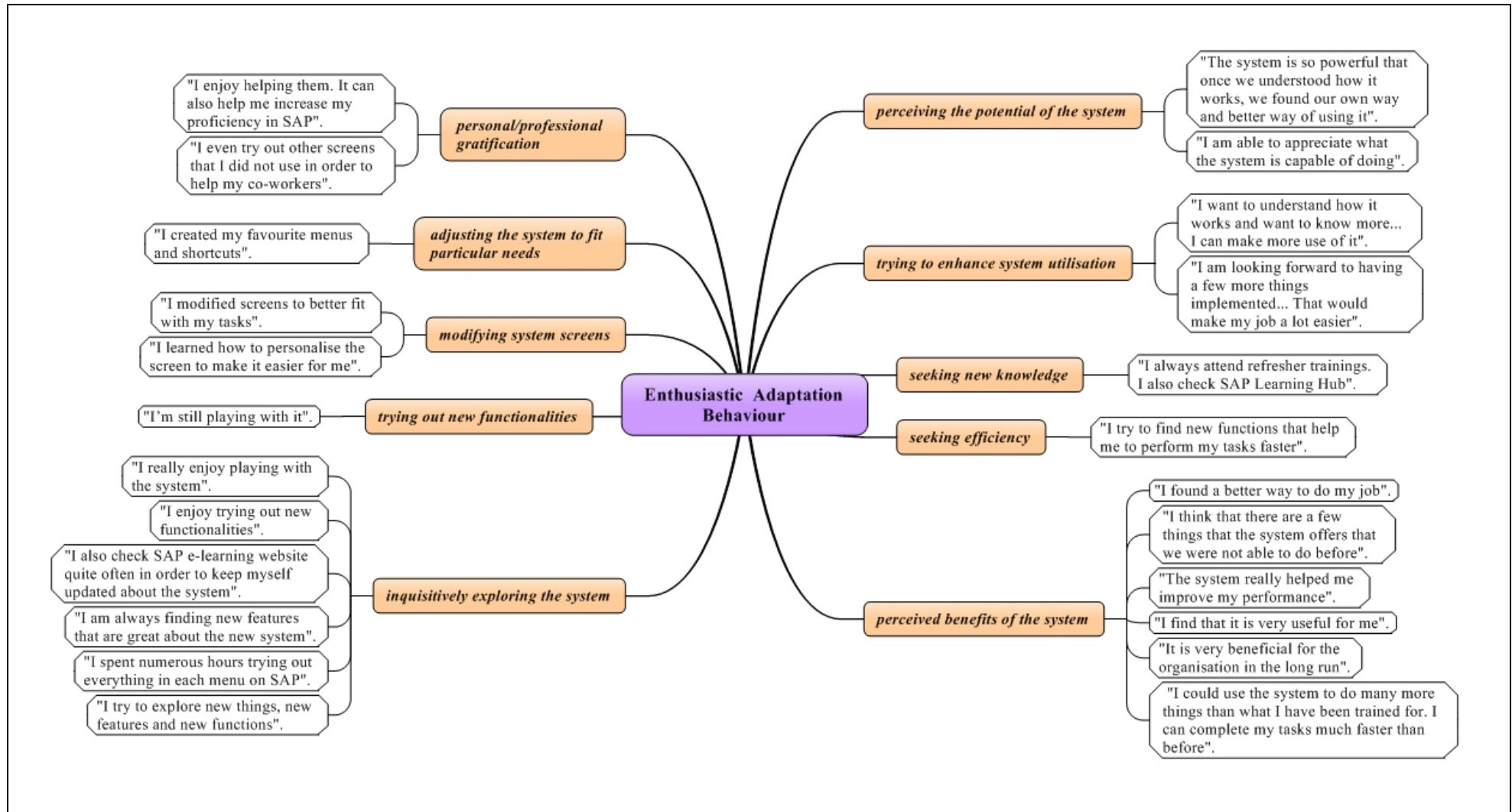


Figure 5.15: Construction of the enthusiastic adaptation behaviour subcategory

### **5.2.5 Summary of user adaptation behaviour category**

The analysis points to four different adaptation strategies. Four subcategories make up this category; they are reluctant adaptation behaviour, compliance adaptation behaviour, faithful adaptation behaviour and enthusiastic adaptation behaviour. Adaptation behaviours and their consequences are diverse and complex. The consequences of adaptation behaviours are mediated by their behavioural manifestations.

Reluctant adaptation behaviour manifested in users' resistance coupled with deviation from system use. Resistance behaviours that did not conform to system use could range from delaying system use for as long as possible to relying on other people to complete tasks. Reluctant adaptation behaviours were often reported by users as unduly impeding performance. For example, these behaviours could lead to costing large numbers of resources for data clean-up and reconciliation. Reluctant adaptation behaviours such as refusal to use the system were equally problematic for achieving expected benefits for organisations.

Compliance adaptation behaviour was characterised by the limited efforts users put in to adjusting previous work practices to those introduced by the system. Users tended to be more passive in their interaction with the system. Examples of these behaviours included using a system just enough to comply with social pressure or complying with the mandate put forth by organisations, using a system as little as possible, complying with the system while resorting to humour to discredit it, gossiping about it or complaining about it. Because these behaviours were characterised by users' reticence towards the IS, the associated performance benefits to users were limited compared to those related to behaviours found in enthusiastic and faithful adaptation behaviours.

Faithful adaptation behaviour was characterised by the learning efforts users employed to use the system to perform their tasks. Users conformed, at least to some extent, with IS use to complete their tasks. However, they were typically less driven to engage in discretionary constructive use of the system that was above and beyond the prescribed work activities. Faithful adaptation behaviours could have led to preventing improvement of tasks and lost opportunities for increasing system utilisation.

Enthusiastic adaptation behaviour was characterised by users embracing the system and engaging with it to improve their level of expertise in the use of the system. This went beyond accommodating and routinising the system to modifying and leveraging it to improve their level of expertise in their use of the system.

### 5.3 Category: Social-task-user conditions

This section presents the findings of three subcategories derived from `Social-task-user conditions` and describes how they influenced the user adaptation process. `Social-task-user conditions` refer to circumstances in which individuals valued the system in terms of their work relations, work practices and professional advancement. The related conditions category is made up of three strongly linked subcategories: *Social context*, *Task-system dependence* and *Individual-system attachment*.

*Social context* reflects how the degree of system mandate, social pressure and support influenced the process of user adaptation. *Task-system dependence* describes the extent to which individuals believed that the system was relevant to their tasks. *Individual-system attachment* reflects the importance that the user attached to the system for their professional advancement. The evidence suggests that there is a strong reciprocal influence among its three component subcategories, each one reinforcing the other.

Table 5.2 presents the construction of this category, its constituent subcategories and open codes.

**Table 5.2: Construction of Social-Task-User Conditions**

Open Codes	Subcategories	Main Category
<i>perceived encouragement, supportive environment, accepted practices, collaborative learning, enforcing organisational procedures, perceived discouragement, reinforcement</i>	<b><i>Social Context</i></b>	<b>Social-Task-User Conditions</b>
<i>low relative importance to task, low frequency of use, high reliance on the system</i>	<b><i>Task-System Dependence</i></b>	
<i>perceived opportunity for professional advancement, feeling involved in the system, feeling of obligation, feeling unattached to the system, being responsible for the system, feeling of ownership</i>	<b><i>Individual-System Attachment</i></b>	

### 5.3.1 Social context

***Social context*** was found to be relevant in influencing the process of user adaptation. The findings showed that the necessary resources and support participants obtained through management support, managerial intervention and encouragement and support from other people (e.g., IT consultants, supervisors and colleagues) made them feel more confident in adapting to the new system in a positive way. The degree of mandate and social pressure affected the extent to which expectations were shared regarding system use. Management expectations and actions (e.g., mandating the system use)

influenced the adaptation behaviours users followed. The expectation of colleagues was another key element that served to increase the system use.

However, the implementation of a new system led to frustrations and worries for some users. In particular, the sheer complexity of an ERP system and user frustration with the early trials of the system led some users to react apathetically to the system. These frustrations were at times provoked by changes in work practices such as shifting from paper-based to computer-based procedures. At the same time, social support influenced the individual adaptation process by encouraging users to explore and experiment with the new system. Managerial interventions and institutional mechanisms, such as contextualising user training and the development of user resource materials promoted user learning, reduced the burden of learning and helped users overcome knowledge barriers. For instance, group learning helped facilitate the learning process for users.

Expectations and pressures from supervisors, peers and the organisation as a whole exerted a powerful influence on how users valued the system. Users who saw others who were important to them encouraging the use of the system were more likely to adapt and use the new system. Participants revealed that management support in the form of commitment and communication related to the implementation of an ERP system motivated them to interact more with the system. If management was supportive of the new system and employees felt that management communicated their belief that the system was beneficial to employees, it was more likely that employees would see the clear benefits of the system to support their tasks. A participant expressed,

It all depends on each manager, with her team, to try to make it work. I think management support is influential in how staff values the system. My manager is very supportive. She is also knowledgeable about the system. I can always ask her whenever I encounter any problem with SAP [MP2, *supportive environment*].

Another participant explained her previous experience:

My manager encourages me to attend training sessions that address broader issues than the software itself, for example, sessions on



changes in work processes or where my job fits in with the overall work processes [ES3, *perceived encouragement*].

Yet, it was more than just the line manager or immediate supervisor who was an important figure in the user adaptation experience. A user looked to fellow co-workers for support and for cues as to how to react to the introduction of the new system. The following participant shared her experiences: “My colleagues also encouraged me to use it and taught me how to use it. They were very helpful. We helped each other a lot” [BT3, *perceived encouragement*]. One participant at MP stated: “We have a super user in our department. She is an expert and she is very supportive. I can always ask her for help whenever I encounter any problem with SAP” [MP4, *supportive environment*]. Another user at ES shared a similar experience: “Everyone in my team uses it now and they seem more satisfied with it than before. What can I do? If I do not use it, they will not do it for me anymore. I do not want to be the black sheep here” [ES5, *accepted practices*]. Some users also looked for support from the IT helpdesk, as one participant revealed: “Our SAP helpdesk people are very helpful and knowledgeable. I always contact them when I encounter any problem and they can always help me” [BT2, *supportive environment*].

Users formed a social group in which information about the system was exchanged. These groups were critical to member responses to the new system. One participant from MP stated:

When you have a group that wants to go through training, sharing and wants to learn and ask questions, you gain more understanding. Then, you get a whole lot more out of the system. We are able to get what we need from the system [MP3, *collaborative learning*].

Another participant at MP added, “The environment has changed. We are moving to a new system. The best thing everybody can do is to cooperate and teach each other to use the new system. It serves no purpose to keep complaining about the system” [MP1, *collaborative learning*]. Similarly, a participant at ES recalled,

Even after I attended training, I still found SAP to be very difficult to use. The training was too short to help me understand everything

I had to do. The user manual I got was also in English. My colleagues and I were struggling with SAP a lot after the system went live. But we still had to use it because the organisation put a strong mandate on us. So, we had no choice. . . . What we could do was to try to help each other to go through this situation together. We tried to work together to translate part of the user manual documents from English to Thai and shared them among all of us in our department. We also trained each other. . . . I think peer-to-peer training is more efficient than formal training [ES3, *collaborative learning*].

Managers who set expectations to increase ERP usage were influential in persuading users to change their level of interactions with SAP. For instance, one participant at ES who was initially overwhelmed by the complexity of the system refused to create a report in the system. During the first few months after implementation, he created and submitted MS Word and MS Excel reports to his manager. After a while, the manager sent the reports back to him and asked him to create reports in SAP because he no longer approved of MS Word and MS Excel reports. Since the participant was concerned that this could affect his performance evaluation, he yielded to the pressure from his manager. In this case, it was a pressure that increased the level of the participant's interactions with the system and, consequently, stimulated him into learning how to create reports in the system. The comment of one participant reflected this situation: "We were told that if we did not use the system, then we could be fired" [ES9, *enforcing organisational procedures*]. Based on these comments, the manager's actions became extremely influential in persuading users to interact with SAP directly.

One participant from MP recalled the situation:

We were told that we could still use paper forms! It was inconsistent, because when we did use paper forms, it was not acceptable. I mean, at the beginning they said we could use paper forms, but when it came right down to it . . . it was not an acceptable thing to do. My manager said "why didn't you enter these into the system" [MP8, *enforcing organisational procedures*].

It also appeared from the findings that beliefs about ERP systems were influenced by the appropriate dissemination of information by managers. If managers did not encourage their staff to use the system to perform tasks, it was more likely that users would limit their level of interaction with the system, which subsequently discouraged their adaptation to the system. A department staff member put it this way: “I do not think my boss really cares how we use it as long as the job gets done. In fact, he does not use it. So, none of us in the team cares much about the system” [IM9, *perceived discouragement*].

One participant described the influence of her manager, indicating that the tone set by the manager was important to her and for the whole department. She recalled,

The manager said that she knew it was not going to work. She did not like it. But for a manager to communicate negative feelings towards the system, even if she was uncomfortable with it, it really set a negative tone for the whole department. It discouraged me from learning how to use it. So, I was just ignoring the system and did not use it [BT9, *perceived discouragement*].

Another source of influence came from key users, super users or power users. They exerted influence by refusing to accept paper forms from users. Such pressure drove users to adapt and increase their level of interaction with the system. This situation was described by one of the key users at MP:

It is sort of like standing there and watching more tasks coming to me, if I do not put more pressure on these users. They keep pushing their tasks on us. They keep postponing because they think the system is not important to them. . . . Usually, they called me and asked if they needed to put the data into SAP; I told them that they need to put it in SAP. And I said I am not going to do it for you anymore but I can teach you how do it [MP1, *reinforcement*].

Key users were eager to relieve their burden of entering data for other users:

I forced them to use SAP. I did not accept any paper forms; I returned them. . . . Because if you allow it, it creates more delay. If they send me a paper form, I will say: “Hey, we are too busy to take this. Please enter it into SAP” [ES4, *reinforcement*].

Users acknowledged pressures from key users to use SAP directly. As one of the participants at MP recalled,

During the first few months, the key user accepted paper forms and entered them in SAP for me. So, I felt that although I did not use the system, I could still do my tasks. But later on, they sent it back to me and said “Enter it in to SAP”. So, I have to learn to do it by myself [MP6, *reinforcement*].

Overall, the findings showed that the social support that participants received from their environments, such as management support, managerial intervention, and encouragement and support from other people (e.g., supervisors and colleagues), influenced the user adaptation process. The presence of social pressure from supervisors and other users also increased the level of interactions with the system.

Figure 5.16 shows the construction of the ***social context*** subcategory with its corresponding open codes and selected participant quotes.

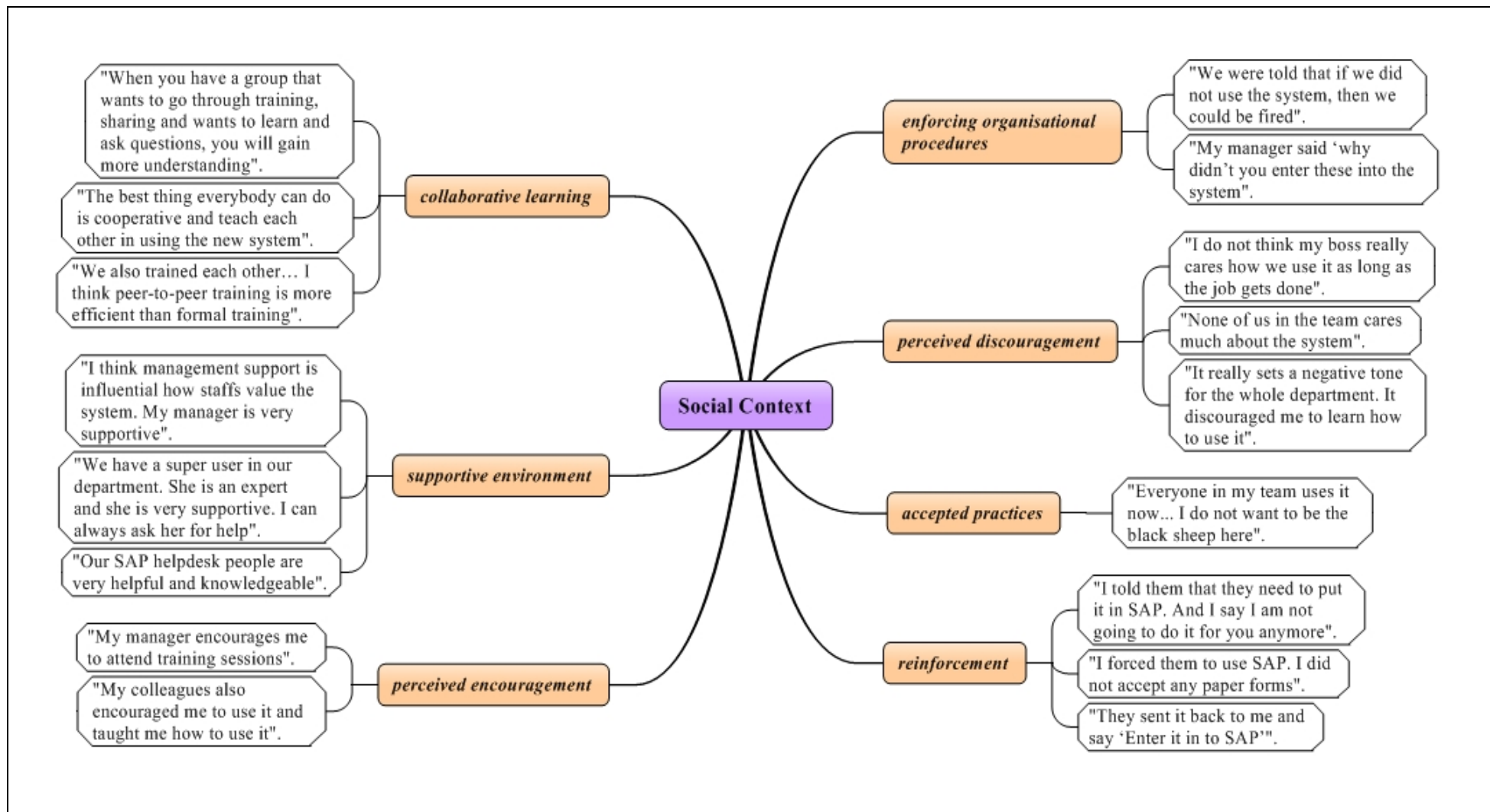


Figure 5.16: Construction of the social context subcategory

### 5.3.2 Task-system dependence

Task environment was an important structure that shaped the individual adaptation process. The adaptation process involved the dynamic interaction among work tasks, the ERP system and the individual. *Task-system dependence* describes the extent to which individuals believed that the system was important to their tasks. Based on the analysis, task-system dependence can be broadly classified into two dimensions: low task-system dependence and high task-system dependence.

Low task-system dependence represented the situation where the execution of work activities required little use of the system. When users perceived that their tasks were not overly reliant on the system, although the system was mandated, they were less willing to invest time and energy in adapting to it. One participant's comment provided an example of low task-system dependence:

My main job does not really rely on the system. I do not use it every day. I just have to fill in a requisition form in the system when I need to request a new material for my task. I do not care much about the system [BT10, *low relative importance to task*].

One of the participants at IM who also had low-task system dependence put it this way: "I do not have to use SAP much. I use it only to approve purchases. . . . I only know the basic things that I have to do. I am too busy to spend time trying to figure out how to use it. I always forget how to use it" [IM9, *low frequency of use*]. Another participant at IM stated,

The system is not a major part of my job. There are some standard forms that I need to fill in using the system [*low relative importance to task*] but, I do not really use it on a regular basis and when I have to, I always forget how to use it [IM9, *low frequency of use*].

Another participant, who also perceived that the system was not important to her task, expressed her feeling:

My task is not heavily reliant on SAP. . . . My tasks are about analysing data, budgeting and creating reports for my manager. I just have to use SAP's reporting functionality to create reports for my manager. . . . I am too busy with other tasks to waste my time generating reports from the system [BT8, *low relative importance to task*].

The low task-system dependence condition was also found amongst participants at MP, as MP5 recalled:

When SAP was first implemented, I just ignored it because I found that it was not important to me [*low relative importance to task*]. I did not know much about it. I did not use it often. I know very little, just enough to get my work done [MP5, *low frequency of use*].

Another participant at MP stated, "Initially, after the system rollout, I did not use SAP at all because it was not important to me. I could still perform my task without the system" [MP9, *low relative importance to task*]. Similarly, a participant at ES recalled, "I did not know much about how to use it because I felt it was not important to me. I used SAP concurrently with my legacy system" [ES10, *low relative importance to task*].

High task-system dependence describes the situation where individuals had to rely entirely on the system in almost all of their work activities. For instance, the activities performed in the accounting and finance departments showed a high degree of task-system dependence. Participants were compelled to use the system to perform their tasks. The comment of one participant illustrated high task-system dependence: "Like it or not we have to use it. It is a mandatory situation. The old system was shutdown. If I did not adapt, I could not work. My tasks are highly dependent on the system" [MP2, *high reliance on the system*].

One participant at IM who also felt that the system was highly important to her task stated,

SAP is the only system that I use to do my job. If I were not able to use it, I would not be able to do my job. The best thing I could do was to learn how to use it as fast as possible because there was so much pending work waiting to be processed [IM2, *high reliance on the system*].

Similarly, another participant expressed,

After they switched to this system; it became the only system I use to perform my tasks. My tasks are highly reliant on the system. I cannot run away from it. I had to learn how to use it; otherwise I could not do my tasks [BT3, *high reliance on the system*].

Another participant explained her situation:

It was a major change for us. They wanted to replace the old system. Now, most of our tasks rely on this system. The old system was shut down. All of my tasks have been transferred to the new system. SAP is the only system that I use to do my job. If I were not able to use it, I could not do my job. I have no choice [ES2, *high reliance on the system*].

Figure 5.17 shows the construction of the *task-system dependence* subcategory with its corresponding open codes and selected participant quotes.



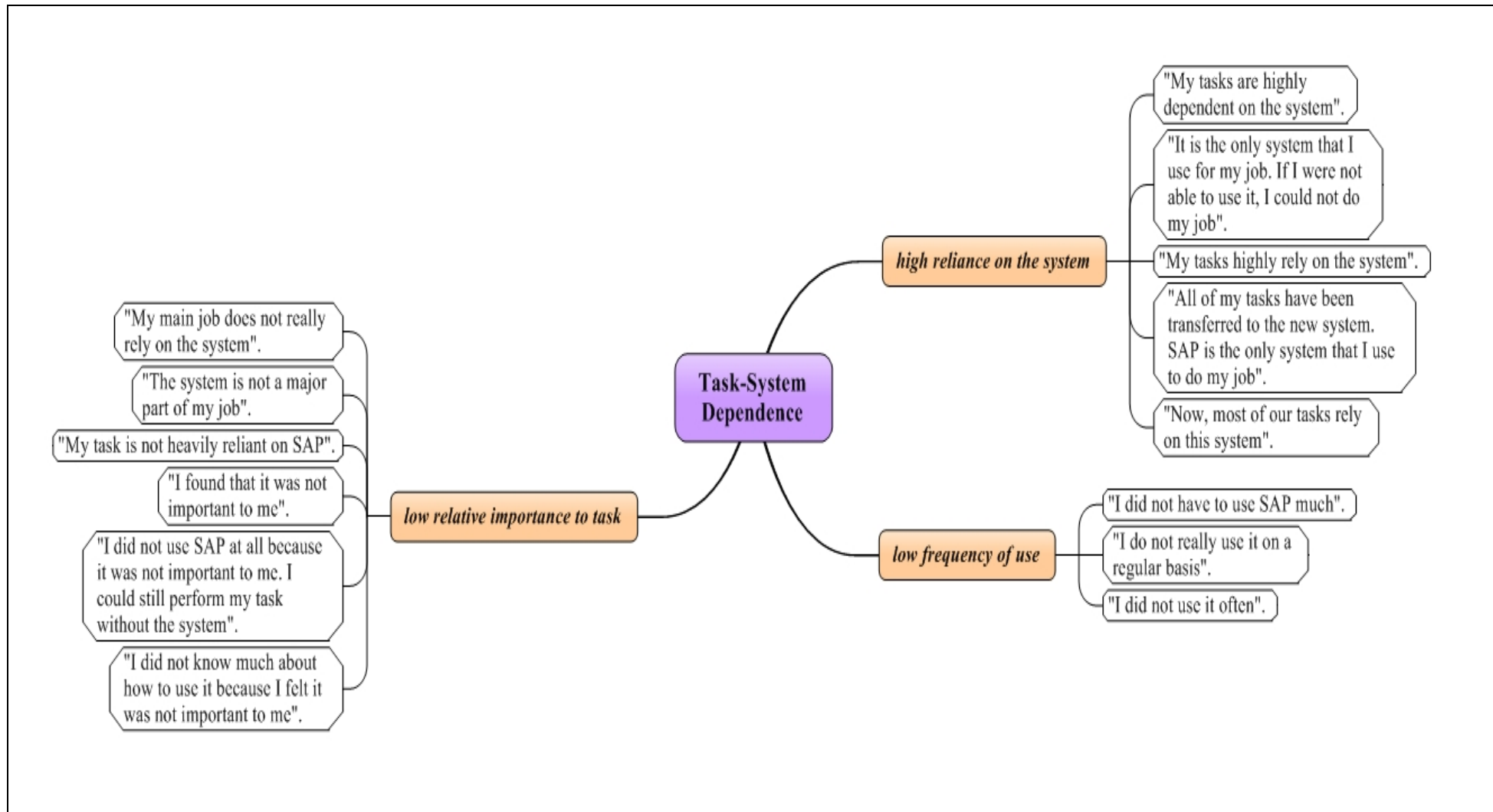


Figure 5.17: Construction of the task-system dependence subcategory

### 5.3.3 Individual-system attachment

*Individual-system attachment* reflected the importance that the user attached to the system for their professional advancement and their immediate job. If users perceived the system as an important resource that helped them progress in their careers, they committed themselves to mastering the system. Those who were system representatives, super users, power users, key users or trainers of the system exhibited a high degree of individual-system attachment. The reflections of one participant manifested this condition: “I was selected to be a key user in my department. I was sent to get an intensive training. It is my duty to be the system representative and to persuade my team to use it. . . . Umm . . . it was a stressful experience but it was worth for my career. They respected me for it” [IM1, *perceived opportunity for professional advancement*].

Early in the ERP implementations, a special kind of user was identified and the terms super user, key user or power user were assigned to them. These were the users who had an in-depth understanding of how the system was used, and could use the knowledge to support their work groups. They did not have IT expertise per se, but had broad knowledge of how the system supported business processes. They were seen by their peers as go-to persons for questions and as a contact point for IT. During the implementation, the user groups were encouraged to nominate key users as one participant described:

The organisation’s view was that the ERP system was so integral to the business functions that these key users needed to be in place to handle the day-to-day operations questions that their peers would have. The key users needed to be identified early, participate during the implementation process and be identified as a resource for the on-going life of the system. Then, they had responsibility for the system module that they were assigned [ES11, *being responsible for the system*].

One participant who was selected as a key user described his situation:

Before starting to configure any module, the organisation selected people and sent them for intensive training and I was one of them.

We were ready when the project began [in 2007]. We came to work well prepared, and of course also with high expectation and responsibility [ES4, *perceived opportunity for professional advancement*].

In addition to peer support, key users were involved in a special initiative to educate users who lacked sufficient knowledge and to encourage them to increase their interaction with the system. The key users voluntarily spent time helping users to understand the system because they knew that such initiatives would eventually benefit their progression in their careers. By doing so, they expected that users' interaction with the system would increase:

Most of the time [the users] call me when they encounter any problem with the system. They know that I am the expert in this module. I have become a trainer in a way [*feeling of obligation*]. I want to help them get to a point where they can do it themselves . Well, it was very tiring trying to help them but it made me feel good too. I know they respected me for doing this for them [MP1, *perceived opportunity for professional advancement*].

It also appears that user participation during the system implementation increased individual-system attachment. Users who participated in the system implementation felt more engaged with the system. The following example demonstrates how participation during system implementation increased a level of *individual-system attachment*. While the user admitted to having a negative perception of SAP early on, an increase in system involvement led her to buy into the system, rather than continually questioning the system's merits. The participant, recalling the early days with SAP, stated:

I also had some negative feelings early on with the new system when I heard the organisation was going to replace the legacy system with SAP. I was ambivalent. At first, I was hesitant, but also had high interest. I was involved during the implementation phase. I worked with the SAP consultant team during the requirement gathering phase when they came here to get user

requirements. So, I had some idea that this was coming on. I saw what it could do [MP2, *feeling involved in the system*].

One of the participants pointed out how user involvement could have a positive effect on users. In this case, the user was involved in the implementation phase that allowed her to develop a feeling of ownership with the system and allowed her to exert influence on decisions related to customisation and, to some extent, to have a voice in business process changes. The participant recalled,

I have been there since the beginning. I mean my boss, myself, and my co-workers are the people that are responsible for making sure that work flow in the new system is correct [*being responsible for the system*]. . . . I think because I was involved with the system planning, it helped me develop a sense of ownership towards the system [*feeling of ownership*]. So, when the system went live, I felt like I should be able to use it and it was not difficult for me to adapt to it [ES3, *feeling involved with the system*].

On the other hand, users who were not involved with the system tended to feel that the system was not relevant and not important to them. A participant discussed how a lack of user involvement negatively affected his attitude to the system:

I did not know much about the system before it went live. I was not involved in the decision-making and implementation process. They did not ask for my opinion. I felt like the organisation did not want my input. Somehow it made me feel the system was not important to me and I did not want to know much about it [BT8, *feeling unattached to the system*].

Another participant stated,

The organisation recruited only those users who heavily used the system to be involved during the implementation phase, like people in the accounting and finance department. They did not pay much attention to us at the beginning; they just told us to use it when the

system was ready. We were not very happy about it [MP8, *feeling unattached to the system*].

Figure 5.18 shows the construction of the *individual-system attachment* subcategory with its corresponding open codes and selected participant quotes.

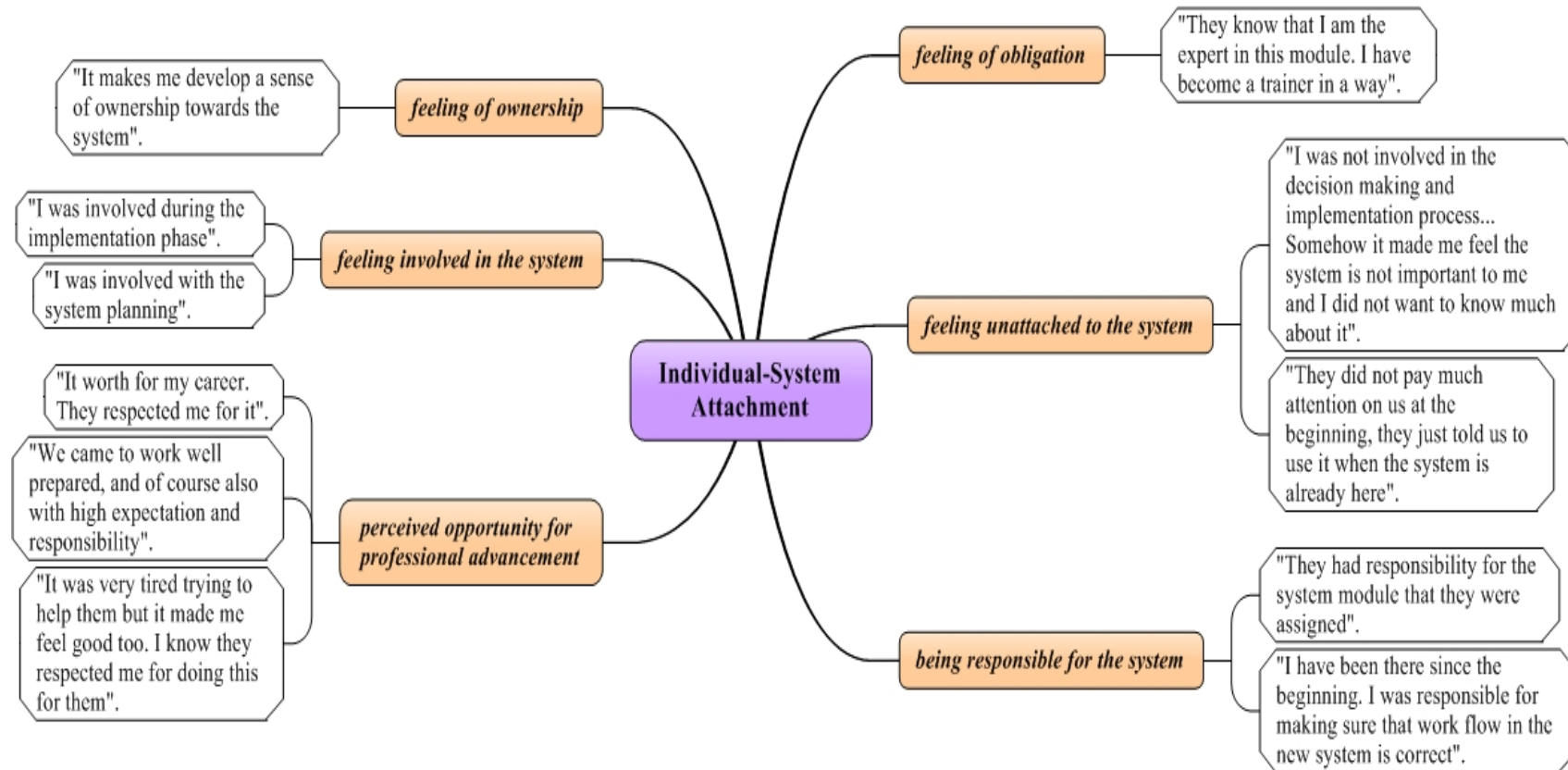


Figure 5.18: Construction of the individual-system attachment subcategory

### 5.3.4 Summary of social-task-user conditions category

The Social-Task-User Conditions category emerged from the *Social context*, *Task-system dependence* and *Individual-system attachment* subcategories. The presented evidence – from participants’ perspectives as well as from my own observations – shows that social context had a strong influence on how users perceived the system. The expectations and actions of superiors influenced the actions of their subordinates in terms of how they adapted to the system. The encouragement and support of colleagues was another key element that served to increase system use. Users who perceived the system as important to their social relations and the accomplishment of tasks, as well as an important resource that would help them progress in their careers, actively tried to adapt to the system and put effort into learning how to use it. On the other hand, users who perceived the system as being of relatively low importance to their tasks, tended to be more passive in their interaction with the system.

## 5.4 Category: System-business process comprehension

System-Business Process Comprehension describes the understanding individuals had of both the way the system worked in relation to business operations and how their work tasks were interrelated with other tasks. Two subcategories constitute this category: *knowledge of the system* and *understanding of the business processes*. *Knowledge of the system* describes the degree to which individuals were capable of using the system functionalities required to perform their work activities. *Understanding of the business processes* is the contextual knowledge of users’ work activity performance within the system environment and how those activities fitted into the activities of others. This relationship makes up the System-Business Process Comprehension category.

Table 5.3 shows the analytical development of this main category, its constituent subcategories and open codes.

**Table 5.3: Construction of System-Business Process Comprehension**

Open Codes	Subcategories	Main Category
<i>perceived system complexity, perceived additional workload, incomplete understanding of the system, perceived lack of control over the system, perceived lack of control over tasks, lack of proficiency to use the system, perceived ambiguity of the system, knowledgeable about the system, perceived control over the system, perceived control over tasks, understanding the system capability, customised training, inadequate training</i>	<b><i>Knowledge of the System</i></b>	<b>System-Business Process Comprehension</b>
<i>standardisation, integrated work environment, lack of business process understanding, need of business process understanding, domino effect, perceived process complexity, understanding the business process, need for training in business process, process visibility</i>	<b><i>Understanding of the Business Processes</i></b>	

#### 5.4.1 Knowledge of the system

***Knowledge of the system*** is the extent to which users could properly use the features of the ERP system to accomplish work tasks. *Perceived system complexity* was a prominent issue highlighted by users in all four organisations. SAP was viewed by most

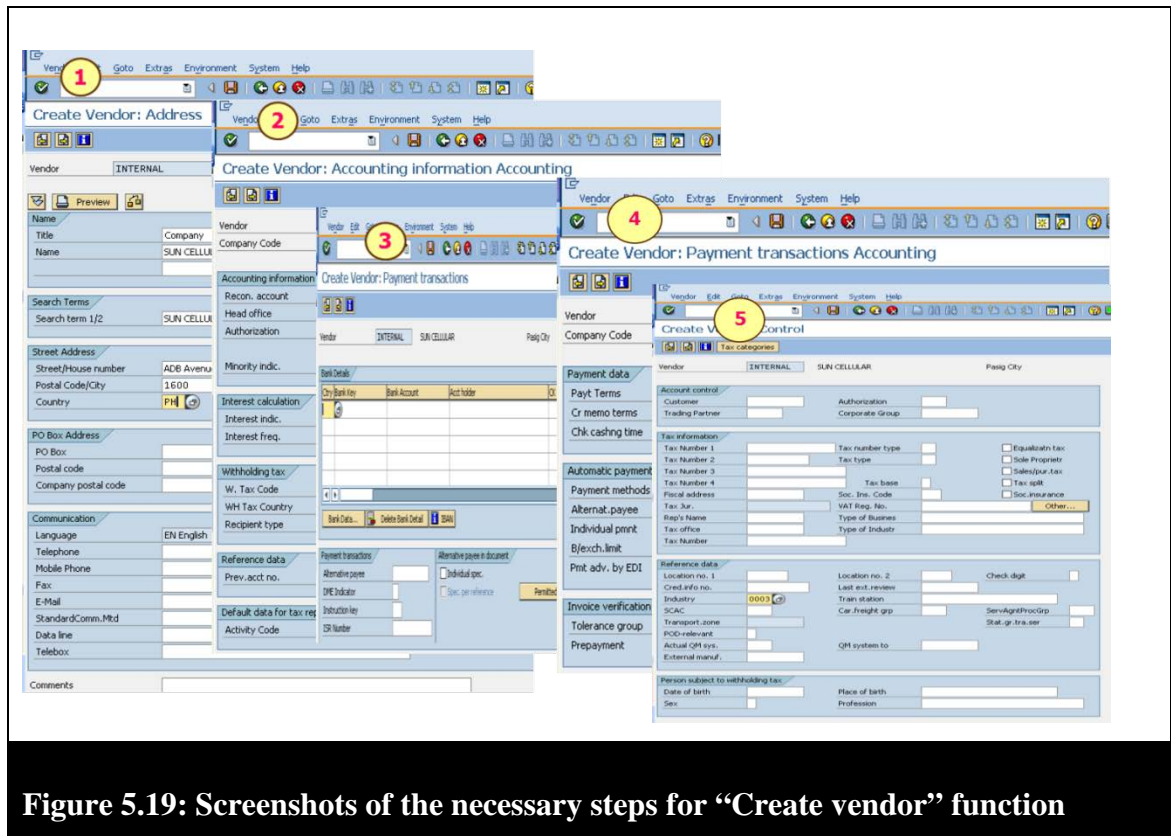


users as unfriendly and very difficult to use. Individual's ability to comprehend new terminology and software logical sequences was frequently brought up in the interviews. Users expressed their frustration with the need to learn the language of SAP, or adapt to a different logical sequence in dropdown menus and screen-to-screen connectivity. SAP radically changed the way users performed their jobs. Users also reported that they felt overwhelmed by SAP as it increased their work load and decreased their control over their jobs.

Some participants also felt that they had a greater amount of work to do as the new ERP system required them to follow certain steps to perform a task. Working on different screens and understanding the information that was needed for each of them added a cognitive burden on the user. As a result, the users found the system relatively difficult to understand and use. The number of fields in SAP also made it difficult to use the system, as users were confused and found it hard to differentiate between the fields that were supposed to be used from those that were not. Users were especially disappointed with the data entry process which was perceived as overly complex. One participant revealed,

For very simple operations such as data entry of a new vendor, it took me at least twice the time to what was needed with the previous system. There were many different screens and fields to enter data [*perceived system complexity*]. All the processes took much longer to finish because they were much more detailed [*perceived additional workload*]. But, for me, I did not understand most of these fields, so they were useless for me [MP5, *incomplete understanding of the system*].

Figure 5.19 shows data entry screenshots of a new vendor in the SAP system as described by MP5.



**Figure 5.19: Screenshots of the necessary steps for “Create vendor” function**

While various aspects of a user’s job were affected, I found ERP implementation had a strong influence on job demand and job control due to the nature of the ERP system. Users revealed that they experienced an increase in job demands due to constraints imposed by the ERP system which made the work environment stressful for several reasons. Following ERP implementation, users had to learn the new system and business processes and simultaneously perform their day-to-day tasks. They had to work under time pressure as they had to find time to learn the new system and accomplish their assigned tasks using the new system. The simultaneous need for learning and performing increased users’ workload.

Users who did not participate in the system implementation did not fully understand the purpose of the system interfaces and data fields they needed for their work. This group of users struggled to recognise which elements of the system needed to be used and which ones did not. For example, creating a purchase order using the system required an employee to access five to eight different screens to enter or retrieve information. Accessing and understanding the information needed (e.g., part number, supplier

number) for each of these different screens added an extra complication for the employee who was not well familiarised with the system. One of participants at IM showed me how to create a purchase order form in SAP and complained,

I felt that I no longer had control over the system [*perceived lack of control over the system*] and my tasks [*perceived lack of control over tasks*]. Putting a purchase order form took a lot of time. There were so many tabs and many fields. I spent more time on getting my work done than before [IM8, *perceived additional workload*].

The perceived complexity of the system produced a sense of uncertainty in terms of the outcomes of these tasks. One participant explained, “In terms of how I derive the information and how I get the numbers that I need, it is much more complex [*perceived system complexity*]. It is much more difficult and much more frustrating. I feel that I cannot control my tasks” [MP6, *perceived lack of control over tasks*]. Some users clearly lacked proficiency in system use: “I do not know how to use it; I do not understand it [BT10, *lack of proficiency to use the system*]” one participant complained. Another participant recalled, “We did not know anything and we did not master the system. It did not make sense for most of us. There was not one person in the department who was knowledgeable about the system” [MP8, *lack of proficiency to use the system*]. Others possessed only a shallow understanding: “I do not know how to use half of the functions in this system. I do not know if they pertain to me or not. I know enough to get what I need” [IM10, *lack of proficiency to use the system*].

Some users also expressed the opinion that there was a lot of duplication in SAP, with too many functions to capture the same information, and having to use multiple screens to find one single piece of information. Most users also mentioned that the layout and terminology used in SAP was not clear. According to one user, “Some new features in the system were unclear in terms of how they were going to work [*perceived ambiguity of the system*] . . . I think a lot of fear and concern had to do with that. I was not sure how I was going to get my work done” [BT5, *perceived lack of control over tasks*].

The data suggested that participation in different stages of the system implementation (i.e., system testing, business process change initiatives and training) contributed to

users' knowledge about the system interfaces, features and functionalities. One of the participants who participated during the system implementation recalled,

I took part in the intensive training and system testing, so once the system went live I felt comfortable with the system because I was already knowledgeable about the system features I had to use [*knowledgeable about the system*]. I was convinced that I would become proficient using it [*perceived control over the system*] and I would use it to improve the way I performed my tasks [ES1, *perceived control over tasks*].

Moreover, participation in the system implementation helped users develop a good understanding of the system benefits. Users acquired a good understanding of how they could use SAP to accomplish their tasks. One participant described the importance of participation in system implementation:

I participated in the intensive training session before the system went live. The trainer taught us how to use the system step-by-step and explained every screen that I had to use in detail. So, I had a good understanding of how to use it [*knowledgeable about the system*] and also a good understanding of the benefits that the system would bring to my task [*understanding the system capability*]. So, when the system went live, it was not that hard for me to adapt to it and used it to do my tasks. I could complete my tasks easier than before [MP2, *perceived control over tasks*].

It also appears from the findings that training was a contextual condition promoting knowledge of the system if it was carried out efficiently. However, according to users, they often received just basic necessary training, enough to satisfy their immediate system needs. The organisations tended to provide intensive training to those who were super users, key users or power users. In addition, organisations often underestimated the amount of training users needed, especially training in how business processes would change with the ERP system. One participant made the following comments:

The SAP training classes were bad. They left me so angry! It took two hours to learn about one form! There were 20 pages of instructions on how to complete one form. I did not understand why I needed to work a lot harder [*inadequate training*]. The end result was that my experiences were awful and I did not know how to use many functions in the system [ES5, *lack of proficiency to use the system*].

One of the participants described his training experience: “It was very fast-paced and I was basically following along, but I did not really understand why I was doing it yet. I really was not sure why I was doing anything, so it took me a long time to figure out what I was doing” [BT6, *inadequate training*].

The findings also revealed that customised training increased user mastery over the system and made users feel more confident in using the system. Trainers were able to communicate how the new system could help users perform their tasks effectively and help users develop a sense of mastery over system features and functionalities. Users learnt how they could use the system to accomplish their tasks and experienced the potential benefits of the new system. The following comments from a participant elaborated on the issue:

The key user offered me one-on-one training and trained me step-by-step until I could do it by myself. It was much better than formal training because it focused on what I actually needed to do in my tasks [*customised training*]. I got a better understanding of the system [*knowledgeable about the system*] and I felt more mastery over the system [MP11, *perceived control over the system*].

Participants from ES also commented on the benefit of customised training. One participant revealed, “After I got the intensive training that was contextualised to my needs [*customised training*], I became more knowledgeable about the system [*knowledgeable about the system*]. Also, I had more confidence to use the system and stopped using the old system. Then, I just kept practising until using it became my routine” [ES10, *perceived control over the system*]. Another participant added, “After

we received the intensive training, most of us stopped using the legacy system. We could use SAP to perform tasks better with less error than before. I felt more confident in using SAP” [ES5, *perceived control over the system*].

Figure 5.20 shows the construction of the *knowledge of the system* subcategory with its corresponding open codes and selected participant quotes.

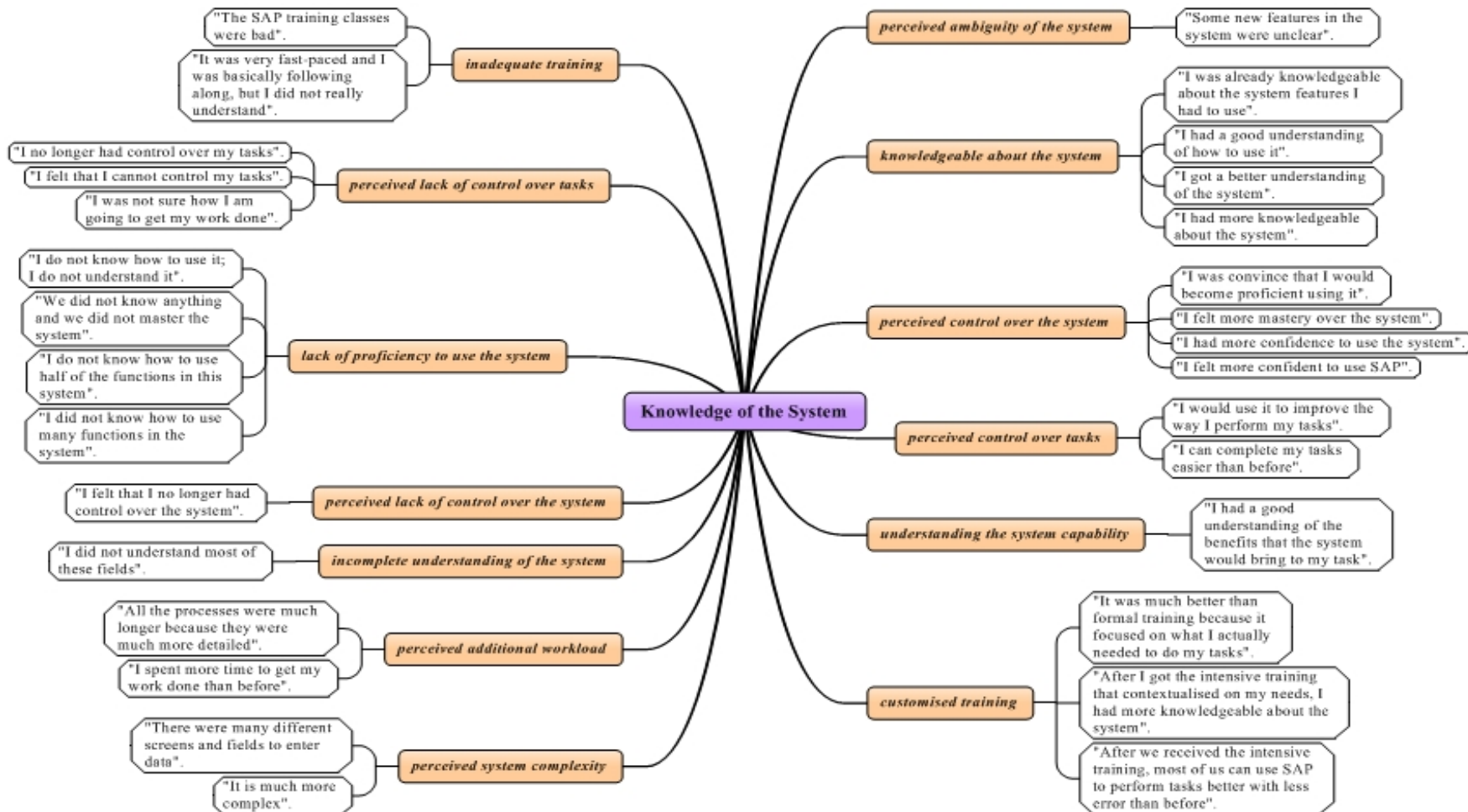


Figure 5.20: Construction of the knowledge of the system subcategory

### 5.4.2 Understanding of the business processes

Since ERP systems are multi-module systems that span across different functional areas, users required substantial *understanding of the business processes* to use the system effectively. Users not only needed to understand how and when to perform a particular process but also how it affected other processes.

Organisational business processes are complex and involve end-to-end flow of information, resources and activities. An organisational-level business processes refer to a set of coordinated activities performed in a sequence by employees from different functional areas of a business (e.g., accounting and finance, purchasing, HR). Within each organisational-level business process, employees have individual-level work processes that refer to the sequential tasks each employee performs as a part of his or her role in the overall business process. Successful execution of these processes requires a concerted effort (i.e., information sharing, handoffs, collaborations) by employees who are responsible for various components of the processes. An employee's work processes can overlap with other employees' work processes. This captures the coordination aspect of a business process. An employee may have to get information or resources from other employees or may have to wait for others to finish some tasks before he or she can perform some activities in his or her work processes. For example, an employee responsible for creating and processing a purchase order for raw materials procurement may have to wait for information from another employee whose job is to verify current inventory level of raw materials.

Participants revealed that, following an ERP implementation and associated business process changes, there was a certain degree of newness in the elements of their work processes (i.e., activities, information and resource requirements). Consequently, they felt that their work processes were now very different from what they were used to and they had to perform new tasks that required a new set of information and resources. During the transition period in which users broke old habits and got used to the new work processes, many felt that their work load had increased substantially as they were not able to use the routines that they had developed over time.



Compared to the conventional paper-based business process, ERP system provided automated business processes. The ERP system integrated all the different functions in different departments through a standardisation process that streamlined business process flows. According to one participant, “The first thing I would probably say is standardisation. Across all sites, we all did things differently and SAP has brought us together with a common focus” [MP2, *standardisation*]. With integration, separate functions were integrated under the same business process. One participant realised that, “Now everybody uses the same system, everybody has got the main system so it is made the whole thing more cohesive” [ES3, *integrated work environment*].

During the course of the interviews, it became apparent that different understandings of business process existed among users. At one end of the continuum, individuals had difficulty in understanding how the elements of their work processes (e.g., information and resources needed) fitted into the overall scheme of organisational processes (i.e., sequence of tasks). As a result, these employees felt that they had less control over the work environment. One respondent who was not knowledgeable about the new business processes after the new system went live made the following comments:

After the system went live, I did not really understand what was going on. I was not sure why transactions were failing and why the bill of materials was not correct. We had a lot of process issues. We had several issues with processing purchase order approval [MP6, *lack of business process understanding*].

The comments of one of the participants illustrated the importance of business process knowledge:

I think when you implement an ERP system, it obviously spans across departments. So, if you do not get the business processes correct, if you do not understand the connection between business processes in your department and those in other departments, I think you will always be lost [MP5, *need of business process understanding*].

The following is a participant's reflection on her *need of business process understanding*:

The system is so integrated that if you make a change here, it might affect other areas. Sometimes you do something and it affects other people but you will not know because you do not know that area. I feel that I no longer have control over my job. Well, I admit that I need to understand the work process better. I need to understand how my tasks integrate with the overall process [BT6, *need of business process understanding*,].

Participants also revealed that the interdependencies that existed among the various steps in SAP workflow meant that an action in one part of the system had downstream implications on the rest of the steps in the workflow. This meant that users had to foresee how their actions in the system would impact other users. One user discussed the situation as follows:

I think the biggest problem is that people have to think a few steps ahead, what is actually going to happen, what they are actually doing. . . . There is the domino effect that is going on, nothing is being done in isolation. One action will cause numerous interactions within the system [ES2, *domino effect*].

Participants also mentioned that when the organisations changed their existing business processes to fit with ERP systems, such standardisation of business processes made employees' work processes more rigid and inflexible. ERP systems made work processes rigid by restricting the ways employees performed their tasks and by enforcing certain information and resource requirements. For instance, there was no sequential variability in the work processes and no improvisation was allowed. The sequence of activities and information/resource requirements could not be altered or circumvented during the execution of the work processes. Consequently, users believed that elements of their work processes could not be modified during execution.

The cross-functional interconnectivity required people involved in a process to have more cross-functional knowledge of the process. As ERP integrated all business

processes, users then had to understand the big picture of processes. One participant admitted the importance of having an organisational view of business processes: “You definitely need to have the bigger picture now. I did not really understand how everything was working together” [IM7, *lack of business process understanding*].

Due to ERP’s business process integration, a task performed in the previous step affected the following steps. One participant described the importance of understanding this aspect of business processes:

Definitely, you have to see the big picture now with SAP because when releasing your task, it does not really mean you complete all tasks. I mean you cannot assume that you are just sending it to Accounting, and Accounting will take care of it now, because it does not work that way. I mean you have to be responsible for it, so the departments have to coordinate on how they are working collaboratively, and you also have to understand the whole process of how you get the invoice, or even when it started [ES7, *need of business process understanding*].

A user who did not have this understanding would not have been able to obtain a broad perspective of where he or she fitted in relation to the new organisational structure. A participant in the purchasing department revealed: “Learning SAP is a big thing. My focus is on purchasing. I do not know a lot about the accounting side. So, at first, it was extremely overwhelming. It was difficult for me” [IM5, *lack of business process understanding*].

One component of their new job role within an organisation was the attempt to understand the new organisational processes. A user who failed in this aspect of understanding also failed to understand the reason why the system was in place and felt that the processes were overly complicated. For example, a participant stated, “I do not understand the purpose of this system – why they brought it here. It makes the work processes so complicated” [IM8, *perceived process complexity*]. Another participant said, “It takes so long to do one form and I feel like an idiot. I end up not getting any

other work done. I do not understand why we are doing this or why I have to learn this. It makes my tasks more complex” [BT9, *perceived process complexity*].

At the other end of the continuum, those users who exhibited a high degree of understanding of how their tasks were integrated through the system were likely to perceive a high degree of control over their work environment. The reflections of one of the participants identified this situation: “I am not saying that I am an expert here, but I understand the change and the big picture. . . . It was not difficult for me to adapt to the system. I think the system makes it easier for me to finish my tasks” [BT1, *understanding the business process*]. Another participant who had a good understanding of the business processes stated that,

I think they all can see the work I do. I see a snapshot of what they do, because when they have problems and I am addressing them, I get to see what they are doing. I might understand a business process in finance so I can fix the problem. I understand, these are the steps you go through, this is your input, this is your output and this is what you expect. So I can see what they are doing [MP1, *understanding the business process*]

The following example demonstrates a participant’s reflection on the need for business process understanding:

My tasks are related to other people’s tasks in different departments. SAP introduces a lot of crossover where you need to be able to do more, and I am kind of doing many things, I have got to have a lot of different skills to be able to interact with different departments. I understand the whole business process. So, once the data are uploaded into the system, I can trace the tasks in an easy way [ES1, *understanding the business process*]

Another important aspect of system use was the visibility of user actions in the system. The integrative nature of SAP meant that actions of users in one department were seen by users in another department. For example, users in the purchasing department could

see what purchase order was created in the accounting and finance department. One participant who was in the purchasing department mentioned,

You can see who's carried out the transaction. So, the system allows that visibility, to see where things have gone wrong, who's made what transactions, who's done what purchasing [ES6, *process visibility*].

The visibility of user actions in SAP applied not only to upper management, but also to peer groups throughout the organisation:

The visibility of a transaction always exists for members of the same team, peer groups, in order to track transactions made by their colleagues. I think it's going back to the disciplines that the SAP system enforces, making it a lot easier and probably a lot quicker to check tasks in the process [MP5, *process visibility*].

However, many users were not aware of this visibility of the status of forms and tasks, and preferred to use more traditional methods such as phone calls to check with users in another department whether they had completed their part of the work in the system. Visibility of user actions in the system in this case arose from the use of usernames and passwords to log into the system. The tagging of user actions in the system included identifying the username of the user who carried out a transaction and the date and time when the transaction was carried out. Some of the users felt nervous about this functionality; for example, one user expressed his feeling as follows:

The thing with SAP though is its visibility. If we try to bypass the system, it is all visible. You can look into who did that, what changes you have made, because that is one thing with SAP, it does not lie. It puts your name against everything, every time [BT6, *process visibility*].

User apprehension with regards to SAP's ability to monitor user actions led some users to believe that anyone with the right authorisation could go and monitor what other

users were doing in the system, and this could be used to highlight areas of inefficiencies with respect to the work carried out by them.

ERP systems involved steep learning curves due to their integrative features and the embeddedness of rigid/inflexible business processes. Therefore, the users required training not only in the technical use of the system but also in new business processes. One user candidly noted,

I think what we need is a customised training that not only provides an overview of the system but also the new work processes as well. There are several aspects of the business processes that I have not understood yet [*lack of business process understanding*]. There were training sessions available; I cannot complain that there were not. I attended one session. But it was just an initial overview on how to use the system. They did not explain the new business process [IM9, *need for training in business process*].

Many participants revealed that the training they received was often focused largely on “how to” and “what” regarding ERP software rather than how work processes had changed in ERP or how to best leverage ERP for more effective work processes. The training commonly addressed how to accomplish a business task, not necessarily the flow of business processes being embedded in the system. Users perceived that the training was just effective enough to perform tasks. One user described the situation:

Most of the training went like this, you get the manual and you go through the manual. But I know for systems like SAP, I need more than that. I need customised training that is contextualised to my need. I not only need to understand how to use the system, but also the new business processes as well [BT5, *need for training in business process*].

The link between a lack of understanding of how to perform the basic required tasks and how these were integrated with other tasks was impacted by a training that failed to communicate the new business process. Even users with general computer experience found it difficult to adapt to the ERP system because of the lack of business process

understanding. This was made clear by another user with a similar experience who also demonstrated that computer experience did not necessarily help with her adaptation process to the system:

I do not think that the training was appropriate. We went to classes and thought, “What does this mean?” I am not an idiot on a computer or with application software. I work with a computer almost every day and I use a computer at home. SAP integrated every part of the organisation together. I need to know other parts as well [MP2, *need for training in business process*].

Figure 5.21 shows the construction of the *understanding of the business processes* subcategory with its corresponding open codes and selected participant quotes.

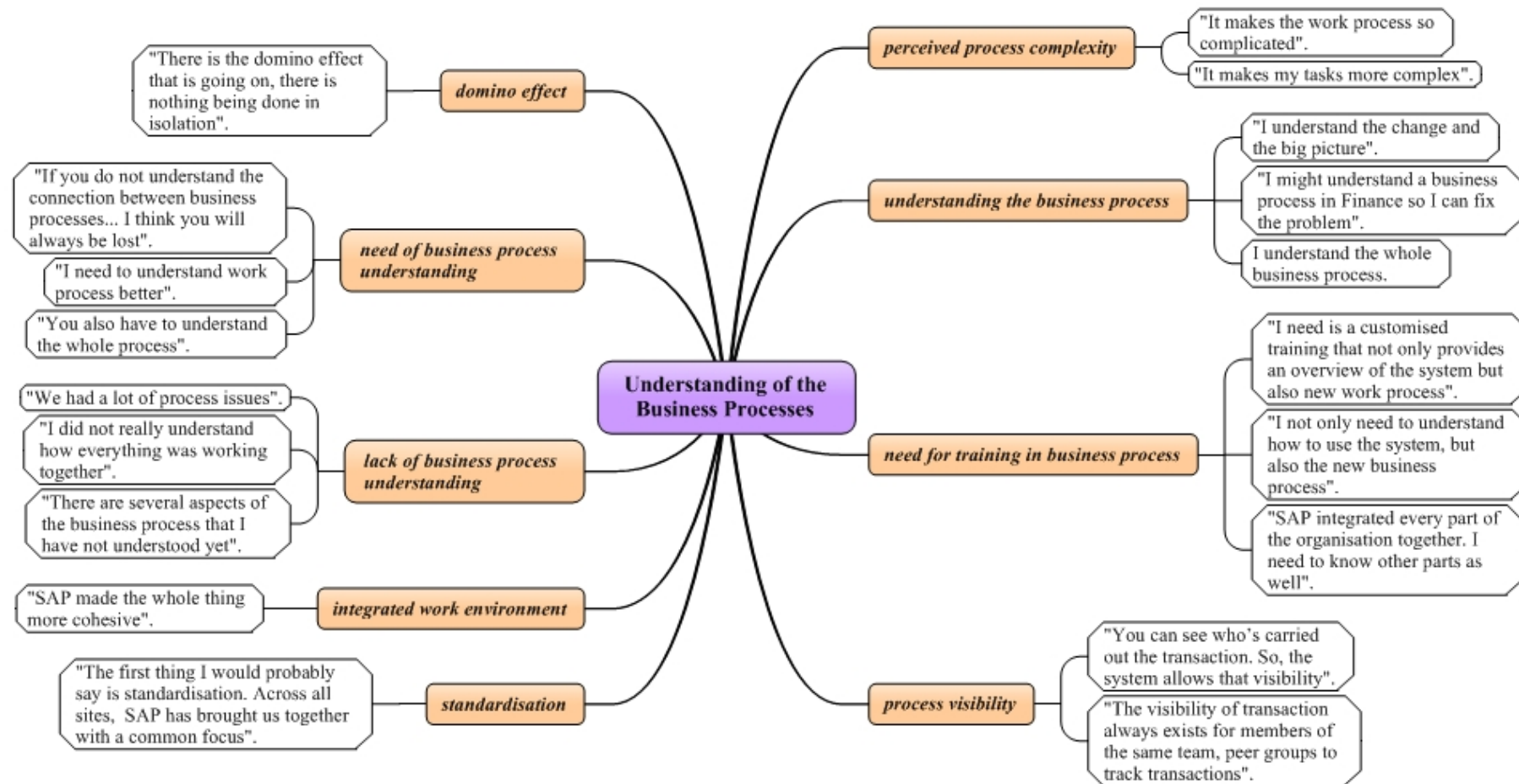


Figure 5.21: Construction of the understanding of the business processes subcategory



### 5.4.3 Summary of system-business process comprehension

The ERP system was viewed by most users as complex and very difficult to use. ERP is a multi-module system that spans across different functional areas and it radically changed the way users performed their jobs. The findings revealed that in order to adapt to the system successfully, users needed to have both substantial *knowledge of the system* and *understanding of the business processes*. From a user perspective, the ERP system was only part of the changes taking place within the organisation. In order to fulfil organisational expectations of ERP use, organisations needed to provide customised training that addressed both the system and associated business process changes. The findings suggested that training focused on work processes had a greater influence on users' ERP software understanding and work process understanding than training focused on ERP software alone.

## 5.5 Category: Triggers

I also probed users about whether or not and the extent to which their perceptions towards the system and, consequently, their adaptation behaviours had changed. I found evidence that adaptation behaviours for some users evolved over time. Most users noted that specific events refocused their attention on the system and triggered further adaptation behaviours. The shift in user adaptation behaviours occurred due to events that changed user perceptions towards the system or changes in the work environment. I refer to these events as *triggers*. Identification of triggers was based on users' responses to open-ended interview questions about what provoked subsequent adaptation activity (via the critical incident technique). Once the users encountered *triggers*, they were prompted to rethink their current use of this system and to make adjustments, if necessary.

I also observed that the changes in adaptation behaviours followed two trajectories: a progressive adaptation process and a regressive adaptation process. The progressive transitioning was a dominant pattern. I found that through ongoing interaction with the system and the occurrence of triggers that provoked changes in the work environment, some users modified their adaptation behaviours more than once.

It is important to note that the *triggers* category has a strong reciprocal influence with other categories. Triggers explain the dynamic transition of user adaptation behaviours. When presenting the evidence, I make an effort to show all the relevant data so the reader can follow my reasoning in labelling the emergent codes. Consequently, some of the participants' quotes that appear in this category might have already been explained in the previous categories. For the sake of simplicity for the reader, I will not recode those participants' quotes that have already been coded in other categories. The coding will focus on those events that are related to *triggers*. For example, some participants' quotes that relate to *reluctant adaptation behaviour* in the User Adaptation Behaviours category may appear again in this category but I will not add a new code to that quote.

Three subcategories represent triggers: *task-related events*, *organisational-related events* and *system-related events*. In Table 5.4, I present the construction of this category, its constituent subcategories and open codes.

**Table 5.4: Construction of Triggers**

Open Codes	Subcategories	Main Category
<i>changing job role, new tasks requirements, transferring tasks, job rotation, becoming a trainer, new responsibility</i>	<b><i>Task-Related Events</i></b>	<b>Triggers</b>
<i>changing policy, the introduction of key performance indicators, one-on-one training intervention, intensive training intervention, phasing-out of a legacy system, knowledge sharing gatherings, user group meeting, train-the-trainer programme</i>	<b><i>Organisational-Related Events</i></b>	
<i>system upgrade, changing interface language, adding new modules</i>	<b><i>System-Related Events</i></b>	

### 5.5.1 Task-related events

*Task-related events* represent occurrences that affected user tasks. Some participants reported that their perceptions towards the system changed due to new task requirements caused by modifications to internal procedures and policies. In other cases, workflow alteration, role change and job rotation changed users' circumstances. These changes encouraged some users to put efforts into learning how to use the system, consequently increasing their knowledge of the system and/or understanding of the business processes. Through ongoing interaction with the system and the occurrence of triggers that provoked changes in their tasks, some users modified their adaptation behaviours.

The cases of MP7 was interesting in that it offered insight into progressive adaptation – from *compliance adaptation behaviour* to *faithful adaptation behaviour*. After the system implementation, MP7 found SAP difficult to use and not highly relevant to his tasks; therefore he made little effort to adapt to the system, just enough to satisfy his immediate work demands, thereby reflecting *compliance adaptation behaviour*. As he recalled, “They forced me to learn how to use the system. I did learn but did not pay much attention to it. My requisition forms were rejected often. . . . They said I did not enter all the fields they needed. . . . It was just a waste of my time to redo it again and again” [MP7].

The subsequent adaptation efforts occurred approximately two years after the implementation when MP7 was rotated from an inventory administration officer to a purchasing officer. After the job rotation, his new tasks became highly reliant on the system. With his new responsibility, MP7 began to regard the system as increasingly important to him. He then actively learned new functionalities through individualised coaching from the employee who was in this role before. Being recently appointed as the purchasing officer, MP7 had yet to develop an understanding of how his tasks related with others that are part of an integrated process. So he just simply imitated the steps learned from training. He also produced his own manual and followed his manual faithfully which reflects *faithful adaptation behaviour*. He explained,

My colleague trained me on how to use the system before she left this role. I created my own manual in MS Word. I captured the screenshots that I had to use and added step-by-step notes. I was new to this position [*changing job role*] and did not know much about the whole business process. The only thing I could do was to use the system based on my manual . . . there was so much pending work waiting to be processed [MP7, *new tasks requirements*].

Another participant at MP described how she also moved from ***compliance adaptation behaviour*** to ***faithful adaptation behaviour*** due to a task-related event that triggered a change from low task-system dependence to high task-system dependence. This event prompted her to reconsider the value she attached to the system, and consequently drove her to put more effort into adapting to the system. She recalled,

When SAP was first implemented, I just ignored it because I thought it was not important to me. I did not know much about it. I did not use it often. I know very little, just enough to get my work done. . . . Yes, [my attitude towards the system] changed after my boss transferred tasks to me. Previously, I did not have to check stock or manage inventory. I did not have to know our budget. I did not have to know all of these inventory codes. After using SAP for about a year, all these tasks were transferred to me. Since then, I have had to learn how to use it. I got training from the key user. After that, I practised by following what she taught me [MP5, *transferring tasks*].

The expression of one participant at ES illustrated how a task-related event triggered a change from low task-system dependence to high task-system dependence. Due to job rotation, his perception of the system changed. Consequently, new task requirements encouraged him to put efforts into learning how to use the system, which reflected the transition from ***reluctant adaptation behaviour*** to ***faithful adaptation behaviour***. He recalled,

About two years after SAP was implemented, I was shifted to another job role [*job rotation*]. Previously, I did not know much about how to use it because I felt it was not important to me. Whenever I had to use it I relied on my colleagues for help. My new tasks heavily rely on the system compared to those in my previous role. I have to pay more attention to SAP and I cannot escape from it now. I learned how to use it through on-the-job-training from my colleague who was in this role previously. After that, I kept practising how to use SAP by repeating what I have learned [ES9, *new tasks requirements*].

In another example, an experienced user from MP was given a special task that required her to become a trainer for employees at an office in Lao People's Democratic Republic. This special task encouraged her to put greater effort into actively learning more about the system and business process. The following is an example of how a task-related event triggered a change from a low knowledge of the business processes to a high knowledge of the business processes, which reflected the transition from *faithful adaptation behaviour* to *enthusiastic adaptation behaviour*:

I was selected to be a trainer and I was sent to provide a month-long SAP training for users in the other branch of our organisation in Laos [*becoming a trainer*]. My boss said he wanted to send an experienced user that had expertise in SAP. Before that, I was not really an expert user. I just used it by following my manual and knew only what I had to do. With this special assignment, I felt that I needed to know more. I was worried that I could not teach those users well and answer their questions. So, I went to the key user and asked her to teach me more features. She taught me and explained many things that actually helped me to better understand the big picture of the system and business processes as a whole. I also spent numerous hours trying out many new things in each menu on SAP. I can work with the system faster than before [MP3, *new responsibility*].

Similarly, another participant at IM was also assigned to become a trainer for employees at the other branch of the organisation. This situation required her to have more knowledge of the system and knowledge of the cross-functional business process. She had to put greater effort into learning how to use SAP which subsequently induced a change from *faithful adaptation behaviour* to *enthusiastic adaptation behaviour*:

I had more confidence to explore SAP after I had a chance to become a trainer [*becoming a trainer*]. That was about one year and a half after the system went live. The organisation wanted to send someone to the other branch of the organisation to train staff over there and I was chosen. I was worried and nervous when I knew that I had to go. I did not believe I could train anyone on how to use SAP. Back then, I had to follow the manual almost every time I used it. I did not have much confidence. Before I went there, I used only the FI module but I also had to give training on both FI and MM modules. I had to learn many new functions in the MM module before I went there and during the time I was there. This responsibility actually helped me gain more understanding and broadened my view both of the system and the process. Before that, I had a very narrow view, I knew only my part. Now I understand both FI and MM work flows [IM2, *new responsibility*].

I also observed that the transition from one adaptation behaviour to another did not always follow a progressive trajectory; regressive transitions were possible. The transition from *faithful adaptation behaviour* to *compliance adaptation behaviour* was a dominant pattern among some participants. An interesting example of the regressive adaptation process was IM4 who transitioned from *faithful* to *compliance adaptation behaviour*. After the system implementation, IM4 perceived the importance of the system because her tasks were heavily reliant on it. She actively learned how to use it by attending training and used system features in a true-to-the-letter fashion based on what she had learned in the training which reflected *faithful adaptation behaviour*. As she recalled,

I attended formal training sessions for three days. It was OK, but they did not tell me how the business processes would change with SAP. They only focused on the technical aspects of the system. So it was just enough to perform work assignments. I used it based on what I learned in the training, just followed every step they taught me [IM4].

Two years later, IM4 was promoted to be the head of the purchasing department. The relevance of the system in her new role was not the same as before. She no longer needed to use every functionality; consequently, the value she attached to the system decreased. Most of her tasks were transferred to her subordinates. She made limited efforts to learn the system and made partial use of the system without exploiting its full functionalities, which reflected the transition from *faithful* to *compliance adaptation behaviour*. As she recalled,

After I moved to this position, I did not have to use SAP as much as previously. I use it only to approve purchases. I think my assistants know more than I do. I only know the basic things that I have to do. I am too busy to spend time trying to figure out how to use it. I always forget how to use it. I just ask my assistants to give me a brief step-by-step walk-through to show me where I need to click in order to approve purchases on the system [IM4, *changing job role*].

Figure 5.22 shows the construction of the *task-related events* subcategory with its corresponding open codes and selected participant quotes.

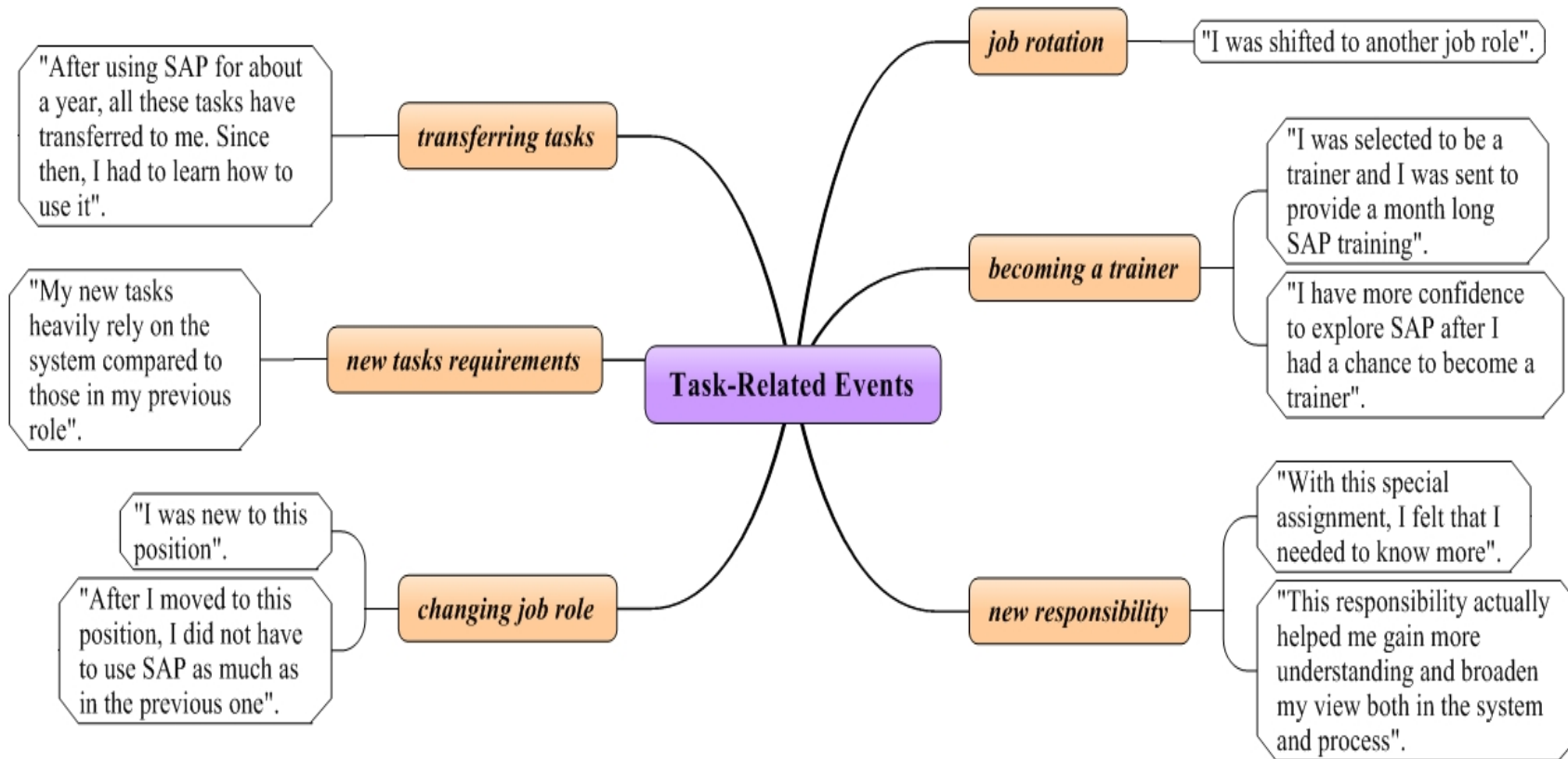


Figure 5.22: Construction of the task-related events subcategory



### 5.5.2 Organisational-related events

Organisational-related events are actions associated with the introduction or modification of organisational policies and in this case included measures to encourage system use. For example, some participants reported changes in their adaptation behaviours because of organisational actions such as the introduction of key performance indicators (KPI) associated with system use, new policies related to system use and the phase-out of the legacy system. These events influenced some users to reconsider the value they attached to the system and consequently changed their adaptation behaviour.

BT5 was an interesting case that offered insight on how *organisational-related events* trigger change in adaptation behaviour. BT5 revealed that his adaptation behaviour changed from *reluctant adaptation behaviour* to *faithful adaptation behaviour* after the phase-out of the legacy system. After observing that some employees still used the legacy system instead of SAP, the organisation decided to phase out all legacy systems. This event encouraged him to refocus his attention on SAP and triggered further adaptation behaviours. He made learning efforts by seeking training from colleagues, producing his own manual and following step-by-step instructions. He stated,

I started using SAP when the legacy system was removed. Before that I did not use it at all. I felt that I could still perform my tasks using the legacy system. I did not really need SAP. You know, when I saw two system shortcuts (the legacy system and SAP system) here on my screen, I always clicked on the legacy one. I started to click on SAP on the day when I turned on my computer and I could not find the legacy system on my computer screen. Then, I walked to my colleague and asked her to teach me how to use it. . . . I still miss the legacy system. . . . I printed out all the screens and put them here with my notes. I have been using them since I started using SAP. I use them almost every time I work with SAP [BT5, *the phase-out of a legacy system*].

After observing employees' struggle to keep up with changes in work practices, some organisations offered special training intervention programmes, individualised training, peer-to-peer information sharing and refresher training. Training interventions included activities initiated by organisations to provide users with the system and business process skills necessary for them to perform their duties. These events helped users to improve their knowledge of the system and/or understanding of the interconnected business processes. Improved understanding allowed users to increase their utilisation of ERP system capabilities.

One participant explained how the transition from *faithful adaptation behaviour* to *enthusiastic adaptation behaviour* occurred after she had gained more knowledge of both the system and business processes as a result of the *organisational-related event*:

Three years after the implementation, there were knowledge sharing events among employees who had been using the SAP FI module across different branches. I learned many new things from other people and these helped me increase my understanding about the system and business processes. Previously, I just used the system step-by-step following what I learned from training. I did not want to explore the system because I was afraid that [my mistakes] might affect other people's tasks. After the event, I learned how to personalise the screen to make it easier for me. . . . Now, I can work with the system faster than before [BT4, *knowledge sharing gatherings*].

At MP, there was resistance to the system at various levels after the system went live which led to a high number of errors and user dissatisfaction for over a year, even once the system was technically stable and working properly. Consequently, there was some impact on customers and suppliers due to the issues of an inaccurate inventory. The finance department was unable to provide accurate accounting data for inventory transactions. For several months, transactions related to inventory from the suppliers had to be manually adjusted before they were processed. In order to solve this problem, the organisation issued a stronger mandate policy requiring all employees to use the system and introduced the KPI associated with SAP use to evaluate employees'

performance. The organisation also forced the key users to take the lead to propose additional one-on-one training sessions based on their own understanding of the system. End users eventually became increasingly involved as the key users knew exactly what their expectations were and could anticipate their questions. It seems that a friendly and supportive atmosphere developed around this learning approach encouraged users to learn and had a strong influence on their ERP software understanding.

MP10 was an interesting case that offered insight on how *organisational-related events* triggered change in adaptation behaviours. MP10 moved from engaging in *reluctant* to *faithful adaptation behaviour*. Earlier, MP10 had a negative view of the system, arguing that the system slowed down his work. MP10 also found the system to be too complicated with difficult interfaces that made it challenging to use. He developed the habit of using paper-based purchase requisition forms for a number of years: “I was very good at using the paper-based form. It took me a lot more time to get the same thing from the system because I had to go through different screens and different fields” [MP10]. As a result, he avoided using the system and simply followed his prior work processes. Sometimes, he asked his colleagues to help him enter requisition forms.

Almost one year after the implementation, the organisation issued a strong mandate policy requiring all employees to use the system and offered one-on-one training to all users who struggled to use the system. This event refocused his attention on the system and triggered further adaptation behaviours. He was concerned that the lack of system use may affect his performance evaluation, so he perceived the system as being relatively more important to his tasks than before. This situation persuaded him to interact with SAP directly and to put effort into learning how to use the system. He attended one-on-one training, produced his own manual and followed his manual faithfully. Consequently, he shifted from *reluctant adaptation behaviour* to engage in *faithful adaptation behaviour*. He explained,

They wanted to replace the old system and all paper-based work. My tasks needed to be done through the new system. The organisation also put pressure on us. My paper-based purchase orders were rejected. They said they would not accept my orders if I did not do it through the system [*changing policy*]. My manager

said if I did not use the system, it might affect my performance evaluation [*the introduction of key performance indicators*]. I had no choice, really. . . . I got one-on-one training from a key user. I wrote every step she taught me in my notebook. I always put my notebook beside my computer so it was easy for me to look at it. I still use it very often in order to make sure that I enter everything correctly [MP10, *one-on-one training intervention*].

Another interesting case was MP9. After the system went live, MP9 also perceived that the system was not important to his work so he did not put effort into adapting to the system. Almost one year later, the organisation changed policy related to system use by increasing the level of mandate and introducing KPIs to evaluate employees' performances. The organisational actions encouraged him to refocus his attention on SAP and he perceived the system to be more important to his tasks than before. Consequently, the events triggered him to increase his level of interaction with the system and to increase his level of knowledge of the system. He put effort into learning the system by seeking training from the key user, creating his own manual and routinising the use of the system, which reflected the transition from *reluctant adaptation behaviour* to *faithful adaptation behaviour*. He recalled,

Initially, after the system rollout, I did not use SAP at all because it was not important to me. I could still perform my task without the system. The organisation allowed us to continue sending paper forms. Almost one year later, our manager put more pressure on us. He said paper forms were not acceptable anymore [*changing policy*]. He got complaints from other departments because we were not using the system. . . . The organisation introduced KPIs to monitor us [*the introduction of key performance indicators*]. I was concerned that my lack of SAP use might affect my performance evaluation, so I started pay more attention to it. . . . I also received one-on-one training from the key user in our department who taught me how to use it. Then, I created my own manual. . . . I kept practising until it became my routine [MP9, *one-on-one training intervention*].

The following is another example of a participant's explanation of how an organisational action encouraged him to change from *reluctant adaptation behaviour* to *faithful adaptation behaviour*:

After the system went live, I did not use it. I was not using SAP yet. I printed a copy [of a form] and sent it to the key user. I kept doing this for many months until the key user said she would not do it for me anymore and rejected my paper forms. Actually, it was not only me that kept sending paper forms. There were many of us. The organisation also put more pressure on us [*changing policy*]. . . . The key user offered me one-on-one training and trained me step-by-step until I could do it by myself. . . . I followed the steps she taught and the manual she gave me [MP11, *one-on-one training intervention*].

A participant who was a key user witnessed other adaptation behaviours and made the following comment about the advantage of the one-on-one training intervention event. "I could see that they changed a lot after they got one-on-one training. They learnt the way we work and I think that they now have a better understanding of the system" [MP1, *one-on-one training intervention*].

In order to encourage users to share knowledge and learn about other business processes and technical knowledge related to the system, MP also initiated a regular user group meeting event in which users from different functional areas got together to share knowledge about each other's business processes. One participant explained how an *organisational-related event* encouraged her to change from *faithful* to *enthusiastic adaptation behaviour*:

Now that I understand the process, the new system is no big deal. When I first started, I did not get the flow. I just followed steps I was told and those in my manual. It was kind of using without understanding. It took me almost two years after the implementation to get the flow of information. That was after I joined the user group meeting. After I understood the flow better, it

was much easier than before. My feeling towards the system also changed. I like it and enjoy exploring it more than before [MP4, *user group meeting*].

At ES, after the system went live the organisation faced serious problems as employees had limited understanding of the system capability. Many users continued to use a shadow system concurrently with SAP. In order to motivate users to exploit the system, ES made a systematic effort by providing intensive training to everybody from administrative staff to managers. The organisation also introduced a train-the-trainer programme within each department in order to make sure that there was always a person responsible for the system in case problems arose. Power users provided an intensive training and then designated someone and trained them to become a trainer within the work area to assist others by answering any questions they may have and providing additional training if necessary. The power users and the trainer group also provided a training documentation which was translated from English into Thai for users.

ES10 was an interesting case that offered insight into how ***organisational-related events*** triggered change in adaptation behaviour. After the system went live, he did not have confidence in using SAP. He restricted himself to using the system in a way that fitted his prior work practices. SAP was used in parallel with the shadow system. After he received the intensive training, his level of knowledge of the system and confidence to use the system increased. The following quotation describes how the ***organisational-related event*** prompted his change from a low level to a high level of knowledge of the system, which reflected the transition from ***compliance adaptation behaviour*** to ***faithful adaptation behaviour***:

Previously, I did not have the confidence to use it. I continued using the old system concurrently with SAP. . . . There was a training document we got from the training session after the system went live. But it was in English. We created our own manual in Thai and shared with others. So there was some knowledge sharing going on [*knowledge sharing gatherings*]. . . . After I got the intensive training and the Thai manual, I had more confidence in using the system and stopped using the old system. Then, I just

kept practising until using became my routine [ES10, *intensive training intervention*].

ES3 also revealed that her adaptation behaviour changed after the organisation initiated the train-the-trainer programme and she was chosen to be one of the trainers for her department. The comments by ES3 illustrated how an ***organisational-related event*** triggered a transition from ***faithful adaptation behaviour*** to ***enthusiastic adaptation behaviour***. She recalled:

I was selected to be the trainer for my department and then to join the train-the-trainer programme. During the programme, they provided us with intensive training to learn how to use SAP and also to learn how to train other users. I think the programme and this new role made me feel more involved with the system than before. My knowledge about the system and business processes increased after joining the programme. I also had a chance to share knowledge with users from other departments too [ES5, *train-the-trainer programme*].

One of the participants at ES commented on the advantage of the organisational-related event:

It was a significant change after the intensive training and train-the-trainer programmes. Although it took a lot of time and resources, I found it to be very positive as the users seemed much more willing to learn and to train their colleagues. It was a great relief for me. Some users became more attached to their job as they could train their own boss [ES4, *intensive training intervention, train-the-trainer programme*].

Figure 5.23 shows the construction of the ***organisational-related events*** subcategory with its corresponding open codes and selected participant quotes.

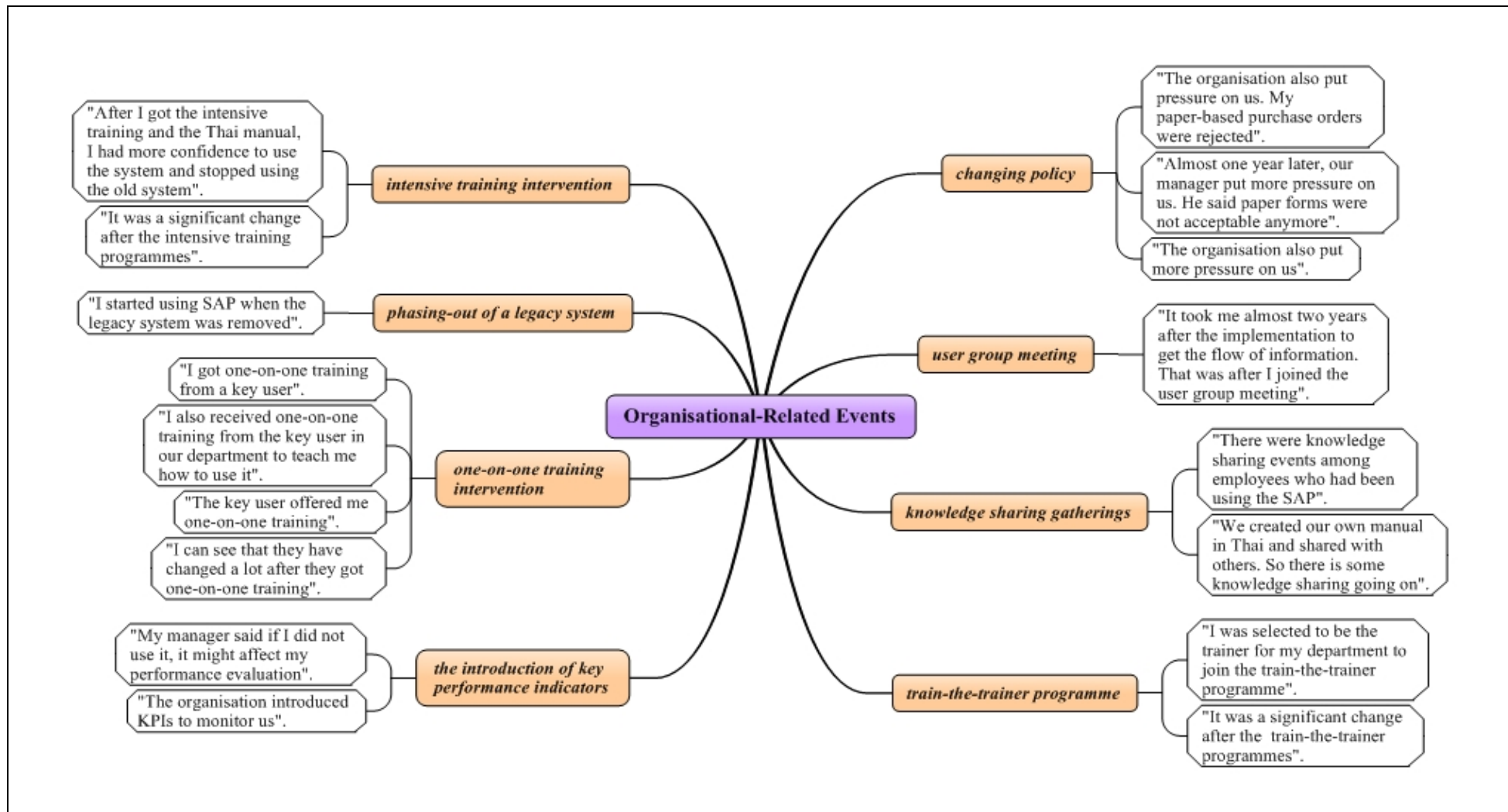


Figure 5.23: Construction of the organisational-related events subcategory



### 5.5.3 System-related events

*System-related events* refer to changes in system functionalities and interfaces that took place due to system upgrades or the addition of a new module. These changes prompted modifications in user adaptation behaviours. System upgrades reduced complexity; as a result, some users felt more confident and motivated to learn how to master the system.

For example, one participant revealed how a *system-related event* made him feel more confident and encouraged him to increase his level of knowledge of the system, which reflected the transition from *reluctant adaptation behaviour* to *compliance adaptation behaviour*:

When we first started using SAP, my job did not really rely on SAP. I just needed to retrieve data from it. Initially, I was not confident in using the system because its screens were all in English. My English is not good and I could not understand many things on the screen. What I did was to ask my colleagues to retrieve the data I needed. After the system interface menu was changed from English to Thai, I was able to use it by myself. . . . I just learned what I needed to do in the system from my colleague but only really basic things [MP6, *changing interface language*].

In the same line, another participant also described how a *system-related event* prompted her to increase her level of knowledge of the system. However, she still felt that the system was not important to her so she made only a small effort to adapt to the system, just enough to satisfy her immediate work demands, which reflected the transition from *reluctant adaptation behaviour* to *compliance adaptation behaviour*. As she recalled,

I was afraid to use it because everything here (system screens) was in English. I was kind of blind when I looked at it. When I did something wrong, error messages were in English and I did not know what I had done wrong or how to fix it. So, I was just trying to keep away from it. I started using the system when it was

upgraded and the system screens were changed from English to Thai [MP8, *changing system language*].

Another participant witnessed the adaptation behaviour and disclosed,

They were uncomfortable at the beginning. . . . I felt they were more comfortable after the system was upgraded to support the Thai language. . . . Yes, they started to enter data into the system [MP1, *changing system language*].

Changes in system environments also put users into a new situation and forced them to actively think about their system use. One participant at ES revealed how a system upgrade prompted him to change from *compliance adaptation behaviour* to *faithful adaptation behaviour*:

After the system was upgraded and new features were added, I think that there were a few things that the system could do that I was not able to do them before, like being able to create some reports that I needed. Some new features were related and useful for my tasks. Previously, it was so complicated to create the reports. So, I did not run them from SAP; instead, I used Excel concurrently with SAP. The new version was a lot easier than before. I learned how to use those features by attending training then practising following what I had learned [ES6, *system upgrade*].

The following quotation describes how another participant from ES also shifted from *compliance* to *faithful adaptation behaviour* due to *system-related events*:

Well, I started paying more attention to SAP when the new version was released. The previous version was not user friendly. SAP was so complicated. I had to go through many steps in order to create only one form that I needed. I was so frustrated with it. . . . But the organisation forced me to use SAP, so I learned how to use it just enough to do my tasks. I did not pay much attention to it. . . . The

new version was easier to use. They also added new functions and it was quite useful for my tasks. . . . I attended a training session and used it following all the steps they taught [ES8, *system upgrade*].

Two participants at BT recalled that their adaptation behaviours changed after the *system-related events*. A new module that was relevant to their tasks was added. Since most of their tasks were now embedded in the system, this event triggered a change from low task-system dependence to high task-system dependence. The following quotation demonstrates a participant's reflection on his transition from *reluctant* to *faithful adaptation behaviour* after the *system-related events*.

It was a big change for me after the MM module was added. The FI module went live first. Only the accounting and finance department fully used the system. I only used some parts of the FI module. So I found the system was not really relevant to me. . . . I just got so frustrated and I was so overwhelmed, so I did not use the system at all. . . . But once the MM module was added, almost all of my tasks needed to be done in the system. I have to learn how to use it. . . . I print out all screens and put them here with my notes. I have been using the notes since I started using SAP. I use them almost every time I work with SAP [BT7, *adding new module*].

Another participant from the same department also reflected on his transition from *compliance* to *faithful adaptation behaviour* after the *system-related events*.

After the rollout, I spent some time trying the system and learning how to use it, but only really basic things. I was not convinced that the system helped me improve my performance. I did not see much benefit from doing all these tasks using the system. I thought the old system was much easier to use. I used SAP concurrently with the old system. . . . After the MM module was added, it became a major part of my tasks. Previously, I used only one form but now I have to use many forms and functions. I cannot run away from it

anymore. . . . I do not really have to think when I want to create a transaction. I have an instruction here to tell me what I have to do, like steps 1-2-3-4. I feel like I have become a machine [BT6, *adding new module*].

Figure 5.24 shows the construction of the *system-related events* subcategory with its corresponding open codes and selected participant quotes.

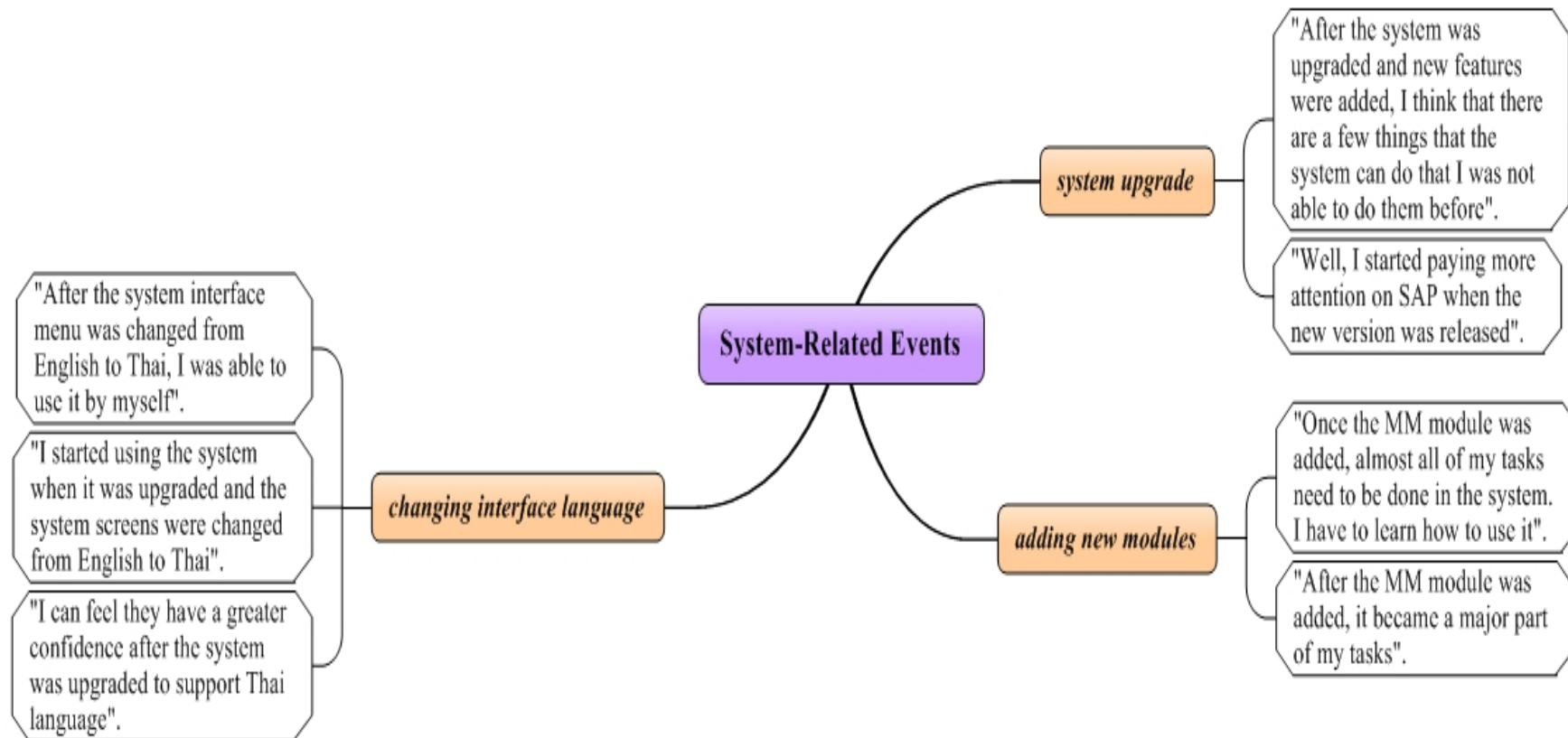


Figure 5.24: Construction of the system-related events subcategory

#### 5.5.4 Summary of the triggers category

Overall, the findings revealed that adaptation behaviours evolved over time. The shift in user adaptation behaviours occurred due to specific events or changes in the work environment that altered users' perception of the system. Consequently, they refocused their attention on the system which prompted further adaptation behaviours. Three subcategories make up the Triggers category. They are *task-related events*, *organisational-related events* and *system-related events*. While some users indicated that their adaptation behaviours had changed over time, these comments came largely from people in units where strong management intervention was present.

### 5.6 Chapter conclusion

Findings reported under the four main categories provided rich evidence to answer the research question outlined in this chapter. I discovered 95 open codes. Grouping the most significant open codes, I produced 12 subcategories. The four main categories derived from the open codes across the four cases are: user adaptation behaviours, social-task-user conditions, system-business process comprehension and triggers.

The development of the themes will be explained in Chapter Six. I use the discovered codes and emergent categories to move up to a higher level of abstraction in the next chapter, where I theorise the process of user adaptation.

## Chapter 6 Analysis and Discussion

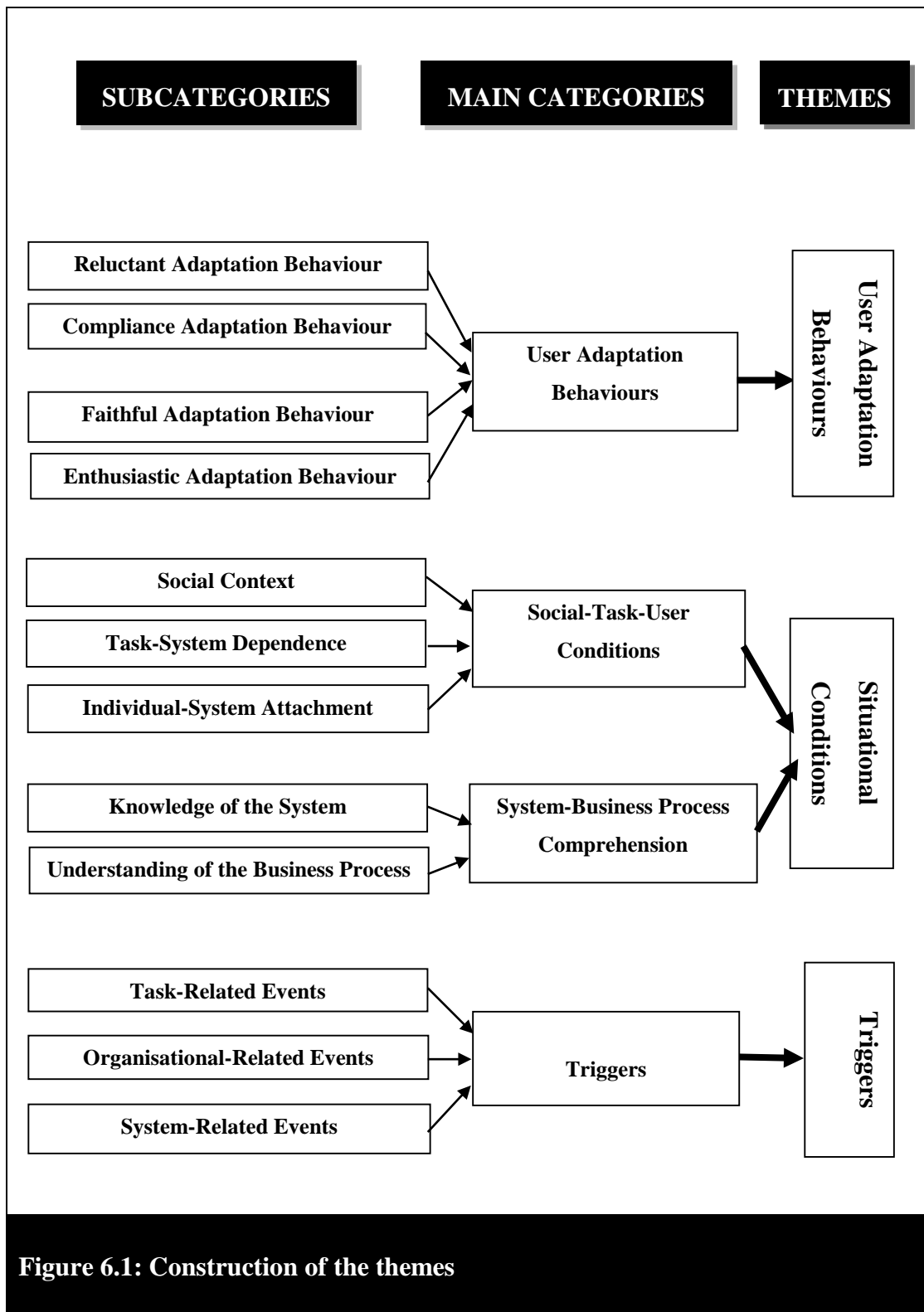
### 6.1 Introduction

This study follows a qualitative approach to build a theory of the user adaptation process to complex mandatory IS. The theory emerges from the findings, and elaborates on the relationships among the themes. This chapter discusses the research findings. As such, this chapter first discusses the key findings related to the three themes, and explains their relationships. A cross-case analysis of the four organisations is also discussed. The findings are then discussed and related to the extant literature detailed in Chapter Two.

### 6.2 Building theory

The key to building a theory is to identify concepts that are salient to the underlying explanation of the phenomenon. As such, the third chapter, Methodology, detailed how the open codes were generated from the data, and how open codes, subcategories, main categories and themes were consecutively conceptualised at a higher level of abstraction, based on their underlying conceptual similarities to one another. The conceptual connections among open codes within individual subcategories, and the connections among subcategories within main categories were demonstrated when presenting the findings in Chapter Five. This section aims to discuss the formation of three core themes – through the theoretical linkages among their respective main categories – and the relationships among them.

For clarity to the reader, themes are in **bold font-changed**, main categories are in font-changed and subcategories are in *bold-italicised* in the following sections. Figure 6.1 depicts the subcategories and main categories that underpin the themes.





### 6.2.1 Emerging themes and the relationships among the themes

Based on the four categories explained in the previous chapter, I now start an analytical process at a higher level of abstraction in order to find the conceptual relations among them. I look for the patterns or the underlying meanings of the phenomena.

As was explained earlier, the categories cannot be completely detached from one another. Indeed, when breaking the data apart during the open coding, I split distinctive, but still related, pieces of information, which afterwards were joined to some others according to their degree of conceptual affinity under the subcategories. In turn, the subcategories yielded the categories. Certainly, moving up from the subcategory level to the category level was a zoom out, in which only the theoretical connections were appreciated, leaving behind the low level connections. As a result of grouping the emergent categories following an inductive thinking path, three core themes were revealed. The categories within the themes not only define the nature of the themes, but in some cases also form connections among the themes. These connections help to support the structural relationships among themes.

Now, I elaborate on the three discovered themes to produce an emergent, substantive theory that explains the adaptation process in the context of complex mandatory systems. This theory constitutes three conceptually linked themes: **User adaptation behaviours**, **Situational conditions** and **Triggers**. These three themes address the research questions:

- **How do users dynamically adapt to complex mandatory IS in organisations in the context of ERP use?**
- **How do organisational contexts play a role throughout the user adaptation process?**

The first emergent theme, **User adaptation behaviours** reflects the different ways in which users respond to the evolving work practices that an ERP system imposes. As reported in Chapter Five, four subcategories make up this theme. They are *reluctant adaptation behaviour*, *compliance adaptation behaviour*, *faithful adaptation*

*behaviour* and *enthusiastic adaptation behaviour*. These subcategories are linked together to become the first of the core themes detailing the aspects of user adaptation behaviour. This category is a theme in its own right, which I name **User adaptation behaviours**.

*Reluctant adaptation behaviour* describes the situation in which users do not make the effort to learn how to use the system following its introduction; in some cases, users may show hostility to the system. Even though the system is mandated, they are unwilling to change their work routines to conform to the ones imposed by the system. Reluctant adaptation behaviour manifests in different ways. It ranges from delaying system use for as long as possible, persisting in old work routines to relying on other people to complete the tasks associated with the system.

*Compliance adaptation behaviour* is characterised by individuals making limited efforts to adjust previous work practices to the ones introduced by the system. Users tend to be more passive in their interaction with the system. Users who exhibit this behaviour engage in superficial learning and make partial use of the system without exploiting its full functionalities; just enough to satisfy their most immediate work demands while trying to minimise changes to their work routines. Compliance users restrict themselves to using the system in a way that aligns with their prior work practices. In some cases, the ERP system is concurrently used with shadow systems (e.g., spreadsheets, legacy systems).

*Faithful adaptation behaviour* is characterised by the active efforts users make to learn to use the system to perform their tasks. In this sense, they conform, at least to some extent, to system use to complete their tasks. They use system features in a true-to-the-letter fashion based on what they have learned in the training. However, they are typically less driven to engage in discretionary constructive use of the system that is above and beyond the routinisation of system use to complete tasks.

*Enthusiastic adaptation behaviour* represents cases where users fully embrace a system and engage in proactive learning in order to improve their level of expertise of system use. Users actively try to maximise the system's benefits. This goes beyond accommodating and routinising a system, to exploring and leveraging it.

The second and third emergent category, Social-task-user conditions and System-business process comprehension reveal the underlying conditions that influence the user adaptation process. These two main categories are strongly interrelated with a reciprocal influence among their component subcategories, each one reinforcing the other. They constitute the second core theme, which I name **Situational conditions**.

The Social-task-user conditions category is made up of three conceptually, strongly linked subcategories: *social context*, *task-system dependence* and *individual-system attachment*. These three conditions shape how users value the system in relation to their social context, work practices and professional advancement. *Social context* reflects how the degree of system mandate, social pressure and support influence the process of user adaptation. *Task-system dependence* describes the extent to which individuals believe that the system is relevant to their tasks. *Individual-system attachment* reflects the importance that users attach to the system for their professional advancement and their immediate jobs.

The System-business process comprehension category describes the understanding users have of both the way the system works in relation to the business operations and how their work tasks are interrelated with other tasks. Two subcategories constitute this category: *knowledge of the system* and *understanding of the business processes*. Users who have a high degree of *knowledge of the system* will likely perceive that they have high control over the system and are able to use the system to perform their tasks. Whereas, users who have a low degree of *knowledge of the system*, tend to feel they have a low level of control over the system.

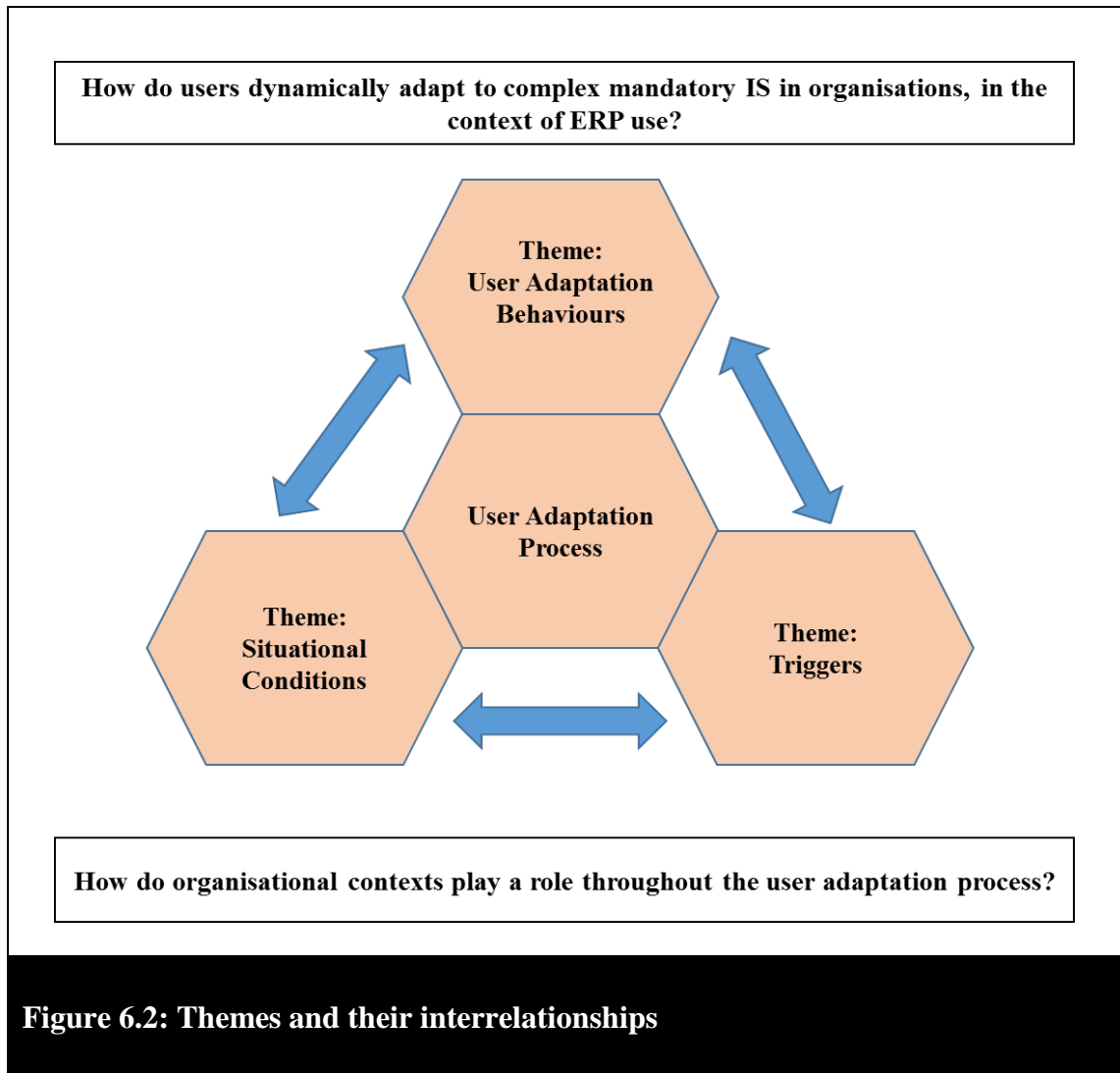
The *understanding of the business processes* subcategory is the knowledge of how individual work activities fit in the overall organisational procedures and how they interlink to other individual activities. Users who have a high degree of *understanding of the business processes* tend to feel that they have a high level of control over work processes. Users who have a low degree of *understanding of the business processes* tend to feel that they have less control over the work processes. When users feel that

their control over their jobs has decreased, they may be less motivated to perform their tasks and are likely to exert less effort.

ERP systems usually causes work processes to change. As users better understand the changed work processes in the new ERP context, they will learn new ERP system features to better support these processes. For example, some ERP systems allow users to create customised reports, forms, templates and short-cuts to access certain screens. When users are able to do these, it is more likely that they will develop a better understanding of how the system can be used to execute their work processes. Users will find resources and functionalities from the system to help them to accomplish their work processes more easily. As a result, users may develop a feeling of mastery over their work processes and perceive that their work processes are less complex in terms of the number of steps associated with each task, amount of coordination needed and predictability of tasks or information needed.

The remaining emergent category, **Triggers**, refers to events that change user perceptions towards the system or changes in the work environment that prompts further adaptation behaviours. Three subcategories make up this category. They are *task-related events*, *organisational-related events* and *system-related events*. This category becomes the third theme in its own right, explaining the transitions in adaptation behaviours, which I name **Triggers**. After users encounter **Triggers**, they are oriented to refocus their attention on the system and rethink their current use of this system, and consequently change their adaptation behaviours.

The themes can now be considered in relation to each other. The interplay among these three themes is dynamic in nature and cannot be understood as disconnected events. **Situational conditions** influence **user adaptation behaviours**. **Triggers** alter the **situational conditions**, which in turn modify **user adaptation behaviours**. The relationship among the themes will be explained in the next section. Figure 6.2 shows themes and their interrelationships.



### 6.2.2 Building the theory of the user adaptation process to complex mandatory IS

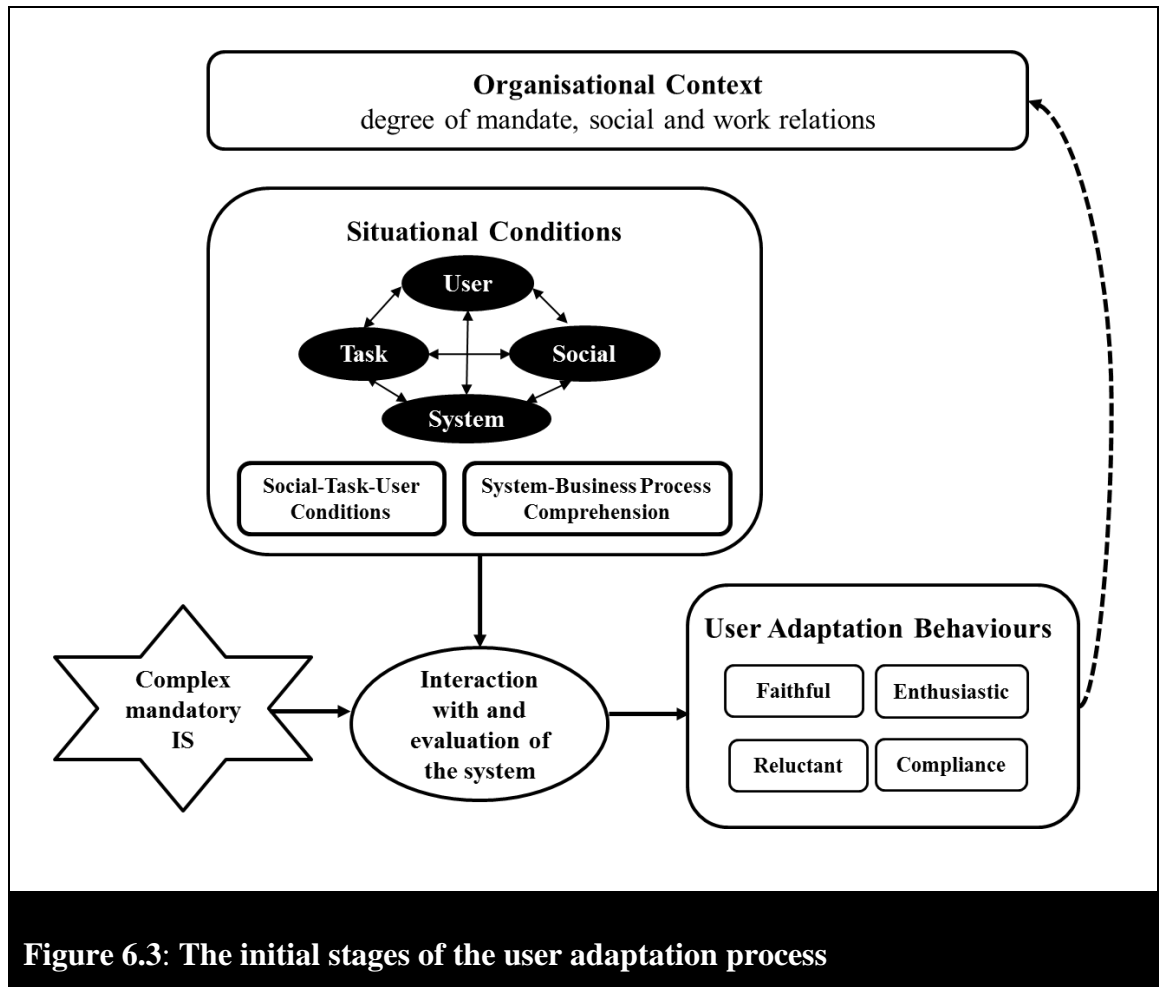
**User adaptation behaviours** constitute the most salient theme of my analysis. I observe that these behaviours are dynamic and evolve over time. First, the user adaptation behaviour in the early interaction with the system is explained. Then, I trace how the initial adaptation behaviours evolve over time as organisational and technological circumstances change.

During the initial stages of the adaptation process, individuals deal with the introduction of a complex mandatory IS in two stages which continuously influence each other: evaluation of the situational conditions and espousing different adaptation strategies

(see Figure 6.3). In the evaluation of situational conditions process, individuals evaluate the potential consequences of the system and their ability to deal with it. Next, in the performing adaptation strategy process, the individuals choose to apply four adaptation strategies to deal with the situation: *reluctant adaptation behaviour*, *compliance adaptation behaviour*, *faithful adaptation behaviour* and *enthusiastic adaptation behaviour*.

In the initial stage, users engage in their process of adaptation within particular organisational and working contexts. While a group of users may have the same level of exposure to the system, their interaction with it may differ. The amount of effort users exert to adapt to the system is shaped by the **situational conditions** (social-task-user conditions and system-business process comprehension). More specifically, users' choice of adaptation behaviours depends on the degree of system mandate, social pressure and supports, their perception of the importance of the system for the accomplishment of their daily work practices and progress in their careers, and their knowledge of the system and work processes.

Figure 6.3 schematically depicts the process through which individuals initially adapt to the system.



**Figure 6.3: The initial stages of the user adaptation process**

As shown in Figure 6.3, the adaptation process begins when a person faces or becomes aware of the implementation of the complex mandatory IS, in this case an ERP system. An individual first evaluates the potential consequences of the situation. At the evaluation stage of **Situational conditions**, the analysis reveals that the evaluation process is likely to be influenced by social-task-user conditions and system-business process comprehension. The *social context*, *task-system dependence* and *individual-system attachment* entail how individuals value the system in relation to their social relations, work practices and professional advancement. In other words, users determine the expected consequences of the new IS and the likely effect of these consequences on their social situation, tasks and professional growth. The paramount issue for the individuals, therefore, is to determine what consequences the system is likely to have and the significance of the system. Users assess whether the system has relatively high or low importance to them. In addition to assessing the importance of the system, individuals also determine their degree of

**knowledge over the system** and **understanding of the business processes**. In other words, they assess how much control they have over the system and work processes.

It is important to recognise that the interplay of various conditions is complex. For instance, users might face a situation when the degree of task-system dependence is low but the degree of social pressure to use the system is relatively high. In such cases, the relative strengths of opposing assessments of the value of the system influence the relative importance of the system, that is, whether the system is viewed as having high importance or relatively low importance to them.

The organisational environment is manifested through social and work relations as well as the degree of system use mandate which also affects the amount of time and effort individuals invest in learning and using the system. It is important to recognise the complex interplay of organisational and situational conditions that shape a user's perception of the system. For instance, despite a high level of task-system dependence, users who work in an organisation that does not enforce a strong mandate to use the system may perceive that the system is not highly important to their jobs and, thus, put less effort into learning and using the system. In contrast, users who work in an organisation that places a strong mandate on using the system may value the system as highly important to their jobs even though they have a low degree of task-system dependence.

At the second stage, individuals espouse different adaptation strategies to deal with the situation at hand. The evaluation of the situational condition processes result in the selection of adaptation behaviours. The analysis reveals that users engage in four different adaptation strategies: **reluctant adaptation behaviour**, **compliance adaptation behaviour**, **faithful adaptation behaviour** and **enthusiastic adaptation behaviour**.

In an instance where the system is perceived as important and users feel that they have high control over the system and work processes, adaptation strategy will be mainly **enthusiastic adaptation behaviour**. These conditions predispose enthusiastic users to take an active interest in continuously exploring the system features or functionalities. On the other hand, in an occurrence where the system is evaluated as less important and users feel that they have low control over the system and work processes, adaptation



strategy will be mainly *reluctant adaptation behaviour*. These conditions make some users hesitant to put effort into learning and using the system.

In some cases, users may perceive the consequences of the system as important and feel that they have high control over the system but limited control over the business processes. In such a situation, their adaptation efforts are likely to be *faithful adaptation behaviour*. Users tend to use the system features in a true-to-the-letter fashion based on what they have learned in the training they receive.

Two circumstances lead individuals to follow *compliance adaptation behaviour*. The first circumstance is when users perceive the system as relatively important to them but they have limited control over both the system and business processes. The second circumstance is when users who experience a high degree of mandate and social pressure to use the system perceive the system as less important to them and they have limited control over both the system and business processes. These situations make some users engage in superficial learning and make partial use of the system without exploiting its full functionalities to support their work; just enough to comply with pressure while trying to minimise changes to their work routines.

Adaptation behaviours and their consequences are diverse and complex. Reluctant adaptation behaviour impedes the proper execution of organisational tasks. ERP systems are multi-module systems that span across different functional areas of a business and ERP systems integrates all related tasks. The participant interviews also showed that the interdependencies that exist among the various steps in ERP workflow mean that an action in one part of the system has downstream implications on the rest of the steps in the workflow. Consequently, if some users refuse to use the system, it may also affect other users' tasks as well.

While compliance adaptation behaviour is associated with resistance, users who exhibit this behaviour engage in superficial learning and make partial use of the system without exploiting its full functionalities to support their work. Consequently, compliance adaptation behaviour leads to system underutilisation. Because these behaviours are characterised by users' reticence towards the IS, the associated performance benefits are

limited compared to those related to behaviours found in enthusiastic and faithful adaptation behaviours.

Faithful adaptation behaviour and enthusiastic adaptation behaviour are likely to contribute to positive consequences in IS use because users who espouse these behaviours actively put high effort into learning how to use the system to perform their tasks. However, their outcomes are slightly different. Despite their active engagement in the use of the system to perform tasks, faithful users do not venture into exploring features beyond those that they have learnt to execute tasks in an innovative way. Faithful adaptation behaviours, in some cases, may therefore lead to lost opportunities for IS-enabled performance gains.

By contrast, enthusiastic users are keen on not only using the learned features of the system but also investing time and energy in exploring and experimenting with functionalities not initially covered as part of the training. They seek to improve their level of expertise in their use of the system. Consequently, based on participants' responses, it appears that enthusiastic adaptation behaviours contribute to increased system utilisation and IS-enabled performance gains.

The consequences of adaptation behaviours also, in some cases, alter the organisational context. Challenges that employees face when adapting to the system may prompt top management to take actions such as increasing the degree of mandate or changing organisational practices. For instance, at MP, after observing that soft mandate did not work well and many employees were reluctant to change their work routine to use the system, the organisation changed their policies by enforcing a stronger mandate.

In other cases, compliance adaptation behaviour and faithful adaptation behaviour may prompt or influence organisations to place organisational initiatives to increase system utilisation. For instance, at ES after the system went live, the organisation placed a stronger mandate on system use but did not offer additional support and training. Consequently, many users tended to engage in compliance and faithful adaptation behaviours that lead to superficial use. After noticing this situation, the organisation changed their practices by encouraging more collaborative and group learning among peers to encourage system use.

### **6.2.3 The dynamic nature of adaptation behaviours**

The analysis also reveals that adaptation behaviours are contingent on individuals' continuous assessment and re-assessment of the changing situational conditions (see Figure 6.3). Through ongoing interaction with the system and the occurrence of triggers that provoke changes in situational conditions, users may modify their initial adaptation behaviours. Thus, the individual adaptation process is inherently dynamic.

Prompted by my questioning about critical events in their interaction with the system, participants' accounts revealed patterns of changing adaptation behaviours, as explained in Chapter Five. I observed that progressive transition was a dominant pattern. Progressive transition means users changed their adaptation behaviour from lower to higher levels of engagement with the system over time. Table 6.1 shows all patterns of adaptation behaviour transition in total and by organisation.

**Table 6.1: Patterns of Adaptation Behaviour Transition**

Patterns of adaptation behaviour transition	Total number of instances	Organisations			
		MP	BT	ES	IM
Progressive Transition					
Reluctant → Compliance → Faithful → Enthusiastic	3	2	-	1	-
Compliance → Faithful → Enthusiastic	5	1	1	3	-
Reluctant → Compliance	4	1	3	-	-
Reluctant → Faithful	6	3	2	1	-
Compliance → Faithful	4	1	1	2	-
Faithful → Enthusiastic	7	2	2	2	1
Regressive Transition					
Faithful → Compliance	2	-	-	-	2
No Transition					
Reluctant	2	-	1	-	1
Compliance	3	-	-	-	3
Faithful	2	-	-	-	2
Enthusiastic	4	1	1	1	1

I choose to highlight three users – two users that exhibited a progressive adaptation process and one user that showed a regressive adaptation process to illustrate the transition of adaptation behaviours. The first user, Anuroot, a participant from the purchasing department at MP, started with reluctant adaptation behaviour, moved to compliance adaptation behaviour, then faithful adaptation behaviour and eventually transitioned to enthusiastic adaptation behaviour. In the early stages, just after the implementation of SAP, he found the system difficult to use and not highly relevant to his job as an inventory administration officer. As a result, he was reluctant to use the system and continued to use paper forms.

Almost one year later, the organisation changed its policy related to the system use by increasing the level of mandate and introducing KPIs to evaluate employees' performances. This event refocused his attention on the system and triggered further adaptation behaviours. He was concerned that his lack of system use may affect his performance evaluation, so he subsequently began to perceive the system as relatively more important to his tasks than before. This situation persuaded him to interact with SAP directly. However, he had limited knowledge of both the system and work processes, so he put small effort into adapting to the system, just enough to satisfy his immediate work demands. As he recalled,

Initially, after the system rollout, I did not use SAP at all because it was not important to me. I was so frustrated with it. I refused to use it and did not even want to look at it. I continued sending paper forms. Almost one year later, our manager put more pressure on us. The organisation introduced KPIs to monitor us. I worried that my lack of SAP use might affect my performance evaluation, so I started using it. I learnt how to use it from my colleague but did not pay much attention to it. My requisition forms were rejected very often. . . . They said I did not enter all the fields they needed.

Two years after the system implementation, he took the position of purchasing officer. The tasks demanded by his new role were highly reliant on the system. He perceived the system as increasingly important. His organisation also offered him an intensive training before starting the new role. He then actively engaged in learning new

functionalities through one-to-one coaching from the employee who was in this role before. However, he had neither the confidence to customise the system to fit his work activities nor an understanding of how his tasks fitted into the overall process. Therefore, he just kept faithfully practising what he had learned. As he explained,

My colleague trained me on how to use the system before she left this role. I created my own manual in MS Word. I captured the screenshots that I had to use and added step-by-step notes. I was new to this position and did not know much about the whole business process. The only thing I could do was to use the system based on my own manual.

Later on, in order to encourage users to share knowledge and learn about business processes and technical knowledge related to the system, his organisation initiated a series of regular group meeting events in which users from different functional areas got together to share knowledge about other businesses and the system. After attending these meetings, his level of understanding of business processes and knowledge of the system increased. He was capable of adapting the system to his work routines. This trajectory illustrated his transition from faithful to enthusiastic adaptation behaviour. He summarised his experience:

It is interesting to say that at first I did not want to use the system but now I like it and I have become an expert user here. Everyone says so! I discovered that I could use the system to do many more things than I had been trained for. After all, I changed how I do my work. In the past, it used to take me one month to complete this task; now, I can complete it in just one week.

Figure 6.4 depicts the dynamic process of Anuroot's adaptation behaviours.

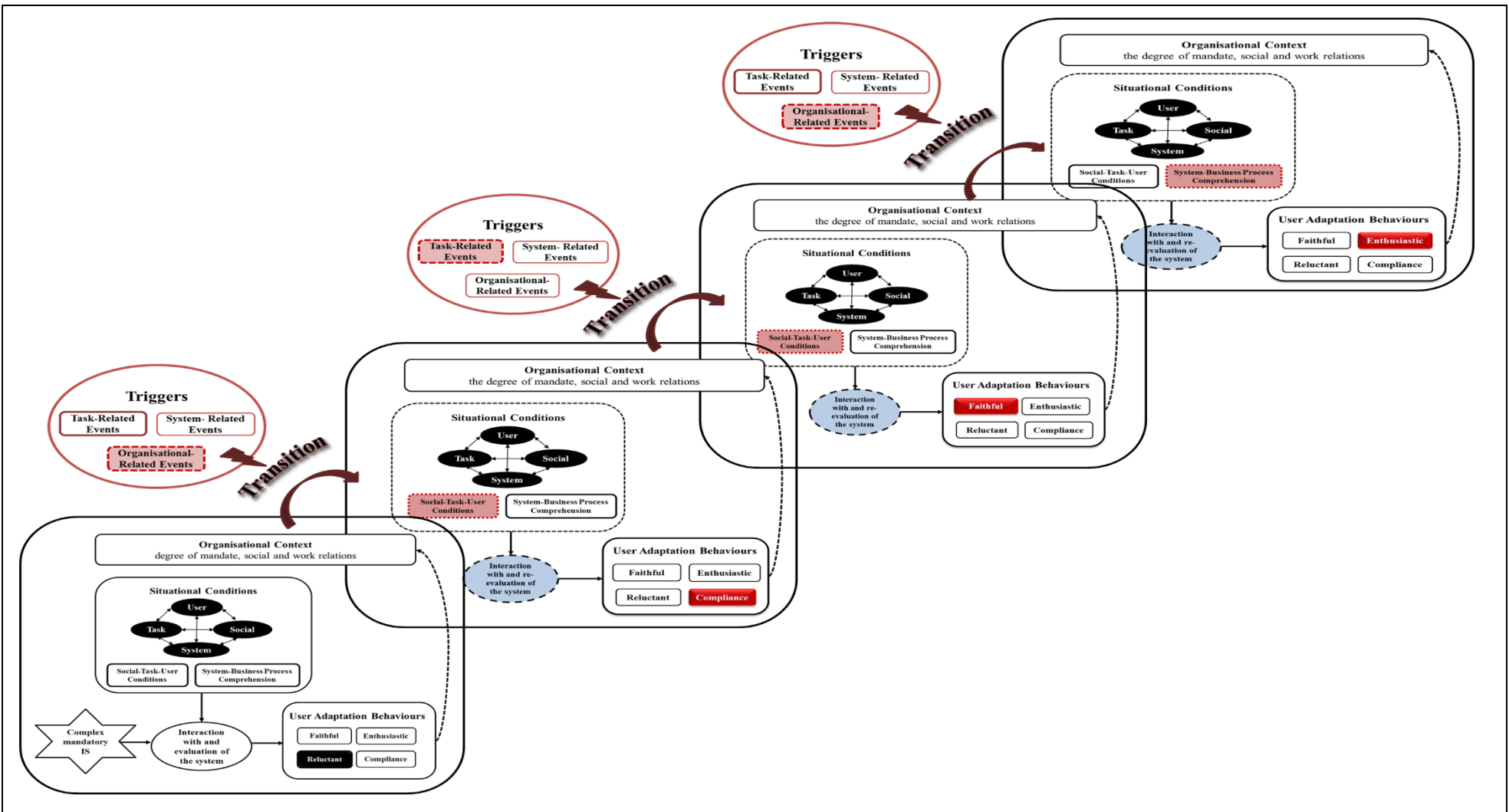


Figure 6.4: The dynamic process of Anuroot's adaptation behaviours

Laddawan, a participant from the purchasing department at ES, was another interesting case who offered insight into progressive adaptation behaviour. Laddawan started from compliance adaptation behaviour, moved to faithful adaptation behaviour and eventually transitioned to enthusiastic adaptation behaviour. After the system went live, Laddawan acknowledged that usage was strongly mandated and felt that she had to learn to use the new system. She was afraid of losing her job due to her lack of system use, so she perceived the system as having relatively high importance to her job security. However, Laddawan was one of the users who had limited understanding of the system capability after SAP went live due to inadequate training. She also found the system to be too complicated with difficult interfaces that made it challenging to use. Consequently, she engaged in superficial use and made the parallel use of shadow systems without exploiting SAP's full functionalities to support her work, which reflects compliance adaptation behaviour. She recalled,

Well . . . it used to be that only power users were sent to intensive training to understand how to use system functionalities. For general users, the organisation provided us with a short training, only two or three hours. The training was way too short and not enough to understand how to use the system. Although we have power users, it was impossible for them to help everyone. It was a mess after the system went live. I continued using the legacy system concurrently with SAP.

After the organisation offered her the intensive training, her level of knowledge of the system increased and she felt more confident in using the system. However, she did not venture into exploring features beyond those that she had learned to execute tasks in an innovative way. This reflects a transition from compliance adaptation behaviour to faithful adaptation behaviour. She stated,

The situation got much better after they provided the intensive training for everyone. Most of us stopped using the legacy system and we could use SAP to perform tasks better with less error than before. I felt more confident in using SAP. I was trying to practise the use of the system by following the instructions.



She revealed that the transition happened again after the organisation initiated the ‘train the trainer’ programme and she was chosen to be one of the trainers for her department. Laddawan’s comments illustrate how the ‘train the trainer’ event triggered her transition from faithful adaptation behaviour to enthusiastic adaptation behaviour. She commented,

After the intensive training intervention, the organisation also initiated a train-the-trainer programme. I was selected to be the trainer for my department and to join this programme. During the training, I learned how to use SAP and also learned how to train and help other users. I think the programme made me feel more involved with the system than before. It also helped me to extend my business process knowledge because I had to learn system functionalities in other modules that were related to material management. I also had a chance to share knowledge with trainers from other departments too.

Figure 6.5 depicts the dynamic process of Laddawan’s adaptation behaviours.

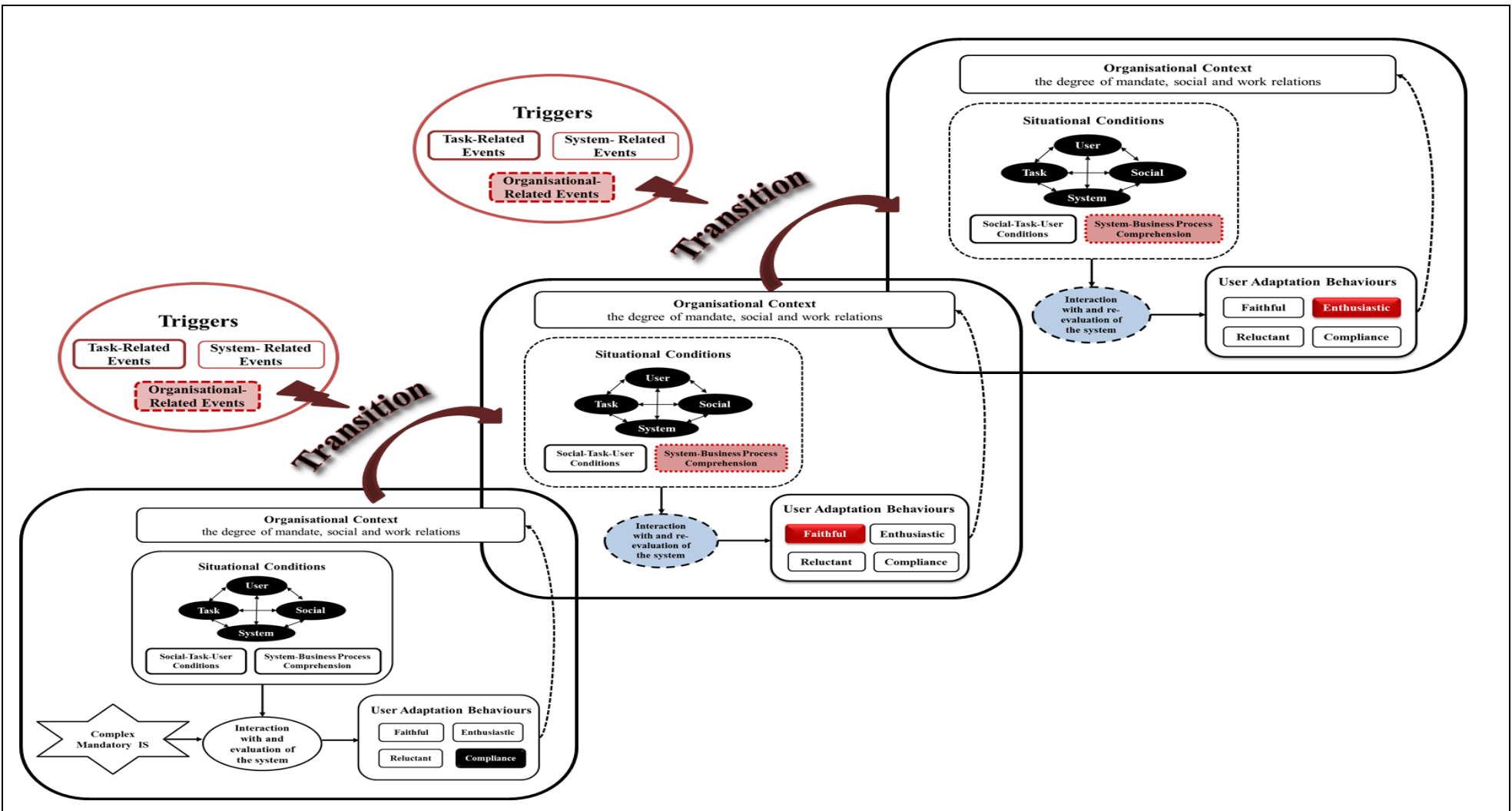


Figure 6.5: The dynamic process of Laddawan's adaptation behaviours

The transition from one adaptation behaviour to another does not only move in a progressive way; regressive transitions are also possible. The transition from faithful to compliance behaviour is the dominant pattern among regressive transitions. Machida, a participant from the purchasing department at IM, illustrated the regressive transition. Initially, she perceived the system as relevant to her work and actively adapted to it following its implementation. She attended training class and tried to routinise the use of the system by following the manual she received from the training, thus showing traits of faithful adaptation behaviour. As she recalled, “After the system went live, the legacy system was shut down. Most of my key tasks were transferred to SAP. I received training . . . along with a user manual. After that, I just followed step-by-step instructions in the manual”.

She recalled that, about two years after the implementation, she moved to a new position that did not heavily rely on the system, so her perception of its importance decreased. In her new role, Machida had to learn new functionalities, but this time her adaptation strategy was different. Even though she was a competent user, she realised that the system was not essential for performing her work. She restricted her interaction with the system to complete tasks at hand, engaging in compliance adaptation behaviour. She explained,

My new work is not as heavily reliant on SAP as the previous work that required me to use the material management module in SAP all day long. My new tasks are analysing data, budgeting and creating reports for my manager. I just have to use SAP's reporting functionality to create reports for my manager. I did not use this functionality before. My colleague taught me how to use it. She told me that I could produce a good report in SAP, but I found it too complicated and time consuming, detracting me from the main activities I should be doing. MS Excel is much easier. . . . I use both SAP and MS Excel. I extract relevant data from SAP to MS Excel in order to produce reports in a format that is difficult to produce with SAP.

Figure 6.6 illustrates the dynamic process of Machida's adaptation behaviours.

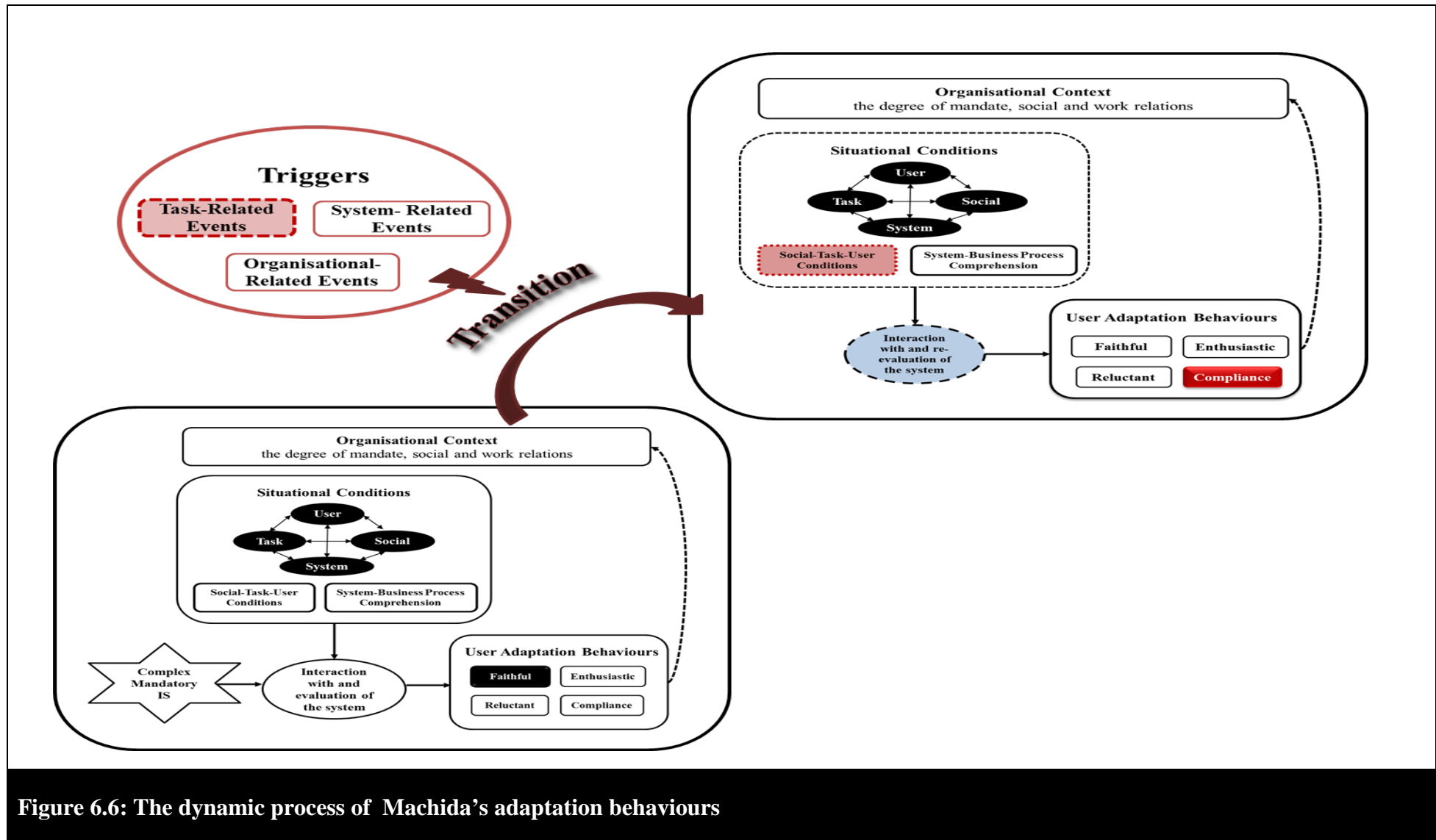


Figure 6.6: The dynamic process of Machida's adaptation behaviours

The findings also reveal that those users who change their adaptation behaviours are largely those who work in units where a strong management intervention is present. They also come from organisations where management introduces organisational initiatives to increase system utilisation and provides resources to continuously improve the systems. The presence of strong management interventions, such as a special training intervention programme, individualised training and peer-to-peer information sharing, play an important role in shaping adaptation behaviours. These events can provide opportunities for users to acquire the system and business process skills necessary to perform their duties. Consequently, users can improve their knowledge of the system and/or understanding of the interconnected business processes. It should be noted that the user adaptation process is not a finite, linear task. Rather, it is a continuous process, which may involve multiple rounds of adaptation changes.

Figure 6.7 depicts a graphical representation of the general dynamic process of user adaptation. The diagram in the foreground represents user adaptation behaviour immediately after the system becomes live. The figures in the background are the next episodes of user adaptation behaviours after experiencing triggers.

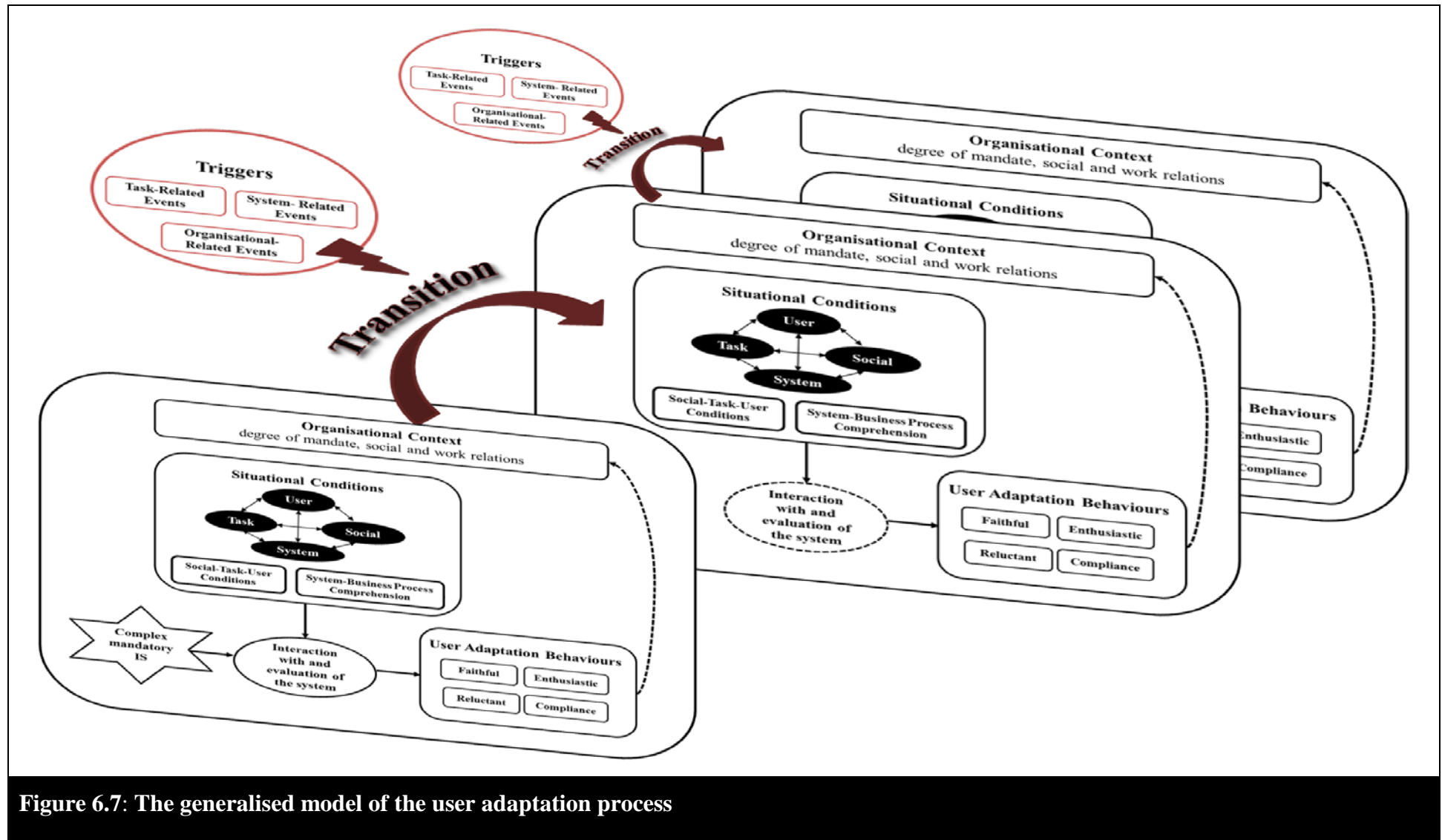


Figure 6.7: The generalised model of the user adaptation process

#### **6.2.4 Cross case analysis**

Going live with ERP systems is a significant event in an organisation. It marks the beginning of the post implementation stage where the organisation as a whole comes to terms with the new system. In all four organisations that participated in this study, a few executives, functional managers and the project team along with key users were the only people directly involved with the ERP system. Some users attended ERP training programmes. Helpdesk, manuals (in English at ES and IM, in Thai at MP and BT) and access to online support service supplemented the training. However, in many cases, training programmes did not provide enough details to ensure that process and system changes were well communicated to and understood by users, since the studied organisations mostly used generic training configurations provided by their vendors.

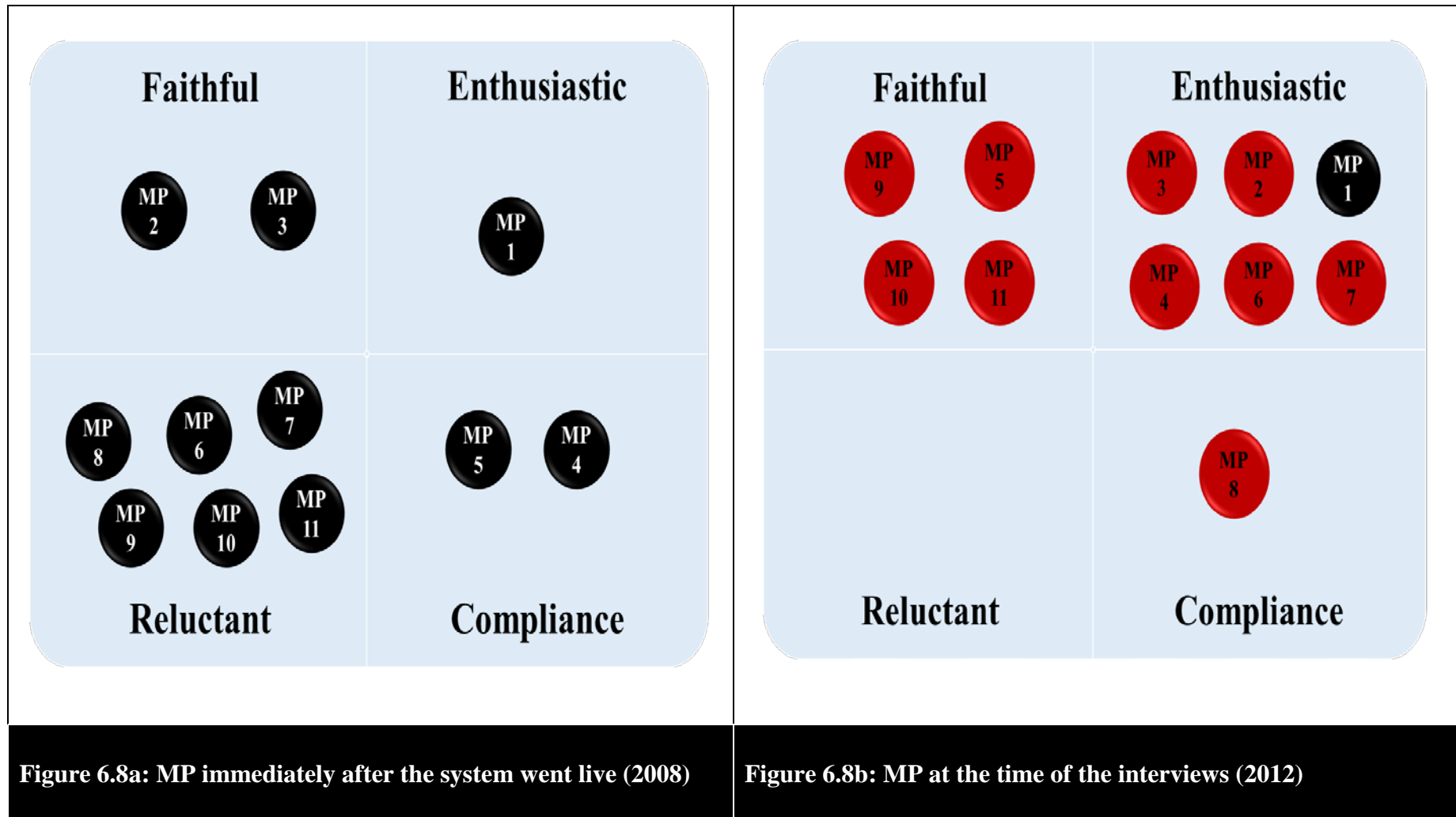
Most users from all four organisations engaged in a dynamic process of user adaptation behaviour. However, this process evolved differently across the organisations. It is worth mentioning that some users experienced the transition more than once after the system was implemented (see Appendix 6). For schematic analysis, I choose to present only two points in time: immediately after the system went live and at the time of the interviews. Figures 6.8a, 6.8b, 6.9a, 6.9b, 6.10a, 6.10b, 6.11a and 6.11b compare different adaptation trajectories from the four participating organisations.

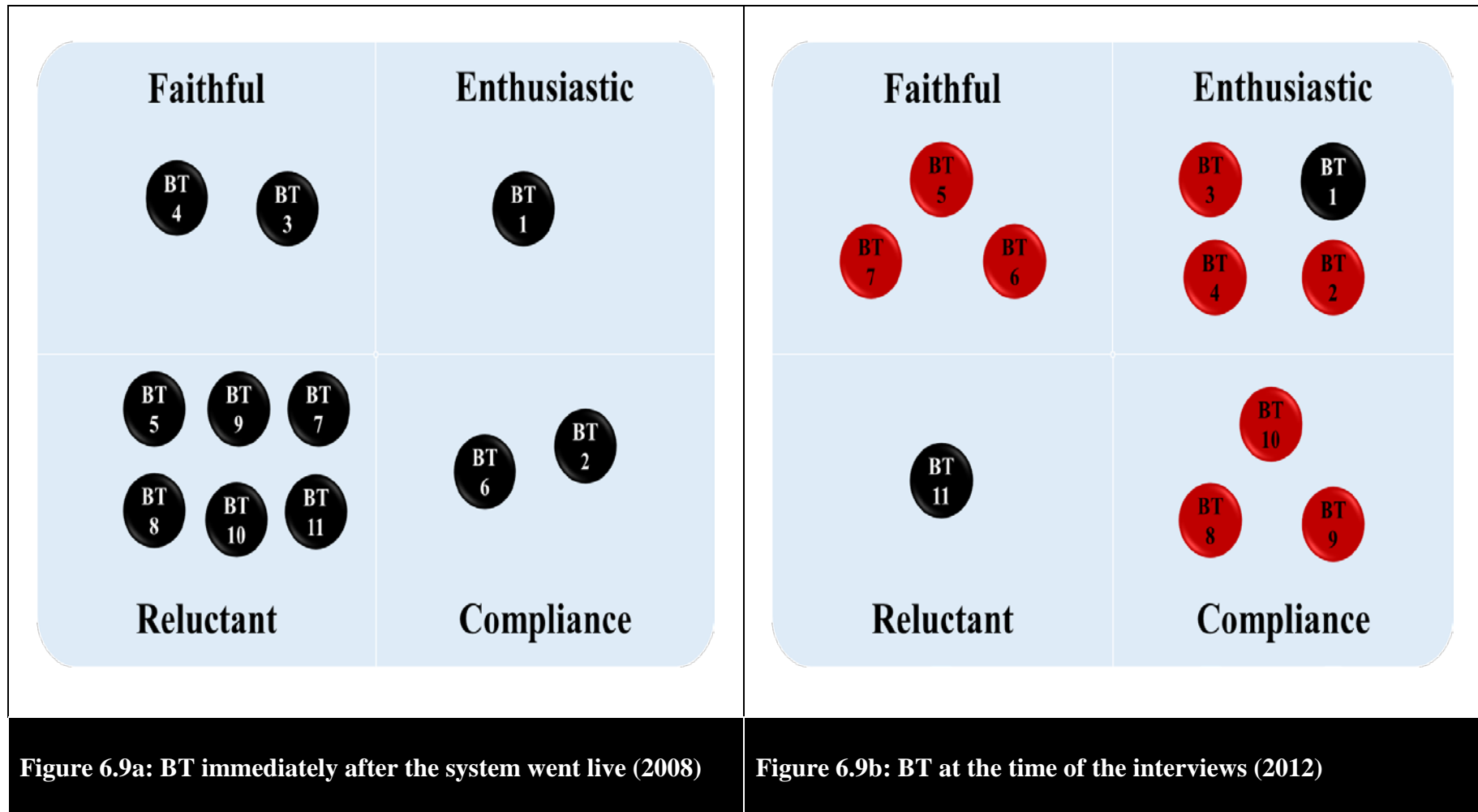
Experiences of the system within each organisation clearly evolved from the moment immediately after the system went live. Most users at MP, BT and ES engaged in a dynamic process of adaptation behaviour over time. This was due to the presence of triggers that encouraged them to change their adaptation behaviours. To some extent, these organisations introduced initiatives to increase system utilisation such as special training programmes, individualised training and peer-to-peer information sharing. In some cases, users shifted their adaptation behaviours due to task-related events, organisational-related events and system-related events such as job rotation and system upgrade.

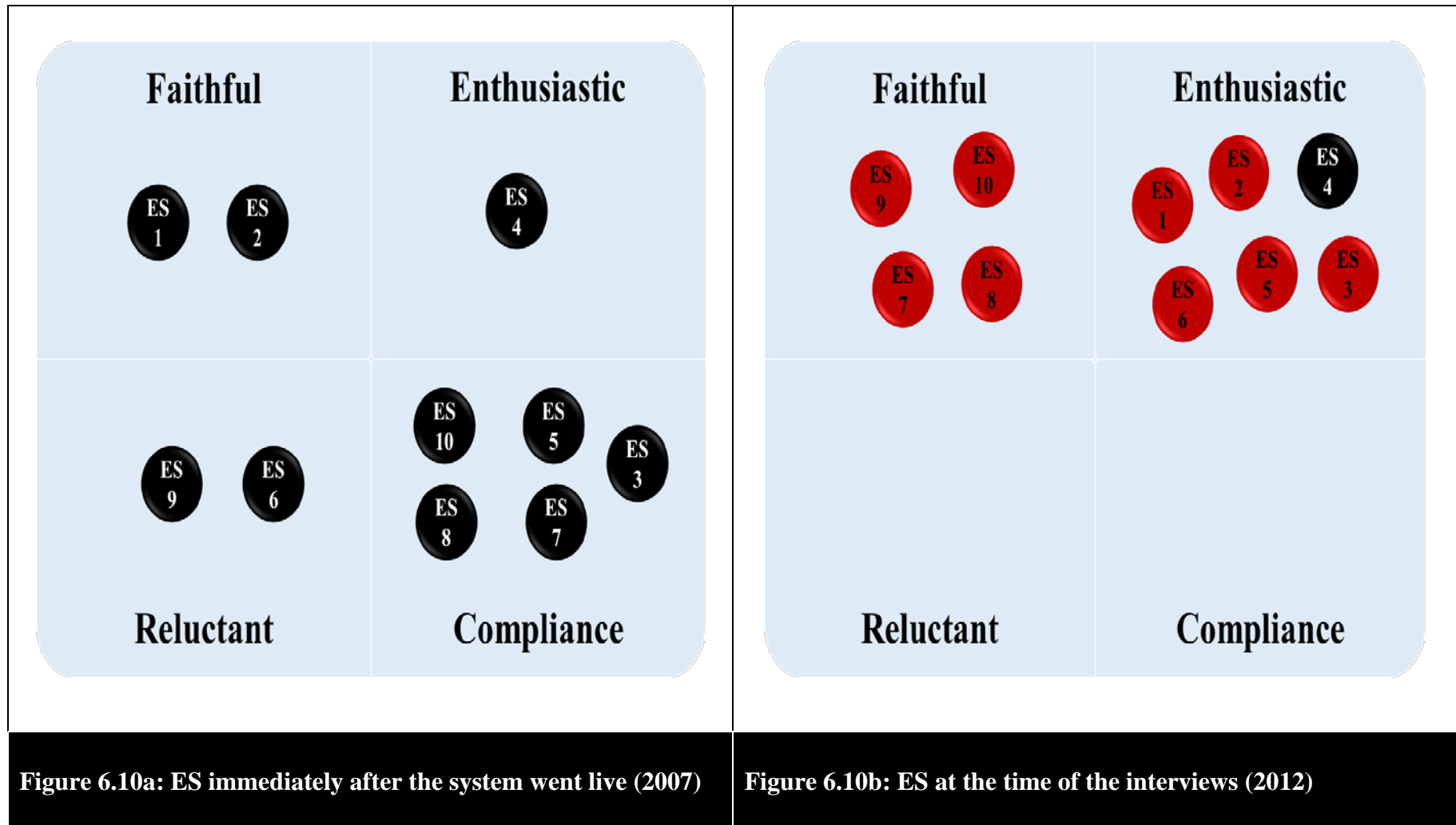
In contrast, the user adaptation trajectory at IM followed a different pattern. Most users did not change their adaptation behaviours because of the lack of triggers. Interestingly, two users, IM4 and IM6, had a regressive trajectory from faithful to compliance

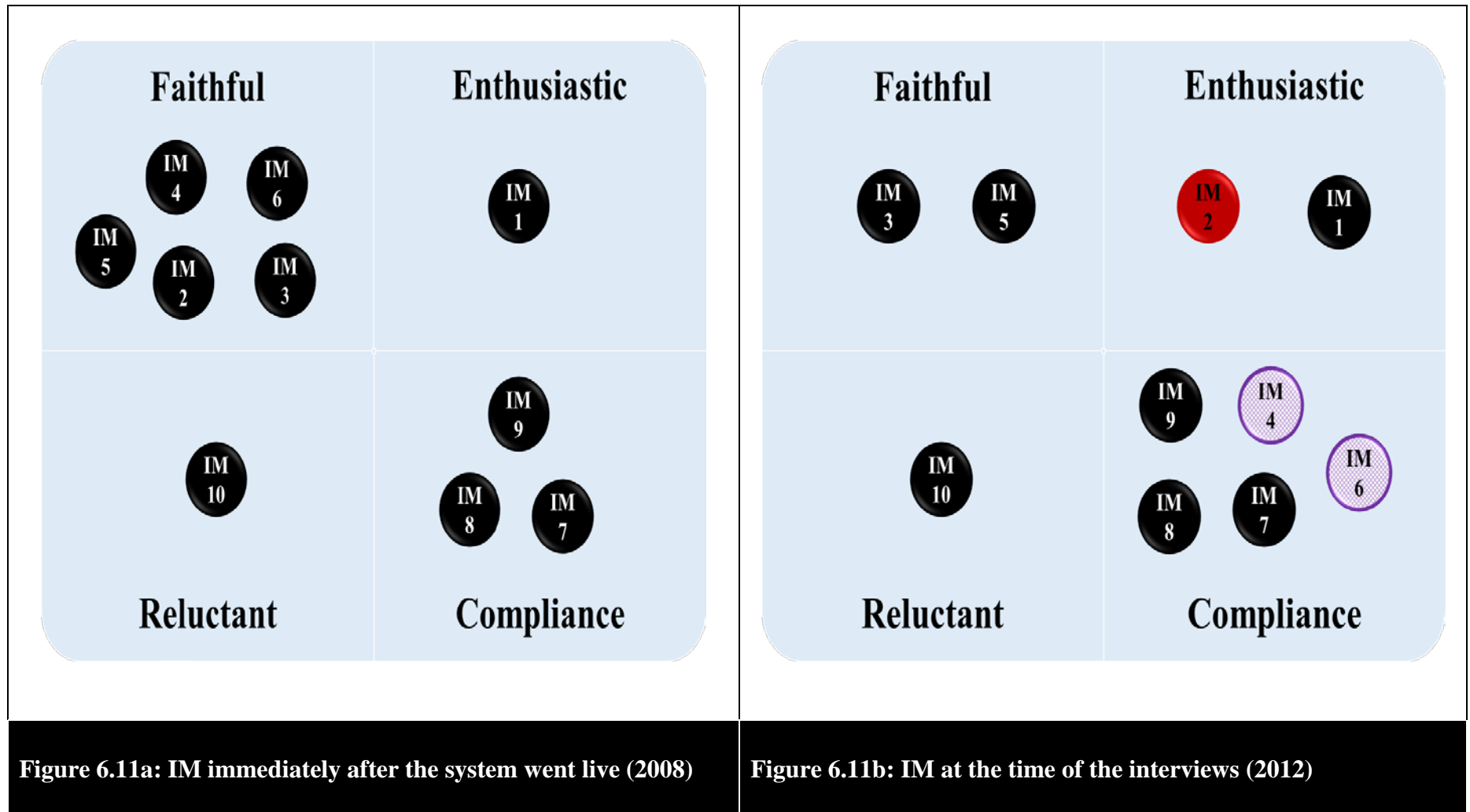
adaptation behaviours due to a change from high task-system dependence to low task-system dependence. As a result, these users reconsidered the value they attached to the system and put less effort into learning how to use it.











I found that there were fewer individuals who initially adopted reluctant behaviour in the multinational organisation (ES and IM) compared to Thai-owned organisations (MP and BT). At ES and IM, as mentioned by participants, the employees believed in their executive's decisions and the overall benefits of their ERP system. The employees seemed to have a greater degree of organisational commitment and a strong belief in their organisation's decision. Employees from both organisations acknowledged that usage was strongly mandatory. According to participants, they were also afraid of losing their jobs due to lack of system use. They eventually needed to learn how to use the new system. At ES in particular, participants revealed that the organisation had very strict rules whereby subordinates were required to follow orders. The organisation also had a highly competitive culture reinforced by an up or out career path. However, none of the organisations provided proper training for users before the system went live. Consequently, in the initial stages of the adaptation process, immediately after the system went live, most users engaged in compliance adaptation behaviours or faithful adaptation behaviours.

At MP and BT, in contrast, I observed that most users started with reluctant adaptation behaviours immediately after the system went live. At MP, as mentioned in Chapter Four, the social relations among the employees were quite informal. After the system went live, users were comfortable sharing information and expressing their positive and negative reactions across different levels of the organisation. Since the organisation placed a soft mandate at the beginning stage, some users interpreted that usage was optional. Although they did not completely reject the new system, they wanted the ERP system to be customised to suit their familiar work patterns.

At BT, employees in the organisation enjoyed job security as a result of the government's human resource policies, which allowed employees to reach tenured status after serving probationary periods of employment. In addition, there was no evidence that employees were afraid of losing their jobs due to lack of system use. When the system first went live, the organisation placed a strong mandate only in the accounting and finance department. The mandate was moderate in other departments. This meant that some users in these departments did not put effort into adapting to the system. Consequently, many users were reluctant to use the system and some of them

continued using the legacy system. As shown in Figure 6.8a and Figure 6.9a, many users at MP and BT initially engaged in reluctant adaptation behaviours.

After the system went live, most users at MP, BT and ES changed their adaptation behaviours in a positive direction. These organisations proactively introduced initiatives to increase system utilisation such as special training programmes, individualised training and peer-to-peer information sharing, along with a continuous improvement of the system.

At MP, after realising that the low degree of mandate did not work well, and observing many employees struggling to keep up with changes in work practices, the organisation changed their policies by enforcing a stronger mandate. The organisation also offered special training intervention programmes, individualised training and peer-to-peer information sharing in order to encourage users to adapt to the system.

At ES, during the initial stage, the organisation used hard mandate tactics without adequate support and training. Although most users did not resist using the system, they resorted to superficial use and ended up with compliance and faithful adaptation behaviours. After noticing this problem, the organisation initiated training intervention programmes such as intensive training intervention and a train-the-trainer programme. The system also continued to upgrade to improve system performance.

MP and ES started with different strategies, but at the time of the fieldwork they appeared to have the similar approach of focusing on both soft and hard tactics and using these tactics to encourage employees to increase system use. The hard tactics tended to involve using managerial power to get subordinates to comply with organisational goals. For example, placing a strong mandate and introducing KPIs to evaluate employees' performances were used in order to encourage employees to use the system. Soft tactics included support, encouragement and knowledge sharing among employees.

At BT, at the time of interview, the degree of mandate still varied among departments – strong in accounting and finance departments and moderate in purchasing, human resources and maintenance departments. BT had also initiated intervention programmes

such as knowledge sharing gatherings to encourage users to explore the system; however, the event only focused on users in the accounting and finance departments. As can be seen in Figure 6.9a and Figure 6.9b, two users from this department (BT3 and BT4) changed from faithful adaptation behaviour to enthusiastic adaptation behaviour. Users in the other departments also showed a transition in adaptation behaviours in response to triggers by system-related events and task-related events. However, none of them transitioned to enthusiastic adaptation behaviour.

By contrast, users at IM had dramatically different adaptation experiences. Most users did not change their adaptation behaviours. The findings revealed that this was due to the absence of triggers. To some extent, the role of the ERP system is to support IM's commitment to accountability and transparency in relation to its member states, donors and other stakeholders. Their focus is on Accounting and Finance areas. After the system went live, the organisation did not initiate an intervention programme to increase system utilisation. I found only three users (IM2, IM4 and IM6) who changed their adaptation behaviours. These users changed their adaptation behaviours due to task-related events that induced change in their situational conditions, as explained in Chapter 5. Interestingly, two users (IM4 and IM6) had a regressive trajectory from faithful to compliance adaptation behaviours due to a change from high task-system dependence to low task-system dependence. As a result, these users reconsidered the value they attached to the system and put less effort into learning how to use it.

The findings show that organisational practices also influence the user adaptation process. Organisational practices direct employees in ways that are consistent with organisational expectations. The findings also suggest that organisations have to make consistent efforts in the post implementation stage to enhance the use of several advanced features that are available in the ERP system. Organisations should allocate significant resources and managerial attention to initiate intervention programme that encourage users to continue improvement in system use.

## 6.3 Theoretical integration

The literature review introduced in Chapter Two informed my ideas and made me theoretically sensitive. The conceptual elements in the literature were used as a “sensitising device” (H. K. Klein & Myers, 1999, p. 75) that led to an examination of individuals’ adaptation process to a new IS, without excluding the possibility of new theoretical insights emerging in the field. In the next subsections, the findings will be discussed by considering the existing literature along with novel theoretical findings that extend our understanding of adaptation behaviours.

### 6.3.1 Coping theory

The analysis indicates that the user adaptation process can be explained by three interrelated concepts: **User adaptation behaviours**, **Situational conditions** and **Triggers**. The theoretical model developed in this study addresses important gaps in the literature, in particular by emphasising the dynamic aspect of the user adaptation process. The emergent, substantive theory corroborates coping theory in the sense that the user adaptation process constitutes two key components which continuously influence each other: the evaluation of a particular situation or event, and the adaptation behavioural efforts exerted to manage the given situation. Depending on the outcomes of their assessment of the importance of the situation and their ability to use the system, individuals choose different adaptation strategies. However, coping theory cannot fully explain the observed adaptation behaviours.

This study extends coping theory in three ways. First, it reveals the influence of social, organisational and system conditions on adaptation. Specifically, this study provides insight on how the interaction among situational conditions shapes adaptation behaviours. Second, it identifies specific individual adaptation behaviours (reluctant, compliance, faithful and enthusiastic adaptation behaviours). Third, the theory explains the dynamic elements of adaptation behaviours and describes why adaptation strategies evolve over time. This study demonstrates that one’s adaptation strategy may change if the situation conditions change over time. Through ongoing interaction with the system



and the occurrence of triggers that provoke changes in situational conditions, users may modify the adaptation behaviours they initially espoused. Hence, the findings represent a theoretical extension to coping theory and can help inform and guide future research into the temporal nature of the coping process.

Coping theory (Lazarus & Folkman, 1984) depicts that individuals deal with a disruptive event in two sequential stages: (1) appraisal, the cognitive evaluation of a particular situation or event, and (2) coping effort, the cognitive and behavioural efforts exerted to manage the given situation. The process begins with appraisal, which is realised in two steps. In the primary appraisal, the nature of the particular event and its personal importance and relevance are assessed. Coping theory suggests that there are two possible outcomes of the primary appraisal process: opportunity or threat. Opportunity refers to a situation that has been assessed as having positive outcomes for an individual and invokes emotions of excitement and anticipation. A threat refers to a situation that is perceived as having negative consequences for an individual.

The findings reveal that the personal and professional consequences one associates with a new system can be perceived as involving both opportunities and threats. For instance, users may perceive the system as an opportunity to be more efficient in the execution of their tasks; however, they may also feel overwhelmed by the complexity of the system. In addition, most users refer to their perception of the system as the degree of its importance to their tasks. Therefore, this study refers to the outcomes of users' assessments of the situation as importance or unimportance rather than opportunity or threat.

In the secondary appraisal, individuals evaluate the coping options available to them. They determine the level of control they exert over the situation and what they feel they can do about it given the coping resources available to them (Lazarus & Folkman, 1984). In this study, secondary appraisal relates to an evaluation of the control an individual has over the situation. This study articulates two dimensions of control: (1) the control over the system, and (2) control over the work process.

Coping theory is silent on what elements of a disruptive IT event shape individual assessment. This study extends coping theory by revealing situational conditions that

influence this assessment: social context, task-system dependence, individual-system attachment, knowledge of the system and understanding of the business processes. These concepts extend the psychological explanation of coping theory by integrating social and IS perspectives to explain the user adaptation process. Furthermore, since the individual assessment takes place within an organisational context, the findings also reveal that user assessment is also influenced by social and institutional factors, such as top management support regarding the IS implementation effort, the degree of mandate and organisational practices. This study emphasises that adaptation goes beyond the psychological process that coping theory claims. The findings indicate that social, organisational and system conditions and their subsequent changes shape user adaptation strategies.

The second component of the coping process, coping effort, follows the appraisals. Coping theory suggests that an individual chooses coping efforts to deal with the situation according to his/her appraisal of the situation (Lazarus & Folkman, 1984). Coping theory classifies coping efforts into two broad psychological categories: problem-focused and emotion-focused coping. Problem-focused coping acts aim at managing the disruptive issue itself. They are oriented towards solving the problem and managing the situation by changing environmental pressures, barriers, resources or changing oneself. Emotion-focused coping acts are oriented towards the self and aim at regulating personal emotions and tensions, restoring a sense of stability, and reducing emotional distress.

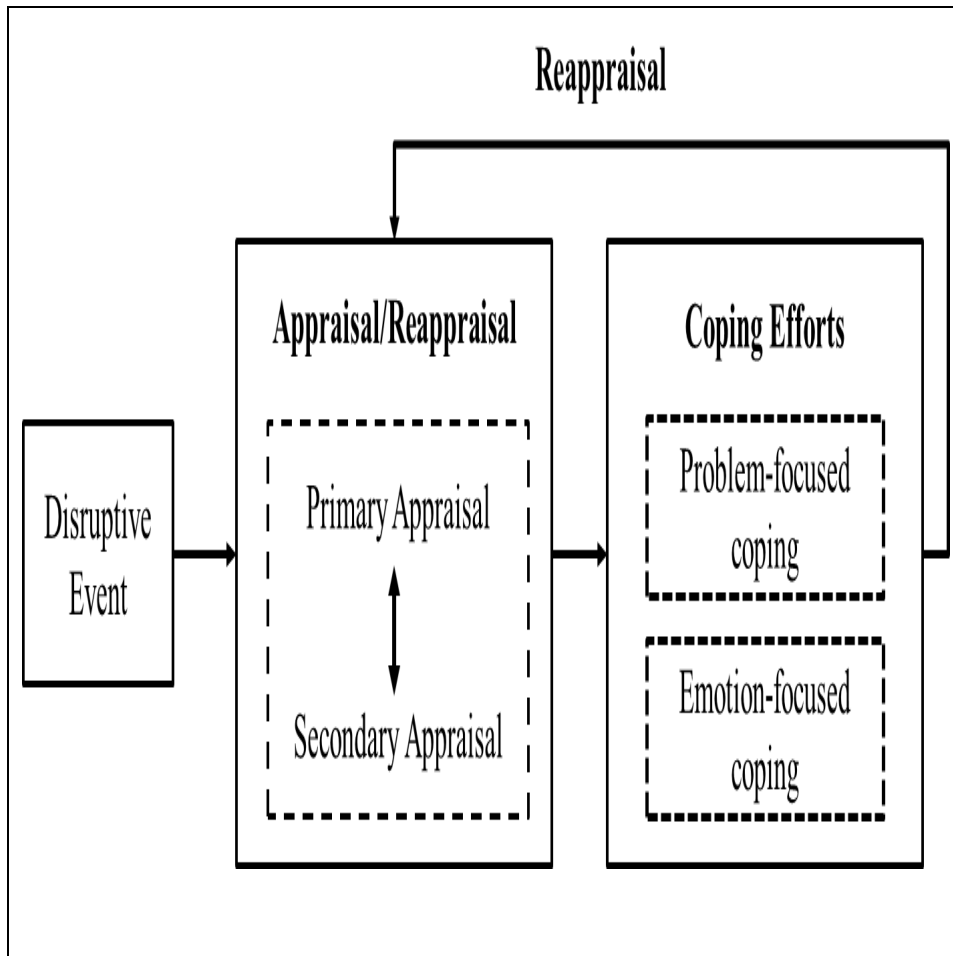
Although coping theory provides a useful theoretical explanation to understand how individuals respond to a disruptive event, it is relatively vague in defining and describing specific coping mechanisms. This study finds that the categories of problem-focused coping versus emotion-focused coping are not mutually exclusive. The dichotomous dimension of emotion-focused and problem-focused coping is too simplistic. For example, seeking help from peers not only guides problem solving but also calms emotion. Within the context of IS adaptation, this study extends coping mechanisms to four different adaptation strategies: reluctant adaptation behaviour, compliance adaptation behaviour, faithful adaptation behaviour and enthusiastic

adaptation behaviour and explains how users respond to the evolving work practices that an ERP system imposes.

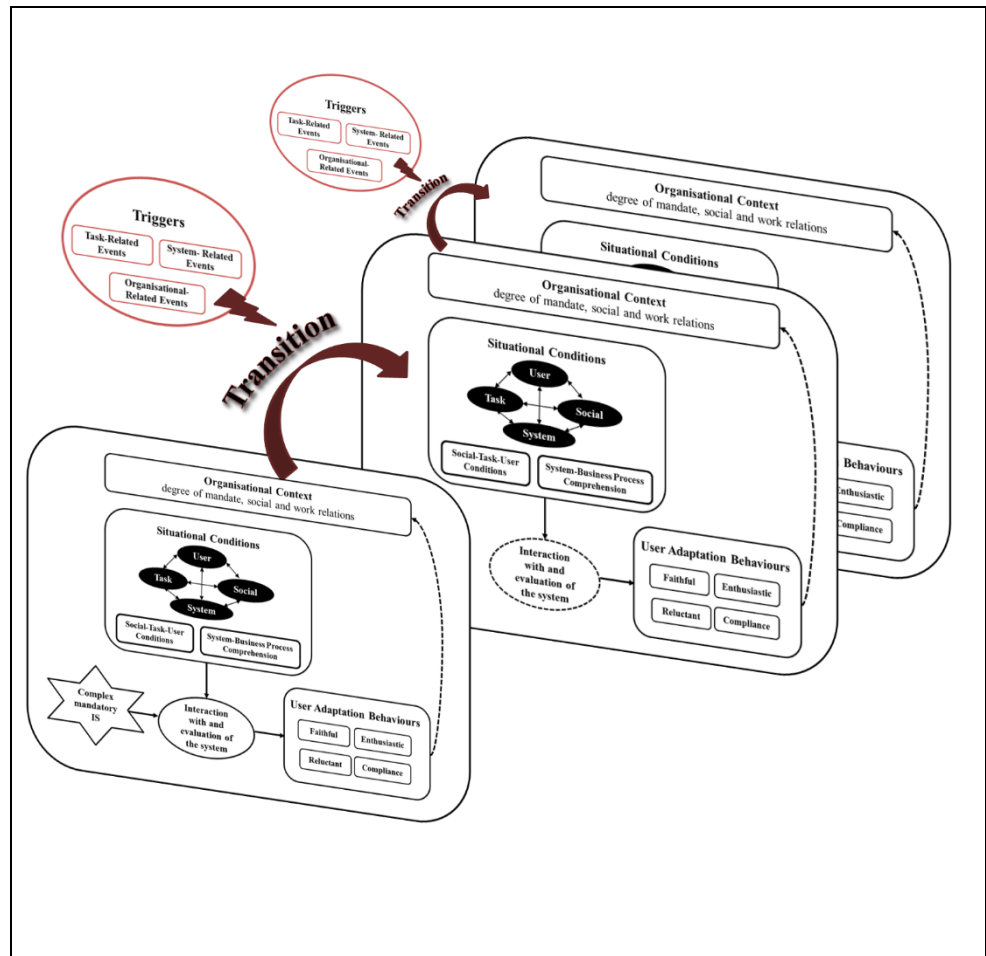
In addition, while coping theory has examined the different coping strategies and how these strategies are related to primary and secondary appraisals, it has not examined temporal shifts in coping strategies. By applying coping theory, CMUA examines different user reactions to IS (Beaudry & Pinsonneault, 2005); however, it neither explains the dynamic elements of adaptation behaviours nor describes why adaptation strategies evolve over time. More interesting from a managerial perspective is whether organisational users can be influenced to move from one adaptation behaviour to another, such as from reluctant to compliance adaptation behaviour or from faithful to enthusiastic adaptation behaviour. This study fills this gap by revealing how users can change from one adaptation behaviour to another. Through ongoing interaction with the system and the occurrence of triggers, namely task-related events, organisational-related events and system-related events that provoke changes on situational conditions, users may modify the adaptation behaviours they initially espoused.

The findings show how the dynamic interplay between individuals' perception of situational conditions and triggers explains adaptation behaviour transitions. The theory explains the dynamic elements of adaptation behaviours and describes why adaptation strategies evolve over time. The analysis of the move from one adaptation behaviour to another provides a fine-grained understanding of the mechanisms by which the transition occurs. Hence, the findings represent a theoretical extension to coping theory and derivative studies, and can help inform and guide future research into the temporal nature of adaptation process.

Figure 6.12a and 6.12b compare the coping theory model and the user adaptation model.



**Figure 6.12a: Coping process (adapted from Lazarus & Folkman (1984))**



**Figure 6.12b: The dynamic model of user adaptation process in the IS context**

### **6.3.2 ERP systems post-implementation**

The findings corroborate and also extend what post-adoptive literature on ERP systems has developed. Consistent with the literature (e.g., Jaspersen et al., 2005; Markus, 2004) the findings show that the a reason for ERP implementation failure and post-implementation ineffectiveness is partly due to inadequate change management during implementation. Particularly, organisations fail to understand the specific nature of changes in employees' jobs caused by an ERP system and associated business process changes. Managers also play an important part in the promotion of post-adoptive use behaviours because they can direct the use of various ERP features, provide incentives for using various features, provide technology interventions, and direct the modification or enhancement of the ERP system. It also appears from the findings that strategies, policies, and actions utilised by organisations have an effect on post-adoptive use behaviour.

The findings also support the literature that ERP system underutilisation is partly due to inadequate training and the failure to ensure that process and system changes are well communicated to and understood by users (Jaspersen et al., 2005; Robey et al., 2002). When users do not receive the proper training, they are unable to perform the functions in the system properly and are incapable of using the system effectively to gain the expected returns. In addition, the lack of training can cause operational issues that affect individuals' behaviour in the organisation and result in poor performance and increased resistance to change (Hwang & Grant, 2011; Metaxiotis, 2009). Limited training and a lack of well-planned change management can obstruct a user's ability to understand and exploit system capabilities and thus limit utilisation of the system.

The findings reveal substantial evidence to suggest that training should be an ongoing process in the post-implementation phase in order for users to fully leverage the system and its capabilities. The level of detail provided during the training intervention helps to provide the context necessary for users to make sense of the system and the business capabilities available to them. Also, as users receive more training in the ERP system, they have less cognitive dissonance and begin to make sense of how business strategies, business processes, and ERP modules are all integrated. Exploring and experimenting

with the system increases users' understanding of the system; as system understanding increases, the assimilation of system features increases.

The analysis also extends the literature by revealing that customised training that incorporates business tasks and work flow is effective for ERP system users. The findings suggest that training in both business processes and the system appear more effective than those only focused on ERP system training. This training will help to improve users' overall understanding of both the system and business processes. A lack of appropriate business processes training not only limits the understanding of business processes, but also the potential of the system. Therefore, it is important to view system and business process training not as mutually exclusive, but rather as synergetic of each other.

The analysis also reveals that individuals adapt to systems in different ways and users may need customised support to help them to adapt to the system. Thus, training-in-context from coaching by super users and peer-to-peer training is a big influence in enhancing the use of the system. In addition, understanding how triggers are manifested allows organisations to steer positive adaptation behaviours to IS.

Previous research has ignored the importance of user groups learning and sharing in the ERP post-implementation phase. The findings highlight the importance of user group learning in increasing system utilisation. Providing user groups learning and sharing opportunities can encourage users to share their knowledge, experiences and practices in how to use the system, consequently helping them to enhance their knowledge of the system and understanding of business processes. In addition, creating user groups and having users participate and be involved in the development of the system can help prevent distancing from the system.

### **6.3.3 IS acceptance and resistance**

The conceptualisation of adaptation behaviours in this study also sheds some light on the existing literature on IS acceptance and resistance. These two areas of research have historically been studied independently, often under the implicit assumption that resistance means non-acceptance. In other words, studies tend to conclude that users

either accept or resist the system (Offenbeek, Boonstra, & Seo, 2013). Acceptance and resistance are simply assumed to be the opposite ends of a single dimension (e.g., Jiang, Muhanna, & Klein, 2000; Lapointe & Rivard, 2005; Martinko et al., 1996). My observations suggest that IS acceptance and resistance are distinct but related phenomena that may coexist within the same group of users, and should therefore be studied in conjunction, rather than in isolation. This research offers a unifying framework to study users' behaviours in response to IS that incorporate elements of acceptance and resistance behaviours.

The findings posit that acceptance and resistance are multidimensional concepts that are associated with a complex mix of behavioural manifestations and organisational impacts. The model from this study provides a new lens for examining these intrinsically complex phenomena. In this regard, categorising user adaptation behaviours reveals nuanced patterns of uses, namely reluctant, compliance, faithful and enthusiastic adaptation behaviours. This research enables a better understanding of users' complex reactions and the way they interact, especially in a situation of mandated use. From this categorisation, it emerges that resistance is not the flip side of acceptance, and vice versa; acceptance does not always imply effective use and resistance does not necessarily imply non-use. Therefore, neither resistance nor acceptance can be considered good or bad per se.

To some extent, some users may engage in a mix of acceptance and resistance behaviours. For instance, while compliance adaptation behaviours such as continuing to follow former procedures or the parallel use of shadow systems imply IS use, as they still use the system to perform tasks, they are also associated with resistance. Similarly, when users deliberately commit errors, they actually use the system. Minimal use is also a manifestation of resistance even though it involves system use. This kind of behaviour has been classified as resistance in the previous literature (Coetsee, 1999; Lapointe & Rivard, 2005; Markus, 1983). On the other hand, resistance manifestations such as gossiping or complaining may be associated with use behaviours performed in compliance with social pressure or enforced by peers or by pressure from management.

Although faithful adaptation behaviours can be translated into acceptance and have positive consequences on IS use, they may result in lost opportunities for enhanced IS

utilisation. To some extent, users are less driven to engage in discretionary constructive use of the system to complete tasks that is above and beyond the routinisation of the system. They do not embrace the system and engage with it in order to improve their level of expertise of system use. Some reluctant adaptation behaviours and compliance adaptation behaviours can represent a formidable obstacle to IS implementation success and organisational performance. Such behaviours may occasionally have positive consequences. For example, they can signal a system's inadequacy and trigger necessary organisational interventions.

Overall, the findings show that adaptation behaviours are diverse and complex. The consequences of these diverse behavioural manifestations cannot be fully appreciated by simply considering whether or not a system is used or they are associated with acceptance or resistance. This study conceptually combines acceptance and resistance perspectives to describe and analyse complex behaviour during IS post-implementation.

## **6.4 Chapter conclusion**

This chapter discussed the major findings, and the relationships among the categories, that make up three core themes. The analysis and discussions of the core themes provided insights and answered the research questions put forward in this study. Cross-case analysis of the four organisations that revealed a different degree of intensity for the themes across the organisations was also discussed. The core themes were then analysed in relation to the existing literature and preliminary theoretical framework. This examination will allow me to make the theoretical generalisations in the next chapter.

The next chapter will provide an overview of the research presented in this thesis, an overall evaluation of the research as a whole, contributions, implications and limitations of the research, and future research areas.



## **Chapter 7 Conclusions**

### **7.1 Introduction**

In this chapter, I conclude my presentation of this research work. This chapter presents the substantive theory that emerged from the analysis. Then, a discussion of the research and practical implications of this study is presented. Finally, the study's limitations are outlined along with some suggestions for future research.

### **7.2 Answering the research questions**

This study investigated the process of user adaptation to complex mandatory IS in the context of the ERP system. It employed an embedded case study design and grounded theory for conducting and analysing data collected through semi-structured in-depth interviews, observations and secondary sources. Through a five-month data collection and analysis – using the critical incident interview technique with 46 participants from four organisations including ERP users, their immediate supervisors and IT specialists – the results revealed three core themes. The core themes are user adaptation behaviours, situational conditions and triggers. Relating the core themes with the relevant literature on coping theory, ERP system post-adoptive behaviours and IS acceptance and resistance, the findings contribute to an understanding of the interplay between the user, system, social and organisational contexts. It can offer an explanation that uncovers the complex process of user adaptation behaviours. This explanation provides an answer to the research questions presented in Chapter One:

- **How do users dynamically adapt to complex mandatory IS in organisations in the context of ERP use?**
- **How do organisational contexts play a role throughout the user adaptation process?**

The first theme, user adaptation behaviours, reflects the different ways in which users respond to the evolving work practices that an ERP system imposes. The analysis points to four different adaptation strategies. They are reluctant adaptation behaviour, compliance adaptation behaviour, faithful adaptation behaviour and enthusiastic adaptation behaviour.

Reluctant adaptation behaviour describes the situation in which individuals do not make the effort to learn how to use the system following its introduction; in some cases, individuals may show hostility to the system. Even though the system is mandated, users are unwilling to change their work routines to conform to those imposed by the system. Reluctant adaptation behaviours can range from delaying system use for as long as possible, persisting in old work routines, to relying on other people to complete the tasks associated with the system.

Compliance adaptation behaviour is characterised by individuals making limited efforts to use the system and adjust work practices to those imposed by the system, while avoiding the consequences of complete resistance. Individuals who exhibit this behaviour engage in half-hearted system use. Their knowledge of the system is superficial and they do not exploit its full functionalities to support their work; just enough to satisfy their most immediate work demands while trying to minimise changes to their work routines. Users restrict themselves to using the system in a way that somewhat fits their prior work practices. In some cases, the ERP system is concurrently used with shadow systems (e.g., spreadsheets, legacy systems).

Faithful adaptation behaviour is characterised by individuals putting effort into learning how to use the system. They use system features in a true-to-the-letter fashion based on what they have learned in the training. Despite their active engagement in the use of the system, these users do not venture into exploring features beyond those that they have learnt to execute tasks in an innovative way.

Enthusiastic adaptation behaviour manifests when individuals are keen on not only using the learned features of the system, but also investing time and energy in exploring and experimenting with functionalities not initially covered as part of the training. Users exhibit this behaviour when they seek to improve their level of expertise in their use of

the system. Users actively explore the system and try to maximise the benefits of the system. Enthusiastic users understand how to use the system to complete the tasks necessary for their job and also understand the way the system works in relation to the business operations and how their work tasks are interrelated with other tasks.

The second theme, situational conditions, reveals the underlying conditions that influence the user adaptation process, including social-task-user conditions and system-business process comprehension. This theme explains how situational conditions play a role throughout the adaptation process.

The findings show that social context has a strong influence on how users react with the system. The degree of mandate and social pressure affects the extent to which expectations are shared regarding the extent of system use. The expectation and actions of superiors influence the actions of their subordinates such as the manager's reinforcement of mandatory use. The expectation of colleagues is another key element that can serve to increase the system use. The necessary resources and support participants can get through management support, managerial intervention and encouragement and support from other people (e.g., IT consultants, supervisors and colleagues) will make them feel more confident to adapt to the new system in a positive way. Users who perceive the system important to their tasks and important resource that helps them progress in their careers will actively try to adapt to the system and put effort to learn how to use the system. While users who perceive the system relatively low important to their tasks, they will tend to be more passive in their interaction with the system.

The findings also reveal that in order to successfully adapt to the system, users require both substantial knowledge of the system and understanding of the business processes. ERP systems are viewed by most users as complex and very difficult to use. Users who have high degree of knowledge of the system will likely perceive they have high control over the system and able to use the system to perform their tasks. Whereas, users who have low degree of knowledge of the system, tend to feel they have low level of control over the system. Since ERP systems are multi-module systems that span across different functional areas, users require substantial understanding of the business processes to use the system effectively. Users who have a high degree of understanding of the business

processes tend to feel they have a high level of control over work processes. Users who have a low degree of understanding of the business processes, they tend to feel that they have less control over the work processes. When users do not have a sense of mastery in a business process, they tend to perceive that they cannot achieve a desired performance in that domain. When users feel that their control over their jobs decreased, they may be less motivated to perform their tasks and are likely to exert less effort.

The study reveals that adaptation behaviours for some users evolved over time. The third theme, triggers, refers to events that change a user's perception towards the system or changes in the work environment. This theme explains how adaptation strategies change over time. After users encounter triggers, they are oriented to refocus their attention on the system and rethink their current use of this system, and consequently change their adaptation behaviours. These events include task-related events, organisational-related events and system-related events. Task-related events represent occurrences that affect user tasks such as workflow alteration, role change and job rotation. Organisational-related events are actions associated with the introduction or modification of organisational policies which in the context of ERP systems, are largely devised to encourage system use – e.g., training intervention programmes and peer-to-peer information sharing. System-related events refer to changes in system functionalities and interfaces due to system upgrades or the addition of a new module.

### **7.2.1 Emergent and substantive theory**

The objective of this study is to build a process theory (Markus & Robey, 1988) that explains how users change their adaptation behaviours over time. The theory of user adaptation process is an explanatory process theory that aims “for analysing” and “for understanding” (Gregor, 2006). Based on the inductive analytical procedures of grounded theory, I formulate the emergent, substantive theory that explains user dynamic adaptation behaviours to mandatory complex systems:

*Individuals adapt to mandatory systems in the form of reluctant, compliance, faithful or enthusiastic adaptation behaviours. These behaviours are influenced by given situational conditions, which are reflected by social-task-user conditions and system-business*

*process comprehension. The degree of mandate and management interventions also affects how individuals value and use the system. However, these adaptation behaviours are not static. Individuals are constantly assessing the system in relation to existing situational conditions. Thus, adaptation behaviours espoused at any given time can be subsequently modified through task-related, organisational-related and system-related triggers.*

The theory is an emergent one because it was a result of an inductive theorising process without any set of hypotheses to be tested; instead, the systematic coding procedure and analysis of the data allowed me to reach an understanding of their underlying conceptual patterns. The theory is substantive because it results from empirical evidence and interpretation of real-life events within a specific area of enquiry (Urquhart & Fernández, 2006).

The next section discusses both the theoretical and practical contributions of this emergent, substantive theory.

## **7.3 Contributions**

The following two subsections outline and discuss both the theoretical contributions and practical implications of this study. Then, the study's limitations are outlined along with some suggestion for future research.

### **7.3.1 Theoretical contributions**

The theory developed extends the previous understanding of adaptation behaviours by emphasising the dynamic aspect of user adaptation process. The theory extends coping theory beyond its psychological explanation by revealing the dynamic interplay between users and situational conditions (i.e., social-task-user conditions and system-business process comprehension). This study reveals the underlying interactive situational conditions that influence the process of individual adaptation to mandatory IS. Specifically, this study provides insight as to how the interactive situational conditions lead to specific adaptation behaviours (i.e., reluctant, compliance, faithful

and enthusiastic adaptation behaviours), and how these behaviours, in turn, impact subsequent IS use.

While coping theory and its extensions in IS studies examine the different coping strategies and how these strategies are related to primary and secondary appraisals, it neither explains the dynamic elements of adaptation behaviours nor describes why adaptation strategies evolve over time. Sun's (2012) adaptive system use (ASU) model suggests that contextual factors, such as novel situations and explicit demands to try out new features, are all likely to trigger more individual user's sensemaking. However, the ASU model (2012) does not examine shifts in adaptation strategies users may experience over time. This study extends prior research by explaining the dynamic elements of adaptation behaviours and describing why adaptation strategies evolve over time. The study demonstrates that one's adaptation strategy may change if the situation conditions changes over time. Through ongoing interaction with the system and the occurrence of triggers that provoke changes on situational conditions, users may modify the adaptation behaviours they initially espoused. Hence, the findings from this thesis extend coping theory and ASU model, and can help inform and guide future research into the temporal nature of adaptation process.

This research complements IS acceptance literature in several ways. Previous research explains whether an individual will use, or continue to use, a given system based on behavioural beliefs or evaluative perceptions of IT. Although IS acceptance research has addressed a multitude of factors that impact IS adoption, by not taking into account the dynamic aspect of adaptation, existing acceptance models do not allow us to fully understand user experiences in the course of their IS use. This research helps to fill this gap. This study offers a theory that takes into account a broader range of behaviours beyond direct relationships between use behaviours and their antecedents. The findings suggest that the concept of IS use is more complex than initially theorised by IS acceptance research. Users shift their IS use behaviours over time as tasks, organisational and system conditions change.

### **7.3.2 Practical contributions**

Besides the outlined theoretical contributions, this study also has relevant practical implications. One of the challenges of IS management in organisations is to create the conditions in which users utilise the full potential of IS. This study has suggested specific management strategies useful in promoting users to adapt in a positive way to the system, minimising the level of user resistance and increasing system utilisation in ERP post-implementations. Specifically, this study offers practical implications for designing appropriate training interventions and devising suitable communications plans.

The findings emphasise the importance of training. The study finds that even though users have received different levels of training for using the system, in general, they do not feel comfortable using the system. Training employees for ERP system use is essential not only for them to know how to do their job but also to understand how the data they enter affect other tasks in business processes. Users resist the system if they feel unskilled or that their abilities are lacking. Thus, a lack of training or lack of support may manifest itself through user resistance. More importantly, the analysis also suggests that training in both business processes and the system appear to be more effective than training that focuses on the ERP system alone. This will help to improve user overall understanding of both the system and business processes. The study suggests that before the system goes live, an initial ERP system training is needed in order for users to begin to grasp the nature of their new work practices. However, once this initial training on the ERP system has occurred, training interventions (formal and informal) focused on work processes are much more effective than those that are focused on the ERP system alone. From a user perspective, the ERP system is only part of the changes taking place within the organisation. In order to deliver on organisational improvement goals, the post implementation of the ERP system must address associated business process changes. A lack of required business process training will not only limit user understanding of business processes but also the potential of the system.

The analysis reveals that individuals adapt to systems in different ways and users may need customised support to help them to effectively adapt to the system. Thus, training-

in-context from coaching by super users, peer-to-peer training and informal training in the form of user group learning are important in enhancing the use of the system.

Another reason for user reluctance to use the system found in this study is the complexity of the system, such as the difficulty to access data or a user interface that is not intuitive. Useful training should be geared to minimise the impact of the complexity on user resistance. For example, organisations should offer contextualised or one-on-one training to those users who exhibit reluctant adaptation behaviour or compliance adaptation behaviour to reduce their feeling of being overwhelmed by the system's complexity and to increase their ability to use the system effectively. Furthermore, through feedback from users, appropriate system customisations can be made to minimise the complexity.

Drawing on these findings, organisations may develop communication strategies that emphasise both the benefits the organisation can get from the system and the opportunities the system offers for professional advancement. Organisations should develop a systematic communications plan that conveys important details and clearly addresses issues such as why the system is being implemented, the changes affected by the system, and the benefits of the system. This may help users better understand changes that will occur and the implications to their jobs. In addition, this research suggests that managers can help reduce the occurrence of negative emotions – for example, anger, hesitation, frustration, worry and anxiety – by explaining how the system constitutes an opportunity for professional advancement for users.

Management should also clearly demonstrate their commitment and support for ERP use. Managers may also play an important part in the promotion of post-adoptive use behaviours because they can influence the use of various ERP system features, provide incentives for using various features and direct the enhancement of the ERP system. This study suggests that strategies, policies, and actions utilised by managers have an effect on the user adaptation process. Moreover, change management is required in both implementation and post implementation phases of an ERP system. This means that management of change is an ongoing process. The progress of change management efforts should be regularly monitored to ensure that users' resistance to an ERP system is under control. For example, managers should provide opportunities for users to share



positive experiences and provide support through user group learning and sharing and regular informal meetings where users share practices about how to use the system. Creating user groups and having users participate and be involved in the development of the new IS might help prevent resistance.

### **7.3.3 Limitations of the research and suggestions for future research**

The overall objective of this study is theory building. The theory that emerged from the case study analysis provides the foundation for further research into the user adaptation process. It is not possible for this study to capture every aspect of this complex phenomenon; therefore, this study has limitations that should be acknowledged. First, the retrospective nature of this research might have left room for a recall bias from participants. Despite careful attention to this issue by using the critical incident technique to minimise the recall bias from our participants, some participants may not have been perfectly accurate in their account of their adaptation process. This issue was mitigated by using data from different participants to corroborate the stories. Second, this study investigated user adaptation in Thailand; the applicability of the nuances of the theory should be scrutinised in other settings that are subject to different institutional contexts.

This research studies an ERP system, which by definition has specific characteristics such as a high level of integration across organisational functions. Future research could use this theory to study other systems that have similar characteristics such as Customer Relationship Management systems. Previous research suggests that certain user characteristics such as gender (Gefen & Straub, 1997; Venkatesh & Morris, 2000; Venkatesh et al., 2003), age (Venkatesh et al., 2003), computer self-efficacy (Compeau & Higgins, 1995a, 1995b), personal innovativeness (Agarwal & Karahanna, 2000) experience with IS (e.g., Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh et al., 2003), learning capabilities (Santhanam, Compeau, Yi, & Rodriguez, 2010) and emotions (Beaudry & Pinsonneault, 2010) shape how users perceive and respond to a new system. However, this was not evident in the analysis. A further examination of the individual factors and emotions that influence user adaptation would facilitate further understanding of this complex process. It is also important to analyse the relationship between user adaptation behaviours and performance, for both

individuals and organisations, to provide additional insights into the downstream implications of the user adaptation process.

The results of this research provide a theoretical basis for further research on the user adaptation process. This study provides rich evidence on the importance of situational conditions and triggers in understanding user reactions to the implementation of new, complex IS. While this study provides some insights about the user adaptation process, it also suggests several promising research areas that need to be addressed.

## **7.4 Concluding reflections**

The purpose of this study is to provide an insight into the process of user adaptation to complex mandatory IS. My intention when embracing this research has been to offer an account and a plausible interpretation of this process. This study has given me the opportunity to get a fine-grained understanding of this process.

As a final word, I do hope the findings of this research inform practice in promoting users to adapt in a positive way to IS, minimising the level of user resistance and increasing IS utilisation. It is hoped that the ideas and results put forth in this study will stimulate further thinking and research into this important topic, which remains a relatively unexplored area in our field.

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## Appendix 1: Indicative interview questions

### Indicative Interview Questions



The interview protocol for participants contains questions about participants' professional and educational backgrounds, their experiences related to information technology, their overall perception and experience with ERP systems, and their adaptation behaviours and influential factors. Respondents will have the opportunity to add further information at their convenience during the interview. The sequence of interview questions may vary during interview and the researcher may ask further questions when something important are presented

The interviewer will begin by indicating to the participant that some basic background/demographic information will be collected such as:

Date of the interview: \_\_\_\_\_

Location of the interview: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_

Gender: ☐ Male ☐ Female

Organisation: \_\_\_\_\_

Position: \_\_\_\_\_

Educational (background): \_\_\_\_\_

No. of years in the organisation: \_\_\_\_\_

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*(Note: the blank lines will be filled out by the researcher)*

**The interviewer will then continue with more precise questions:**

**ERP User:**

1. How long have you worked for the organisation?
2. How long have you been using the ERP system?
3. What systems did you use prior to the ERP system?
4. How do you use the ERP system as part of your job? / How much do you rely on the ERP system to get your job done?
5. How has the ERP system affected your productivity on the job?
6. Could you please recall the moment when you were first made aware that the ERP system would soon be introduced? How did you feel at that time?
7. How did you feel about the ERP system when it was implemented?
8. Did you avoid or resist using the ERP system?
9. How difficult was the transition to the ERP system for you?
10. How did you cope with the situation?
11. What was the role of your organisation/manager/colleagues in your adaptation effort to use ERP?
12. How did your organisational environment help you adapt the new system?
13. How difficult has it been for you to learn to use the ERP system?
14. What has been the most difficult thing about the ERP system to learn? Why?
15. Please walk me through the actions you took. Which was the most significant incident for you? Why?
16. Did you respond to this incident?
17. How was the general situation surrounding this incident before, during and after?
18. What exactly was it about this incident that influences your adaptation to the system?
19. What made you realise that you needed to adapt to the system or needed to learn how to use the system?
20. How does this incident make you more aware of the system?
21. What were the problems that you confronted during the incident? How did you cope with these problems? Were they successfully addressed?

22. Can you remember any other details about the event?
23. Does this bring to mind any other incidents?
24. What types of support for using the ERP system have been available to you? (e.g. training, documentation, etc.)
25. What types of support activities have you participated in (e.g. training, documentation, groups)?
26. Please describe the helpfulness of the various support activities you've participated in.
27. How much have you tried on your own to improve your performance using the ERP system?
28. How have you changed your personal work habits in order to better take advantage of the ERP system?
29. To what extent do (did) your colleagues come to you for help with their use of the ERP system?
30. To what extent do (did) you ask your colleagues for help with your use of the ERP system?
31. How proficient would you say you are at using the ERP system? (e.g., Expert? So-so? Can barely function?)
32. What are some advantages or strengths of the ERP system compared to the previous system? In what ways has it directly made your job easier?
33. What are some disadvantages or weaknesses of the ERP system compared to the previous system? In what ways has it made your job more difficult?
34. Regarding the whole process: how flexible/useful have you perceived the ERP system package overtime? Do you think that this flexibility/usefulness was perceived differently overtime?
35. How much have your knowledge, expectations, interpretations about the ERP system changed overtime?
36. What do you think your organisation can do to improve your experience with the ERP system?
37. Any further comments would you like to add?

### **Immediate supervisors:**

1. Could you please give me a picture of the organisation: how does it look like? (e.g. centralisation, hierarchy)
2. How do you describe the technological context of the organisation? (level of computing; maturity of organisation members regarding computers, areas automated)

3. How do you describe the organisational members regarding their perceptions, expectations and knowledge about the ERP system?
4. Could you please recall the moment when the ERP system was implemented?
5. Looking at the changes and improvements in your company systems, as a manager, how did you cultivate/train/help your subordinates to adapt and accept changes promptly without any major problems?
6. Did employees come to you when they have a problem with ERP???
7. Regarding the actual state of the ERP use, how do you evaluate the results?
8. Regarding the whole process: how flexible/useful have people perceived the ERP system package overtime? Do you think that this flexibility/usefulness was perceived differently overtime?
9. What are the most important factors leading to such?
10. How well would you say the change to the new ERP system has been managed up to this point? What has gone well and what could have been (or still could be) improved?
11. Any further comments would you like to add?

### **IT specialists:**

1. How long ago did your company go live with the ERP system?
2. Has the implementation been successful? Please explain.
3. Has the use of the ERP system changed since it was implemented?
4. Have these changes involved modification to the software or the processes supporting it?
5. Return to the beginning of the ERP implementation project. Could you please describe overall information about the project?
6. In the beginning of the EPR implementation project: how did users express their opinion about the flexibility/usefulness/ ease of use of the system?
7. How do you describe the organisational members regarding their perceptions, expectations and knowledge about the ERP system?

8. What are some of the support that you and your IT team provide to ERP users?
9. How was the training scheduled?
10. How long were the training sessions and the entire phase of training?
11. What is your opinion about the trainings' content, form and outcome?
12. Regarding the whole process: what are the tools or techniques that consultants/IT specialists have used to carry out the training phase?
13. Which of those tools or techniques do you think are more efficient to improve the training phase and to improve the effective use of the system?
14. Regarding the whole process: how flexible/useful have people perceived the ERP system package overtime? Do you think that this flexibility/usefulness was perceived differently overtime?
15. Any further comments would you like to add?

Approved by the Auckland University of Technology Ethics Committee on 5 March 2012 AUTECH Reference number 12/36

## Appendix 2: Summary of interviews

The following table presents detailed information about the location, format, the place, the date and the duration of each in-depth interview.

### Case MP: Summary of interviews

Participant	Location	Interview format	Interview place	Interview date	Duration
MP1	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	9/Jul/2012 and 12/Jul/2012	180mins 80mins
MP2	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	9/Jul/2012 and 13 /Jul/2012	180mins 70mins
MP3	KhonKaen	one-on-one	Interviewed on-site at participant work desk	11/Jul/2012	60mins
MP4	KhonKaen	one-on-one	Interviewed on-site at participant work desk	16 /Jul/2012	80mins
MP5	KhonKaen	group discussion& one-on-one	Interviewed on-site in meeting room	9 /Jul/2012 and 17 /Jul/2012	180mins 50mins
MP6	KhonKaen	one-on-one	Interviewed on-site at participant work desk	13 /Jul/2012	90mins
MP7	KhonKaen	one-on-one	Interviewed on-site at participant work desk	18 /Jul/2012 and 1/Oct/2012	75mins 45mins
MP8	KhonKaen	one-on-one	Interviewed on-site at participant work desk	20 /Jul/2012	87mins
MP9	KhonKaen	one-on-one	Interviewed on-site at participant work desk	24 /Jul/2012	50mins
MP10	KhonKaen	one-on-one	Interviewed on-site at participant work desk	26 /Jul/2012	65mins
MP11	KhonKaen	one-on-one	Interviewed on-site at participant work desk	27 /Jul/2012	85mins
MP12	KhonKaen	group discussion& one-on-one	Interviewed on-site in meeting room	9 /Jul/2012 and 30/Jul/2012	180mins



### Case BT: Summary of interviews

Participant	Location	Interview format	Interview place	Interview date	Duration
BT1	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	6/Aug/2012	150mins
				8/Aug/2012	63mins
BT2	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	6/Aug/2012	150mins
				11/Aug/2012	66mins
BT3	KhonKaen	one-on-one	Interviewed on-site at participant work desk	8/Aug/2012	90mins
BT4	KhonKaen	one-on-one	Interviewed on-site at participant work desk	10/Aug/2012	85mins
				7/Nov/2012	45mins
BT5	KhonKaen	one-on-one	Interviewed on-site at participant work desk	13/Aug/2012	115mins
				5/Nov/2012	50mins
BT6	KhonKaen	one-on-one	Interviewed on-site at participant work desk	15/Aug/2012	75mins
BT7	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	6/Aug/2012	150mins
				17/Aug/2012	55mins
BT8	KhonKaen	one-on-one	Interviewed on-site at participant work desk	20/Aug/2012	82mins
BT9	KhonKaen	one-on-one	Interviewed on-site at participant work desk	20/Aug/2012	74mins
BT10	KhonKaen	one-on-one	Interviewed on-site at participant work desk	27/Aug/2012	95mins
BT11	KhonKaen	one-on-one	Interviewed on-site at participant work desk	30/Aug/2012	65mins
BT12	KhonKaen	group discussion & one-on-one	Interviewed on-site in meeting room	6/Aug/2012	150mins
				24/Aug/2012	62mins

### Case ES: Summary of interviews

Participant	Location	Interview format	Interview place	Interview date	Duration
ES1	Chonburi	one-on-one	Interviewed on-site at participant work desk	12/Sep/2012	78mins
ES2	Chonburi	group discussion & one-on-one	Interviewed on-site in meeting room	10/Sep/2012	170mins
				14/Sep/2012	54mins
ES3	Chonburi	one-on-one	Interviewed on-site at participant work desk	17/Sep/2012 15/Nov/2012	67mins 48mins
ES4	Chonburi	group discussion & one-on-one	Interviewed on-site in meeting room	10/Sep/2012	170mins
				13/Sep/2012	68mins
ES5	Chonburi	one-on-one	Interviewed at a café nearby the organisation	20/Sep/2012	90mins
ES6	Chonburi	one-on-one	Interviewed on-site at participant work desk	24/Sep/2012 12/Nov/2012	98mins 50mins
ES7	Bangkok	one-on-one	Interviewed on-site at participant work desk	28/Sep/2012	102mins
ES8	Bangkok	one-on-one	Interviewed on-site at participant work desk	28/Sep/2012	98mins
ES9	Chonburi	one-on-one	Interviewed on-site at participant work desk	25/Sep/2012	66mins
ES10	Chonburi	one-on-one	Interviewed at participant's home	13/Sep/2012	57mins
ES11	Chonburi	group discussion & one-on-one	Interviewed on-site in meeting room	10/Sep/2012	170mins
				15/Sep/2012	50mins

### Case IM: Summary of interviews

Participant	Location	Interview format	Interview place	Interview date	Duration
IM1	Bangkok	group discussion & one-on-one	Interviewed on-site in meeting room	11/Oct/2012	120mins
				15/Oct/2012	54mins
IM2	Bangkok	one-on-one	Interviewed on-site at participant work desk	15/Oct/2012	85mins
				24/Nov/2012	46mins
IM3	Bangkok	one-on-one	Interviewed on-site at participant work desk	18/Oct/2012	70mins
IM4	Bangkok	group discussion & one-on-one	Interviewed on-site in meeting room	11/Oct/2012	120mins
				22/Nov/2012	46mins
IM5	Bangkok	one-on-one	Interviewed on-site at participant work desk	24/Oct/2012	72mins
IM6	Bangkok	one-on-one	Interviewed on-site at participant work desk	25/Oct/2012	85mins
IM7	Bangkok	one-on-one	Interviewed on-site at participant work desk	26/Oct/2012	63mins
IM8	Bangkok	one-on-one	Interviewed on-site at participant work desk	30/Oct/2012	74mins
IM9	Bangkok	one-on-one	Interviewed on-site at participant work desk	19/Oct/2012	50mins
IM10	Bangkok	one-on-one	Interviewed on-site at participant work desk	26/Oct/2012	51mins
IM11	Bangkok	group discussion & one-on-one	Interviewed on-site in meeting room	11/Oct/2012	120mins
				18/Oct/2012	48mins

## Appendix 3: Ethics approval



# MEMORANDUM

## Auckland University of Technology Ethics Committee (AUTEC)

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To: Antonio Diaz Andrade

From: **Dr Rosemary Godbold** Executive Secretary, AUTEC

Date: 5 March 2012

Subject: Ethics Application Number 12/36 **Adjusting to mandatory information systems: Understanding individual adaptation to enterprise resource planning (ERP) systems.**

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Dear Antonio

Thank you for providing written evidence as requested. I am pleased to advise that it satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC) at their meeting on 27 February 2012 and I have approved your ethics application. This delegated approval is made in accordance with section 5.3.2.3 of AUTEC's *Applying for Ethics Approval: Guidelines and Procedures* and is subject to endorsement at AUTEC's meeting on 26 March 2012.

Your ethics application is approved for a period of three years until 3 March 2015.

I advise that as part of the ethics approval process, you are required to submit the following to

AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 3 March 2015;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. This report is to be submitted either when the approval expires on 3 March 2015 or on completion of the project, whichever comes sooner;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this. Also, if your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply within that jurisdiction.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all written and verbal correspondence with us. Should you have any further enquiries regarding this matter, you are welcome to contact me by email at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz) or by telephone on 921 9999 at extension 6902. Alternatively you may contact your AUTEC Faculty Representative (a list with contact details may be found in the Ethics Knowledge Base at <http://www.aut.ac.nz/research/research-ethics/ethics>).

On behalf of AUTEC and myself, I wish you success with your research and look forward to reading about it in your reports.

Yours sincerely

Dr Rosemary Godbold

**Executive Secretary**

**Auckland University of Technology Ethics Committee**

Cc: Paweena Wanchai pwanchai@aut.ac.nz, Angsana Techatassanasoontorn

## **Appendix 4: Participant information sheet**

# **Participant Information Sheet**



### **Date Information Sheet Produced:**

7<sup>st</sup> January 2012

### **Project Title**

**Dynamic Process of User Adaptation to Complex Mandatory Information systems**

### **An Invitation**

My name is Paweena Wanchai and I am a PhD student at AUT University's School of Business, undertaking primary research as part of my PhD study. I am conducting research to understand the process of individual adaptation to mandatory information systems, under the supervision of Dr. Antonio Díaz Andrade and Dr. Angsana A. Techatassanasoontorn. I would like to invite you to participate in this research and share your experiences, adaptation behaviours and usage regarding the ERP system. Your participation is entirely voluntary and you are not obliged to take part in this study if you do not want to. If you choose to participate, you may withdraw your participation without penalty at any stage of the research.

### **What is the purpose of this research?**

This research is a requirement to complete my PhD study. The purpose of this study is to better understand the process of individual adaptation to mandatory information systems, specifically ERP systems, in an organisational context. Questions posed are, how do individuals adapt to mandatory information systems? What strategies do individuals use to adapt to mandatory information systems? What are the factors that influence the individual adaptation process? It is hoped the findings will help better understand the process of individual adaptation to mandatory information systems and thereby assist to improve the effective use of information systems to enhance users' job performance. The findings will be presented in a thesis. A hard copy and electronic copy of the final thesis will be available in the AUT library.

**How was I identified and why am I being invited to participate in this research?**

You have been identified as a potential research participant because you are an ERP system user in selected organisations and you are 20 years and over. I am asking you to participate because I believe that your experience, expertise and ideas about ERP system would help me to better understand the process of individual adaptation to mandatory information systems.

**What will happen in this research?**

Should you choose to participate you will be asked questions in an interview that will take approximately thirty to sixty minutes. The questions will explore your experience of using an ERP system. The interview should be answered objectively without any pressure or fear. You do not have to answer questions if you do not want to, and should you feel at any point that you do not wish to continue participating you are free to quit and leave. After the interview you will be asked to verify the notes taken during the interview to confirm the accuracy of the information collected. If needed, I may also contact you again later, for as long as the research is going on, to ask you for some additional information, always respecting your availability and consent. The level of confidentiality, anonymity and privacy will be maintained. Anytime I use the information you give me, I will always identify you by a pseudonym. The research will gather different perspectives and the findings will be reported in a thesis and academic research papers.

**What are the discomforts and risks?**

Risk and discomfort to subjects is minimal in this study since it does not involve any manipulation of variables that could affect individuals participating in the research. You are not required to disclose any sensitive information about your experience of using an ERP system. However, if you feel uncomfortable or unable to answer some of the questions in the interview, you can withdraw from participating in this research prior to the completion of the data collection.

**How will these discomforts and risks be alleviated?**

The interviews will be carried out in your preferred language and at your preferred place, either at organisations or a cafe outside organisation. Just to re-iterate you may decline to answer any question(s) if you do not wish to. At any point during the interview you feel discomfort please feel free to request the interview to be stopped. Please keep in mind this interview is voluntary and you may withdraw anytime before the interview is finished. In order to protect your confidentiality, if you wish to do so, the interview will be carried out at a cafe outside organisation, so your employers and colleagues cannot identify you.

**What are the benefits?**

The benefits of participating in this research are twofold for you. First, you might learn some new things about your own experience after sharing your ideas and feelings from a new perspective. Second, your participation in this study will contribute greatly to our understanding of how individuals adapt to information system and thereby assist to better understand how to improve the effective use of information system to enhance users' job performance. This research will also enrich the extant literature on information system use.

**How will my privacy be protected?**

All data collected will preserve anonymity of individuals and organisations that participate in the study and will be kept strictly confidential. All publication of the results will be done anonymously for both the individuals and the organisations, and



results will be reported in such a way that it is impossible for one to trace or identify a participant in the study. Once the research project is completed, all information will be stored in a secure locked cabinet on AUT premises. No party, other than the supervisors and the interviewer will have access to the data. All data and Consent Forms will be securely destroyed after a period of six years.

**What are the costs of participating in this research?**

There are no costs to you for participating in this research except for approximately 30-90 minutes of your time, this is much appreciated.

**What opportunity do I have to consider this invitation?**

You will be given at least a week to review this information sheet and either accept or decline this invitation to participate in the research project. If you want to seek further information, to clarify any points you can contact me on my details below.

**How do I agree to participate in this research?**

If you agree to take part in this research you will be required to sign a Consent Form which will indicate your willingness to participate in this research and that you will be participating with full knowledge of the aims and purpose of this research

**Will I receive feedback on the results of this research?**

If you wish to receive a copy of the final report you will be sent one upon completion. You can indicate on the Consent Form whether or not you would like a copy.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisors, Dr. Antonio Díaz Andrade, [antonio.diaz@aut.ac.nz](mailto:antonio.diaz@aut.ac.nz), ph: +64 9 921 9999 ext 5804 and Dr. Angsana A. Techatassanasoontorn, [angsana@aut.ac.nz](mailto:angsana@aut.ac.nz), ph: +64 9 921 9999 ext. 9235.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTECH, Dr. Rosemary Godbold, [rosemary.godbold@aut.ac.nz](mailto:rosemary.godbold@aut.ac.nz) , 921 9999 ext 6902.

**Whom do I contact for further information about this research?**

**Researcher Contact Details:**

Paweena Wanchai, [pwanchai@aut.ac.nz](mailto:pwanchai@aut.ac.nz), ph: +64 021 262830, or +66 087 6926662

**Project Supervisor Contact Details:**

Dr. Antonio Díaz Andrade, [antonio.diaz@aut.ac.nz](mailto:antonio.diaz@aut.ac.nz), ph: +649 921 9999 ext. 5804

Dr. Angsana A. Techatassanasoontorn, [angsana@aut.ac.nz](mailto:angsana@aut.ac.nz), ph: +64 9 921 9999 ext. 9235

## Appendix 5: Consent form

### Consent Form



**Project title: Dynamic Process of User Adaptation to Complex Mandatory Information Systems**

**Project Supervisors: Dr. Antonio Díaz Andrade**

**Dr. Angsana A. Techatassanasoontorn**

**Researcher: Paweena Wanchai**

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated 1<sup>st</sup> January 2012.
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ☐ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ☐ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- ☐ I agree to take part in this research.
- ☐ I wish to receive a copy of the report from the research (please tick one): Yes ☐ No ☐

Participant's signature: .....

Participant's name: .....

Participant's Contact Details (if appropriate): .....

Date: .....

## Appendix 6: Patterns of adaptation behaviour transition by participant

### Case MP: Patterns of adaptation behaviour transition by participant

Participants	Transition of adaptation behaviour	Triggers
MP1	Enthusiastic	
MP2	Faithful → Enthusiastic	Organisational-related events
MP3	Faithful → Enthusiastic	Task-related events
MP4	Compliance → Faithful → Enthusiastic	Organisational-related events → Organisational-related events
MP5	Compliance → Faithful	Task-related events
MP6	Reluctant → Compliance → Faithful → Enthusiastic	System-related events → Organisational-related events → Organisational-related events
MP7	Reluctant → Compliance → Faithful → Enthusiastic	Organisational-related events → Task-related events → Organisational-related events
MP8	Reluctant → Compliance	System-related events
MP9	Reluctant → Faithful	Organisational-related events
MP10	Reluctant → Faithful	Organisational-related events
MP11	Reluctant → Faithful	Organisational-related events

## Case BT: Patterns of adaptation behaviour transition by participant

Participants	Transition of adaptation behaviour	Triggers
BT1	Enthusiastic	
BT2	Compliance → Faithful → Enthusiastic	Task-related events → Organisational-related events
BT3	Faithful → Enthusiastic	Organisational-related events
BT4	Faithful → Enthusiastic	Organisational-related events
BT5	Reluctant → Faithful	Organisational-related events
BT6	Compliance → Faithful	System-related events
BT7	Reluctant → Faithful	System-related events
BT8	Reluctant → Compliance	System-related events
BT9	Reluctant → Compliance	System-related events
BT10	Reluctant → Compliance	System-related events
BT11	Reluctant	None

### Case ES: Patterns of adaptation behaviour transition by participant

Participants	Transition of adaptation behaviour	Triggers
ES1	Faithful → Enthusiastic	Organisational-related events
ES2	Faithful → Enthusiastic	Organisational-related events
ES3	Compliance → Faithful → Enthusiastic	Organisational-related events → Organisational-related events
ES4	Enthusiastic	
ES5	Compliance → Faithful → Enthusiastic	Organisational-related events → Organisational-related events
ES6	Reluctant → Compliance → Faithful → Enthusiastic	Organisational-related events → System-related events → Organisational-related events
ES7	Compliance → Faithful	Task-related events
ES8	Compliance → Faithful → Enthusiastic	System-related events → Organisational-related events
ES9	Reluctant → Faithful	Task-related events
ES10	Compliance → Faithful	Organisational-related events

**Case IM: Patterns of adaptation behaviour transition by participant**

Participants	Transition of adaptation behaviour	Triggers
IM1	Enthusiastic	
IM2	Faithful → Enthusiastic	Task-related events
IM3	Faithful	None
IM4	Faithful → Compliance	Task-related events
IM5	Faithful	None
IM6	Faithful → Compliance	Task-related events
IM7	Compliance	None
IM8	Compliance	None
IM9	Compliance	None
IM10	Reluctant	None