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Adjusting to Mandatory Information Systems: Understanding Individual Adaptation to ERP Systems

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Abstract

Realising the benefits from information technology depends on how the systems are actually used. Although previous information systems (IS) research provides useful models for understanding individual acceptance, there is a limited understanding of the underlying adaptive process related to IS use, particularly in a mandatory context. This study argues that adaptation is a socially constructed process. Informed by the conceptual elements of coping theory, this study proposes an examination of the adaptive behaviours of enterprise resource planning (ERP) systems users. The fieldwork will be conducted in three organisations − one private, one public and one multinational − operating in Thailand. The multiple-case study design allows the scrutiny of contrasting patterns in the data. By taking an interpretive grounded theory approach, this study aims at producing an emergent and substantive theory that explains both the adaptive process and the complex interplay of individual and contextual factors that influences adaptive behaviours over time.

Keywords
Adaptive behaviour, Coping theory, ERP, IS use, Grounded theory

1. Introduction
Organisations have been increasingly implementing complex information technology such as Enterprise Resource Planning (ERP) systems to improve the effectiveness of daily work practices (Wang, Hsieh, Butler, & Hsu, 2008). The major challenge for these organisations is to ensure that the systems are fully and appropriately used, which, in turn, requires providing support in order for the staff to adapt to the inevitable technological and work practice changes. Nevertheless, previous research suggests that complex systems, especially ERP systems, are often underutilised (Abugabah & Sanzogni, 2009; Davis & Venkatesh, 2004; Jasperson, Carter, & Zmud, 2005; Robey, Ross, & Boudreau, 2002).

The underlying explanation of underutilisation encompasses both technical issues and behavioural factors (Davis & Venkatesh, 2004; Robey et al., 2002; Wang et al., 2008). 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). Therefore, users have to learn to adapt to the simultaneous requirements of the new system and the organisational changes. The problem is exacerbated for ERP systems because these systems often allow little customisation (Davenport, 2000). 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).

In the information systems (IS) discipline, research that theorises about user interaction with new systems has employed either a variance or a process approach. Variance research aims at explaining and predicting the variation in outcome variables by associating those variables with antecedent conditions and predictor variables (Van de Ven & Poole, 2005). Studies conducted under the variance approach mostly rely on models such as technology acceptance model (Davis, 1989), theory of planned behaviour (Ajzen, 1991), and task-technology fit model (Goodhue & Thompson, 1995). Although these theories provide useful snapshots on IS acceptance, they do not explain the underlying adaptive process that most users have to go through once the system has been implemented. By contrast, a process approach seeks to explain how change emerges, develops and diminishes over time (Van de Ven & Poole, 2005). This type of research elucidates the rich and complex nature of user interaction with IS – e.g., how users respond to new systems and how their behaviours, knowledge, skills, efforts and attitudes change over time (Beaudry & Pinsonneault, 2005; Majchrzak & Cotton, 1988; Tyre & Orlikowski, 1994).

Despite the cumulative body of knowledge on the use of new systems, few studies have attempted to explain user adaptation to IS. Therefore, some IS scholars have called for research that studies a wider range of use behaviours than what is currently offered by the variance approach in order to produce rich theory of the individual adaptation process (Benbasat & Barki, 2007; Fadel & Brown, 2010; Jasperson et al., 2005). To develop greater insight into IS use, it is necessary to go beyond models of technology acceptance in order to explore how individuals adapt to IS and how the adaptation process affects post-adoptive use behaviours.

This study aims at building a substantive and emergent theory that explains the adaptation process to mandatory IS and the complex interplay of individual and contextual factors that influences adaptation behaviours over time. The research questions guiding this study are: *How do individuals adapt to mandatory IS, specifically ERP systems, in an organisational context?,* and *how individual and contextual factors play a role throughout the individual adaptation process?* This study defines adaptation as the process by which individuals learn, adjust, change and make an effort to a given situation following a new IS implementation (Bruque, Moyano, & Eisenberg, 2009; Tyre & Orlikowski, 1994).

2. LITERATURE REVIEW
In this section, a critical literature review of the relevant body of knowledge on IS acceptance, resistance and adaptation is discussed.

2.1 IS Acceptance
There is a need to go beyond what the technology acceptance model and its variants afford in order to reveal the complex process of adapting one's work practices to a disruptive technology, like an ERP system. Firstly, technology acceptance models may not be a good

explanatory fit in mandatory usage contexts (Agarwal & Prasad, 1997; Brown, Massey, Montoya-Weiss, & Burkman, 2002; Karahanna, Straub, & Chervany, 1999). Much of prior research on the new IS acceptance has been conducted in the context of voluntary adoption of new technology using either the usage or the intention to use as a dependent variable. Some researchers argue that the theory of reasoned action-based acceptance models make the important 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 (Brown et al., 2002).

Secondly, the intention-behaviour gap in traditional technology acceptance models 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 the psychological elements that may be present 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. 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, technology acceptance models 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). Finally, Bagozzi (2007) points out that technology acceptance models neglect group, social and cultural influences on decision to use the system. A significant body of knowledge indicates that social influence and peer pressure have a direct effect on intention to use the system in mandatory use contexts (Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). In addition, culture may exert a significant influence on intention to use the system (Srite & Karahanna, 2006; Straub, 1994; Straub, Keil, & Brennan, 1997).

2.2 IS Resistance

The literature suggests that user resistance to a new system is attributed to many factors. Some of these factors are the 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, Henry, & Zmud, 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 due to a loss of prestige and status in an 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, previous bad experiences with IS effort, and unclear benefits of new IS to the user. In addition, 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).

2.3 IS Adaptation

Different studies emphasise different aspects of user adaptation. Some studies investigate how the work system and organisational structure are adapted following the new IS implementation (Sokol, 1994; Tyre & Orlikowski, 1996). Other studies focus on temporal patterns of adaptation (Tyre & Orlikowski, 1994) and adaptation behaviours (Beaudry & Pinsonneault, 2005). Collectively, these studies suggest that when a new system is implemented, individuals may act in different ways and adaptation behaviours may change

over time. Adaptive behaviours are not deterministic but are instead constrained by existing contextual structures in the environment such as work tasks and systems (DeSanctis & Poole, 1994). These adaptation behaviours have implications for the way in which IS are used, benefits derived from their use, and individual and organisational outcomes (Beaudry & Pinsonneault, 2005).

3. The Use of Coping Theory

In this research, we use coping theory as a starting point to conceptualise user adaptation to a complex IS. Introducing new technology is a disruptive event for users and their work practices, especially when the systems are mandated. Coping theory provides a useful theoretical lens to explain how individuals respond to disruptive events in their life situations (Lazarus & Folkman, 1984).

During the coping process, individuals deal with a disruptive event in two sequential stages: appraisal and coping effort. 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, individuals choose to apply two mechanisms to deal with the new situation: problem-focused and emotion-focused coping efforts (Lazarus & Folkman, 1984). Problem-focused coping aims at solving problems and managing the situation. Emotion-focused coping aims at changing one's perception in order to reduce emotional distress. Coping is not a static process. It entails a dynamic interaction between the individual and the incident including an 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 conceptual elements from coping theory are to be used as a "sensitising device" (Klein & Myers, 1999, p. 75) that can lead an examination of the individual adaptation process with a new IS, without excluding the possibility of new theoretical insights that may emerge from the field. Since using complex systems, like ERP systems, involves interactions among users, managers and IT specialists, this study extends the coping theory beyond its psychological explanation of adaptation to argue that adaptation is a socially constructed process. This study incorporates individual and contextual factors that may influence the individual adaptation process.

The research model, shown in Figure 1, incorporates key elements of coping theory for the investigation of the individual adaptation process. Table 1 presents the definitions of the concepts shown in Figure 1.
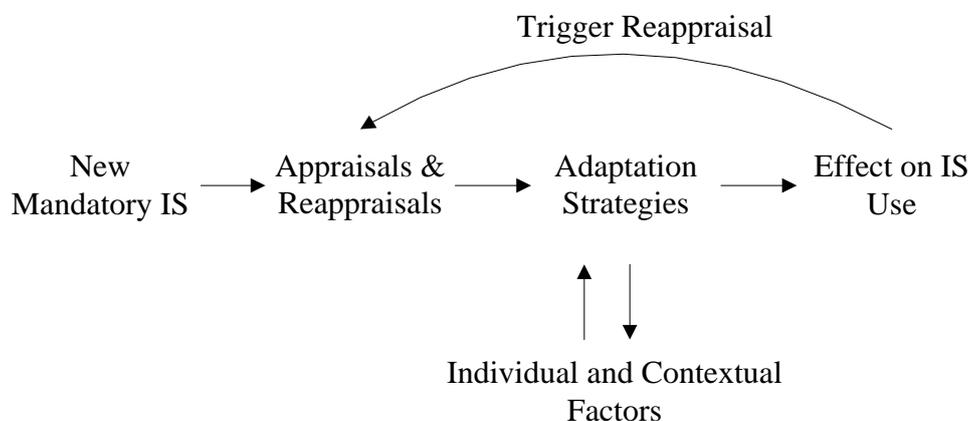
Figure 1: Proposed Research Model of the Individual Adaptation Process

Concepts	Definition
Appraisal	Users evaluate the potential consequences of mandatory system usage and adaptation resources available to them
Adaptation Strategies	Adaptation behaviours that an individual performs in response to the system
Individual Factors	Factors related to the individuals themselves
Contextual Factors	Social, organisational and system factors

Table 1: Definitions of key concepts to be used in this study

4. Scrutinising the Process

The process approach adopted in this study draws on various elements from prior process approaches of IS development and use (Lyytinen & Newman, 2008). This study recognises the multi-faceted and dynamic process of IS use and avoids treating IS use as a linear trajectory with a narrow focus on individual dimensions of the phenomenon (McLeod & Doolin, 2012). We adopt a multi-level analysis spanning from the individual, group, social and organisational levels. The analysis will not overlook the complexity and interrelationships between influences, events and effects that can occur in the process of individual adaptation.

Following the contextualist theory development approach, we will examine contextually situated process of changes (Pettigrew, 1987, 1990) . Firstly, both context and action, and their mutual influence on each other will be analysed. Secondly, this study recognises that explanations of change are more likely to be holistic and multi-faceted than linear and singular: "changes have multiple causes and are to be explained more by loops than lines" (Pettigrew, 1990, p. 270). While the focal unit of analysis is the individual, consideration will also be given to the multiple levels of analysis in an organisational context.

5. Research Methodology

An integration of the qualitative interpretive case studies and grounded theory is adopted in this research (Díaz Andrade, 2009; Klein & Myers, 1999; Walsham, 1995). It follows an embedded multiple-case study design, which provides a robust and rigorous ground for quality research derived from the corroboration of multiples sources of evidence (Eisenhardt, 1989; Yin, 2003).

Three organisations in Thailand provide the empirical grounding for this study. They include a public organisation, a private organisation and a multinational organisation, which can increase comprehensive and diverse data and enable a broader theoretical elaboration (Eisenhardt & Graebner, 2007). The principle of theoretical sampling has guided the case study selection based on the likelihood that they offer for theoretical insights (Glaser & Strauss, 1967). Different organisational cultures and practices will help scrutinise contrasting patterns in the data by observing the influence of socio-organisational factors on the

adaptation process. The selected organisations have mandated the use of SAP for at least three years.

The study will employ semi-structured and critical incident interview techniques to collect data from ERP users, immediate supervisors and IT specialists. Other data sources will include organisational documents – i.e., training and user manuals and organisational reports.

6. Expected Contributions

From a theoretical perspective, the substantive and explanatory theory of this study aims at contributing to the body of knowledge on IS use beyond research that examines initial technology acceptance.

For practice, results from this study can be used to inform the design of ongoing training and user intervention programmes that encourage higher levels of use among IS users, thus helping organisations to obtain stronger benefits from their IS investments.

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