

**Investigating the Link Between Users' IT Adaptation  
Behaviours and Individual-Level IT Use Outcomes Using the  
Coping Model of User Adaptation: A Case Study of a Work  
System Computerisation Project**

By

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## **DEDICATION**

To my family, my friends, my country and humanity

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A link to this paper has further been provided to the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development. <http://www.unapcict.org/ecohub/the-impact-of-ict-investment-on-development-using-the-capability-approach-the-case-of-the-nigerian-pre-paid-electricity-billing-system>

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## **ABSTRACT**

The benefits of new IT-induced organisational changes, such as new organisational information systems (IS), depend on the degree that system users adapt by proactively changing themselves, their work routines, and even the technology itself in order to reap its strategic capabilities and advantages. However, researchers are increasingly concerned that IS research has provided very little indication about how IS users' IT adaptive strategies are formed and evolved over time and how such adaptive behaviours employed by IS users influence subsequent IT use and individual-level performance outcomes.

This thesis investigates in-depth the evolution of IT adaptation behaviours towards disruptive IT events in the case study of a Medical Clinic attached to one of Iran's elite Oil and Gas industry companies. The case study investigated the individual coping behaviours of the employees of this Medical Centre as a consequence of the introduction of a mandatory Work System Computerisation (WSC) initiative. Work System Computerisation project refers to both the replacement of manual work processes with computers as well as modernisation of the existing out-dated computerised work systems in the medical centre under investigation. According to the case study, each of the seven sub-units of the Medical Centre implemented a different WSC scheme and the consequences of the introduction of the scheme resulted in differing outcomes among the employees of those sub-units, such outcomes being related to a complex interplay of the individuals' coping behaviours, appraisals and emotional responses and the environment. The term 'Disruptive IT event' in this study refers to any enhanced or completely new information technology in different units within the medical centre (i.e. Work System Computerisation schemes) that replaced and disrupted existing work processes/practices and had resulted in disruptive and unpredictable changes to users' daily routines.

The theoretical lens used in this study is the Coping Model of User Adaptation (CMUA) elaborated by Coping Theory, which also underpins the model. CMUA provides a useful theoretical basis for deeper understanding of users' adaptive responses to a new work information system (IS) as well as direct analysis of the impact of such adaptive responses on system usage. The other theoretical concept used, which addresses issues not readily

covered by the CMUA, was a typology of adaptive behaviours from Roth and Cohen (1986): avoidance vs. approach. This allows for further clarification of how different types of individual-level adaptation acts evolve over time and affect individual-level IT use outcomes. Furthermore, how these various adaptive acts enhance or hinder the extent to which the new IT is used can also be explained.

The research questions guiding this thesis are as follows: (1) How do IS users' adaptation tactics and strategies evolve over time when dealing with a disruptive IT event? (2) How do alterations in users' coping strategies subsequently influence their IT use outcomes and overall performance?

The study's methodological approaches and underlying philosophical assumptions followed an interpretive research approach. A broadly interpretive approach was adopted in this study with the aim of understanding the complexity of human sense making and their IT adaptation behaviours as the situation emerges. The research was carried out in one state of Iran, Mashhad, and took place during the period of 2011-2012.

The findings of this thesis have both theoretical and managerial implications. From a theoretical perspective, this study expands on the work of Beaudry and Pinsonneault (2005) who suggested that the process of user adaptation could be understood in light of coping theory. The results of this study and the additional identified perspectives and enhancements which are represented in the following ways could help to advance the field of user IT adaptation behaviours in IS research.

- This study contributes to the existing IT adaptation literature by providing rich insights into the phenomenon of user IT adaptation behaviours within the context of Iran. Adopting an interpretive approach through a longitudinal process-oriented perspective has provided a greater understanding of the patterns of user adaptation to IS, users' psychological constructs, initial patterns of their coping strategies, the alterations in such coping efforts over time, and the consequences of these evolutions on IT use outcomes in different divisions within a healthcare environment.
- The appraisal of 'challenge' is an influential contributor to the users' subsequent adaptation process that CMUA is mute about it. The findings indicate that since the

challenge appraisal represents a 'positive stress', some levels of challenge are useful to mobilise IS users towards IT adoption and use.

- The correlated concerns identified in the research (i.e. a web of complex personal, social and technical concerns) play a vital role on users' adaptation processes following the IT implementation and over time. This highlights the importance of feedback loop in the adaptation process (which represents users' reevaluation process), and how the direct and indirect impacts of such interventions affect users' reassessments of the IT event and their subsequent efforts and outcomes.
- The concept of emotion that is missing from CMUA is influential especially where non-IT savvy users' behaviours toward significant IT events may be influenced by extreme emotions.
- Outcomes of this study highlight the theoretical importance of preserving the distinction between approach-, and avoidance-oriented emotion-focused behaviours in exploring how emotion-focused behaviours may influence behavioural outcomes such as system usage.
- The consideration of parallel processes for users' IS appraisal is another area of theoretical expansion.

The findings also suggest implications for practice as well as directions for future research. Understanding how employees' IS appraisals considerably affect coping efforts and ultimately their technology performance outcome is critical for successful IT implementations and use in work settings. The results could assist decision makers in assessing user adaptation concerns and the intensity of such apprehensions at each phase of the change process and hence address them more effectively.

## ACRONYMS AND ABBREVIATIONS

CMUA	Coping Model of User Adaptation
GP	General Practitioner
HCSP	HealthCare Service Provider
ICT	Information and Communication Technology
IS	Information Systems
ISM	Information Success Model
IT	Information Technology
ITCE	Information Technology Council Excellence
MDI	Medical Documents and Insurance
MIS	Management Information Systems
NIGC	National Iranian Gas Company
NIOC	National Iranian Oil Company
NIODC	National Iranian Oil Distribution Company
NIPC	National Iranian Petrochemical Company
OPEC	Organisation of the Petroleum Exporting Countries
PHC	Public Health Centre
PIHO	Petroleum Industry Health Organisation
SCT	Social Cognitive Theory
TA	Technology Adoption
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UN	United Nations
UTAUT	Unified Theory of Acceptance and Use of Technology
WSC	Work System Computerisation

## CHAPTER ONE - SCOPE OF RESEARCH

### 1. Introduction

#### 1.1. Scope of Research Area

The introduction of new information technology (IT) can generate a multitude of expected and unexpected consequences in the users' environment (Griffith, 1999; Beaudry & Pinsonneault, 2005; Barki et al., 2007; Beaudry, 2009; Fadel & Brown, 2010; Fadel, 2012; Schwarz et al., 2014). These consequences are interpreted and understood in a variety of ways by system users, triggering complex user responses (Beaudry & Pinsonneault, 2005) and have been shown to cause stress in employees (Tams et al., 2011). Research within the information systems (IS) domain with respect to user adaptation (or coping) to IT, suggests that individual stress varies in accordance with a user's ability to cope successfully with the IT event (Beaudry & Pinsonneault, 2005; Beaudry, 2009) which echoes a similar statement from the stress literature (Lazarus & Folkman, 1984; Smith et al., 1985) and management research (Huy, 1999). In IS literature user adaptation to IT-related organisational changes has been to some extent reported and reflected upon- sometimes with overlapping perspectives (Leonard-Barton, 1988; Ives & Olson, 1984; Tyre & Orlikowski, 1996), and all these studies share a common ground and concern an adaptation process between the work system, technology and the IS user.

This study, in essence, attempts to fit into the body of research that investigates user adaptation behaviours (processes or strategies) to new IT systems in workplaces and the significance of such adaptive efforts on subsequent system usage and individual-level IT use outcomes. Although this sub-domain of IS research overlaps with areas of the psychology discipline, it ultimately engages its core subject matter- the information technology (IT) artefact- and focuses on the IS aspects of the phenomenon that concern the relationship between users' adaptive responses to IT events and IT use outcomes such as productivity. Research has shown that the most successful IS implementations are those in which the users of the technology adapt in order to take full advantage of its features (Tyre & Orlikowski, 1994; Orlikowski, 1996; Leonard-Barton, 1988). Thus, explaining how adaptation processes (or specific types of adaptive efforts) occur and how and why these strategies are altered and evolved constitutes an important practical and theoretical

challenge (Fadel & Brown, 2010). Nevertheless, until recently many aspects concerning how and why one's IT adaptation strategies unfolds remain unclear (Beaudry, 2009; Elie-Dit-Cosaque & Pallud, 2011). Furthermore, there has been very little direct analysis of the impacts of users' diverse IT adaptive acts on technology usage and their productivity. Until now, two main streams of IS research have attempted to a certain extent to address the complex phenomenon of user reactions to new technologies in work settings.

The first stream, which has applied a variance approach, has mainly focused on the antecedents of adoption and usage of new IT systems in order to predict the IS users' behaviours and has yielded numerous models of user acceptance (Venkatesh et al., 2003). Researchers, most frequently, by taking this approach consider user adaptation to be implicit in system usage (Elie-Dit-Cosaque & Straub, 2011). While very insightful, these models do not indeed contribute to explain the underlying and dynamic adaptation processes (especially in mandatory settings) which individuals experience when a new IT system is being implemented and used (Beaudry, 2009). As such, while variance models are insightful in explaining the "what" and "how often" facets of IT adoption and use, they are incapable of fully capturing the psychological processes involved in user adaptation behaviours to new IT systems (Beaudry & Pinsonneault, 2010).

The second stream of research, on the other hand, has mainly relied upon a process approach and has focused on user adaptation (Orlikowski, 1996; Tyre & Orlikowski, 1994, 1996) and its effects on outcomes such as group performance (DeSanctis & Poole, 1994; Majchrzak et al., 2000) and structuring of organisations (Orlikowski & Robey, 1991). Again, although very insightful, these studies have not shed light on "how" and "why" individuals' reliance on various coping strategies may lead to different IT adaptation behaviours (system usage). In this regard, Beaudry and Pinsonneault (2005) indicate that the extant research regarding the different aspects of user adaptation is fragmented and has evolved over the years in a fairly non-integrated way. They thus put forward the Coping Model of User Adaptation (CMUA) to reconcile and integrate prior research within the area of user adaptation to IT events and suggest that coping with significant technology events is a major aspect of users' behaviours that helps to manage relations with their environment.



The central premise of CMUA is that the introduction of a new technology or major modification of an existing one can generate changes that are perceived as novel and can form a disruption in users' daily routines and at a higher level in organisations (Lyytinen & Rose, 2003). So far, however, we have limited knowledge about the ways users employ coping strategies to adapt to stressful IT events (Guinea & Webster, 2011; Elie-Dit-Cosaque & Straub, 2011). In this thesis, the term 'user adaptation' is viewed as the cognitive and behavioural efforts applied by users to manage specific consequences associated with a significant IT event that occurs in their work environment (Beaudry & Pinsonneault, 2005). In other words, adaptive behaviours are, in fact, activities<sup>1</sup> that users perform in order to cope with the perceived consequences of the IT-related organisational changes.

This study is theoretically based on the Coping Model of User Adaptation (CMUA) to provide a deeper insight into the dynamics of IS users' IT adaptation processes in a workplace in one of the less talked about countries, Iran. It attempts to understand how IS users go through the coping process to deal with an IT event and adapt to new ways of using the IT systems, how they readjust their earlier adaptation efforts to better deal with issues related to the IT event and how their psychological constructs such as appraisal, feeling, coping acts and revaluation of the situation work together in this dynamic process and affect subsequent individual-level outcomes. Such outcomes could be referred to as achieving efficiency and effectiveness, restoring emotional stability, modifying their tasks, adapting the technology, or even resisting it. Simply put, the purpose of this study is to explore and provide a deeper understanding of how different and specific forms of adaptive strategies employed by IS users contribute to or detract from IT usage at the individual level. However, such linkage between 'coping efforts and outcomes' cannot be investigated without considering other embedded psychological constructs such as users' IS appraisal that triggers the actions taken by employees.

As such, users' adaptation efforts are explored in detail using this individual-level theoretical lens (i.e. CMUA) with regard to employees with no or very little computer knowledge (IT skills) required to work with the new implemented IT systems, ranging from

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<sup>1</sup> IT adaptive behaviours are strategies (including specific types of emotional and practical efforts) that IS users employ to change/modify/adjust either or all of the components of the task, technology and self.

rigid and non-flexible IT systems to fully customisable and state-of-the-art computers and software packages. The focus is on the post-implementation usage of a disruptive IT event<sup>2</sup> (i.e. work system computerisation) within the context of Iran at a medical centre linked to the Ministry of Petroleum (MoP). While the concept of IS adaptation has been previously presented in the literature, much less is known about the direct impacts of various user adaptive efforts on the productivity of IS users which forms the motivation for this research.

## **1.2. Research Motivation**

The context of Iran was selected as the case study country for various reasons. First, until now, the employee side of IT-related organisational changes, and in particular, the improvement of the quality of users' system usage and outcomes through better understanding of their adaptive behaviours have been overlooked in this country. There have been a few published papers and reports (both local and internet-published reports) concerning the country's state of Information and Communication Technology (ICT) with surprisingly no investigation whatsoever about the Work System Computerisation (WSC) projects and its related issues in Iranian organisations. The majority of such studies have clustered around topics such as e-government and other technical terms and issues and very few have focused on the human aspects of IT/IS implementation and use in workplaces, particularly with behavioural/adaptation themes, which is the focal point of this study.

One reason for such deficiency could be the lack of interest among researchers to study the user side of technological innovations. This subject (or concern) has never been taken into account as important by the researchers, practitioners and managers of this country. Another reason has been undoubtedly political issues that have extensively limited the access of investigators to internal resources, which has consequently discouraged researchers to research topics concerning the country. Another reason for choosing Iran is that although this country could be considered technologically advanced in the subjects of

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<sup>2</sup> By using the term 'disruptive IT event', the intention is to refer to both the IT systems and the surrounding conditions (situational factors) that affected the performance of such technological enhancements in the medical centre. In this study the term refers to both the replacement of manual work processes with computers as well as major modernisation of the existing out-dated IT systems in the medical centre under investigation where such IS development had resulted in disruptive and unpredictable changes to users' daily routines which subsequently led to diverse IT use outcomes.

nuclear arms in military-related fields or in Nanotechnology in the domain of medicine, it is definitely not the case in the implementation and use of information systems, in the public sector such as health information systems, clinical information systems and automating the work systems in organisations to name a few.

Additionally, consistent with Bass's (1990) notion about different leaders' characteristics that are associated with higher performance, managers in Iran are (to a high degree) productive-centred leaders and see employees more as a tool or resource to achieve a particular personal and organisational goal or outcome. As Javidan and Dastmalchian (2003) indicate Iranian managerial practices are distinguished by individualism, high power distance, high performance orientation with a short-term horizon, high male orientation and have little tolerance for ambiguity and need to follow rules (Abbas & Amirshahi, 2002). While it is believed that these traditional value systems are detrimental to organisational operations and functionalities, they are rooted in Iranian's national culture (Yeganeh & Su, 2007). Iranian managers tend to be somewhat performance oriented but with short time horizons<sup>3</sup>. The tendency toward a short-term orientation is probably related to the lack of rule orientation and strong power distance. The lack of emphasis on regulations and procedures reduces one's ability to plan for and have confidence in the future, and high power distance means that those in positions of power may change the rules to suit their own interests (Javidan & Dastmalchian, 2003).

These behaviours subsequently give rise to a complex web of socio-technical difficulties that significantly affect employees' perceptions and their willingness to welcome, embrace and use the new IT system suitably. Furthermore, based on the author's understanding of the context<sup>4</sup>, it was already known that the influences of employees' feelings and appraisals on their receptivity to new IT systems and their subsequent actions (coping efforts) towards embracing innovative computer-based technologies were significant.

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<sup>3</sup> Short-term horizon in here means that Iranian managers usually wish to invest money for only a relatively short time and blindly accept short-term benefits. They do not consider and think about the long-term interest of the organisation.

<sup>4</sup> The author is an Iranian citizen and has the experience of working in the organisational environments as an IT administrator and IT trainer for several years. Through working with diverse people and computer users in organisational settings, the author noticed the complexities of user IT adaptation-especially for those who did not have the necessary skills for the new IS- and how easily they could be affected by environmental conditions.

This unexplored area has raised a very good opportunity, notwithstanding earlier mentioned difficulties, for interested researchers to contribute to the research and knowledge by investigating the employee side of IS implementations and technological advancements in this country. The public sector is of particular interest to the author since the majority of employees in this sector are middle-aged with traditional mind-sets of doing things. Therefore, their confrontation with technology would be very valuable for understanding the degree of their adaptations, their perception of change and the impact of coping efforts on the organisation's work system as a whole so it can be taken into account for more successful IS implementation in this sector in the future.

There is clearly a need for more rigorous, focused, responsive research into the users' dynamic processes of 'appraisal-coping-outcomes' when confronted with new (often disruptive) IT-related organisational transformation in countries which have not received the attention they deserve. To conclude, this study is motivated by a research need and the author empirically and theoretically seeks to understand the complex process of users' IT adaptive behaviours and their subsequent IT use outcomes.

### **1.3. Research Questions and Objectives**

This research is informed by an underlying assumption that user adaptation behaviours can influence users' IT use outcomes and in particular can contribute to the desired IT use outcomes (e.g. deeper system usage, individual efficiency and effectiveness, etc.) if its focus is on providing opportunities that users can effectively use to improve their adaptive efforts. This underlying assumption leads to the following research objectives:

- To understand the current status of user IT adaptation literature in IS research
- To provide some insight into the process of user IT adaptation behaviours (comprising of different constructs and sub-processes such as users' IS appraisal, adaptive strategies and reconsideration) to a WSC event in Iran
- To provide a greater insight particularly with respect to the relationship between IS users' certain types of adaptive strategies and IT use outcomes
- To provide some insight into the likely influences of contextual factors that may hinder or promote the users' IT adaptive behaviours

- To contribute to the theoretical and practical knowledge concerning the user adaptation to new IT systems

The research objectives lead to the following research questions:

- 1- How do IS users' adaptation tactics and strategies evolve over time when dealing with a disruptive IT event<sup>5</sup>?
- 2- How do alterations in users' coping strategies subsequently influence their IT use outcomes and overall performance?

The two research questions were carefully formulated to guide the study and achieve the aim of the research. Furthermore, due to the complex nature of the research topic the author designed the research questions in a way that they could be easily understood by IS researchers who are not actively engaged or familiar with this area of research. Accordingly, while the first question concerns the "employed adaptation tactics and strategies by users" as well as the potential alterations to the patterns of user adaptation efforts, the second question seeks the influences of such alterations on users' subsequent IT-use outcomes. Jointly, these questions provide a clearer understanding of user adaptation processes and the likely consequences of such adaptive acts on individual-level outcomes such as productivity and system usage as the IT event unfolds over time in a work setting.

#### **1.4. Research Approach**

To address the above research questions, an empirical investigation was conducted to understand the context, involved users, dynamics and challenges of the process of user adaptation to a WSC project in a medical centre in Iran. A broadly interpretive approach was adopted in this study (Walsham, 2006) with the aim of understanding the complexity of human sense making as the situation emerges (Kaplan & Maxwell, 1994; Walsham, 2006; Bryman, 2008, 2012). Interpretive studies attempt to understand phenomena through the meanings that people assign to them (Boland, 1985; Orlikowski & Baroudi, 1991).

In this thesis, user IT adaptation behaviours and organisational IT implementation were examined through employees' experiences and perceptions. This means that the IS users'

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<sup>5</sup> Sherif et al. (2006) define a disruptive IT innovation as "a novel idea or behaviour that when introduced in organisational settings, causes dramatic changes in the structure of work processes" (p.341).

experiences and perceptions that constructed their subjective realities were studied. Emphasising the subjective nature of reality is in line with the phenomenological view, according to which a person and the world are inseparably related through the person's experience of the world (Sandberg, 2005). Examining individuals' experiences (i.e. experiences of being in a disruptive IT event and adapting to new ways of doing things via the new IS) was valuable since descriptions of existing experiences offer authentic insights into the individuals' observations, emotions, beliefs, thoughts, opinions and evaluations. Hence, the author was able to find out and understand, for example, what was important or trivial for the interviewees, what they paid attention to and how they went through the adaptation process.

The study was carried out during the period 2011-2012 through a single interpretive case-study design approach. The research was carried out at one of the major medical centres related to the Iran's National Iranian Oil Company. Data collection was conducted via semi-structured interviews, field observations and document analyses and, 'thematic analysis'<sup>6</sup> were used to analyse the data (Braun & Clarke, 2006).

### **1.5. Theoretical Approach**

The thesis is theoretically based upon Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation (CMUA). Drawing on Coping Theory, Beaudry & Pinsonneault (2005) propose the CMUA to study how individuals adapt to new IT implementations in their work place. Beaudry & Pinsonneault (2005) define user adaptation in light of coping theory 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" (p.496). CMUA frames users' responses to a new workplace IT system in terms of three processual sequential phases. Initially the IS user becomes aware of a new IS in his/her work environment. This awareness leads to an IS appraisal wherein the user assesses the likely consequences of the IS and his/her available options for responding to it. Based on these appraisals, the IS user then engages in various types of adaptive acts in response to the IS, which subsequently can produce both external outcomes (improved efficiency and effectiveness using the new IS) and internal outcomes (e.g. restored emotional stability and

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<sup>6</sup> Thematic analysis is a method of organising and describing data in rich detail by identifying, analysing and reporting patterns referred to as themes.

improved concentration on the task at hand). CMUA also connects the IT use outcomes to the user's IS appraisal through a feedback loop to indicate that adaptive acts can be altered over time as the situation unfolds.

### **1.6. Expected Contributions**

This research envisages contributing theoretically and practically to the research domain of user adaptation to IT events, specifically relating to:

- Expanding the scope of user IT adaptation studies based on the Coping Model of User Adaptation (CMUA) by adopting an interpretive approach and a longitudinal design and hence highlighting the role of time-related adaptation behaviours at an individual level<sup>7</sup>
- Improving the initial theoretical framework (CMUA) by enhancing various aspects of the model based on the empirical findings of the case study research
- Contributing to the debates on the theorisation and evaluation of user adaptation to IT events
- Providing practical insights for managers by giving a better understanding of users' perceptions and coping reactions, which in turn can be used to improve trainings and user intervention programmes to promote higher levels of IT performance outcomes among IS users, and ultimately help organisations reap more benefit from their IT investments

### **1.7. Research Overview and Structure**

The structures of the chapters are organised as follows:

Chapter two begins with an overview of the importance of employees' psychological perspectives in IT-related organisational changes followed by a review of areas which concern IT-related organisational transformation and the challenges of such IT events. Next, the literature review focuses on the key topic of user adaptation to Information Systems (IS), why such a topic is important to be taken into account and how it is related to other

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<sup>7</sup> This study explores the topic of user IT adaptation behaviours from a process-oriented perspective to allow deeper understanding of the underlying links between how users' different types of user adaptation behaviours contribute to or diminish system usage at the individual level. This approach, in essence, shows whether adaptive strategies evolve over time and what the consequences of these evolutions on IT outcomes are.

topics in the IS domain such as IT adoption and infusion studies. Then, the current status of user adaptation studies in IS research is explored. Coping theory in psychology is then discussed followed by its suitability for the IS field. Exploring coping-based IS studies come next and finally the research gap is discussed. The chapter concludes with the formulation of the research questions informing this study.

Chapter three discusses the different individual-level psychological/behavioural frameworks that have thus far been used in IS research. A discussion of these different frameworks reveals the coping theory as the most appropriate framework to help answer the research questions. The characteristics of the coping theory and its components are then discussed. Next, the Coping Model of User Adaptation (CMUA), which is based on the coping theory, is described that allows clarifications on the relationships between the psychological constructs from a cognitive-relational and process-oriented approach in an IT context. The chapter concludes by discussing the limitations as well as the strengths of the CMUA and how this study can contribute by operationalising the framework differently.

Chapter four is devoted to describing the philosophical assumptions underpinning the study, particularly the epistemological assumptions of interpretive research. The main strategy adopted for studying the user IT adaptation behaviours was an in-depth case study. Next, the study focuses on the research design and its various aspects followed by the research strategy with a discussion of the author's understanding of an in-depth single case study and an explanation of the rationale behind the selection of the work system computerisation (WSC) as the IT event. The chapter concludes by explaining the qualitative methods of data collection and the method of data analysis.

Chapter five focuses on the case study. It initially introduces the historical background of the research context. It then moves towards the detailed explanation of the case study context and its IT-related historical background with respect to the WSC event. In other words, all the necessary background and required information about the case study context is presented in this chapter.

Chapter six presents a thematic analysis of the research findings followed by a critical discussion based on the key elements of the CMUA, which served as the theoretical



framework. This chapter exclusively focuses on the individual-level analysis of IS users' IT adaptation behaviours in different divisions within the medical centre and includes the following themes: (A) the key interrelated concerns which influenced the users' dynamic adaptation processes directly or indirectly over time; (B) users' initial perception of the IT event, their early IT adaptation behaviours as well as the subsequent IT use outcomes; (C) users' evolved adaptation strategies affected by the contextual factors and the subsequent IT use outcomes; (D) other identified influential patterns such as 'emotion' in employees' adaptation processes or a particular type of IS appraisal. The results of the analysis were interesting in that they allowed the author to understand not only the users' interpretations of the IT systems and the subsequent adaptive acts that were crucial in achieving particular outcomes, but also how the context played a crucial role in enabling or constraining users to use the new IT systems in their relative field for optimum efficiency and effectiveness.

Chapter seven discusses the findings and results of the case study analysis, linking it to the theory discussed earlier in chapter three, in terms of implications for research. By doing so, the findings are discussed in the context of the extant literature on this topic to evaluate the contributions being made. Next, the research questions are addressed according to the findings from this study. Finally the outcomes of the practical case study will be used to establish a revised model of IS users' adaptation behaviours.

Finally, the thesis concludes with chapter eight by discussing the contribution of the research to both theory and practice and reporting on the implications of the research approach. The chapter and the thesis concludes with the limitations of the research and suggestions for future research to progress the field of user adaptation to IT events in IS research.

## CHAPTER TWO - LITERATURE REVIEW

### 2. Introduction

This chapter begins by providing a brief overview of the importance of reflection on users' psychological perspectives in today's complex IT-related organisational changes, an area of study with which this research aligns itself. This research builds on literature from a variety of domains within and outside of IS research, however the salient IS research themes include user adaptation/coping behaviours to new IT artefacts in work settings. In addition, this research draws on general and IS-specific theories of individual coping as a theoretical foundation for deeper understanding of users' IT-related adaptation behaviours. As the study touches on organisational change discourse, the subsequent sections provide an overview of the diversity of perspectives regarding the different types of change jointly with more focused discussions of technological innovations in organisations and disruptive IT events in particular, followed by an overview of different types of IT events in work settings. The challenges of change for individuals are then presented by briefly covering the related areas of personal change, individuals' emotions, psychological stress and making sense of IT. Next, the relevant literature on user adaptation to IT is reviewed, followed by an overview of general and IS-specific coping research. The chapter concludes by recognising the gap in the user IT adaptation behaviour literature that guides the focal point of this study and formulation of the research questions.

#### 2.1. The Importance of Attention to IS Users' Psychological Perspectives in IT-Induced Organisational Changes

Changing times (e.g. changes in IT systems and/or structures) are often troubling for organisations. Today's organisations increasingly rely on complex information systems (IS) to maintain and enhance competitive advantages by, for example, combining and streamlining diverse business functions under a united technological platform (Fadel & Brown, 2010). Research on organisational change, however, has shown that 'change programmes' frequently face a series of problems (Eriksson, 2004). While it has been suggested that Information and Communication Technologies (ICTs) have positive impacts on organisational performance, they have also been shown to result in negative consequences such as staff turnover and productivity losses (Tams et al., 2011). Empirical evidence demonstrates that the benefits of IS often fall short of expectations or fail to materialise at all and the

frequently mentioned reason for such failures is that new implemented IS/IT systems are underutilised (Barki et al., 2007). Vakola et al. (2004) argue that managers have seen that many change efforts with the aim of organisational transformation have fallen behind the expected mark since they take no account of human elements in their change projects. Swarnalatha and Prasanna (2013) similarly explain that successful employee engagement is considered a primary antecedent to successful change management. The important role of the human side in IT-induced organisational changes has also been put forth by several researchers. Liu and Perrewe (2005) indicate that besides the technical part of the change process, managers must also deal with employees' psychological well-being on the part of the change recipients. Similarly, research on the implementation of information communication technologies (ICT) has demonstrated that the success of such implementation efforts are as much a function of human interaction as they are a function of appropriate technology (Taylor et al., 2001; Zorn, 2003). Clagget (2010) also points out the importance of IT adoption by 'system users' and explains that the success of any organisation that utilises an IT artefact is the adoption of that artefact by the necessary system users.

In this respect, related IS research has highlighted the vital role of the social side (also referred to as 'human side' or 'employee side') of IT-related organisational changes which has led IS researchers to adopt empirical approaches that focus particularly on human interpretations and meanings (Walsham, 1993; Beaudry & Pinsonneault, 2005, 2010; Fadel, 2012; Fadel & Brown, 2010; Tyre & Orlikowski, 1994, 1996). Given the fact that many organisational tasks highly depend on effective use of IT, the degree to which computer users adapt to a new IT system can have a major impact not only on the efficiency of the operations at the individual level that are directly based on IT, but certainly on the performance of the organisation as a whole (Bruque et al., 2008). In a similar context, Fadel and Brown (2010) stress that the ubiquity of IT utilisation in the modern organisation makes the effective use of IT by organisation members a necessary condition for effective performance and successful business operation. Clarke (1994) similarly points to the critical role of employees in every corporation by stating, "if 'structure' is the skeleton of organisation and process represents the nervous system or infrastructure of the organisation, then people are the blood and guts" (p.39). Clarke (1994) also stresses that

even the small routine changes inherent in running any business are often accompanied by stress. Thus, if this is the case for small changes, it is perceived how much more difficult it is to implement big changes such as restructuring the business, major programs of culture change, IT-related change projects or merging the companies (Montalvo, 2006; Aziz & Salleh, 2014).

The introduction of new information technology (IT) can generate a multitude of expected and unexpected consequences in the users' environment (Griffith, 1999). These consequences are interpreted and understood in a variety of ways by users, triggering complex user responses (Beaudry & Pinsonneault, 2005) and have been shown to cause stress in employees (Tams et al., 2011). Research within information systems (IS) domain with respect to stress, suggests that individual stress (also called psychological stress) varies in accordance with a user's ability to cope successfully with the IT event (Lazarus & Folkman, 1984). In IS literature user adaptation (coping) to IT events have been reported and reflected upon (Leonard-Barton 1988, Ives & Olson 1984; Tyre & Orlikowski 1996). All the studies share a common theme: an adaptation process between the work system, technology and the system user.

To this date, however, we have limited knowledge about the ways users employ coping strategies to adapt to the disruptions caused by stressful and disruptive IT events such as changes in users' work processes (Fadel, 2011). Little attention has been given to understanding how system users' psychological perspectives influence and are influenced by one another as well as by personal and contextual factors in the process of IT adaptation, which lead to consequent IT use behaviours and individual-level outcomes. For example, according to Beaudry and Pinsonneault (2005), the topic of 'IT-related user adaptation behaviours' has been diversely understood and defined in Information Systems. The reason, as they explain it, is that IS researchers have studied user adaptation without a universal approach that would allow exploiting the variety of findings from each of the variance and process research traditions. In the same vein, Elie-Dit-Cosaque and Straub (2011) stress that quantitative researchers, very often, consider user adaptation to be implicit in system usage. This raises the question of whether quantitative research can uncover the story behind the statistics and fully capture the complexity and nature of user responses to IT

events. Fadel (2012) similarly argues that complexity of today's organisational IS has resulted in greater user discretion over 'how' as opposed to 'whether' or 'how often' an IS is used since increased use quantity (as frequency, intensity or duration) does not necessarily imply increased individual or organisational benefits. Hence, research must be developed to understand adaptation processes that shape quality or depth of use, particularly with regard to complex, mandated organisational IS (Barki et al., 2007; Fadel, 2011).

Because the benefits of IS depend upon how the systems are used by individuals (Fadel, 2012; Beaudry & Pinsonneault, 2005), organisations that invest in these systems have a considerable stake in ensuring that they are used effectively. As a result, researchers and practitioners seek better explanations for the nature of user responses to IS that shape quality IT use behaviours (Bruque et al., 2008). This has therefore left scope for integrating psychological perspectives into the domain of IS to improve both theoretical and practical understanding of how IS users adapt to new IT systems and how particular types of individual user adaptation promote or discourage system usage and IT use outcomes (Guinea & Webster, 2011; Elie-Dit-Cosaque & Straub, 2011; Fadel, 2012).

## **2.2. Organisational Change as Loss and Gain**

Although there may be a gain through change, there could also be a loss (Lazarus & Folkman, 1984). Effective change within an organisation in many respects depends on the employees, their contribution and development (Beaudry & Pinsonneault, 2005; Bruque et al., 2008; Tyre & Orlikowski, 1994). People's reactions to change vary in accordance with their perceptions of the change (Bridges, 1991; Humphrey, 1986). Morrison (1998) and Harvey-Jones (1988) stress that some employees find the proposed change attractive, some are committed to change and others, who are more traditionalists, do not want anything to do with change. Robbins and Finley (1997) elucidate that there are three kinds of change, namely: global change, organisational change and personal change.

'Global change' in Robbins and Finley's (1997) definition is the big change that happens to people no matter what they do. Some examples of this kind of change are technology, politics, social change and so forth. The second one -organisational change- includes all the revolutionary change initiatives that most organisations undertake to cope with the

pressure of environmental change such as restructuring. Finally and more importantly, Robbins and Finley (1997) put emphasis on the third kind of change, which is 'personal change'. They describe it as "little and micro changes that assail us on an individual level" (p.42). De Vries and Balazs (1998) stress that for many employees change implies a loss of the security that goes with a specific job. Other people may fear that they lack the skills and stamina needed for change. Still others may be afraid that good working conditions may be taken away. Some employees may fear that change implies a loss of responsibility and power. Other people may see a proposed change as an attack on their previous performances and react defensively.

Duck (1993) explains change as something intensely personal because it requires people to do something different, to think something different and to feel something different. Duck (1993) also adds that it is not simply whether people feel positive or negative about a change but how they handle it. Researchers have therefore, identified various employees' responses to organisational changes ranging from strong positive attitudes to strong negative attitudes (Piderit, 2000). As a result, change can be received with excitement and happiness or anger, fear, anxiety, uncertainty and worry, while employees' responses may range from positive intentions to support the change to negative intentions to oppose it.

IT-related organisational changes, which are a type of organisational change initiative, have attracted the attention of academics and practitioners for several decades and have been a central concern in the field of information systems (Markus & Robey, 1988; Orlikowski & Iacono, 2001; Luo et al., 2012; Ramirez & Lawler, 2010). The changes that continue to occur as ICTs and technological advancements pervade organisations and become intensely involved in intra- and inter-organisational relations, decision-making processes, operational procedures, as well as employees' work practices are multi-faceted, complex and unpredictable to say the least (Ciborra, 2004; Brown & Duguid, 2000; Zorn, 2003; Choi et al., 2011).

### ***2.2.1. IT-Induced Changes in Organisations as IT Innovations***

A widely accepted definition of organisational innovation is that it involves the adoption of an idea, material artefact or behaviour that is new to the organisation adopting it (Rogers & Shoemaker, 1971). However, not all ideas, material artefacts or behaviours adopted are

innovations; an innovation must be supplemented with newness or novelty as a key distinguishing feature (Lyytinen & Rose, 2003). Since defining newness is often difficult, it is argued that it is the perception of newness that should be considered, rather than whether the idea or artefact is actually new to the world. Following Zaltman et al. (1977), innovations are always defined in terms of a specific individual, organisation or community.

In a more general and high level sense, IT innovation is an IT-induced change that is a particular case of an organisational change, and very often significant alterations in people's work take place when organisations adopt new IT systems. These 'change' situations have been termed techno-changes (Markus, 2004) and could be, for example, a new accounting system that may eliminate some specialist jobs in an organisation and requires the users working with the new IS to develop their IT skills (Bruque et al., 2008). Swanson (1994) defines an information technology (IT) innovation as an innovation in digital and communication technologies and their applications. In their simplest form, IT innovations involve only a technological component, meaning, changes in software and hardware that are new to an industry or adopters. In a more technical sense, Chandler et al. (2012) explain IT as a combination of computers and telecommunications science which is used in organisations in order to retrieve, transfer and manipulate data. The IT Association of U.S also denoted IT as "the study, design, development, application, implementation, support or management of computer-based information systems" (Daintith, 2009). This terminology is widely used as a substitute for computers and computer networks (Shabanefahani, & Tabrizi, 2012).

Defining Information Systems, on the other hand, is not an easy task. Many different descriptions have been proposed over the years by researchers. Alter (2008) define IS as a special case of work system in which human participant and computer machines perform work processes and activities using information, technology, and other resources to produce informational products and/ or services for internal and external customers. This approach involves treatment of IS as a system rather than a tool. BusinessDictionary.com also defines Information Systems (IS) as a combination of hardware, software, infrastructure and trained personnel organised to facilitate planning, control, coordination, and decision-

making in an organisation<sup>8</sup>. Accordingly, in later chapters when the author considers the technical aspects of the IT event the term “IT system” is used, and when the intention is to refer to and explain how the work processes have been influenced by such technological advancement the term “IS” is used.

### **2.2.2. IT Innovations as Disruptive IT Events**

It is acknowledged that the implementation of new IT systems indicates modifications in organisational processes, tasks and the nature of work (Schraeder et al., 2006) and very often it is accompanied by complementary administrative innovations (Zmud, 1984). While non-disruptive IT systems (that are compatible with previous systems or work processes with which the IS users are already familiar) still offer challenges to individuals, the technology itself is not fundamentally new to IS users (Elie-Dit-Cosaque & Straub, 2011). The same, however, can not be said about disruptive IT events. System users who make sense of the technological innovation and appraise their roles, tasks, and utility to be empowered by the new IT system usually support its adoption and those who perceive their roles, tasks, and utility as diminished usually resist its adoption (Orlikowski 1993). Sherif et al. (2006) define a disruptive IT innovation as “a novel idea or behaviour that when introduced in organisational settings, causes dramatic changes in the structure of work processes” (p.341). Lyytinen and Rose (2003) similarly suggest that when the technology is disruptive IS users do not behave in a predictable manner. The result of a study by Lazar et al. (2006) also indicates that 43% of IS users’ time is wasted in frustrating experiences resulting from disruptive IT systems. As a result, changes induced by disruptive IT events can be threatening for IS users who are also social actors (Lamb & Kling, 2003).

Elie-Dit-Cosaque and Straub (2011) explain that still little is known about the processes by which users cope with disruptive IT systems and research in IS has often neglected the need to take user adaptation to new IT events and the influence of such behaviours on subsequent system usage into account. Thus, it is important to learn how employees adapt to radical technological advancements in work settings because their needs can be better understood and addressed.

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<sup>8</sup> Definition of Information Systems, accessed 12/06/2013, <http://www.businessdictionary.com/definition/information-system.html>



### **2.2.3. Types of IT Events**

Sometimes, modifications made to an existing IT can be viewed as significant enough to stimulate similar user responses as with the implementation of a new IT (Griffith, 1999; Louis & Sutton, 1991). Throughout this research, the disruptive IT event refers to IT artefacts as a whole including computers as both hardware and software components, IT infrastructures, peripherals as well as the consequences that result from this encounter such as changes in work routines. However, part of a disruptive IT event includes difficulties that computer users face when working with the new technology and the interruptions it causes. Thus, this section briefly covers this aspect of disruptive IT systems in work settings.

Guinea and Webster (2011) explain that during an IT interaction there are three types of encounters that can take place, classifying them into the following categories: (1) a good event (discovery); (2) an expected event; and (3) a negative unexpected technological interruption. The first one, discovery encounters (i.e. positive or desirable), take place when users find new functions in an IT or a new way of using the IT that makes the completion of their tasks easier or more effective. The second one occurs when things go smoothly and IT behaves as expected. Finally, the third encounter (also referred to as unintended IT interruption) represents a stressful situation and will be appraised by the computer users as threatening. Coraggio (1990) describes an interruption as “a negative, externally generated, randomly occurring, discrete event that breaks the continuity of user’s cognitive concentration on a key task” (p.19). In this definition negative specifies that the event has the potential for harm; externally generated indicates that the nature of the interruption is not controlled by the worker; randomly occurring means that the timing of the interruption is not known to the worker before it happens; and discrete implies that the interruption has a finite duration (Coraggio, 1990).

Within an IT context, negative interruptions include misunderstandings, confusions or troubles with the new IT system (Benbunan-Fich, 2001). These circumstances occur when there is ‘an unexpected failure’, ‘a disruption’, ‘a problematic situation’ or when there is a significant difference between expectations and reality” (Louis & Sutton, 1991: p.60). Such negative unintended IT interruptions characterise a specific case of ‘a stressful situation’ for several reasons. First, such events are novel in that it is possible that the IS user has never dealt with them before. Thus, occurrence of this event breaks the continuity of the user’s

primary task, posing a threat to its completion. Second, these events are unpredictable in most cases because the user does not know when he/she is going to experience the difficulty with the computer application. Third, such events are frequently very ambiguous (or at least appraised as ambiguous) since it is not often clear to the user what he/she has to do to resolve the encounter. For instance, many applications display error messages on the screen with numbers or codes, making the assessment of the situation very difficult for the computer user (Brown, 1983).

Because of the characteristics of the negative unexpected IT events, they will be perceived as demanding (Guinea & Webster, 2011), which represents a specific case of a stressful situation within the coping theory<sup>9</sup>. After over two decades of research on IS use and users' numerous frustrating experiences with IT, we do not know much about the complexity of coping processes and particular adaptive strategies by which users deal with IT interruptions (Guinea & Webster, 2011; Fadel, 2011). The study of IT adaptation in light of coping theory may therefore be able to explain and shed some light on which coping strategies should be used by IS users in order to reduce the negative implications of frustrating experiences.

### **2.3. The Challenges of IT-Induced Changes for System Users**

A major challenge facing organisations is that of adapting to major technological advancements that influence daily work routines. The degree to which organisation members adapt to a new IT system can have significant impacts not only on the effectiveness of the operations that are directly based on IT but also on the performance of the organisation as a whole (Bruque et al., 2008). Griffith (1999) refers to the complexity of human responses to major changes in their immediate environment and explains it this way: "given the complex systems within which new technologies are implemented, it is even more difficult for implementers of modern technologies to anticipate users' sense-making and its effect" (p.472). This indicates that while the functioning of new devices or technologies can be predicted, experience tells us that this is not the case with human

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<sup>9</sup> Coping deals with the adaptational acts that an individual performs in response to disruptive events that occur in his/her environment to manage it. Individuals cope with disruptions by using two key processes that continuously influence one another. First, individuals evaluate the potential consequences of an event (appraisal) and second, the process of coping which is also called the 'coping efforts' (Lazarus 1966; Lazarus & Folkman, 1984; Smith et al., 1985).

reactions to these changes (Bruque et al., 2008). Thus, gaining insight into employees' perspectives concerning technological changes will strengthen the IT use-performance link. This section therefore briefly covers some areas that are of importance for the purpose of this research.

### **2.3.1. Personal Change**

Change requires the participation of people who must first change themselves for organisational change to succeed. Managers need to develop an understanding of how people respond to change. Organisational change entails the ending of something and the beginning of something else (Liu & Perrewe, 2005; Bovey & Hede, 2001). For example, it might involve the introduction of a new organisational structure, a new computerised work system, job transfers or the mergers of two units. While these changes might be carefully planned, it might take some time until those involved have adapted to these external events (Cheng & Petrovic-Lazarevic, 2005). Because organisations consist ultimately of people, organisational change essentially involves personal change (Band, 1995; Steinburg, 1992; Stam & Stanton, 2010; Chou et al., 2010; Rusly et al., 2012). Employees' personal change, hence, has become an important aspect of research in the domain of IS associated with psychology, where a range of strong positive attitudes to strong negative attitudes has been identified concerning IS users' receptivity to and mobilisation for change (Eriksson, 2004; Piderit, 2000; Rusly et al., 2012; Kashefi et al., 2012).

The fact is that a proper acceptance of an IT-related change by employees necessitates them to be personally altered to some extent and adopt new ways of doing things. This implies that they have to experience the stages of personal change. Bridges (1991) conceptualises these types of personal transition into three overlapping stages divided by clear boundaries, as beginning with an ending and then going on to a new beginning via a transition phase. Moreover, Clarke (1994) points to employees' pain levels and elucidates that these are usually highest in the early stages of personal change as people move from accepting the end of the past into the transition phase. This stage often gives rise to negative emotions among employees. These negative questions can be categorised into four major groups: stress, uncertainty, fear and anger, however, the first two are considered as significant (Vakola & Nikolaou, 2005; Milliken, 1987; Liu & Perrewe, 2005). On the other

hand, positive emotions such as enjoyment, pleasure and happiness have also been referred to in IS studies (Davis et al., 1992; Kim et al., 2004). Walinga (2008) explains that if at the heart of organisational change is change in organisational members' beliefs and behaviours, it seems imperative to explore the process of change at the individual level of analysis to inform models of change at the organisational level as it is important to understand the role that cognitive and emotional processes play in the change processes.

### **2.3.2. Employees' Emotions**

Walinga (2008) refers to the challenges of change and explains: "organizational change poses many challenges to the individual. Effectively meeting any challenge demands certain physical, emotional and psychological resources in such areas as creativity, problem solving, focus, memory recall, and task performance" (p.7). Studies of both streams of research (i.e. variance and process approach) with regard to emotion in the field of Information Systems vary in their significance and the role they attribute to emotions. Many authors have used a quantitative approach concerning the employees' emotions and motivation in association with personal characteristics in order to predict or test a model. For instance, Beaudry and Pinsonneault (2010) indicate that emotions felt by users early in the implementation of new IT have important effects on subsequent IT use. In their study, Beaudry and Pinsonneault surveyed 249 bank account managers to examine the direct and indirect relationships between four emotions (excitement, happiness, anger and anxiety). Similarly, Schraeder et al. (2006) examine the relationships between employee reaction to specific technological changes and the job-related attitudes of these employees.

In contrast and among those who have used qualitative approaches in the domain of IS, Eriksson (2004) is one of the good examples who focuses on the effects of organisational change on employees' behaviours by adopting the dynamic model of change from Huy (1999). Eriksson (2004) explains that to be able to change, the person has to be willing to consider change, take actions and take steps to acquire or gain knowledge. Huy (1999) who was referred to earlier, also presented a multi-level theory of emotion and change which focuses on attributes of emotional intelligence at the individual level and emotional capability at the organisational level and tried to theoretically associate it with Lazarus's (1993) theory of stress. Kashefi et al. (2012) in the same stream of research investigated the above-proposed relationship through an empirical study and pointed out the crucial role

and impact of one's emotions and cognition towards their receptivity to and mobilisation for an IT-related organisational change.

Furthermore, McGrath (2006) drew from the theoretical work of Michel Foucault to argue for elaborating current notions of IS innovations as a moral and political struggle. Although her conceptual framework was not primarily about emotion, however, she considered it as part of the study due to its considerable impact on LAS (London Ambulance Service) staff. Likewise, Liu and Perrewe (2005) propose a cognitive-emotional model of organisational change. This model is developed according to the Lazarus's research on emotion and stress (1991a; Lazarus & Folkman, 1984). The model explains that in a planned organisational change individuals go through a cognitive-emotional process, in which they try to make sense of the change (i.e. cognitive appraisal), struggle with their emotional tensions and choose their ways of coping. In other words, it is an emotion-eliciting process and until the whole change episode elapses, emotions of different affective tone and intensity will be generated which give rise to different attitudinal and behavioural reactions.

Emotions influence our beliefs and attitudes and they help guide our thinking, decision-making and actions (Lazarus & Folkman, 1984; Gratch & Marsella, 2004). Beaudry and Pinsonneault (2010) indicate that cognitive-based models such as technology acceptance model (Davis, 1989; Davis et al., 1992), the unified theory of acceptance and use of technology (Venkatesh et al., 2003) and so on predict IT use based on perceptions and beliefs about the instrumental nature of technology such as effort and performance expectancy and perceived compatibility. As a result, they are thought not to be able to capture the full range of emotional reactions of users in order to account for their relationship to IT adoption. Emotion-based models of IT use are thus needed to complement cognitive-based approaches.

One might conclude that recent moves within some disciplines such as sociology and psychology studies to give attention to emotions are an effort to give voice to a phenomenon that has been studied only tangentially (McGrath, 2006). Simply put, usage of a new IT is complex and multifaceted, and human behaviour does not always comply with technical/rational models (Markus, 1983). However, to date, little attention has been given

to understanding how emotions can influence employees' IT adoption and use (Beaudry & Pinsonneault, 2010).

### **2.3.3. Users' Psychological Stress**

Stress is usually considered as one of the main concepts in all psychoanalytic theory and when experienced in an acute form, is the most unpleasant feeling that a human being can experience. It exists when routine thoughts, feelings and behaviours in the subconscious conflict with new thoughts and feelings in the conscious mind. Moreover, these unconscious forces can have more power over an individual's behaviour than consciousness does (Bovey & Hede, 2001).

In terms of definition, stress can be categorised into three types; the first type is stimulus-based which considers stress as environmental or situational based stimulus, impinging on the person. The second type is response-based, defining stress as an individual's psychological response to environmental and situational forces. The third definition brings together the concepts of the first two definitions in the sense that it defines stress as both the stimulus (source of stress) and the response (Vakola & Nikolaou, 2005).

In terms of the impact of stress on attitudes to change and organisational commitment, many studies have suggested that organisational change efforts most of the time are very stressful for employees (Elrod & Tippett, 2002; Morrison, 1998). Several literatures have also compared these stressful phases and responses to change, with individual responses to shocking changes such as death and grief (Kubler-Ross, 1969). Vakola and Nikolaou (2005) explain that, "Stress caused by organisational change will result in creating negative attitudes toward change and therefore will become an inhibitor to change" (p.163). Benamati and Lederer (2001) studied the coping mechanisms used by IT managers to reduce the stress associated with rapid changes in IT. Similarly, Tsai et al. (2007) investigated how IT professionals perceived and coped with the stress associated with continuously having to update their technical skills. Furthermore, stress is a well-known factor for low motivation and morale (Vakola & Nikolaou, 2005; Kashefi et al., 2012), decrease in performance and low job satisfaction (Schabracq & Cooper, 2000) and finally low quality services and poor internal communication (Vakola et al., 2004; Schraeder et al., 2006).

#### **2.3.4. Making Sense of IT**

When information technologies (IT) have a central role in organisational change programs, understanding how organisation members make sense of technology is critical to influencing their actions and to achieving planned outcomes (Davidson, 2006). People act based on their interpretations of the world (Berger & Luckmann, 1967); therefore, their understandings must change if their actions are to change substantively. In all situations of new IT initiatives employees have to make sense of the IS/IT event in organisations (Orlikowski & Gash, 1993; Piderit, 2000; Liu & Perrewe, 2005). This allows users to recognise the legitimacy of such proposed IT-related changes, welcome the technology, go through personal change, cope with new practices regarding particular instances of IS/IT innovation and finally mobilise towards it (Eriksson, 2004; Kashefi et al., 2012).

In this regard, Orlikowski & Gash (1993) argue that an understanding of peoples' (employees') interpretations of a technology is critical to understanding their interactions with it. In this sense making process, people develop particular assumptions, expectations and knowledge of the technology that help to shape their subsequent actions toward it. Cognition and micro-level processes at the individual level are therefore keys to understanding the impact of new technology in any IT-related organisational change (Orlikowski & Gash, 1993; Liu & Perrewe, 2005). Despite the fact that these interpretations of technology become evident and are rarely reflected on, they remain significant in influencing how actors in organisations think about and act toward technology (Eriksson, 2004).

Organisational change has been characterised as first and foremost an interpretive process (Barr, 1998; Isabella, 1990; Davidson, 2006). How people make sense of technology is an important component in organisational changes in which information technology (IT) plays a central role (Gephart, 2004; Griffith, 1999). Managers may hope for organisational change through IT use, but such results are often difficult to achieve (Markus, 2004). As Orlikowski (2000) indicates inertia or limited application are more common outcomes than significant changes in how people think about and perform work using IT systems. Understanding and guiding interpretive processes could therefore help managers to improve these organisational change outcomes.

## **2.4. User Adaptation to Information Systems**

This section indicates the necessity of studying user adaptation processes in IS literature by reviewing the recent discussions in this area of research. In doing so, the study reviews the recent associations that have been established between the topic of user adaptation and existing literature such as information systems infusion studies and IT acceptance and use. The final part of the section focuses on the diverse IT adaptation studies in the IS literature.

### **2.4.1. Why Study User Adaptation?**

As organisations become increasingly dependent on complex information systems, the need to better understand how users appraise and adapt to these systems continues to grow. Organisations implement information systems to improve efficiency, reduce errors and enhance productivity (Fadel, 2012). However, empirical evidence has shown that such benefits occur only to the degree that users of the technology adapt by proactively changing themselves (self), their work routines (task) and even the IT system itself (technology) in order to leverage its strategic capability (Tyre & Orlikowski, 1994, 1996; Beaudry & Pinsonneault, 2005; Beaudry, 2009; Kock et al., 2006; Elie-Dit-Cosaque & Straub, 2011; Fael, 2012). The importance of user adaptation to IS and its impact on IS success outcomes has been documented by several studies (Tyre & Orlikowski, 1996; Majchrzak et al., 2000); however many aspects of user adaptation surrounding how and why adaptation unfolds at the individual level remain unclear. Since user adaptation is crucial to IS use, IS success and infusion<sup>10</sup>, explaining how adaptation processes occur constitutes an important practical and theoretical challenge.

### **2.4.2. User Adaptation and IT Adoption Studies**

With regard to the IT adoption studies, there is currently a large volume of research that approaches the issue of adoption with an assumption that the individuals (or organisations) can accept or reject a particular technology. Bruque et al. (2008) explain that models of IT adoption have over-focused on the quantity and pace of adoption and therefore a valuable alternative approach is to explicitly study the outcomes of the technological adoption in individual behaviour and performance, focusing on the quality aspect of the innovation

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<sup>10</sup> Information Systems (IS) infusion is defined as the degree to which the IS is used within the organisation to its fullest potential (Cooper & Zmud, 1990).



process. Moreover, by under-estimating context and the complexity of user behaviours, the models that work well in experimental settings lose predictive power in real-world settings (Gallivan, 2001).

While the large body of research following or refining models such as TAM, ISM and UTAUT has analysed numerous factors that permit us to better understand what motivates individuals to use IT, in none of these models does user adaptation to new IT systems clearly and explicitly appear (Elie-Dit-Cosaque & Straub, 2011). Yet, there are several meaningful differences between adaptation and adoption (Bruque et al., 2008). First, adoption is an end-result of a decision-making process that is often time-dependent, whereas adaptation is usually a dynamic, cyclical and long-term process that is in constant evolution and renewal. Second, adaptation could be best considered as a continuous-type process that differs from the dichotomous nature of adoption that is adopters against non-adopters. Third, by focusing on adaptation, the current focus can be shifted from examining factors affecting top managers' decision-making process of IT adoption to investigating the issues and concerns affecting members' adaptation to a given technology (Bruque et al., 2008).

Researchers are now more concerned about these limitations in the IT acceptance and usage stream of research (Elie-Dit-Cosaque & Straub, 2011). As a solution to the above concern, for example, Benbasat and Barki (2007) propose that "researchers broaden their perspective of system use from one that exclusively focuses on a narrow 'amount' view of users' direct interaction with systems to one that also includes users' adaptation, learning, and reinvention behaviours around a system" (p.215). Benbasat and Barki (2007) argue that IS researchers should shift the way they study how users react to IT and build richer models to take into account a broader range of behaviours instead of focusing only on the direct relationships between use behaviours and their antecedents. Since user adaptation is crucial to IS success and infusion (Fadel, 2012), an adaptation focus is a necessary theoretical complement to what literature on adoption has so far revealed with regard to the introduction of the innovation process (Bruque et al., 2008).

#### **2.4.3. User Adaptation and Infusion Studies**

Information System infusion is another area that is highly associated with user adaptation studies since infusion occurs as the result of individuals' adaptive efforts to modify the

system, their work tasks, or themselves to more fully integrate the IS into their work procedures (Fadel, 2011). Infusion has been defined as the extent to which IT applications are embedded deeply and extensively and are used to their fullest potential within the work system of an individual or of an organisation (Cooper & Zmud, 1990; Saga & Zmud, 1994). This definition refers to the following aspects of IS infusion: 1) technology may be integrated at various levels by both organisations and individuals, and 2) organisational and individual benefits derived from technology depend on the level of this integration (Fadel, 2011). Empirical evidence indicates that the benefits of IS often fail to meet the aims for which they are introduced and a frequently cited reason for these failures is that IS are underused, thus undermining their benefits to the organisation (Barki et al., 2007; Davidson & Chismar, 2007; Jaspersen et al., 2005). Although IS use is one of the most frequently studied concepts in the IS literature (Barki et al., 2007), however, most existing research has examined system use from a quantitative perspective, operationalising the construct as frequency, intensity, or duration of use behaviours (Burton-Jones & Straub, 2006). However, increased use quantity does not necessarily mean increased individual or organisational benefit (Fadel, 2012).

Prior research has examined infusion from two broad perspectives: infusion via organisational-level technology configuration and infusion via individual-level technology use. The former perspective examines infusion in terms of subsets of IS features that have been implemented by an organisation as a whole. While this perspective is valuable from a macro-level, it does not account for the individual-level processes by which infusion is realised. As to the infusion via individual-level system usage, although this type of infusion is a precondition for organisational infusion, studies that have adopted this approach are relatively recent (Fadel, 2011). Most of such studies have been based on technology adoption (see Davis, 1989) and continuance (see Bhattacharjee, 2001) to examine whether infusion is affected by antecedents such as perceived usefulness, personal innovativeness and so forth. One important precursor to individual-level infusion that has received scant attention and has been absent from studies of this nature is user adaptation to IT systems (Fadel, 2012; Fadel, 2011; Beaudry & Pinsonneault, 2005).

Early theoretical works in this area include Lassila and Brancheau (see Lassila & Brancheau, 1999) who drew on punctuated equilibrium theory and suggested four increasingly deeper

states of organisational technology integration characterised by increasingly adaptive levels of technology use: low-integration, standard adoption, expanding, and high-integration. Similarly, Orlikowski (2000) proposes three types of 'technology enactment' such as inertia (technology is used within the existing way of doing things), application (technology is used to refine the existing way of doing things), and change (technology is used to substantially alter the existing way of doing things) that reflect the degree to which processes, technology, and social structures are changed as a result of the technology's integration within the work system. The consistent message from this body of research is that infusion occurs by users' efforts and determinations to adapt themselves and their environment to enable deeper use of the IS system within a work process.

However, the literature in its current state offers limited insight into how particular types of individual user adaptation promote or discourage IS infusion. Moreover, although user adaptation is generally seen as having positive effects, adaptive efforts however can take many forms, including behaviours that may detract from deeper, infused use (Beaudry & Pinsonneault, 2005). Furthermore, since a firm's return on its IS investment will be limited if the system is not fully used to its fullest potential (Ng & Kim, 2009), there is a significant theoretical and practical motivation to better understand how individual-level IS infusion is achieved. Nevertheless, although the concepts of IS adaptation and infusion have been present in the literature for some time, our understanding of how specific types of adaptation lead to infusion of technology in an individual's work system remains limited (Fadel, 2011). Research that studies how infusion is enhanced or hindered by various types of individual adaptation behaviours can help researchers and practitioners to better understand and manage these behaviours to achieve desired IS use outcomes.

#### ***2.4.4. IT Adaptation Studies: Different Ways to Discuss the Same Topic***

The IS adaptation process has been the subject of several studies over the past few years. Several researchers have investigated different aspects of the adaptation process such as temporal patterns of adaptation (e.g. Tyre & Orlikowski, 1994), adaptation behaviours (e.g. Beaudry & Pinsonneault, 2005), and structural and performance effects of adaptation (e.g. DeSanctis & Poole, 1994; Majchrzak et al., 2000) using theories such as punctuated-equilibrium (Orlikowski, 1996), adaptive structuration (DeSanctis & Poole, 1994; Korpelainen et al., 2010) and coping model of user adaptation (Beaudry & Pinsonneault,

2005). Nevertheless, the review of the IS and technology management literature on users' IT-related adaptation processes indicates that this phenomenon, over years, has been diversely understood and defined in IS research (Beaudry & Pinsonneault, 2005). As such, different words (appropriation, adaptation, adjustment, reinvention) have been used in different studies to refer to these adaptation acts, which has stemmed from the lack of consensus on what adaptation means (Beaudry & Pinsonneault, 2000) and has, in turn, resulted in confusion in this area of research.

Some studies, for example, have focused on the technology-side of the adaptation process and investigated about the extent to which a technology is altered by the IS user. Poole and DeSanctis (1988) defined "reinvention" as the extent to which an innovation is modified by the user while Rice and Rogers (1980) labelled this phenomenon "appropriation". Taking a different approach, Majchrzak and Cotton (1988) and Majchrzak et al. (2000) focused on the user-aspect of the adaptation process on how users' perceptions and attitudes are adapted by the IT implementation and called this process "adjustment". Other studies of IT-related adaptation behaviours have been more concerned with the notion of fit in this process. Ives and Olson (1984) stated that IT "adaptation" is the modification of the technology in such a way that it meets users' requirements. Poole and DeSanctis (1990) also defined IT "appropriation" as the way a group uses and reproduces the structure of a technology to their needs and requirements.

Still other studies in this research area argue that adaptation cannot be referred to as a simple notion of fit between IT and the users. For instance, Tyre and Orlikowski (1994, 1996) defined "adaptation" as comprised of all the changes and adjustments following an IT implementation. These include all the changes and adjustments to the technology itself, to the work system, as well as those to users' beliefs, knowledge, and working relationships. Similarly, Leonard-Barton (1988) noticed that most prior studies of adaptation had primarily focused on either how technology could be adjusted to its environment or how the environment is shaped by the technology, prompting her to combine the two viewpoints and propose a process of mutual adaptation. Later studies, however, advanced this idea by considering that the adaptation process happens as a reciprocal adjustment process among

three components of work/ task, technology and user/self (Orlikowski, 1996; Beaudry & Pinsonneault, 2005).

From this perspective, when a new IT system is introduced in a work setting, computer users may engage in different adaptation behaviours directed at each of these dimensions. For example, users may adapt the work task by modifying work routines and procedures. The technology may also be adapted to better fit the needs of users in particular situations. Finally, users may employ adaptation behaviours directed at themselves such as developing IT skills by attending training sessions or seeking additional knowledge through social support (Spitler, 2005). The summary of well-known IT adaptation studies can be viewed in Table 2.1.

**Table 2.1 - User adaptation studies, different names but similar concepts**

Authors	Concept	Concept Definition	Focus
Ives & Olson (1984)	Adaptation	Configuration of the IT system in such a way it meets user's requirements and needs.	Technology
Leonard-Barton (1988)	Adaptation	The modification of the technology and the simultaneous adaptation happening at multiple levels within the organisation.	Technology, Work system
Sokol (1994)	Adaptation	Concerns about modifications brought to the technology, environment, social protocols and development of contingency plans.	Technology, Work system
Tyre & Orlikowski (1994)	Adaptation	The changes following an IT event such as: technology, work routines, beliefs and knowledge of the users.	Technology, Work system, User
Tyre & Orlikowski (1996)	Adaptation	Changes brought to the technology, working system and users' views.	Technology, Work system, User
Beaudry & Pinsonneault (2005)	Adaptation	Focuses on user cognitive and behavioural adaptation responses and accounts for a wide range of user behaviours such as technology appropriation, avoidance, and resistance.	Technology, Work system, User
Rice & Rogers (1980)	Re-invention	The degree to which the system user modifies an IT innovation during the adoption and implementation periods.	Technology
Leonard-Barton (1988)	Re-invention	The alteration of the initial IT innovation by users to suit their needs.	Technology
Majchrzak & Cotton (1988)	Adjustment	Concerns with regard to different aspects of user adaptation.	User
Poole & DeSanctis (1988)	Appropriation	Modification of the IT innovation made by the system user while using it.	Technology
Poole & DeSanctis (1990)	Appropriation	The way a group uses, adapts and reproduces the structures of technology	Technology, Work system

		based on their needs.	
Orlikowski (1996)	Appropriation	The continuous, progressive and mutual adjustments between the technology and the users.	Technology, User

This table is quite revealing in several ways. For example, while it is apparent from the table that these studies pertain either to an adaptation process between IT and the users, between IT and the work system, or between IT and both the user and the work system, the studies all fundamentally focus on a key phenomenon: the way system users respond to changes or disruptions induced by the IT event. Hence, despite the fact that different labels and/or definitions are used across these studies, the same phenomenon is discussed. Additionally, very few studies have considered the role of 'one's self' in this process of reciprocal adjustments between the task, technology and user, although the time-line indicates a growing interest in user-specific behaviours when it comes to recent studies.

Nevertheless, while it is clear that users may employ a variety of adaptation behaviours, the IS literature has lacked a theoretical framework for understanding how adaptation behaviours occur or how these behaviours are evolved over time. For example, Leonard-Barton (1988) pointed out that in some cases, computer users may tend toward changing the technology to fit their current work routines, while in other situations system users may change work tasks to fit the new IT system. Studies of adaptation, therefore, while generally agreeing that adaptation behaviours involve modifications (adjustments, changes) to either one, two, or all three structures (task, tech, self), have not reached consensus on the nature of this adaptation (Majchrzak et al., 2000), or how different types and patterns of individual adaptation behaviours affect subsequent use of information systems (Boudreau & Seligman, 2005) which leads to higher levels of integration between them (Fadel, 2011).

Organisations adopt information systems to improve efficiency, reduce errors and enhance productivity. Nevertheless, experience has shown that such advantages emerge only to the extent that IS users adapt by actively changing themselves, their work routines and even the technology itself in order to leverage its strategic capabilities. The significance of user adaptation to new work IS and its impact on IS success outcomes has been reflected by several researchers (e.g. Tyre & Orlikowski, 1994; Majchrzak et al., 2000; Beaudry &

Pinsonneault, 2005), however, many aspects surrounding when, how and why adaptation unfolds at the individual level remain unclear (Beaudry & Pinsonneault, 2005).

Recently, coping theory (Lazarus, 1966; Lazarus & Folkman, 1984) has emerged as a promising foundation for understanding user's varied post-adoptive reactions to an IS. Coping theory provides a framework for understanding how individuals respond to disruptive events in their environment and over the past few years has become a valuable lens for explaining a variety of IS-related behaviours (Fadel & Brown, 2010). It also seems well suited to help us reduce the definitional confusion and to better understand the adaptation process at the individual level (Beaudry & Pinsonneault, 2000). The next section will present an overview of general coping literature, with particular emphasis on the most prevalent model of coping behaviour, the contextual model of coping.

## **2.5. Introduction to Coping Theory**

This section of the literature review covers the concept of 'Coping', with which researchers in the field of Management Information Systems (MIS) are seen as less likely to be familiar. Accordingly, the prior work of Richard Lazarus and Susan Folkman in the field of psychology, as two well-known psychologists for their widely accepted 'Coping Theory', will be cited. This section begins with general information about the contextual theory of stress and coping with respect to its introduction as well as its broad acceptance and diverse usage in various fields. Coping theory in psychology is then discussed, followed by its suitability for the IS field. Exploring coping-based IS studies will be next and finally the research gap and research questions are presented.

### **2.5.1. What Is Coping?**

People constantly evaluate various aspects of their environment to see if they are personally or professionally relevant. They are thus dynamically responsive to events affecting them that occur in their surroundings (Pearlin & Schooler, 1978), or according to Lazarus and Folkman's (1984) terminology, the 'person-environment' relationship. These active responses and reactions to stressors shape the core arguments of the 'psychological stress and coping theory' that has its origin in the domain of psychology. Over the past several decades, the study of stress and coping has produced a huge literature in psychology. Drawing from early work on psychological defence, research on human adaptive

responses to stress began to unite under the term “coping” in the 1960s, most notably with Lazarus’s (1966) influential work ‘Psychological Stress and the Coping Process’ (Parker & Endler, 1996).

Since then, an immense propagation of coping research has theoretically and empirically examined the adaptive mechanisms individuals use in response to stressful situations (Beaudry, 2009; Lazarus & Folkman, 1984; Lazarus, 1990). While this theory over the years has been referred to by different names, the most common terminologies include: stress theory, emotion theory, appraisal theory of emotion, coping theory, relational cognitive theory and contextual theory of coping and stress. Coping theory in essence was developed to explain the dynamics underlying individual’s appraisal and reactions to disruptive events in their life.

Due to its capability to incorporate a broad scope, coping theory has been widely studied since its discovery by numerous researchers to understand individuals’ responses to a large array of events in various contexts ranging from economics (e.g. sub-fields of microeconomics for the purpose of purchase decision-making and risk perception) to social sciences (to examine the role emotion and appraisal play in human culture and social interactions) to health and nursing studies including deadly disease and mourning (Folkman et al., 1986; Folkman & Moskowitz, 2000). In Organisational Behaviour and Information Systems research, coping theory has been applied to a large array of events from interruptions in organisational context such as layoffs (Leana et al., 1998), organisational downsizing (Shaw & Barrett-Power, 1997), firms’ mergers and acquisitions (Cartwright & Cooper, 1996b), to cyber privacy threats (Bulgurcu, 2011), and users’ adaptation behaviours to IT events (Beaudry & Pinsonneault, 2005).

### **2.5.2. Different Types of Coping**

Psychologists conceptualise adaptation from three main perspectives: ego-psychology perspectives, personality perspectives and contextual model of coping (Folkman, 1992). The ego-psychology perspective (also referred to as the evolutionist perspective) looks at coping as an unconscious adaptive defence mechanism that manages instinct and affect, reduces tension, and reinstates a person’s psychological stability which is also referred to as the “internal defence mechanisms” (White, 1974). According to the Bovey and Hede’s (2001)



investigation, a person's internal defence mechanisms can be developed from a psychological construct called unconscious processes to protect oneself from the unpleasant feelings of anxiety.

From the personality perspective, coping is a personality trait, attribute or characteristic that reflects one's ability to effectively face environmental challenges (see Grasha & Kirschenbaum, 1986). Consequently, an individual's coping actions can be predicted by one's coping trait, disposition, or style (Folkman, 1992) and while research on coping styles has not yielded satisfactory results, important works were issued from this stream such as Kirton's (1976) innovativeness and Bandura's (1977) self-efficacy. Nevertheless, both perspectives (ego-psychology and trait), although valuable for understanding some individual behaviours, have important limitations and have received, over the years, mixed support from empirical studies.

The third school of thought and the most relevant to the study of IT adaptation -the contextual model of coping, nevertheless, has received most attention and is extensively used and accepted in the domain of psychology (Beaudry & Pinsonneault, 2005). In this contextual perspective, coping is studied in relation to particular situations or events, sensed or appraised as desirable or undesirable, occurring in the person's environment. Two widely used definitions of coping are also based on this contextual perspective. Lazarus and Folkman (1984) define coping actions as 'cognitive and behavioural efforts (i.e. a dynamic process) to manage (minimise, reduce, tolerate, master) relations with the environment that generate psychological stress. In a similar vein, Folkman et al. (1986) consider coping efforts as 'cognitive (emotion-focused coping acts) and behavioural efforts (problem-focused coping acts) exerted to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person. Internal demands in this definition are personal desires or requirements that the environment must meet such as an individual's desire to get challenging work versus the challenges that a specific job effectively carries (French et al., 1974). External demands stem from the environment and must be met by individuals. They are in fact related to the roles one has to play in a given environment or context (e.g. organisation, society), such as a secretarial position requiring a typing speed of 50 words per minute versus the effective typing ability of a candidate (Beaudry, 2009; Lazarus & Folkman, 1984).

Coping from this viewpoint serves two main purposes or functions: firstly dealing with the issue that is causing the discomfort and secondly, maintaining a psychological and emotional stability (Folkman, 1992; Mechanic, 1974). In doing so, individuals employ two types of coping mechanisms to deal with the stressful situation namely emotion-focused coping efforts and problem focused coping efforts. The former strategy attempts to regulate the emotional distress, and return to normal social and physiological functioning. The latter, problem-focused coping, on the other hand, is goal-directed and includes strategies such as decision making and planning to resolve conflicts or to manage the problem (Lazarus & Folkman, 1984).

In the contextual perspective, coping is studied in relation to particular situations or events, sensed or appraised by individuals as desirable or undesirable. Consequently the type of coping strategies utilised depend on how the individual appraises the stressful event, the likely consequences, personality differences and environmental factors, which may result in enhanced or decreased psychological adjustments (Lazarus, 2000). This allows for a wide range of patterns as individuals can interpret similar situations differently or different situations similarly. Therefore, in this perspective, coping reactions unlike the first two perspectives are not a stable feature of personality (trait) or unconscious defence mechanisms (ego-psychology), but rather, they are what a person thinks and does in response to changes in a given situation or context (Folkman, 1992).

Apart from being highly dynamic, the coping process is highly iterative too. While one's appraisal influences and determines the subsequent coping efforts that are likely to be pursued, coping efforts and their outcomes will, in turn, lead to the reappraisal of the situation (Lazarus & Folkman, 1984; Smith et al., 1985). Because the coping process is dynamic and is linked to contextual influences, people might try one coping strategy but change to another on the basis of feedback (e.g. achieved outcomes) and reappraisal. This means that the consequences of the followed coping strategies will influence users' subsequent appraisal, which in turn might trigger an adjustment of coping mechanisms.

In IS literature, Beaudry and Pinsonneault (2005) indicate that a user's IT-related adaptation behaviour is very similar to the concept of coping and thus can be better understood and explained in light of this theory. The next section will discuss the suitability of applying the

contextual model of coping to Information Systems literature to study users' IT-related adaptation behaviours to a disruptive IT event by presenting the common grounds between the two areas of study.

### **2.5.3. Why Coping Theory Suits the Study of User IT Adaptation Behaviour?**

As mentioned earlier, the contextual model of coping is widely used in individual psychology to explain and predict the behaviours of individuals facing disrupting events. While the study of coping has produced a huge literature in psychology over the past several decades or so, IT research on users' coping efforts facing disruptive IT events is nevertheless quite scarce (Guinea & Webster, 2011). Thus far, no research has been directed specially towards deeper understanding of the dynamic, recurrent and longitudinal view of system users' IT adaptation processes based on the coping theory, how users' adaptation behaviours evolve over time and how such alterations in users' coping strategies contribute to or diminish the system usage and performance outcome at the individual level. This is somewhat surprising because a considerable amount of research in IS has been directed towards negative reactions to technology (e.g. computer anxiety) and the coping theory provides an appropriate framework from which to examine them. Moreover, since the implementation of a new IT system can be seen and understood as a disruptive event in the habits and work systems of computer users (Beaudry & Pinsonneault, 2001, 2005), the behaviours of users facing such events can be analysed using the coping theory.

Coping theory is well suited to study the individual adaptation process caused by a new IT implementation because it shares three key characteristics with existent user adaptation studies (Beaudry, 2009). First, both studies of user adaptation and coping theory deal with how individuals respond to important changes that occur in their environment (e.g. Leonard-Barton, 1988; Majchrzak et al., 2000; Tyre & Orlikowski, 1994). Adaptation studies typically centre on users' responses to the implementation and use of a new technology (i.e. IT artefacts) as these types of IT-induced changes can potentially involve significant consequences in organisations. As with stressors in coping theory, IT-related changes can be understood positively or negatively and they can generate significant stress (Cartwright & Cooper, 1996a; Louis & Sutton, 1991).

Second, both coping theory and user adaptation studies focus on similar components of the individual-environment relationship, which in IS literature is usually referred to as the “context” (Avgerou, 2001). Each person subjectively evaluates the encounter with the environment and the available resources to manage it (Lazarus & Folkman, 1984, Smith et al., 1985). Both types of study deal with efforts and behaviours related to the self (e.g. learning new skills, psychological distancing, positive reappraisal) and to the environment (e.g. modifying one’s working routines, modifying software applications, seeking social support) (e.g. Poole & DeSanctis, 1990; Tyre & Orlikowski, 1996; Beaudry & Pinsonneault, 2005). Furthermore, both coping and user IT adaptation behaviours can be oriented toward managing the issue at hand (resulting in external outcomes) such as adjusting a new technology to make it fit with one’s own preferences or work routines (e.g. Goodhue & Thompson, 1994; Kraut et al., 1989; Pentland, 1989); or they can be oriented toward restoring emotional stability such as avoidance and denial (e.g. Beaudry & Pinsonneault, 2005; Zuboff, 1988).

Third, both studies are concerned about the vast array of potential outcomes of the adaptation/coping process ranging from solving the problem at hand, increasing one’s efficiency, reducing the undesirable effects of the stressor, to restoring emotional stability and maintaining one’s sense of well-being (e.g. Patrickson, 1986; Zuboff, 1988).

In addition to these common grounds, to date, two main streams of IS research have attempted to address the complex phenomenon of user reactions to new technologies. The first stream, which has applied a variance approach, has mainly focused on the antecedents of adoption and usage of new IT systems in order to predict the IS users’ behaviours and has yielded numerous models of user acceptance (Venkatesh et al., 2003). Some of these variance quantitative-based models include the technology acceptance model (TAM)(Davis, 1989), unified theory of acceptance and use of technology (UTAUT)(Venkatesh et al., 2003), theory of planned behaviour (TPB)(Taylor & Todd, 1995) and so on. Researchers, most frequently, by taking this approach consider user adaptation to be implicit in system use (Elie-Dit-Cosaque & Straub, 2011). For instance, employing TAM as a theory lens neither conceptualises nor examines user adaptations explicitly (Benbasat & Barki, 2007).

While very insightful, these models do not indeed contribute to explain the underlying and dynamic adaptation processes (especially in mandatory settings) through which individuals cope with new implemented IT systems (Beaudry, 2009). Put differently, while variance models are insightful in explaining 'what' and 'how often' facets of the IT adoption and use, they are incapable of fully capturing the 'how' and 'why' aspects of the user adaptation to an IT innovation (Fadel, 2011). The quantitative analysis of user IT adaptation behaviours cannot provide us with an in-depth look at the worldviews that sat behind the 'facts' shared by the participants, nor can it provide us with the reasons behind their behaviours (Trauth, 2001). The latter aspects (how and why aspects of the adaptation process), however, provide insight into how IS users go through the coping processes to adapt to the new IT system, how they readjust their earlier adaptation efforts to achieve better outcomes, how IT-related individual outcomes are influenced when users adjust their coping strategies or how they decide to deal with the IT stressor in the first place (Beaudry & Pinsonneault, 2005).

The second stream of research, on the other hand, has mainly relied upon a process approach and has focused on user adaptation (Orlikowski, 1996; Tyre & Orlikowski, 1994, 1996) and its effects on outcomes such as group performance (DeSanctis & Poole, 1994; Majchrzak et al., 2000) and structuring of organisations (Orlikowski & Robey, 1991). This stream has so far showed the rich and complex nature of user adaptation and described how users change their skills, beliefs, attitudes, aspirations, and work commitment (Majchrzak & Cotton, 1988; Tyre & Orlikowski, 1994), modify their work procedures (Leonard- Barton, 1988; Poole & DeSanctis, 1990), and use the technology in unanticipated ways (Griffith, 1999; Kraut et al., 1989). Again, although very insightful, these studies have shed light on the phenomenon in a non-integrated manner (Beaudry, 2009) as different concepts and labels have been used to refer to the same phenomenon or similar concepts have been defined differently (e.g. competing definition of adaptation in different studies). Nevertheless, all these studies share a common ground and concern an adaptation process between the work system, technology and the user. Coping theory provides a well-established and empirically validated theoretical lens to further explore and deepen our understanding of the user IT adaptation phenomenon in an integrated way.

Moreover, as a dynamic process, coping theory provides an in-depth look at the relational meanings between one's appraisals, emotions, coping strategies and outcomes when dealing with the stressful event such as an introduction of a new work IS. It provides insight into how users' coping efforts are accordingly modified as the stressful encounter unfolds through the reappraisal of the situation and/or individual outcomes, and how new coping mechanisms can be put into place (Lazarus & Folkman, 1984; Carver & Scheier, 1994). In light of coping theory, our understanding of user adaptation can thus be further enhanced since it looks at this complex process from a different perspective. In other words, while IT adaptation studies indicate that the adaptation process is comprised of modifications to either one, two or all three components (work system, IT, user), how using different coping strategies or changes in these efforts will result in the modification of these components can be better explained by coping theory.

Furthermore, variance models and theories have been most helpful in enhancing our understanding of individual acceptance and use of new IT systems. Coping theory, however, helps to take a step further and investigate the user adaptation behaviours that unsurprisingly follow the disruption that the new IT implementation brings in the work environment of individuals. By taking into account the individual interpretation of the positive and negative consequences that the new IT event will have on them and their work, and by investigating the visible and invisible cognitive and emotional adaptation acts performed by IS users, we will reach a deeper understating of IT-related reactions and of their individual and organisational outcomes (Beaudry, 2009).

Additionally, as Guinea and Webster (2011) indicate, the definition of coping overlaps with recent IT use definitions that describe users' adaptational reactions to the IT as one's interaction behaviours, including the actions performed to adapt, adjust and modify the technological context in which the task takes place (Barki et al., 2007). As a result, given the overlaps of these two definitions (coping and IT use) and fundamental characteristics the coping theory shares with IT adaptation studies, joined with the advantages coping theory offers for deeper understanding of IS users' adaptational behaviours, it can be said that coping theory can be a suitable approach from which to study and analyse how users deal with IT events in work settings. In summary, since coping theory provides a comprehensive

and empirically validated framework for examining a full range of individual perceptions, responses and the likely consequent outcomes, it is believed that coping theory provides a valuable theoretical lens that can enrich our understanding of individual responses to IS and resultant behaviours (Fadel & Brown, 2010; Beaudry, 2009; Elie-Dit-Cosaque & Straub, 2011).

#### **2.5.4. Coping Theory in IS research**

Major organisational change initiatives are recognised as significant stressors in organisational life, more frequently associated with negative outcomes such as job loss, reduced position, conflicts at work and home, and threats to the psychological well-being of individuals (Judge et al., 1999). Despite being cited in many IS papers, an examination of these papers concerning 'coping theory' reveals that most of them only refer to coping in the discussion section (e.g. Kim & Kankanhalli, 2009), or to justify a relation between variables without actually examining coping (e.g. Tams et al., 2011; Lee et al., 2008). The few studies that apply coping theory have been aimed at studying employees' coping actions when a new IT is introduced and being used in the work setting (e.g. Beaudry & Pinsonneault, 2001, 2005) that challenges users' identities (e.g. Nach & Lejeune, 2010) or when users avoid the malicious IT (as a coping process) (e.g. Liang & Xue, 2010). In organisational behaviour and management literature, coping theory has so far been used to study individual reactions to a variety of organisational changes such as layoffs due to firm closures (Leana et al., 1998), firms' reorganisations and downsizing (Ashford, 1988; Judge et al., 1999; Shaw & Barrett-Power, 1997), firms' mergers and acquisitions (Cartwright & Cooper, 1996b; Judge et al., 1999) as well as in new stressful working conditions (Erera-Weatherley, 1996; Dewe, 1992).

Judging from the extant literature in IS (e.g. Leonard-Barton, 1988; Poole & DeSanctis, 1990; Tyre & Orlikowski, 1994, 1996), new IT implementation or major changes to existing ones, are significant events in the life of organisational actors (i.e. employees as computer users). Still, we have little knowledge about the adaptation process that inevitably follows (Beaudry, 2009) and existing research on this topic is rather limited (Ashford, 1988; Leonard-Barton, 1988; Tyre & Orlikowski, 1994). In IS literature, coping theory has been used to study how IT managers cope with rapid IT changes (Benamati & Lederer,

2001), IT professionals' strategies to deal with the stress associated with having to constantly update their technical skills (Tsai et al., 2007), users' reactions toward software limitations (Yang & Teo, 2007), and users' reactions to new IT implementation in the work environment (Beaudry & Pinsonneault, 2005).

Benamati & Lederer (2001) investigated the coping mechanisms used by IT managers to reduce the problems associated with rapid changes in IT. Thirty-six various coping mechanisms were identified from sixteen interviews with IT managers. Collected results from a survey of 246 IT managers indicate that each of these 34 mechanisms was employed and successfully used by multiple respondents. The results also indicate that the respondents had relied more on problem-focused actions than emotion-focused acts. With a similar approach, Tsai et al. (2007) conducted interviews with 14 IT professionals in order to investigate how they perceived and coped with the stress associated with continuously having to update their technical skills. Their results suggest that IT professionals relying on a balance of problem- and emotion-focused coping seem to experience lower stress as a result.

Yang and Teo (2007) designed a longitudinal field experiment to study the coping behaviours triggered by free software trial restrictions and their impact on participants' willingness to buy the full version. They argue that coping acts are crucial intermediaries connecting the negative disconfirmation that restrictions impose on time and functionality and subsequent purchase decision-making. Yang & Teo's results suggest that negative disconfirmation on time limit expectation is positively related to controlling negative emotions toward trial restrictions whereas negative disconfirmation on functionality restrictions is related to action coping (i.e. problem-focused coping acts) which is, in turn, related to users' willingness to pay a premium for the software.

While the above studies are insightful, they however have not considered users' coping acts with disruptive IT events (e.g. work IS) in work environments. An exception to this type of coping theory-based IS research is the study by Beaudry and Pinsonneault (2005), which yields a rich understanding of adaptation-related issues in a real environment. Drawing on the contextual/ transactional coping theory, Beaudry & Pinsonneault (2005) propose the Coping Model of User Adaptation (CMUA) to examine how and why individuals (IT-savvy



account managers) adapt to the implementation of a new IT system in two North American banks. Beaudry and Pinsonneault (2005) define user adaptation in line with coping theory and indicate that: 1) both “visible” and “invisible” adaptation acts can be performed by an IS user as part of his/her adaptation process; 2) adaptation acts will vary from one individual to another depending on one’s interpretation of the potential positive and negative consequences that the new IT artefacts and further interactions with the new IS will bring about; 3) the adaptation acts one performs are also related to one’s perceived control over the management of the consequences.

In essence, CMUA explains how IS users at work “restore emotional stability, modify their tasks, reinvent and adapt the technology, or even resist it” (p.494). CMUA suggests that the adaptation process occurs over time as users interact with the IT artefacts and cope with the occurrence of an “IT event” in their work environment (Beaudry & Pinsonneault, 2005). They indicate that the personal and professional consequences one associates with a new IT can be perceived as being an opportunity or a threat. This appraisal coupled with one’s evaluation of the level of control one has over the new IT is said to be the main determinants of one’s adaptation strategy that can be changed over time as the stressful encounter unfolds.

## **2.6. GAP in the Literature and Research Questions**

As reviewed in this chapter, the implementation and use of a new IT system (particularly new IT implementation or major changes to existing ones which represents a case of disruptive IT innovations) generates expected and unexpected consequences in the users’ environment (e.g. social norms, task, technology, self). These consequences are understood, evaluated and dealt with by IS users differently, triggering multifaceted user responses, which very often result in an individual’s psychological stress. In turn, the level of stress an individual might be experiencing highly depends on the user’s ability to cope successfully and effectively with the stressor (IT system itself and the surrounding social conditions). Understanding how IS users rely on a combination of coping strategies to adapt to new technologies and how and why they adjust their earlier efforts over time has therefore gained in importance since the outcomes of IS users’ coping mechanisms subsequently affect the individual outcome, their job performance and IS infusion at the individual level

(Fadel, 2012). Despite the growing interest in the subject of user adaptation behaviours to new IT artefacts in work settings over the last decade or so, relatively little investigation has been done to study the 'how' and 'why' facets of user coping processes when facing stressful IT-induced disruptions (Beaudry, 2009).

This lack of attention to the ways in which users cope with the technology once it has been adopted and is being used is somewhat surprising as Fadel and Brown (2010) argue that individual outcomes associated with the use of the IS depend on adaptation behaviours system users employ to cope with the IS. Moreover, a considerable amount of research in IS has been directed towards negative reactions to technology and resistance to IT-induced changes in work settings (Kashefi et al., 2012) and coping provides an appropriate theory from which to study the individuals' psychological processes (i.e. appraisal and coping) with respect to stressful events.

The main objective of CMUA, as mentioned by Beaudry and Pinsonneault (2005), was to integrate both streams of research (process and variance approaches) and reconcile the IT adaptation studies in a new direction. However, this model has been thus far mainly used for testing or predicting purposes in IS literature. For instance, such studies have used CMUA to test the model in a much larger sample compared to the original study to examine user system usage (Elie-Dit-Cosaque & Straub, 2011), to examine the relationship between IS user adaptation behaviours and the level of IS infusion in their work (Fadel, 2011), to examine the relationship between IS appraisal and adaptive behaviours (Fadel, 2012), or to examine how adoption-related IS perceptions influence individual-level post-adoptive IS appraisal (Fadel & Brown, 2010), to name a few. This has made the CMUA more heavily oriented towards the predicting and testing aspects of the user responses to disruptive IT than towards exploring and explaining the dynamic underlying users' reactions to new IT.

Nevertheless, CMUA also has the potential to be explored qualitatively and several avenues have so far been identified for future research (Beaudry & Pinsonneault, 2005; Beaudry, 2009). First, while the original study was conducted with knowledge workers adapting to flexible technologies, Beaudry and Pinsonneault (2005) expressed that CMUA has a broader scope and can explain the adaptation behaviour of various types of users dealing with other technologies. Second, they also asked future research to investigate the effects of some

social factors (e.g. group norms, top management influence, organisational culture, and colleagues' attitudes) on user adaptation. Third, Beaudry and Pinsonneault (2005) asked for longitudinal studies to examine the user adaptation process in depth over a period of time. In doing so, they mentioned that the sequencing and interplay of problem- and emotion-focused adaptation efforts should be studied. Fourth, Beaudry and Pinsonneault indicated that future research on the topic of user IT adaptation behaviours using CMUA is needed to document and build a comprehensive inventory of IT-related adaptation efforts and to develop a typology of adaptation strategies. Finally, the relationship between users' coping processes and acceptance of and resistance to IT should also be investigated (Beaudry, 2009).

Other studies have also identified some areas for future research. For instance, Fadel (2012) while calling for longitudinal perspectives for further investigation about how adaptation behaviours are adjusted/ altered over time, raised several questions as to whether adaptive behaviours occur constantly throughout the IT use life-cycle or during irregular intervals of instability? Or how do on-going reappraisals direct and re-direct adaptation strategies and under what conditions do these adaptive strategies are altered? Thatcher and Perrewe (2002) also argue that in order to gain a better understanding of the role of personality in IT-related behaviours, research is needed to examine how different stable traits relate to constructs that influence eventual computer use (Thatcher & Perrewe, 2002). Guinea and Webster (2011), who proposed a model of user-computer interactions in which users cope with IT interruptions, called for future research about the different types of coping mechanisms that are most effective in terms of user performance.

The purpose of this study as previously mentioned is to explore and provide a deeper understanding of how different types of user adaptation contribute to or detract from IT use at the individual level. Although the concept of IS adaptation and individuals' coping mechanisms have been previously presented in the literature, our understating of how specific types of user coping efforts can lead to diverse system usage and individual-level IT use performance is limited, which forms the motivation for this research. To this end, much more research still needs to be done to understand the dynamics of user interactions with disruptive IT events since it has been echoed repeatedly that a key component to the

success of any situation that utilised an IT artefact is the adoption and use of that artefact by the necessary users (Claggett, 2010; Taylor et al., 2001; Zorn, 2003). Therefore, the aim of this thesis is to add to the current body of literature on IT-related adaptation behaviours and the processes through which users adapt to new IT initiatives in work places by focusing on individuals' psychological perspectives and the influences of such complex processes on users' IT use outcomes. A better understanding of the users' adaptation/coping processes will enable researchers and practitioners to better foresee IT acceptance (or resistance) and related behaviours and thus to better manage them to achieve the desired IS outcomes.

Although this study attempts to respond to many research calls in order to narrow the knowledge gaps about this topic in the literature, it will not be possible to address all the under-researched subjects as discussed above in one thesis. Having said that, this study is based on Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation and attempts to address the above-mentioned concerns to some extent. The research questions the study aims to answer are as follows:

- 1- How do IS users' adaptation tactics and strategies evolve over time when dealing with a disruptive IT event?
- 2- How do alterations in users' coping strategies subsequently influence their IT use outcomes and overall performance?

## CHAPTER THREE - THEORETICAL FRAMEWORK

### 3. Introduction

The development of any discipline is related to the strength of its underpinning theoretical base. Well-established disciplines have a diversity of clearly defined and competing theoretical frameworks to describe and explain theoretical constructs. Information systems (IS) is a relatively new discipline and many well-known IS theories are borrowed from disciplines such as economics, psychology and sociology. The 'theories' in IS research wiki maintained at the Brigham Young University (BYU)<sup>11</sup> illustrate this point with well over eighty theories listed. Usually the application of these theoretical frameworks from diverse disciplines depends on the purpose of the research. This chapter begins with a discussion of what is the characteristic of a useful theory in IS and then summarises some of the theoretical approaches adopted in the area of IS users' reactions to IT-related organisational changes research by loosely categorising them into: (1) psychological/behavioural intention theories/models in IS research, (2) other frameworks used in IT adaptation studies, (3) the theory of coping, and lastly (4) the IS-modified model of CMUA based on the coping theory. However, it should be noted that this is not a comprehensive classification but rather a taxonomy that will be useful in justifying the reasons for choosing the Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation (CMUA) as the guiding framework in this research and how other frameworks might intersect with this favoured approach.

#### 3.1. What is a Useful Theory in IS?

It is noteworthy that despite the volume of research in computer-based information systems, there is no commonly agreed definition of what is an information system (IS) (Paul, 2007). However, a number of common fundamentals emerge from these definitions. Computer-based IS are related to information technologies (IT), involving software and hardware components which are then used by people. They use IS in particular ways and follow established rules of usage and quite often adapt or modify formal routines in order to ensure that tasks are completed. To put it another way, when trying to understand what

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<sup>11</sup> This site provides researchers with summarised information on theories widely used in information systems (IS) research, accessed 16/10/2012, [http://istheory.byu.edu/wiki/Main\\_Page](http://istheory.byu.edu/wiki/Main_Page).

one means by IS, it is required to consider the interactivity of users, the technologies and the usage processes (Paul, 2007).

A good theory not only describes the phenomena of interest, it also clarifies why and how those phenomena occur (Caputi et al., 2009). Explanation and prediction are, therefore, key defining features of a theory (Gregor, 2006). It follows that good theories or models of computer-based IS should describe and explain relevant phenomena associated with the IS. Gregor (2006), in a similar vein, states that a characteristic that distinguishes IS from other fields is that it concerns the use of artefacts in human-computer systems, a theme also echoed by Orlikowski and Iacono (2001) in calling for attention to the information technology artefacts as the core subject matter of the IS discipline. Moreover, if the interactivity of users, technologies and processes is a defining characteristic of an IS, then this interaction needs to be considered in any theory or model of IS (Caputi et al., 2009). The IS user (the person), then, is a stakeholder in theories of IS and the role of the 'user' and usage behaviour becomes important in IS theories (Paul, 2007). Good theory should also have practical application. As Lewin (1945) points out 'nothing is as practical as a good theory', which is supported by Campbell (1998) who stresses that a good theory is a useful theory. Good theory informs practice and in turn is informed by practice. This point is particularly relevant to the IS discipline. The development and application of IS theory should happen with respect to, and not separately from IS practice. The following section summarises some of the theoretical approaches adopted in the area of IS users' responses to IT-induced organisational changes research.

### **3.2. Psychological/ Behavioural Intention Theories in IS Research**

Frameworks adopted in information system studies have their roots in a wide range of disciplines such as psychology and sociology. In this section, the author limits his discussion to individual-level theories with respect to individuals' behavioural intention which are also referred to as cognitive models (Beaudry & Pinsonneault, 2010) namely: the theory of reasoned action, the theory of planned behaviour, IT adoption theories and the social cognitive theory.

#### **3.2.1. Theory of Reasoned Action (TRA)**

The roots of the Theory of Reasoned Action (TRA) come from the field of social psychology. Social psychologists attempt, among other things, to explain how and why attitude affects

behaviour. The TRA was first proposed by Ajzen and Fishbein (1980) and is a widely validated intentional model that explains and predicts human behaviours (Shareef et al., 2009). TRA proposes that an individual will be influenced by their own attitudes and other people's attitudes of what they think he/she should do (Ratten & Ratten, 2007). TRA in essence addresses the impacts of cognitive components such as attitudes, social norms and intentions on behaviours and assumes that most human's social behaviour is under volitional control and, hence, can be predicted from intentions alone (Ozer & Yilmaz, 2011; Hameed et al., 2012; Frymier & Nadler, 2007). TRA is very general, designed to explain virtually any human behaviour (Ajzen & Fishbein, 1980) and is therefore appropriate for studying the determinants of computer usage behaviour as a special case (Davis et al, 1989). As a result, many researchers have used TRA as a foundation to investigate individuals' IT usage behaviour (Taylor & Todd, 1995).

However, TRA has been criticised as not adequately explaining when behaviour is not under an individual's control (Frymier & Nadler, 2007). Furthermore, the assumption that when someone forms an intention to act, they will be free to act without limitation, is often tenuous. In practice, constraints such as limited ability, time, environmental or organisational restrictions, and unconscious habits will limit the freedom to act (Shareef et al., 2009). Another issue could be the linearity of the components in this theory since individuals may first change their behaviour (system usage) and then their beliefs/attitudes about it. As to the purpose of this study, while TRA is based upon people's behaviour being strongly related to their attitudes towards that behaviour, it does not explain how an individual makes a decision and then applies the made decision to adopt or reject an innovation. In other words, this theory mainly focuses on the internal (psychological) determinants of people's behaviours in non-mandatory settings regardless of the importance of users' post adaptive behaviours, coping efforts, their outcomes and how these adaptation efforts could over time affect users' behaviours with respect to IT usage that is the focal point of this research.

### **3.2.2. Theory of Planned Behaviour (TPB)**

Ajzen (1985) expanded the TRA to include the variable of Perceived Behavioural Control (PBC) as a way of accounting for behaviours that are non-volitional. In fact, the construct of PBC was added in an attempt to deal with situations in which people may lack complete

volitional control over the behaviour of interest (Ajzen, 2002). Therefore, performing a behaviour not only depends on intention, but also on some external or internal factors that may interfere with the motivational behaviour. Perceived behavioural control refers to an individual's perception of how much control he or she has when completing a task or behaving in a certain way (Ajzen, 1985; Ratten & Ratten, 2007). The user perception may be influenced by external factors such as availability and quality of training, or internal and person-oriented factors such as beliefs in one's abilities to perform a task. However, another criticism of both TRA and TPB is that they do not include previous behaviour in the model (Frymier & Nadler, 2007). In other words, they assume that behaviour is pre-planned and not subject to change.

Within the context of technology adoption, PBC relates to the individual's perception of the accessibility of IT and to the benefits and opportunities for its usage, and to an individual's self-confidence in his or her ability to use IT effectively (Ozer & Yilmaz, 2011). Similar to TRA, this theory is not suitable for studying the individuals' adaptation processes and coping efforts since its focus is still on the individual's behavioural intention without taking the complex and dynamic nature of the phenomenon of users' adaptive responses to an IT event into account.

### ***3.2.3. Technology Adoption/ Acceptance Theories (TA)***

The influence of psychological views and concepts is evident in technology adoption theories, which are useful for understanding the users' motives for the adoption and use of IT systems in work settings. A review of the prominent models in this stream of research reveals the important role of psychological or behavioural variables in models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Technology Acceptance Model (TAM) (Davis, 1989). Behavioural intention models of IT usage posit that an individual is more likely to express an intention to use a technology if that technology is perceived to be useful and easy to use. Perceived usefulness and ease of use are individualised experiences, which reflect the interpretations of an individual and how the individual will eventually behave (Davis, 1989).

Each model specifies theoretical variables or factors that predict the determinants of that behaviour. The latter, TAM, models how users come to accept and use the technology by



focusing on the perceived ease of use and usefulness of the system while the former model, UTAUT, is an extended version of the TAM that models not only the two above mentioned factors but also include social influences and facilitating conditions that are direct determinants of usage intention and behaviour. Rawstorne (2005) highlights that rationality and rational decision-making are important assumptions that underpin these models and by doing so the important role of the users is emphasised.

While the TAM and UTAUT provide an analytical lens through which to examine the use and non-use of a technology, they are not suitable for providing insights into the users' dynamic adaptive responses. Similar to previous models the major issue is that these models do not cover the IT adaptation behaviours (also referred to as post adoptive behaviours). Moreover, while the user's perception of a technology is part of the adaptation process that IS users go through, these models are not able to provide insight into other psychological aspects of users' IT adaptation processes, which ultimately lead to IT use outcomes. Such aspects include how IS users evaluate the significance of a new IT event, how they assess their control over the situation and available resources, how their adaptation efforts are adjusted accordingly or how users' relationship with the surrounding environment affects the adaptation process over time. In other words, these models predict IT use based on perceptions and beliefs about the instrumental nature of technology, however, the usage of a new IT is complex and multifaceted and, as research in psychology indicates, cognitive models do not capture all of the antecedents of behaviours (Beaudry & Pinsonneault, 2010).

#### **3.2.4. Social Cognitive Theory (SCT)**

Social cognitive theory (SCT) is built upon the foundations of individual and group psychological behaviours. This theory is also referred to as the social learning theory (Pincus, 2004). Social cognitive theory is a widely accepted model of individual behaviour as it examines the reasons why individuals adopt certain behaviours (Bandura, 1986). The theory identifies human behaviour as an interaction of personal factors, behaviour, and the surrounding environment (Bandura, 1986). According to SCT, the interaction between the person and behaviour involves the influences of a person's thoughts and actions. The interaction between the person and the environment involves human beliefs and cognitive competencies that are developed and modified by social influences and structures within

the environment. The third interaction, between the environment and behaviour, involves a person's behaviour determining the aspects of their environment and in turn their behaviour being modified by that environment.

This theory, however, cannot be considered as the theoretical lens for this research. While Bandura's social learning theory covers broad aspects of human behaviours and has had important implications in the fields of learning, education, personality and public health<sup>12 13</sup> as well as Information Systems (Compeu & Higgins, 1995a, 1995b; Compeu et al., 1999), it lacks an overall understanding of the complexity of human behaviour in general and the focused topic of individuals' underlying adaptive processes in particular. For example, SCT does not answer how a user's adaptive responses work (e.g. how users go through the stressor-appraisal-coping-outcome processes when confronted with new stressors such as a new implemented disruptive IT system in a work setting). It is also unable to answer how changes in one's adaptive efforts could influence an IS user's subsequent behaviour (i.e. system usage). As a result, this theory is limited in what it can explain and unable to provide the required level of interpretation and analysis concerning the complex process of user IT adaptation behaviours and the subsequent IT use outcomes.

### **3.3. Frameworks Used in User IT Adaptation Studies**

Among the existing research on IT adaptation processes (presented in Table 2.1), only a few studies have truly considered the 'user' aspect of the process of user IT adaptation behaviours beside the 'work system (or task)' and 'technology' components (e.g. Tyre & Orlikowski, 1994; Orlikowski, 1996; Beaudry & Pinsonneault, 2005). Other studies, however, have mainly focused on the extent an innovation is changed (Rice & Rogers, 1980) to meet users' needs (Ives & Olson, 1984) or the way a group adapts and reproduces the structures of a technology (Poole & Desanctis, 1990). In the following subsections, the two well-known perspectives the have highlighted the importance of user component in the process of technological adaptation are reviewed.

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<sup>12</sup> Limitation of the Social Cognitive Theory, Boston University School of Public Health, accessed 10/03/2013, <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/SB721-Models/SB721-Models5.html>

<sup>13</sup> Evaluating the Social Cognitive Perspective on Personality, accessed 15/03/2013, <https://www.boundless.com/psychology/personality/the-social-cognitive-perspective/evaluating-the-social-cognitive-perspective-on-personality/>

### ***3.3.1. Punctuated Equilibrium Perspective***

Tyre and Orlikowski (1994) state that the process of technological adaptation is not yet well understood and an important area of uncertainty involves the timing of the adaptations. They point to the innovation and behaviour literature as two bodies of research, which contain conflicting implications about the timing of the technological adaptation. For instance, the innovation literature considers a gradual and continuous process of modifications over time, whereas the behaviour literature (which investigates the behaviour of individuals, groups and organisations) suggests that the pattern of modifications is likely to be discontinuous or uneven. Tyre and Orlikowski's (1994) results confirm the second stream and reveal a pattern of adaptation that is distinctly discontinuous or episodic. Tyre and Orlikowski's findings also show that the initial episodes of adaptation are especially important, as the decisions taken during a short period following initial installation will be major determinants of how the technology will be used over the longer term. They also indicate that further adaptation is rare unless some sort of unusual event or discovery triggers subsequent episodes of adaptive activity.

Although their approach is insightful in better understanding of the episodic pattern of technological adaptation by users and how important the initial episode of adaptation is, the likely relationship between the adjustments made to the technology, users' procedures (task) and users' knowledge (self) at this early episode of adaptation and the types of adaptive efforts users may have employed remains unclear. In other words, while this study gives insight into the importance of the initial episode, it does not explain how users' reliance on different types of coping strategies could affect this 'window of opportunity'.

### ***3.3.2. Situated Change Perspective***

Orlikowski (1996), by proposing this perspective, argues for an emergent change perspective, one in which change arises as a natural and on-going consequence of everyday work practices. Orlikowski (1996) describes this kind of organisational transformation as "grounded in the on-going practices of organisational actors, and emerges out of their accommodations to and experiments with the everyday breakdowns, exceptions, opportunities and unintended consequences that they encounter" (p.65). In this perspective as Orlikowski explains it: an organisational transformation is not portrayed as a drama staged by deliberate directors with predefined scripts (planned change perspective)

or the inevitable product of a technological logic (technological imperative perspective) or a sudden discontinuity that fundamentally invalidates the status quo (punctuated equilibrium perspective). Rather, organisational transformation is seen to be an on-going improvisation enacted by organisational actors trying to make sense of and act coherently in the world.

By focusing on change as situated, it provides a way of seeing that change may not always be as planned, inevitable or discontinuous as we imagine. Rather, it is often realised through the on-going variations, which emerge frequently in the improvisations of everyday activity. Those variations that are repeated, shared, amplified and sustained can over time produce perceptible and striking organisational changes. However, this perspective although very insightful, is not suitable to be used in this study. The reason is while this perspective helps to explain how appropriation of a technology and the adjustments employees enacted over time facilitated the transformation of the structures of the organisation, it does not explain the adaptation process itself that IS users go through to adapt to an IT event. In other words, the focus of this perspective is not on the individual's adaptation processes per se but on how such users' appropriations of a technology affect the organisational transformations.

After having reviewed the limitations of some of the well-known IS theories and models with respect to the aim of this thesis, in the following sections the author focuses on a particular psychological theory which has received a growing attention in IS research over the past few years for studying user IT adaptation behaviours in work settings. This theory which is called 'the theory of stress and coping' or simply 'the coping theory', was initially introduced to the field of psychology by Lazarus (1966) and developed afterwards by Lazarus and Folkman (1984), which is described next in detail.

### **3.4. Coping Theory: An Individual-Level Theory**

Lazarus and Folkman's (1984) coping theory, from the psychology discipline is an individual-level theory and linked to theories related to cognitive appraisal (Smith et al., 1985). Among the appraisal theorists, Lazarus's cognitive theory of stress and coping was selected since this theory (as opposed to arousal-based theories) clearly defines and explains the main components of the coping process in individuals. Moreover, it is one of the most cited and conceptually advanced models/theories available (Parkinson, 1997). Lazarus is one of the

main proponents of the situational view and his contextual theory of coping (as explained in chapter two) describes the coping in individuals as a highly dynamic context-dependent process (Jones & Bright, 2001).

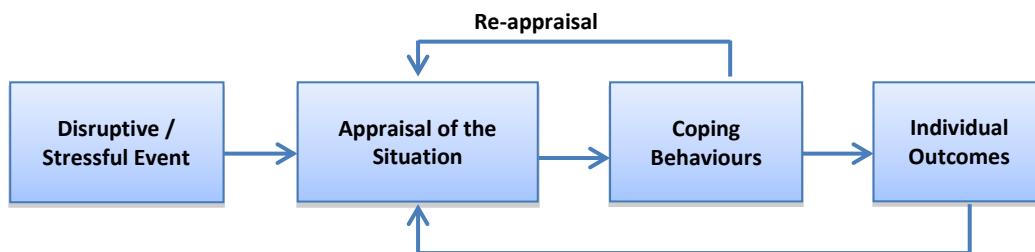
Coping theory, which is the most predominant and widely accepted theory of coping (Jones & Bright, 2001; Beaudry, 2009; Fadel & Brown, 2010; Fadel, 2012), defines coping as an evolving process of cognitive appraisal of a situation followed by behaviours aimed at managing the situation and/or reducing stress. Lazarus and Folkman (1984) unambiguously define stress (or so-called psychological stress) as “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (p.19). Consistent with this definition, Carver and Connor-Smith (2010) consider stress as the experience resulting from either facing or expecting difficulty that obstructs efforts aimed at the accomplishment of a specific or set of goal(s). Coping processes, therefore, are thus critical mediators of unfavourable person-environment relations and various immediate and long-term outcomes as the stressful encounter unfolds (Folkman & Lazarus, 1990; Lazarus & Folkman, 1984, Smith et al., 1985).

### ***3.4.1. Coping and User IT Adaptation Behaviours***

As previously mentioned in chapter 2, coping theory and user IT adaptation literature have several common grounds which makes this individual-level theory particularly relevant to the study of IT-related user adaptation processes/behaviours in work settings. The significance of individual-level behaviours in an IT context has already been the focus of various studies. In IS research, it has already been acknowledged that the success of any situation that utilises an IT artefact depends on various factors including: users' readiness to change effectively (Walinga, 2008), how IS users make sense of a technology and its features (Orlikowski & Gash, 1993; Griffith, 1999), users' emotions with regard to the IT event (Zorn, 2003; Beaudry & Pinsonneault, 2010; Kashefi et al., 2012), users' perceptions of the IT event in their adaptation to new IT systems (Fadel & Brown, 2010; Fadel, 2012) and finally users' coping mechanisms (Beaudry & Pinsonneault, 2000, 2001, 2005), which are prerequisites for the infusion of technology at the individual-level (Fadel, 2011).

Unlike behavioural intentional models, coping theory takes a step further in one's psychological processes and accounts for other critical components such as one's coping/adaptation processes to disruptive troublesome events, individual outcomes as well as re-appraisal of the situation. Such components clarify the adaptive acts one may employ to deal with the stressor, the impact of the applied coping acts on IT-related individual outcomes, and then how one's outcomes, prior experiences and on-going learning (as the stressful situation continues) jointly could lead to re-evaluation of the situation over time. Figure 3.1 depicts the sub-processes involved in one's coping process and their sequence as a high-level process map. The consequences of these complex interrelated mechanisms might accordingly lead to sustainment or adjustment of the current coping strategies or adoption of a new set by the IS user.

**Figure 3.1 - The Contextual Model of Coping Theory**



In addition, as to the strength of this theory, not only does coping theory explain the coping process in individuals comprehensively and systematically, but it also allows researchers to study the topic of individual's emotions in light of this cognitive, processual<sup>14</sup> and relational theory. In this respect, Lazarus (1991) explains that this theory has a great power to help us reason forward about how emotion is generated and how it shapes subsequent adaptations. In turn, it helps us to reason backward from any given pattern of emotion to its causation. This sort of knowledge can aid us in trying to change emotional patterns resulting from defective appraisal and coping patterns (Lazarus 1990, 1991, 1991a, 1993). The coping theory as previously mentioned is relational and process-oriented, which are considered as underpinning themes for this theory, and are discussed next.

<sup>14</sup> OxfordDictionaries.com defines 'processual' as relating to or involving the study of processes rather than discrete/ static events. In this thesis, too, the term processual means process-oriented view and is used to refer to the Coping Theory and CMUA as two dynamic processual frameworks.

#### **3.4.1.1. Coping as a Relational Meaning**

This theme implies that psychological stress is not generated per se by factors in the environment or by one's intra-psychic processes, but by the person-environment relationship that changes over time and circumstances (Lazarus & Folkman, 1984; Lazarus, 1991a, 1991b, 1999). Threat, for example, is not solely a property of the person or of the environment; it requires the combination of an environment having certain attributes with a person whose characteristics mean that they will react as though threatened when exposed to those environmental attributes (Lazarus, 1990). The concept of threat loses its meaning when applied to an environment regardless of the persons who transact with it; or when it is applied to individuals regardless of the environment that appears threatening to them (Lazarus, 1993).

#### **3.4.1.2. Coping as a Dynamic Process**

A process approach to coping has three main features. First, observations and assessments are concerned with what the person actually thinks. Second, what the person actually thinks or does is examined within a specific context. Third, to speak of a coping process means speaking of change in coping thoughts and acts as a stressful encounter unfolds (Lazarus & Folkman, 1984). Coping is therefore a shifting process in which a person must rely more heavily on one form of coping such as emotion-focused coping, and at other times on problem-focused acts (also called problem-solving strategies) as the status of the person-environment relationship changes (Beaudry & Pinsonneault, 2005; Lazarus & Folkman, 1984; Krantz, 1983). The dynamics and changes that characterise coping as a process are not accidental; they are a function of continuous appraisals and reappraisals of the shifting person-environment relationship (Lazarus & Folkman, 1984).

To put it more simply, the coping process involves a relatively complex and mainly cognitive evaluation of the current or impending transaction between the person and the environment (Parkinson, 1997). Any changes in the person-environment relationship may be either the result of coping efforts directed at changing the environment, or coping efforts directed inward that changes the meaning of the event or increases an individual's understanding of the situation. Regardless of its source, any shifts in the person-environment transaction will lead to a re-evaluation of what is happening, its significance and what can be done about it. The re-evaluation process, or reappraisal, in turn influences

subsequent coping efforts (Jones & Bright, 2001; Lazarus, 1990, 1993). However, this emphasis on process does not deny that the specific pattern of appraisal and coping adopted by the individual may be influenced by one's dispositional factors (Lazarus & Folkman, 1984).

### **3.5. The Coping Process Components**

Coping theory (Lazarus, 1966; Lazarus & Folkman, 1984) describes the coping process as made up of two key components, which continuously influence each other: (1) appraisal, which is the cognitive evaluation of a particular situation or event; and (2) coping acts, which are the cognitive and behavioural efforts exerted to manage the given situation. These components and their sub-components are explained next in detail.

#### ***3.5.1. Cognitive Appraisal***

The notion of appraisal is central to Lazarus's approach to psychological stress and coping in individuals. Lazarus suggests that the nature of appraisal is important in determining how individuals cope, that is, appraisal mediates the relationship between stressors and one's coping efforts. In general, cognitive appraisal is concerned with how individuals process and make sense of the surrounding environment. In the workplace this could relate to how we respond to dealing with difficult or demanding clients. Cognitive appraisal is the process that actively negotiates between the demands, constraints and resources of the environment and the goal hierarchy and personal beliefs of the individuals (Lazarus & Folkman, 1984; Jones & Bright, 2001). It is a mental process by which people assess two factors: (1) whether a demand threatens their well-being, and (2) whether they have the necessary resources to meet the demand of the stressor.

#### ***3.5.2. Why is Cognitive Appraisal Important?***

Although certain environmental demands and pressures produce stress in considerable numbers of people, individual and group differences are always evident in the degree and kinds of reaction to the stressor (Lazarus & Folkman, 1984). In other words, people differ in their sensitivity and vulnerability to certain types of events, their interpretations and reactions (Lazarus, 1991). Under similar conditions one person responds with anger, another with depression and some still feel challenged rather than threatened (Lazarus, 1990). In order to understand differences among individuals under comparable conditions, we must take into account the cognitive processes that interfere between the encounter



and the reaction, and the factors that affect the nature of this mediation; otherwise we will be unable to understand human adaptations (Lazarus & Folkman, 1984; Fadel & Brown, 2010). Moreover, a cognitive appraisal reflects the unique and evolving relationship taking place between an individual and an environment (Lazarus & Folkman, 1984; Lazarus, 1991; Beaudry & Pinsonneault, 2005). For instance, new inputs and thoughts feed back to the original appraisal of threat, confirming it, enhancing it or reducing it depending on further evaluation of what is happening and what we can do (Lazarus, 1990, 1991; Beaudry & Pinsonneault, 2005).

At this point, there are two critical questions that have been referred to in different studies of appraisal and coping. The first question is: *“Are emotion and cognition separate systems?”* Eriksson (2004) argues that a person’s cognitions, emotions and reactions are intimately interlinked. Liu and Perrewé (2005) also explain that the cognitive process is also an emotion eliciting process, meaning, in different states according to the meaning of the situation different emotions with different intensities will be generated. Lazarus (1991, 1993) and Smith and Ellsworth (1985) likewise believe that the functional relationship between cognition and emotion is bidirectional. As a dependent variable, emotion is the result of appraisals of the significance of what has happened for personal well-being. Lazarus (1991a) argues: “it is always a response to cognitive activity, which generates meaning regardless of how this meaning is achieved” (p.353). As a cause or independent variable, however, emotion may interfere with subsequent thoughts and produce feedback about its consequences that produce further thoughts that are emotional. To put it simply, the moment emotion occurs it becomes food for the next appraisal and emotion.

The second question is: *“Is appraisal necessary for emotion?”* Lazarus (1990, 1993) answers yes to this question and adds that emotion and cognition are inseparable and if the personal meaning vanishes so does the emotion. Lazarus (1991) argues that appraisal is a necessary as well as sufficient cause of emotion. Folkman (1984), in a similar vein, argues that humans are meaning-oriented, meaning-created creatures who constantly evaluate events from the perspective of their well-being and react emotionally to some of these evaluations. In fact emotion results from an evaluative perception of a relationship between a person and the surrounding environment.

Motivation is another psychological construct, which is associated with the concepts of cognition and emotion in individuals. It refers to values, goals, commitments, intentions and plans which are fused with cognitive activity. This concept helps us understand what makes an encounter personally or professionally relevant and a source of harm or benefit. We do not become emotional without a goal or personal stake in a transaction, but about values and goals to which we have made a strong commitment (Lazarus, 1991a). Such evaluation of the significance of what is happening is managed by cognitive appraisal. Nonetheless, overlaps between motivation, cognition and emotion make it difficult to separate and distinguish their respective territories (Lazarus, 1991a).

### ***3.5.3. Basic Forms of Cognitive Appraisals***

Cognitive appraisal can be understood as the process of categorising an encounter and its various facets for one's well-being (Lazarus & Folkman, 1984). According to Lazarus and Folkman (1984) there are three (in the majority of literature referred to as only two; primary and secondary) identified kinds of cognitive appraisal: primary, secondary and re-appraisal.

#### **3.5.3.1. Primary Appraisal**

Primary appraisal or 'Am I in trouble or being benefited, now or in the future, and in what way?' or 'what do I have at stake in this encounter?' are judgments concerning the meaning of the situation and its likely consequences with regard to the individual's well-being. Answers to these questions also determine both the nature and intensity of the emotional reactions (Parkinson, 1997; Lazarus & Folkman, 1984; Lazarus, 1990, 1991, 1993). Those questions in fact consist of the judgment whether an encounter is irrelevant, benign-positive or stressful. Irrelevant means that an encounter carries no implication for a person's well-being. In other words, the person has no investment in the possible outcomes; therefore nothing is to be lost or gained in the transaction. Benign-positive appraisal, on the other hand, occurs if the outcome of an encounter is interpreted as positive, that is, it preserves or enhances well-being or promises to do so (Lazarus & Folkman, 1984). These evaluations are usually characterised by pleasurable emotions such as joy and happiness.

Stressful appraisals can take three forms: harm/loss, threat, and challenge (Folkman, 1992; McCrae, 1984). The former (harm/loss) refers to a damage the person has already experienced, threat refers to anticipated harms or losses, and challenge refers to events that hold the possibility for mastery or gain. Challenge appraisals are characterised by positive emotions whereas threat centres on potential harms and is characterised by negative emotions such as fear, anger and so forth. Threat and challenge are not mutually exclusive and are often related constructs. For example, a job promotion while it is likely to be appraised as having potential for enhancement in skills and knowledge, it also entails the risk of the person being overwhelmed by new demands. This shows that the relationship between threat and challenge appraisals can shift as an encounter unfolds (Lazarus & Folkman, 1984).

Challenge as opposed to threat has important implications for adaptation since challenged people feel positive and more confident; they are more capable of drawing on available resources, more likely to have better morale and a higher quality of functioning than a person who is feeling threatened (Smith & Ellsworth, 1985; Lazarus, 1993, Lazarus & Folkman, 1984). To put it more simply, challenge is a way of viewing the stress in a positive way. In summary, primary appraisal involves considering the potential threat, benefit, challenge or loss that a situation may present to individuals. This involves appraising the potential impact of the situation on valued personal goals and the likelihood of accomplishing those goals. If the situation is not relevant to valued goals, then we are unlikely to have an emotional response to that situation.

#### **3.5.3.2. Secondary Appraisal**

Secondary appraisal or 'what can I do?', 'What are my options for coping?', 'What if nothing can be done about this encounter?' or 'How much control do I have over the situation to cope with it?' are judgements concerning what might and could be done about the stressful encounter. Some of the possible scenarios and answers to the above questions include: I cannot do it - I know I will fail, my chances are slim but I will try, I can do it if I get help, I can do it if I work hard, if this method fails I can try a few others. When an individual is in trouble, whether it is a threat or challenge assessment, something must be done to manage the situation.

Secondary appraisal is a complex evaluative process that takes into account which coping options are available, an evaluation about the likelihood that a given coping option will achieve what it is supposed to, together with the likelihood that one can apply a particular strategy or set of strategies effectively (Lazarus & Folkman, 1984; Lazarus, 1990, 1991). Secondary appraisals of what are the available coping options and primary appraisals of what is at stake interact with one another (in a quite complex way) in shaping the degree of stress and the strength and quality of the emotional reactions. Challenge appraisals are more likely to appear when the person has a sense of control over the troubled person-environment relationship (Lazarus & Folkman, 1984). A sense of control in a stressful situation involves: control over oneself, over one's emotions and over the environment.

Lazarus and Folkman (1984) explain that primary and secondary appraisals were unfortunate in terms of choice of terminology. These terms mistakenly suggest that one is more important (i.e. primary) than the other, or that one precedes the other in time. Neither of these meanings is intended. For the purpose of analysis they are considered separately, however, they go hand in hand to improve performance behaviours and results. They both happen together or sometimes the secondary occurs first and affects the primary appraisals and one's motivation. Table 3.1 (next page) provides the summary of the primary and secondary cognitive appraisal types.

### **3.5.3.3. Reappraisal**

Reappraisal is referred to as a changed or modified appraisal based on new information from the environment and/or the person (Lazarus & Folkman, 1984; Lazarus, 1993, 1991; Jones & Bright, 2001; Beaudry & Pinsonneault, 2005). A reappraisal differs from an appraisal only in that it follows an earlier appraisal in the same encounter. Any shift in the person-environment relationship will lead to a re-evaluation of what is happening, its significance and what can be done.

Since cognitive appraisal rests on the individual's subjective interpretation of a transaction with their surrounding environment, it is phenomenological. In other words, when we speak of cognitive appraisal, we refer to the notion that people usually want to know what is happening and what it means for their well-being. As a result, by saying that 'the reaction to a demanding environment is mediated by cognitive processes' does not mean that the

inner promptings alone shape appraisals, but that such promptings interact with the environment to generate cognitive appraisals (Lazarus & Folkman, 1984).

**Table 3.1 - Summary of cognitive appraisal types**

Type	Question asked	Outcomes	
Primary Appraisal	<ul style="list-style-type: none"> <li>• What is at stake for me in this situation?</li> <li>• Is it good or bad for me?</li> <li>• Will it get better or worse?</li> <li>• Do I care about what is happening?</li> </ul>	<b>Irrelevant:</b> Situation has to implication for the person’s well-being	
		<b>Benign/Positive:</b> Situation is perceived as desirable that preserves or enhances person’s well-being	
		<b>Stress</b>	<b>Harm:</b> Situation has already resulted in some damage or loss to the person
			<b>Threat:</b> Situation involves harm/loss that has not yet taken place but it is anticipated
Secondary Appraisal	<ul style="list-style-type: none"> <li>• What can I do about it?</li> <li>• Can I change or do something about it?</li> </ul>	<b>Problem-focused coping efforts:</b> are oriented toward altering the situation or can be oriented inward, the self. Aim at managing the disruptive stressor event itself when situation is perceived as changeable.	
		<b>Emotion-focused coping efforts:</b> are oriented toward the self and aim at regulating personal emotions and tensions and restoring a sense of stability when situation is perceived as non-changeable.	

**3.5.4. Basic Forms of Coping Mechanisms**

The second component of the coping process, coping efforts, follows one’s appraisal and the outcomes of primary and secondary appraisals will subsequently affect the type of coping strategies used and the likely emotional response (Jones & Bright, 2001). Furthermore, because emotions are reactions to the meaning of the situation and coping efforts often changes the meaning of the situation, one’s coping strategies also shape subsequent emotions (Lazarus & Folkman, 1984). Lazarus’s coping theory accounts for two main types of coping acts namely problem-focused and emotion-focused (Folkman, 1992; Lazarus & Folkman, 1984; Stone et al., 1992), which are now explained.

#### **3.5.4.1. Problem-Focused Coping Efforts:**

These coping strategies (also referred to as practical efforts, problem-solving efforts or engaging efforts) aim at managing the disruptive issue itself. They are oriented toward solving the problem or taking advantage of a given opportunity perceived as associated with it. Problem-focused coping acts can be directed at changing the environment, such as altering, lessening or improving environmental pressures, barriers, resources, or procedures. They can also be oriented inward, at the self, such as developing new standards of behaviour, shifting levels of aspiration, and learning new skills or procedures (Lazarus & Folkman, 1984). Problem-focused forms of coping are more probable when stressful conditions are evaluated as amenable to change. They are efforts that are often directed at defining the problem, generating alternative solutions, weighting the alternatives in terms of their costs and benefits, choosing among them and acting (Lazarus & Folkman, 1984; Lazarus, 1990).

#### **3.5.4.2. Emotion-focused Coping Efforts:**

Emotion-focused coping efforts are oriented toward the self and aim at regulating personal emotions and tensions, restoring a sense of stability, and reducing emotional distress (Lazarus & Folkman, 1984). This can be accomplished through numerous cognitive and behavioural efforts. For example, one can change his/her perception of a situation by minimising the consequences or threats (e.g. maintaining hope and optimism, refusing to acknowledge the negative side of the event), positive comparison (i.e. comparing one's situation with others that are worse off) and passive acceptance. Other emotion-focused acts include avoidance (e.g. escaping the situation), self-deception and denial (e.g. denying the facts and their implications and acting as if the event never happened), distancing and doing physical activities to get one's mind off the stressful event (Lazarus & Folkman, 1984; Beaudry & Pinsonneault, 2005). Coping studies differ in the number and types of emotion-focused coping behaviours they identify. However, a synthesis of coping studies reveals that common emotion-focused coping behaviours include seeking social support, positive reappraisal, distancing and avoidance (Skinner et al., 2003).

### 3.5.4.3. How Problem- and Emotion-Focused Coping Acts Are Connected?

Individuals in most situations use both types of coping strategies but the amount of efforts invested in each type highly depends on how the situation is appraised by the person (Folkman, 1992; Lazarus & Folkman, 1984). Perceived likely consequences (i.e. primary appraisal) and perceived controllability (i.e. secondary appraisal) together influence the extent to which one relies more on problem- or emotion-focused efforts (Folkman, 1992; Folkman & Lazarus, 1985; McCrae, 1984; Oakland & Ostell, 1996; Stone et al., 1992; Beaudry, 2009). Emotion-focused coping efforts occur primarily when individuals feel that they do not have much control over a stressful situation whereas problem-focused coping occurs mainly when individuals feel that they do have some control over the situation (Folkman & Moskowitz, 2000; Folkman, 1992; Folkman et al., 1986; Lazarus & Folkman, 1984). This can be explained by the fact that in response to disruptive events, individuals tend to choose the coping strategy that they feel has the highest likelihood of meeting the demand they face as well as promises greater chances of success, thus restoring a sense of well-being (Begley, 1998).

However, over-emphasising on one type of coping while the other type is actually beneficial may result in undesirable outcomes for the person. For instance, by over-relying on problem-focused acts in an unchangeable situation, individuals engage in a process that is likely to result in frustration and distress, while not actually solving the problem at hand (Begley, 1998; Cohen et al., 1986; Folkman, 1992). Conversely, relying solely on emotion-focused acts in a changeable situation, instead of undertaking actual actions that could potentially solve the problem or issue at hand, would also likely result in frustration (Begley, 1998; Folkman, 1992).

Problem-focused coping efforts, if successful, may result in solving the problem at hand, thus reducing the negative consequences of the stressor, increasing one's related knowledge and skills, or decreasing uncertainty. On the other hand, emotion-focused acts may lead to restoring one's emotional stability, reducing stress, positive reappraisal, or avoidance of various psychological disorders. The coping acts and their outcomes may also lead one to re-appraise the situation and perform another set of coping behaviours (Beaudry, 2009). Extreme cases, when an event is appraised as negative or too demanding

given the control/resources one has, can lead an individual to withdraw from the situation. Such a strategy may imply, for example, asking for a transfer, quitting a job, or retiring (Begley, 1998; Beaudry & Pinsonneault, 2005).

The Coping Model of User Adaptation (CMUA), which is described next, allows for deeper understanding of the nature of user IT adaptation behaviours from a cognitive, relational and process-oriented approach in an IT context after the process of IT implementation when new technology is being used.

### **3.6. The Coping Model of User Adaptation (CMUA)**

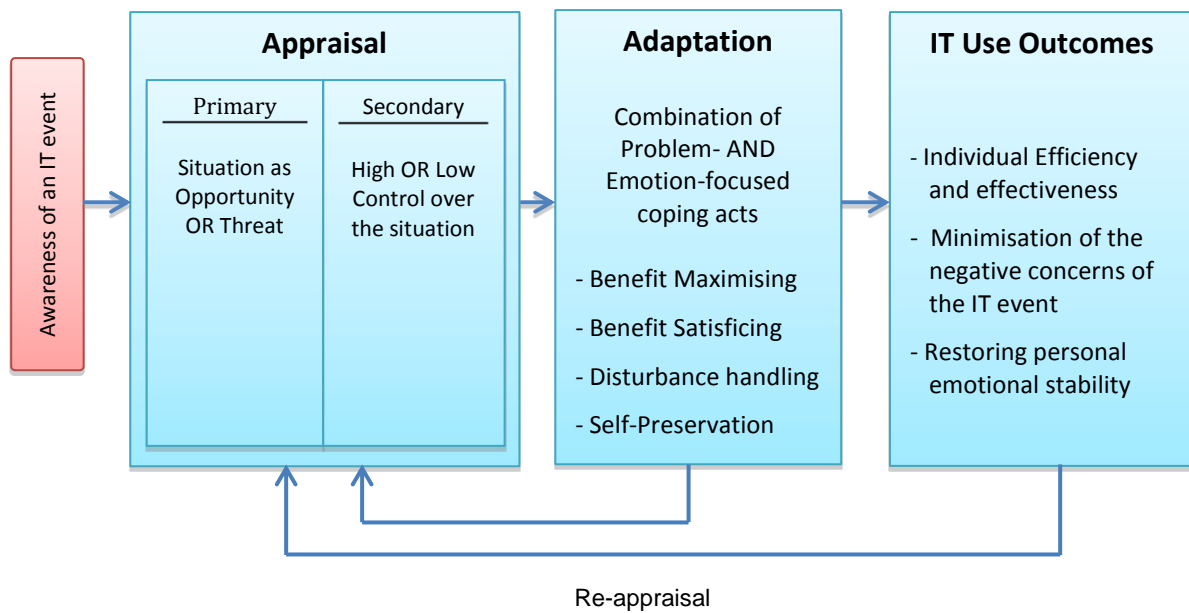
Drawing on coping theory, Beaudry & Pinsonneault (2005) propose the Coping Model of User Adaptation (CMUA) to study how and why individuals adapt to new IT implementations in their work place. Beaudry & Pinsonneault (2005) define user adaptation in light of coping theory as “the cognitive and behavioural efforts exerted by users to manage specific consequences associated with a significant IT event that occurs in their work environment” (p.496). Aligned with coping theory, this definition indicates that: 1) both ‘visible’ (problem-focused acts) and ‘invisible’ coping behaviours (emotion-focused acts) can be performed by the IS user as part of his/her adaptation process, 2) adaptation acts differ from one individual to another depending on one’s interpretation of the potential desirable and undesirable consequences that the new IT may bring about, and 3) the adaptation acts one performs are also related to one’s perceived control over the management of the consequences.

Building on coping theory, CMUA frames users’ responses to a new workplace IT system in terms of three sequential phases as shown in Figure 3.2. Initially the IS user becomes aware of a new IS in his/her work environment. This awareness leads to appraisal of the IS wherein, the user assesses the likely consequences of the IS (i.e. primary appraisal) and his/her available options for responding to it (i.e. secondary appraisal). Based on these appraisals, the IS user then engages in various types of adaptive acts in response to the IS, which subsequently can produce both external outcomes (improved efficiency and effectiveness using the new IS) and internal outcomes (e.g. restored emotional stability). As Figure 3.2 (next page) depicts, the adaptation process is iterative with appraisal and adaptation strategies constantly affecting one another. The performance and usefulness of



adaptation acts and the resulting outcomes will also lead individuals to reappraise the situation to either continue with their initial adaptation strategies or follow a new set of behaviours (Beaudry & Pinsonneault, 2005). This explains why a new IT implementation initially appraised negatively (positively) might be more positively (negatively) reappraised after an initial round of adaptation acts or vice versa.

**Figure 3.2 - High-Level View of the Coping Model of User Adaptation (CMUA) from Beaudry and Pinsonneault’s (2005)**



**3.6.1. Evaluating an IT Event in CMUA: Appraisal**

After explaining the concept of cognitive appraisal and coping strategies in coping theory, the following sections explains these concepts with regard to an IT context as described by Beaudry and Pinsonneault’s (2005) Coping Model of User Adaptation (CMUA).

**3.6.1.1. Primary Appraisal in CMUA**

According to CMUA, the assessment of an IT event starts with the primary appraisal as the beginning point. At this stage, the user evaluates the situation and determines the probable consequences of the IT event and how they are likely to affect him/her both personally and professionally. For example, an IS user might think that the new system will make her job more interesting and that she will need to learn new skills and to adapt her working procedures. Another user might be afraid of losing his job and think that he does not have

the necessary skills to obtain a new and interesting job. As shown in Figure 3.2, user adaptation in CMUA is triggered by a significant IT event that disrupts the user's work environment. In particular, user adaptation starts when a user gains an awareness of the potential consequences of a significant IT event in his/her environment and evaluates them to be of personal and/or professional relevance. These consequences (i.e. the outcomes of the primary appraisal) according to CMUA could be of two types: an opportunity or a threat (Beaudry & Pinsonneault, 2005; Beaudry, 2009).

Beaudry and Pinsonneault (2005) indicate that in an IT context, the influential elements on primary appraisal can be loosely categorised into three groups: (1) aspects of the implemented technology, (2) personal characteristics of the user, and finally (3) the social and institutional influences. As to the first influential category, several authors have suggested that users' views about a technology are mainly developed based on their understanding of certain key aspects of the new technology (Davis, 1989; Griffith, 1999; Moore & Benbasat, 1991; Rogers, 1983; Venkatesh et al., 2003). For instance, Griffith (1999) argued that a new or adapted feature of a technology that is seen as concrete, meaning that it can be directly and specifically observed and described (as opposed to abstract), or as core, referring to a dimension that is critical to the functionality or the goal of a technology (as opposed to tangential) is more likely to be experienced as novel and therefore to generate more individual sense-making.

Furthermore, the perceived or expected fit between a technology and users' daily routines (tasks) (Dishaw & Strong, 1999; Zigurs & Buckland, 1998) as well as the perceived compatibility of the new implemented technology with users' needs (Karahanna et al., 1999; Moore & Benbasat, 1991) might also influence users' primary appraisals. For instance, the perception of an IT system's inability to support the user's task (task-technology misfit) might lead the IS user to assess an IT event as threatening, whereas a strong fit, instead, might be considered an opportunity to improve one's performance. Additionally, performance expectancy has been found to influence users' behaviours (Venkatesh et al., 2003) and might affect whether one considers an IT event to be an opportunity or not since a technology associated with high performance expectancy is likely to be assessed positively.

As to the second category of the influential elements, some personal characteristics are likely to affect users' primary appraisals. For instance, it has been shown that an individual's anxiety with regard to a specific situation tends to lead to further anxiety in a person (Bandura, 1977; Rosen et al., 1987). In an IT context, this series of changes in anxiety levels can undesirably affect one's views about the new technology (Venkatesh, 2000) and subsequently produce fear (Weil & Wugalter, 1990; Kashefi et al., 2012). Likewise, individuals with higher personal innovativeness have been found to exhibit more positive beliefs about a technology (Agarwal et al., 2000). Users' previous experiences with a technology have also been found to shape how they may view and perceive a new technology (Taylor & Todd, 1995a).

As to the third category, the contextual factors, since primary appraisal occurs in a specific context, it is therefore likely to be influenced by some social and organisational factors such as what others (i.e. colleagues and superiors) think of the technology (Taylor & Todd, 1995b; Venkatesh et al., 2003). Top management's commitment and support for a technology also influences users' beliefs about the usefulness and ease of use of a technology (Lewis et al., 2003). The organisational culture and group dynamics associated with technology acceptance and use are also likely to form and influence users' primary appraisal (Ajzen, 1985; Davis et al., 1989; Taylor & Todd, 1995b; Thompson et al., 1991).

### **3.6.1.2. Secondary Appraisal in CMUA**

In secondary appraisal, IS users evaluate the coping options as well as the level of control they feel they have over the IT event and what their adaptation options are given the resources available to them (Beaudry & Pinsonneault, 2000, 2001, 2005). Here, "resources" is used in a general sense and includes financial, material, physical, psychic, and social resources as well as specific knowledge, skills, and attitudes (Beaudry, 2009). As outlined in Beaudry and Pinsonneault (2005), in the context of IT, the secondary appraisal will be done with respect to three main components of:

- *Control over the work (task)*: refers to the degree to which employees feel that they have autonomy and are able to modify their tasks in response to an IT event

- *Control over the self*: refers to whether employees feel they can adapt themselves to the new environment (Lazarus & Folkman, 1984)
- *Control over the technology*: refers to how much influence employees feel they have over the features and functionalities of the IT (Orlikowski, 1996; Poole & DeSanctis, 1988; Tyre & Orlikowski, 1994).

Appraisals of control may shift as the encounter (i.e. IT event) unfolds and modifications can come about as the result of new information from the environment and/or as the result of users' coping efforts. This thesis, similar to Beaudry and Pinsooneault (2005), incorporates this typology of 'task, tech and self' into the analyses since the author believes this typology is useful for the further explanation and analysis of user IT adaptation behaviours.

### ***3.6.2. Coping with IT Events in CMUA: Adaptation Behaviours***

The adaptation strategy will most likely comprise both types of coping acts (i.e. emotion- and problem-focused) but their relative importance will depend on one's cognitive appraisal (Beaudry, 2009; Folkman, 1992). Adaptation behaviours can also be targeted towards any or all of three dimensions of the IS implementation context: the user, the technology itself and the work task. Beaudry and Pinsooneault (2005) propose a typology of adaptation behaviours that include problem- and emotion-focused behaviours.

#### **3.6.2.1. Problem-Focused Adaptation Behaviours in CMUA**

As to the problem-focused adaptation behaviours, Beaudry and Pinsooneault posit that problem-focused adaptation behaviours will result in increased individual efficiency and effectiveness by using the IS in a more productive manner. They explain how these adaptive behaviours in response to a new implemented IS may alter the work task, the user or the IT itself:

*Problem-focused adaptation aims at managing the issues associated with the IT event directly by (1) adapting one's self such as adjusting personal habits to fit the requirements of the technology (Orlikowski, 1996; Tyre & Orlikowski, 1994), learning new skills (Tyre & Orlikowski, 1994), and adjusting work commitments (Majchrzak & Cotton, 1988); (2) adapting the work by modifying procedures and routines (Sokol,*

1994; Tyre & Orlikowski, 1996); and/or (3) adapting the technology by changing its functionalities and features (Leonard-Barton, 1988; Rice & Rogers, 1980) (P.500).

### 3.6.2.2. Emotion-Focused Adaptation Behaviours in CMUA

Emotion-focused adaptation behaviours, on the other hand, are directed toward the inner self to regulate emotional responses. These adaptive acts focus on individuals' affective responses to the new workplace IS. According to Beaudry and Pinsonneault (2005):

*Emotion-focused adaptation is oriented toward one's self and aims at changing one's perception of the consequences of the IT event or at reducing emotional distress. Emotion-focused adaptation includes self-deception and avoidance such as denying that the IT affects one, acting as if the IT event had not occurred (Zuboff, 1988), minimisation of the consequences of the IT event such as removing thoughts of the event, positive comparison such as comparing oneself to other users who are more badly affected by the event (Lazarus & Folkman, 1984), and passive acceptance such as accepting the IT event as a fact of life by changing beliefs and attitudes (Tyre & Orlikowski, 1994, 1996) (P.500).*

Beaudry and Pinsonneault (2005) indicate that re-establishment of emotional stability may be necessary to enable a user to engage in practical and problem-solving adaptation efforts that produce increased operational efficiency and effectiveness. For example, behaviours such as avoidance or wishful thinking, while potentially useful for regulating emotional stability, are not likely to produce positive external outcomes. Nevertheless, the restoration of emotional equilibrium as an outcome of emotion-focused behaviours may lead to further positive coping results. Table 3.2 (next page) provides the summary of the problem- and emotion-focused adaptation behaviours in an IS context.

**Table 3.2 - Types of IS user’s adaptation behaviours**

Types of adaptive behaviours		Example behaviours
Problem- focused coping	Technology	Modifying, adding or deleting screens, personalizing the IT, changing personal settings
	Task	Modifying working procedures, streamlining work tasks
	Self	Learning new skills, seeking social support, spending time practicing using the system
Self (Emotion-focused coping)		Minimising perceived negative consequences, making positive comparisons with others, seeking social support, engaging in selective behaviours such as attention, avoidance or distancing

To distinguish the effects of various emotion-focused adaptation behaviours on individual-level IT use outcome, this study also considers a supplementary well-known typology of adaptive behaviours from Roth and Cohen (1986): *avoidance* vs. *approach*. Approach behaviours are oriented toward the sources of stress while avoidance behaviours are oriented away from it. Approach-oriented emotion-focused adaptation strategies include acts such as positive reappraisal or seeking social support. Avoidance-oriented adaptation behaviours, in contrast, include cognitive attempts to deny or minimise threat or distancing (Roth & Cohen, 1986). Existing research has generally shown that approach-oriented emotion-focused behaviours produce better adjustment outcomes than do avoidance-oriented behaviours (Ebata & Moos, 1991; Roth & Cohen, 1986). Table 3.3 provides the summary of emotion-focused adaptive strategies.

**Table 3.3 - Types of emotion-focused adaptation behaviours**

Emotion-focused types	Example behaviours
Approach-oriented emotion-focused adaptation	Seeking social support, reappraising the stressor in a positive light
Avoidance-oriented emotion-focused adaptation	Cognitive attempts to deny or minimise the threat, escape/avoidance, wishful thinking, distancing

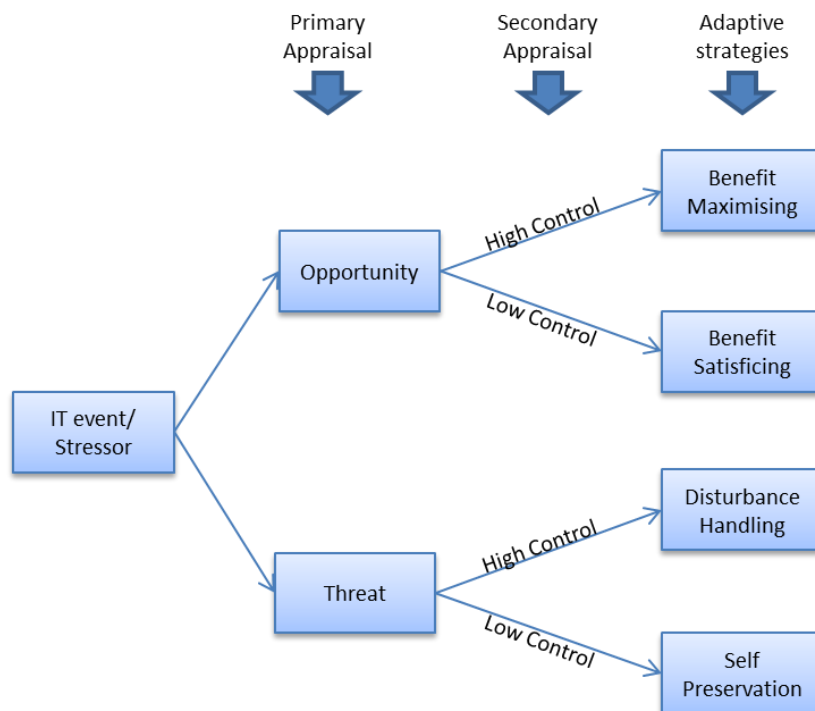
As seen in Table 3.2, 'seeking social support' overlaps between self (problem-focused coping) and self (emotion-focused coping). With the help of Table 3.3 this overlap can be explained. In the former (self: problem-focused coping), seeking social support implies the efforts one makes to find people in the work place in order to help the user with the troublesome technology or the IS-enabled work system. The latter (self: emotion-focused coping), implies the psychological help one could receive from colleagues in terms of empathy and sympathy which according to Table 3.3 is an approach-oriented emotion-focused coping act, since the user is willing to actively share his/her feelings and receive emotional help to regulate emotional equilibrium and reduce the level of stress.

CMUA identifies four "pure" adaptation strategies that are based on primary and secondary appraisal outcomes (i.e. opportunity and threat with high and low control) and characterised by various combinations of problem- and emotion-focused adaptive efforts. These strategies are termed 'benefit maximising', 'benefit satisficing', 'disturbance handling' and 'self-preservation'. The first two strategies, benefit maximising and benefit satisficing occur when the user appraises the IS as an opportunity. In this situation if the IS user appraises a high level of control over the disruptive event, she is likely to mostly engage in problem-focused adaptive behaviours that allow her to extract maximum advantages from the IS and this behaviour is likely to be related to increased individual efficiency and effectiveness at work. This strategy is called "*Benefit Maximising*". In contrast, if the individual appraises lack of control over his/her work environment, both problem- and emotion-focused adaptation behaviours are used but are likely to be limited. In this case, the IS user employs the "*Benefit Satisficing*" strategy by passively accepting the benefits the IS offers without proactively adapting to it.

The next two adaptation strategies, disturbance handling and self-preservation, occur when the expected consequences of the new IT are perceived as threatening by the IS user. If such an individual retains a high level of control over his/her work environment, the user will be likely to engage in problem-focused adaptation behaviours to lessen the potential harm deriving from the IS. In addition, the user is also likely to engage in emotion-focused adaptation behaviours to minimise perceived negative consequences and restore emotional stability. This coping strategy is called "*Disturbance Handling*". In contrast, if the

individual appraises that she has limited control over her work environment, a “Self-Preservation” strategy will be adopted since the user can do nothing or very little to alter the situation. This strategy only comprises of emotion-focused efforts and will most likely result either in the restoration of one’s emotional stability or in withdrawal from the situation in extreme cases. Figure 3.3 depicts the summary of user IT adaptation behaviours in CMUA in a more detailed perspective.

**Figure 3.3 - Summary of the IS Appraisal and Adaptive Strategies in CMUA**



**3.6.3. Individual Level Outcomes in CMUA**

CMUA asserts that the specific combinations of problem- and emotion-focused adaptation behaviours employed by the user will impact IT-related individual-level outcomes such as individual efficiency and effectiveness (i.e. high efficiency outcome), minimisation of the perceived negative consequences of the IT (i.e. no or very limited efficiency), and restoration of personal emotional stability (i.e. no efficiency outcome). Adaptation strategies that involve problem-focused behaviours are likely to result in improved efficiency and effectiveness in using the new IT system to perform work tasks, whereas adaptation strategies that mostly involve emotion-focused behaviours are likely to result in minimisation of the negative consequences and restored emotional stability. In extreme



cases when a user feels severely threatened by an IS and cannot cope with it, he/she may withdraw from the situation by for example quitting the job or requesting a transfer.

### **3.7. Limitations of CMUA**

By comparing Beaudry and Pinsonneault's (2005) CMUA with its underlying theory (i.e. contextual theory of coping), it is perceived that CMUA by its current status, although very insightful, does not completely represent some of the key constructs of the coping theory.

Concerning cognition in individuals, the appraisal process involves primary and secondary appraisals jointly. To put it simply, for the purpose of analysis they are considered separately, however primary and secondary appraisals go hand in hand and happen together or sometimes the secondary appraisal occurs first and affects the primary appraisal and one's motivation (Lazarus & Folkman, 1984). However in CMUA, IS appraisal's sub-section (primary and secondary) are represented as linear processes, that is, primary appraisal happens first and secondary appraisal occurs afterwards.

Furthermore, while 'relational meaning' is one of the two fundamental facets of the coping theory, this aspect has not received the attention it deserves in the original study of CMUA and has only been referred to in terms of account managers' revaluation of the technology during the first few weeks. Other aspects or factors embedded in the individual-environment relationship that might affect the users' understanding of the situation, their adaptation behaviours to the IT event or the evolution of such coping strategies were not taken into account. In this respect, the importance is not solely the personal factors (e.g. self-efficacy) or the social and institutional factors (e.g. management or colleague support), but how these two features influence and are influenced by one another in the dynamic process of adaptation.

Lastly, Beaudry and Pinsonneault (2005) stress that: "... there is a need to progress toward a framework that integrates both approaches [i.e. variance and process approaches] and allows studying the antecedents, behaviours, and outcomes of user adaptation together. This paper takes the study of user adaptation a step further in that direction by proposing an integrative model, the coping model of user adaptation (CMUA)" (p.495). However, the way Beaudry and Pinsonneault proposed the model it has been largely considered for variance approach studies for testing purposes rather than providing insight into the

complex dynamic process of user adaptation to new disruptive IT events. As a result, this study adopted a higher-level view of the CMUA in order to study IS users' adaptation processes from a process approach and to focus on the inter-related relations of the key constructs to provide a comprehensive understanding of this dynamic adaptation process.

### **3.8. Strengths of CMUA and Current Study**

Having said the limitations of CMUA, this model nevertheless has several strengths and is very insightful in studying different aspects of individuals' reactions to IT events in organisations. More specifically, this model is particularly helpful in terms of enhancing the current understating of IS users' coping processes (= adaptation behaviours) facing IT events. While the concentration of Lazarus and Folkman's appraisal and coping research were extensively on individuals' psychological health, emotions, cognition and coping processes in general terms including laboratory experiments and focusing on life traumas, the research conducted by Beaudry and Pinsonneault in 2005 and the model they put forward shed a new light for studying user adaptation behaviour at the individual level that was needed in IS research. In the following, the strengths of the CMUA model and the reasons for considering it as the theoretical framework are explained.

The first strength of CMUA is that it has been grounded in a comprehensive individual-level psychological theory. This allows CMUA to benefit from the underlying themes (relational and process-orientation) and components (cognitive appraisal and coping) already existing in coping theory and to apply them to the IS research for investigating IS users' adaptational behaviours to stressful and often disruptive IT-related organisational changes. In light of this model the dynamic process of stressor-appraisal-coping-outcome in individuals facing such events can be studied in depth.

The second strength of CMUA lies in the consideration of the re-appraisal/ feedback link in this complex dynamic process. Unlike other psychology-based models (e.g. TRA and TPB) that have neglected this important psychological sub-process, this iterative aspect of the coping process allows researchers to consider individual's concurrent learning, experiences gained through the coping processes and their outcome as well as appraisals gained through re-evaluations of new information from the environment. This aspect is especially beneficial for longitudinal and clarifying studies (similar to this study) that provides an

explanation of how, why and when things happened in some particular real-world situations (Gregor, 2006). This aspect also explains how, why and when users' coping strategies are altered (or not-altered) over a period of time and how the alterations in users' adaptation behaviours may affect their IT-related outcomes.

The third advantage of using CMUA is its explanatory power in providing insight into other highly related topics such as Huy's (1999) dynamic model of change at the individual level and Tyre and Orlikowski's (1994) 'window of opportunity'. For instance, Huy's (1999) dynamic model of change, which is described briefly here, divides the change process into its three critical components (receptivity, mobilisation and learning) and shows clearly how individuals go through the course of change. Table 3.4 summarises the criteria used for theory selection.

**Table 3.4 - Criteria for theory selection**

<b>Model's Required Characteristics</b>	<b>Explanation</b>
<b>Scope of model</b>	The model had to be high-level enough to allow the author to make sense of users' processual IT adaptation behaviours as a whole, while at the same time it had to be in-depth enough to allow for detailed interpretations of results with regard to each psychological construct.
<b>Explanatory power</b>	The theory had to be strong in terms of 'explanatory power' and be able to clarify why, how, when and to what extent user IT adaptation behaviours occur and evolve over time, to be able to explain the reasons behind employed adaptation efforts, and help to reduce the empirical concerns in the IS domain with regard to the phenomenon under investigation.
<b>To account for social and contextual factors</b>	Although it had to be an individual-level theory explaining individual's psychological processes, it still had to take the importance of social and situational factors into account.
<b>Attention to the IT artefacts as the core subject matter</b>	Attention to the information technology artefacts as the core subject matter of the IS discipline, consider the interactivity of users, technologies and processes.
<b>Process-oriented model</b>	The model had to be a process-oriented model in order to explain how adaptive behaviours as a process change over time, to account for an outcome by referencing to a sequence of events. This perspective was necessary for a richer understanding of the dynamics of the process of user IT adaptation behaviour.

<p><b>Well established, theoretical foundation</b></p>	<p>The model’s coherence was another key criteria. The model’s underlying theory base and had to be based on well established, reliable and coherent. In this thesis, CMUA is based on the Coping Theory, which is a comprehensive and profound theory in the psychology domain.</p>
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The above criteria were used by the author to identify the most appropriate and relevant framework for studying and analysing the phenomenon of user IT adaptation behaviours in this thesis. None of the earlier mentioned theories/models (i.e. TPB, TRA, TAM, SCT, Punctuated Equilibrium) had all the required characteristics to be considered as the theoretical lens. The Coping Model of User Adaptation (CMUA), on the other hand, was found to have the best fit and cover all the above six aspects. Accordingly, the scope of CMUA was found to be within the scope of the research (first criteria). While CMUA provides a high-level view of IT-related user adaptive processes, it also gives a detailed analysis of the steps in such processes in a systematic, dynamic and reciprocal way. The CMUA’s explanatory power is high and could qualitatively explain the reasons behind the statistics. Furthermore, as mentioned, it can provide insight into other highly related topics such as Huy’s (1999) dynamic model of change at the individual level and Tyre and Orlikowski’s (1994) ‘window of opportunity’ (second criteria). The model also takes the importance of social and situational factors into account by considering the feedback loop in the model which represents the individual-environment relationship (Third criteria).

CMUA which is the IS-customised form of the Coping Theory focuses on IT artefacts as the core subject matter. The central premise of CMUA is that the introduction of a new technology or major modification of an existing one can generate changes that are perceived as novel and can form a disruption in users’ daily routines. CMUA explains how and why individuals adapt to new IT implementations in their workplace (forth criteria). CMUA is also a process-oriented framework. This iterative aspect of the coping process allows researchers to consider individual’s concurrent learning, prior experiences and their outcomes as well as new evaluations gained through re-evaluations of new information from the environment. It allows clarifications on the relationships between the psychological constructs from a cognitive-relational and process-oriented approach in an IT context (fifth criteria). CMUA is based on the Coping Theory from the psychology discipline which is an individual-level theory and linked to theories related to cognitive appraisal. The Coping Theory clearly defines and explains the main components of the coping process in

individuals and is one of the most cited and conceptually advanced models/theories available (sixth criteria).

In Huy's model '*Receptivity*' refers to employees' willingness to consider change and recognise the legitimacy of such proposals. Receptivity as a process shapes and is shaped by the continuous sense making and sense giving activities conducted among various members of an organisation. Since emotions are reactions to the meaning of a situation (Lazarus & Folkman, 1984) and that meaning is due to an individual's evaluation of a situation (Lazarus, 1993), the receptivity phase covers both employees' emotional and cognitive responses. '*Mobilisation*' is the concrete actions taken by an employee in the direction of change (Huy, 1999). As the word itself implies, mobilisation covers the action part of the change process in which employees take steps toward change (adoption and use of IT). Mobilisation depends on the time and receptivity of others, support structures, systems and skills. Moreover, mobilisation is greatly dependent on the receptivity phase. Regarding the '*Learning*' phase, since employees learn from their earlier experiences, this step may affect their willingness to see the need for change and to mobilise accordingly. In this respect, using coping theory as a theoretical lens will not only allow us to investigate the 'how' and 'why' facets of IS users' adaptation behaviours, but it also provides insight into how individuals go through the course of change and how their primary appraisals (subjective judgments about the significance of a specific event), secondary appraisals (personal evaluations of coping resources, constraints and options) and coping efforts affect IS users' receptivity to and mobilisation for change (Huy, 1999; Lazarus, 1990; Lazarus & Folkman, 1984).

Furthermore, it is perceived that the explanatory power of CMUA can also be used for better understanding of the Tyre and Orlikowski's (1994) window of opportunity. As they argue this window which represents the initial period of adaptation, is particularly important since the decisions and directions taken by users during this short period following the implementation of the IT system are major determinants of how the technology will be used over the longer term (p.114). Tyre and Orlikowski (1994) also refer to technological adaptation as adjustments and changes following installation of a new technology in a given setting that may be made to one or all three components of the technology, task and self. Now by referring back to CMUA and viewing this 'window of

opportunity' from this psychological perspective, these modifications can be seen and understood as the results of coping acts (i.e. combination of problem- and emotion-focused coping acts) that users engage in to adapt to the new technology in this short initial period. Thus, CMUA could be used for deeper understanding of this window of opportunity by explaining how users' appraisals and reliance on two forms of coping acts can affect how they make sense and modify those three components. These in turn represent the presence or absence of an initial episode of adaptation.

To guide our inquiry, the current thesis draws on the Beaudry and Pinsonneault's *Coping Model of User Adaptation (CMUA)* in the domain of user IT adaptation behaviours, which provides a useful theoretical basis for understanding users' adaptive responses to a new work IS and their consequent outcomes. This allows for further clarification of how different types of individual-level adaptation acts evolve over time and affect individual-level IT use outcomes. Furthermore, how these various adaptive acts enhance or hinder the extent to which the new IT is used can also be explained. Examination of extant literature, shows that this topic by this level of focus has received limited treatment in IS research. In other words, the existing literature offers little in the way of deep exploration of IS users' adaptation behaviours facing IT events in their work environments. Drawing on principles from the contextual coping theory and CMUA, this research empirically attempts to provide insight into key aspects of CMUA's components (i.e. appraisal, adaptation, outcomes, and reappraisals), which has not yet undergone detailed explorations in the context of IT. Drawing on these two also allows explanations of this phenomenon that was poorly or imperfectly understood and reflected on beforehand.

By doing so, this study investigates how users' particular appraisals of a workplace IS influence specific adaptation behaviours and the way IS users adapts to it, what strategies they use, how they switch between coping efforts in order to better cope with the new IS as well as how changes in users' coping strategies subsequently affect their IT use outcomes. Although Beaudry and Pinsonneault (2005) illustrate the principles of the model using qualitative case evidence from two IS implementations in North American banks, they note the need for further exploration of the model with large-scale studies involving numerous users (p.519). This research by focusing in depth on these inter-related constructs, allows for a better understating of the dynamics and critical processes of

stressor-appraisal-coping- outcomes that IS users go through in order to adapt the new technology.

## CHAPTER FOUR - RESEARCH METHODOLOGY

### 4. Introduction

This chapter aims to discuss the philosophical assumptions underpinning this research. It also introduces the research strategy and justifies the methods selected to meet the purpose of this study. Both the methodology and its associated methods were chosen with the aim of having a 'valid' research approach combined with the resources available for this study. This chapter also provides justifications for the rationales behind the decisions with regard to research methods and strategy. The importance of this chapter lies in defining the scope and limitations of the research design and exploring the various alternatives from which the researcher makes a choice.

The philosophical assumptions for conducting this study were drawn from the interpretive research philosophy, which assumes that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artefacts (Kaplan & Maxwell, 1994). The qualitative research method (i.e. research strategy) adopted for this study constitutes a single in-depth interpretive case study. Fieldwork was carried out on site during the period of 2011-2012 with frequent correspondence with informants on the site. The qualitative data sources used are those traditionally associated with interpretive research in IS: observations, semi-structured interviews and document analysis (Myers, 1997).

The remainder of the thesis is organised as follows: sections 4.1 and 4.2 discuss the philosophical assumptions and research methodology respectively. Section 4.3 focuses on the research design and its various aspects. Section 4.4 focuses on the research strategy with a discussion of the author's understanding of an in-depth single case study and an explanation of the rationale behind the selection of the user IT adaptation to work system computerisation (WSC). The ethical consideration of this study is explained in section 4.5. Section 4.6 describes the qualitative methods of data collection and finally, section 4.7 explains the method of data analysis.



#### **4.1. Philosophical Perspective: Interpretive**

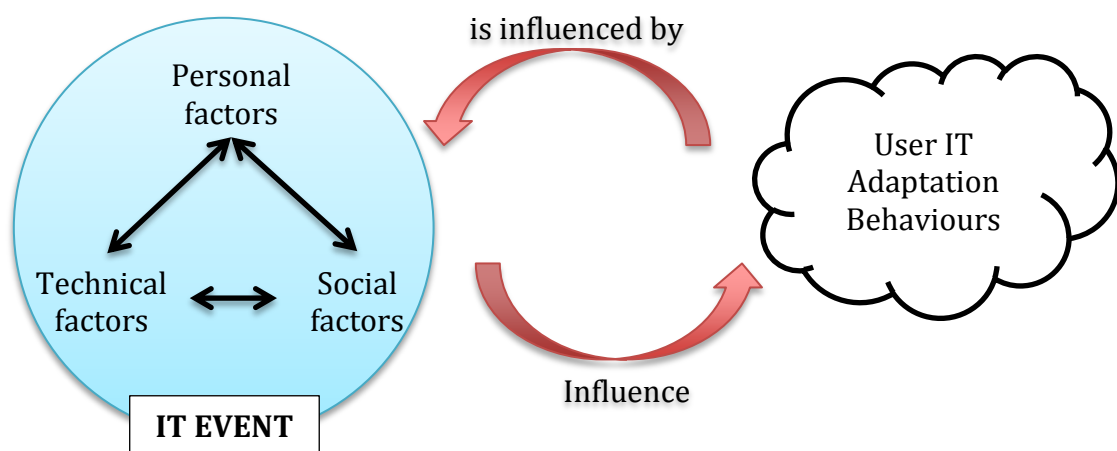
The diversity of research paradigms posed complex challenges for the selection of the appropriate approach for this study. All research, be it quantitative, qualitative or mixed-method, is based on some underlying assumptions about what constitutes 'valid' research and what research methods are the most suitable. In this study, an interpretive research paradigm was taken, with the assumption that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents and other artefacts (Klein & Myers, 1999, 2001). In general terms, interpretive research does not predefine dependent and independent variables, but focuses on the complexity of human sense making as the situation emerges (Kaplan & Maxwell, 1994, 2005). It attempts to understand phenomena through the meanings that people assign to them. The interpretive approach is described as an attempt aiming to understand how and why individuals interact with, relate to and participate in their social environment (Orlikowski & Baroudi, 1991).

In IS, interpretive methods of research are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 1993, p.4-5). Klein and Myers (1999) similarly argue that "interpretive research can help IS researchers to understand human thoughts and actions in social and organisational contexts; it has the potential to produce deep insights into information systems phenomena including the management of information systems and information systems development" (p.67). Orlikowski and Baroudi (1991), alike, describe the strengths of an interpretive research in that it provides an opportunity to give voice to the participants (who are IS users) by presenting their experiences in their own words from their own perspectives. This demands a 'going beyond the surface' approach and looking far enough for the true determinants of a phenomenon. Interpretive studies are therefore advantageous in providing a deep understanding of a phenomenon (Klein & Myers, 1999; Avison & Heje, 2005).

As mentioned earlier the underlying assumption of the author was that social process is not captured in hypothetical deductions or covariance. Instead, the author believed that social reality can only be interpreted and understanding social processes involves getting inside

the world of those generating it. Nevertheless, the decision to use the interpretive approach for my research has also been influenced deeply by rational considerations about the nature of the problem to be investigated and the answers being sought. In this thesis, an IT event is conceptualised as a personal, social and technical linkage -that dynamically influences and is influenced by users' adaptation acts; with an emphasis on the work system computerisation aiming to enhance users' efficiency and effectiveness with regard to their work routines (Figure 4.1). Accepting such an assumption leads the author to believe that interpretivism will be the most suitable research approach to study and comprehend the inter-linkage among the users' thoughts (i.e. subjective meanings), actions (i.e. coping efforts), social processes and various technical elements and their relationship with individuals' IT use outcomes such as performance. This is because interpretive research attempts to understand the subjective meanings embedded in social life and hence to explain why people act the way they do (Gibbons, 1987).

**Figure 4.1 – Three dimensions of the IT event in this thesis**



Likewise, another reason for taking the interpretive stance in this thesis is the conception of IT and coping, which was described, in previous chapters. This study accepts the premise that coping is relational (Lazarus & Folkman, 1984; Folkman et al., 1986; Beaudry & Pinsonneault, 2005) and can only be conceded in its outcomes. The concept of coping can be studied from different angles; nevertheless, as discussed in the literature review section, one's coping efforts are contextual and their outcomes beside the technical aspects depend on personal and social conditions (i.e. environment). Taking an interpretive perspective, hence, helps this study to increase understating of the phenomenon of user reactions to IT

events within cultural and contextual situations; where the phenomenon of interest (i.e. IT-related user adaptive behaviours) was examined in its natural setting (i.e. a medical centre) and from the perspective of the participants (Orlikowski & Baroudi, 1991; Chen & Hirschheim, 2004; Myers, 1997). Furthermore, taking an interpretive approach allows the author to more deeply (1) investigate the users' psychological constructs behind their adaptive efforts to a new IT event, (2) study the inter-linkages between users' coping strategies and the development of such adaptive efforts and their individual-level IT-related outcomes (e.g. performance), and (3) explore the patterns of user adaptation from perception to IT use outcomes.

These aspects can be examined more thoroughly by following an interpretive position rather than by adopting other research traditions. This is because the underlying premise of the interpretive researcher is that "individuals act toward things on the basis of the meanings that things have for them, that meanings arise out of social interaction, and the meanings are developed and modified through an interpretive process" (Boland, 1979: p.260). Orlikowski and Baroudi (1991) argue that in this attempt to understand the meaning, positivist approaches are not useful and claim the major limitation of the positivist approach as the disregarding of historical and contextual conditions that surround an IS phenomenon. "The design and use of information technology in organisations in particular, is intrinsically embedded in social-contexts marked by time, locale, politics and culture and neglecting these influences may reveal an incomplete picture of information systems phenomena" (Orlikowski & Baroudi, 1991: p.12). This weakness is also indicated by Rowan's (1973) statement that research can only discover one-sided things if it insists on setting-up one-sided relationships...you only get answers to those questions you are asking. In contrast, interpretive techniques allow participants to use their own words and images and to draw on their own concepts and experiences.

In this study, the author studies users' IT adaptive responses to a new IT event in a medical centre in Iran, through formally and informally collected sources of data. The exploration process included being present in the context, direct observation, attending meetings, listening to and analysing what various actors had to say about their experiences of working with the new automated work system, reading related documents about the IT event as a

whole, and relating these empirical experiences with the concept of user IT adaptation and use. The following section discusses the methodological perspective applied in this study.

#### **4.2. Research Methodology: Qualitative**

This study was conducted using a qualitative research methodology with the aim of understanding the phenomenon within its context in order to develop rich interpretive insights (Myers & Avison, 2002). In social research, methodologies may be broadly classified as mainly quantitative or qualitative. According to Chen and Hirschheim (2004), quantitative research simply objectively reports reality, whereas qualitative research emphasises the description and understanding of the situation behind the factors. Qualitative research methodology as a subjective approach attempts to discover, describe, understand holistically and explain the meaning underpinning the perceptions, attitudes, feelings, opinions, insights, activities and practices of individuals (Patton, 1990; Marshall & Rossman, 1995). It aims to empirically investigate a variety of phenomena concerning IS through qualitative data from a variety of sources, such as interviews, observations, interventions and archival materials (Conboy et al., 2012), while quantitative data are usually generated by experiments and surveys (Klein & Myers, 1999, 2001; Myers, 1997).

Additionally, Trauth (2001) identifies some of the factors influencing the choice of qualitative methods for IS research: (1) the degree of uncertainty surrounding the phenomenon; (2) the researcher's theoretical lens; (3) the nature of the research problem, which Trauth argues should have the most significant influence on the choice of a research methodology; (4) academic politics; and (5) the researcher's skills. Of these factors, the first three are of immediate importance that represent *what* one wants to learn determines *how* one should go about learning it (Trauth, 2001).

Accordingly, the motivation for the choice of qualitative research methods in this study was the fact that user adaptation to IT events in workplaces is interdisciplinary, complex and contextual and thus requires the exploration of the context rather than the use of predetermined methods. The fact that projects of this type (i.e. work system computerisation projects) are new in Iran creates a certain degree of uncertainty about which aspects of IT events to focus on in the research. For a scenario of this nature,

qualitative research methods are thought to be more suitable and, as such, they were adopted due to the value-laden nature of their mode of enquiry.

Furthermore, the qualitative methodology was chosen over the quantitative methodology due to the processual nature of the investigation and the theoretical lens, to show how events and patterns unfold over time and to provide an account of the context within which IS users' behaviours takes place (Bryman, 2008). Myers (1997) stresses that a motivation for doing qualitative research as opposed to quantitative research could be the fact that if there is one thing, which distinguishes humans from the natural world, it is our ability to talk. Silverman (2010) in the same vein argues that qualitative methods can provide a '*deeper*' understanding of social phenomena, which would not be obtained from purely quantitative data. Kaplan and Maxwell (1994, 2005) and Trauth (2001), likewise, argue that the goal of understating a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified.

Finally, as to the nature of the research problem, since the aim was to investigate the complexity and dynamics of the process of IT-related user adaptation behaviours (i.e. how and why these adaptive strategies were evolved over time as well as their relationship with users' subsequent IT use outcomes through the employees' experiences and perceptions of the IT event) qualitative methods were believed to be more useful than quantitative ones. In this regard, Maxwell (1996) indicates that the strengths of qualitative research methods lay in their usefulness for understanding the meaning and context of the phenomena studied, and the particular events and processes that make up these phenomena over time, in real-life, natural settings. Kaplan and Maxwell (2005) similarly argue that when assessing computer information systems, these contextual issues include social, cultural, organisational, and political concerns surrounding an information technology; the processes of IS development, installation, and use (or lack of use); and how all these are conceptualised and perceived by the participants in the setting where the study is being conducted. The adoption of qualitative research methods in this study also matches Kaplan and Maxwell's (2005) guideline and/or reasons for using qualitative methods in the IS domain as follows (p.32):

1- Understanding how IS users perceive and evaluate the system and, what meanings the system has for them

Users' perspectives are not generally known in advance. Qualitative methods are helpful to understand not only what happened during the users' IT adaptation processes, or what people were responding to, but why they acted the way they did. By allowing researchers to study users' perspectives in depth, qualitative methods can contribute to the explanation of users' behaviours with respect to the system, and therefore to the system's success and failure and even of what is considered a 'success' or 'failure'. Qualitative methods help to understand how system users think or feel about a new IT event in their organisation and why they think that way, what their perspectives and situations are and how those influence what is happening.

2- Understanding the influence of social and organisational context on system use

Computer information systems do not exist in a vacuum; their implementation, use, and success or failure occur in a social and organisational context that shapes what happens when that system is introduced and being used. Qualitative methods are thus useful for discovering and understanding these influences.

3- Investigating causal processes

Although quantitative methods can reveal that causal relationships exist, they are less useful in showing how causal processes work. Qualitative methods often allow the researcher to get inside the black box of experimental and survey designs and to discover the actual processes involved in producing the results of such studies. Qualitative research is particularly useful for developing explanations of the actual events and processes that led to specific outcomes

4- Increasing the utilisation of evaluation results

Administrators, policy makers, systems designers, and practitioners often find purely quantitative studies of little use since these studies do not seem related to their own understanding of the situation and the problems they are encountering. Qualitative methods, in contrast, by providing evaluation findings that connect more directly with these individuals' perspectives, can increase the credibility and usefulness of evaluations for such decision makers.

This study does not aim to present objective truths, but rather seeks to understand from the different users how they perceived the IT event, how they coped with it, how and why they adjusted their coping strategies over time to achieve better performance (if any) and how their different adaptation strategies affected their IT use outcomes. In other words, the intention here is not to objectively refer to respondents' comments as positive/negative or to specify 'only true appraisals or emotions or coping strategies' in the adaptation process. Rather, the intention is to gain a better understanding and be able to explain how individuals went through the coping process. In summary, while the advantages of qualitative research methods have been described as seeing through the eyes of the people being studied, emphasis on context, emphasis on process, and flexibility and limited structure, they have also been criticised for being too subjective, difficult to replicate and problems of generalisation (Bryman, 2008, 2012). Table 4.1 demonstrates some main differences between quantitative and qualitative research.

**Table 4.1 - Common contrasts between qualitative and quantitative research, adapted from Bryman (2012)**

Quantitative	Qualitative
Numbers	Words
Point of view of researcher	Point of view of participants
Researcher distant	Researcher close
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalisation	Contextual understanding
Hard, reliable data	Rich, deep data
Macro	Micro
Behaviour	Meaning
Artificial settings	Natural settings

As Bryman (2008, 2012) puts it, quantitative researchers are often portrayed as preoccupied with applying measurement procedures to social life (*Number*) and the set of concerns that he or she brings to an investigation structures the investigation (*Point of view of the researcher*). Additionally, quantitative researchers are uninvolved with their subjects and may have no contact between them and their participants (*Researcher distant*). Quantitative researchers typically bring a set of concepts to test a model (*Theory testing*) and their research is frequently depicted as presenting a static image of social reality with its emphasis on relationships between variables (*Static*). Furthermore, quantitative research is typically highly structured so that the researcher is able to examine the precise concepts that are the focus of the study (*Structured*). Quantitative researchers want to generalise their findings to the relevant population (*Generalisation*) as their data are depicted as 'hard' in the sense of being robust and unambiguous owing to the precision offered by measurement (*Hard data*). Finally, quantitative researchers are often depicted as involved in uncovering large-scale social trends and the connection between variables (*Macro*), concerned with people's behaviour (*Behaviour*) and conduct research in a contrived context (*Artificial settings*).

Qualitative researchers, in contrast, are seen as using words in the presentation of analyses of society (*Words*) and the perspectives of those being studied provides the point of orientation (*Point of view of the participants*). Furthermore, the qualitative researcher seeks close involvement with the people being investigated in order to genuinely understand the world through their eyes (*Researcher close*). In qualitative research concepts and theoretical explanation emerge out of data collection (*Theory emergent*) and this type of research often depicted as attuned to the unfolding of events over time (*Process*). Moreover, in qualitative research, the approach is invariably unstructured, meaning, the possibility of getting at actor's meanings and of concepts emerging out of data collection is enhanced (*Unstructured*) since the researcher seeks an understanding of behaviour, values, beliefs in terms of the context in which the research is conducted (*Contextual understanding*). Additionally, qualitative researchers claim that their contextual approach and their often lengthy involvement in a setting engender rich data (*Rich data*). Finally, qualitative researchers are seen as being concerned with small-scale aspects of social reality (*Micro*) since they are concerned with the meaning of action (*Meaning*) and



investigate people in natural environments (*Natural settings*) (Bryman, 2008, 2012). In the next section, the research design is presented.

### **4.3. Research Design**

According to Flick (2009), the core of a good qualitative research design is the application of a set of principles that are rigorous and open-ended at the same time while doing justice to the complexity of the social setting under inquiry. In this research the author wished to provide insight into the complex nature of user adaptation behaviours to an IT event in a work setting. Thus, emphasis was placed on both stability and change and to understand how actors' perceptions and sense making processes influenced their subsequent adaptation behaviours and resulted in particular outcomes. I wished to investigate both the intended and unintended consequences of the actions taken by users and the ways in which their reflections on these consequences changed or maintained their perceptions and thus influenced their future actions.

The author designed the research in two phases similar to longitudinal studies in that he collected data over a total period of about three months (first phase: 58 days and second phase: 29 days) after the IT implementation when the system was being used. During both phases of the research the author was staying at the research site full-time. This allowed the author to observe how people were working with the system and the extent to which they were using it. Using different modes of inquiry increased the validity of the study and enabled the author to gain access to the complex and shifting nature of actions and interpretations. The theoretical basis of this study was based on CMUA in order to guide the research and data collection. Together with the other theory (Roth & Cohen, 1986: approach vs. avoidance) they were used to provide a more detailed and nuanced analysis of user IT adaptation behaviours in the case study.

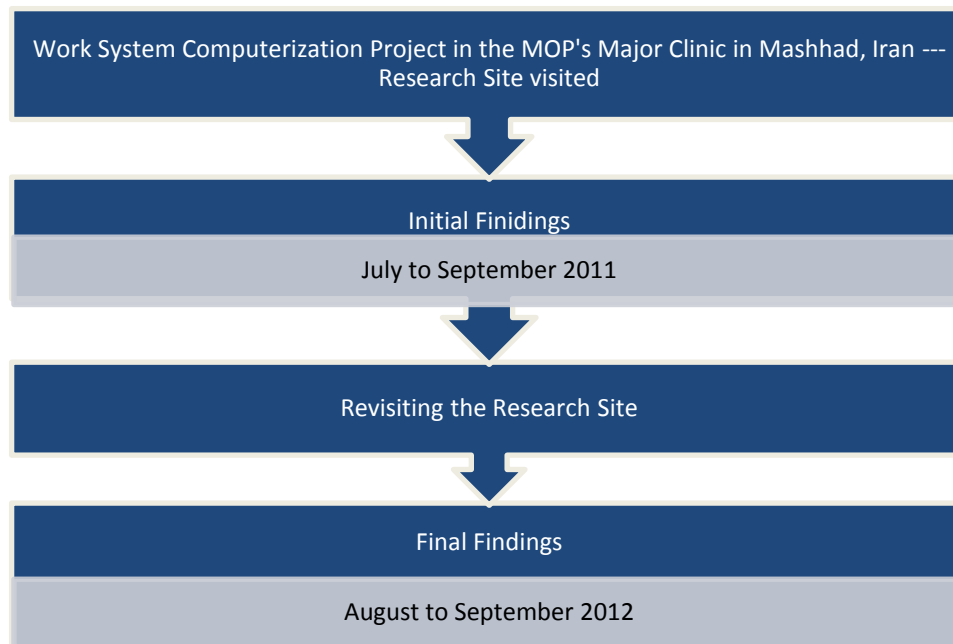
It is worth briefly noting that although this study was conducted in a medical centre, the purpose of the study was not to merely consider a specific clinical-related IT system in the medical centre such as the 'patient record system'. Instead, the aim was to investigate how various adaptation behaviours were employed by IS users to cope with the new IT systems in general (regardless of whether it was a patient record system in the doctors' division or a system in the laboratory or an organisational/administrative IS in the finance department),

and how their coping mechanisms were evolved over time and influenced system usage in their work. Information Systems users in the research site were non-technical employees in different divisions who had to use the system for daily routines (mandatory system usage) with no or very little computer knowledge (IT skills) required to work with the new technology. In the following sections various aspects of the research design will be discussed including the phases of the study, the time perspective of the study, the role of theory, the type of the research question used in this research, the type of theory and finally the role of researcher in this thesis.

#### ***4.3.1. Two Phases of the Research***

The research was carried out in two phases: July to September 2011, and August to September 2012 (Figure 4.2). During the first phase of the research several participants were involved, including: The heads of six clinical divisions (i.e. Reception, Laboratory, Pharmacy, Public Health Centre (PHC), Medical Documents and Insurance (MDI), Finance & Accounting), secretariat, head and deputy of IT department, several employees (IS users) in different divisions and two IT contractors. The interviewed employees were providing their views and insights on various aspects of the IT event such as their experiences of using the new or upgraded system, how they coped with the IT-induced changes initially and over time, and the effects of such coping strategies on their system usage and effectiveness, to name a few.

In the second phase, a follow-up research was conducted in the same work setting based on the findings of the initial phase of the study. At this stage all the initial study participants were interviewed again in order to monitor the possible alterations in their thoughts, adaptation strategies and mobilisation towards IT-changes over time. Such a research design (i.e. single case study with multiple snapshots) was beneficial in enabling a follow-up of the WSC project at different points in time, allowing the researcher to monitor and understand how users' adaptation behaviours evolved over time.

**Figure 4.2 - The two phases of the study**

#### **4.3.2. Time Perspective**

The time perspective has an influence on the nature of the case study approach. Case studies might provide either a single snapshot or a longitudinal perspective to a phenomenon. Case studies might entails collection of data at a single point in time because of a limited time period of study (Bryman, 2012). Single snapshot case studies however have limitations (Walsham, 1995). Firstly, taking this approach neglects to undertake the historical investigation of the working practices/traditions in that organisation. Secondly, a single snapshot may occur when the researcher is not interested to take account of all the interest groups involved in the investigated issue. Thus, a study that simply takes the viewpoints of the management team on how, for instance, technology has changed working practices in an organisation is a snapshot case.

In contrast, case studies that adopt a multi-snapshot or longitudinal approach are concerned about historical and contemporary events as well as traditions and processes that surround that organisational phenomenon under investigation (Saldana, 2003). As Pettigrew (1990) puts it, without longitudinal data it is impossible to identify the processual dynamics of changing, and the relationship between forces of continuity and change. Furthermore, these studies tend to comprise the viewpoint of all relevant groups involved

in that issue. The longitudinal approach emphasises the capability of a case study approach to fully analyse a phenomenon. In the information systems field, a longitudinal study could contribute to ‘fully incorporate the reality of time-dependent change’ and thus provide insights into many of the perplexing issues surrounding information systems research (Vitalari, 1985).

This study was designed to provide more than a snapshot of the phenomenon of interest and instead give a richer picture including the interaction between users’ complex psychological constructs and how such interaction influence the evolution of user IT adaptive behaviours over time. The author attempted to design the research more like a longitudinal study which allows the present to be explored in relation to the past and the emerging future (Pettigrew, 1990: p.272). Remaining in the site for a longer period of time and collecting qualitative data via different modes of inquiry from a wide range of participants combined with gaining knowledge of contextual background and historical trends<sup>15</sup> allowed the researcher to better understand and explain the phenomenon of users’ technology adaptation and their consequent IT outcomes. The use of a multi-snapshot case study approach was useful for deeper understanding of complex human sense making and adaptation that are dynamic and evolving. The user-centred approach used within this multi-snapshot case study allowed for a deeper understanding of the user IT adaptive processes from the users’ perspectives and allowed for the emergence of relationships within each phase and between each phase of the study. It was believed that for a qualitative study of an interpretive paradigm a longitudinal approach would be very helpful to investigate the possible changes in user adaptation over time and to fully analyse the phenomenon which are complex and dynamic.

#### **4.3.3. Role of Theory**

The interpretive tradition maintains that there are no right or wrong theories; rather, the theories should be assessed according to how “*interesting*” they are (Walsham, 1993). Hence, Silva (1997) notes that researchers following the interpretive paradigm can only claim that the theories presented are interesting to them and expect them to be interesting

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<sup>15</sup> Contextual background and historical trends in here refer to the orientation of the medical centre with respect to IT implementation and use over different managerial periods.

to those involved in the same research domain. The outcome is not theory generation but rather an inter-subjective process in which a theory is being built upon by members of the research domain (Silva, 1997).

However, one of the concerns regarding the use of case study approach is the lack of control the researcher may face over the huge amount of information that can influence the findings (Bryman, 2012). Due to time and resource constraints researchers are recommended to set out indications or frameworks that would restrict the scope of study (Daft, 1983). Such a framework would aim to direct the focus of the investigators' attention to those concepts or factors that are of his/her interest. This approach is also likely to result in a more explicit specification of the data needed to be collected since it prescribes a specific way of looking at organisational phenomena.

With regard to the application of theory in interpretive research, Walsham (1995) identifies the different roles of a theory: (1) a guide to design and collect data; (2) as part of an iterative process between data analysis and collection; (3) as the final product of research. As to this study, the theory (i.e. CMUA) was used as an initial guide to design and data collection. Such a framework would take into account previous knowledge as well as create a reasonable theoretical basis to inform the approach of the early empirical work (Walsham, 1995). However, as Walsham (1995) indicates, using theory in this way had the potential of the researcher only seeing what the theory suggests and hence using the theory in a rigid way that prevents potential new issues and avenues of exploration. In order to avoid this pitfall, the author attempted to remain flexible in his thinking and to preserve a substantial degree of openness to the field data and a willingness to modify (or reassess) the initial theoretical framework. Consideration of a new typology of behaviours (i.e. *avoidance vs. approach*) to better explain the collected data or improvement of the initial CMUA model based on the findings of the field data were the result of this flexibility and openness to the field data. In this study, the author provides a table (see Table 4.2) to highlight the main concepts of the CMUA framework and the guiding questions that informed the data collection process.

**Table 4.2 - Linkage between the main areas of the CMUA and questions guiding data collections**

Main concepts of the CMUA	Sample research questions guiding data collection
<p><b>Appraisal and re-appraisal</b></p>	<p>-How did you originally appraise the consequences of the technology (i.e. the new work system)? What was your reaction when you saw the computer on your desk for the very first time, how did you feel? What made you think that way? What were the rationales behind the implementation of the WSC in your opinion?</p> <p>-What control did you feel you had over the technology, their work, and themselves (secondary appraisal)? Why did you feel that way?</p> <p>-How did you perceive your system at this time (i.e. after about one year of implementation and being used)?</p>
<p><b>Adaptation strategies</b></p>	<p>-After that initial perception you had, how did you cope with the new ways of doing things? Why this approach?</p> <p>-What strategies or tactic did you initially use to improve the situations? How did you come to the decision that you needed to act differently? How did you change your efforts? Tell me more about the part you mentioned earlier that you decided to work more on yourself. What do you mean by that?</p> <p>-When did you decide to change your adaptation efforts? What caused you to pursue new coping approaches?</p>
<p><b>IT use outcomes</b></p>	<p>-What impacts do you think the new system had on you personally and on your performance at work?</p> <p>-You mentioned that your thoughts and acts influenced your IT outcomes... how do you think the initial thought and coping strategies enhances or hindered your IT use outcome? How did you change your strategies to achieve different outcomes?</p> <p>-You mentioned that once you became stabilised emotionally you engaged more into practical efforts? Tell me more about it.</p>
<p><b>Personal/ Environmental Factors</b></p> <p><b>(Exist in the coping theory, but referred to implicitly in the CMUA)</b></p>	<p>-What factors (personal, social, technical) enable or restrict your capabilities to adapt effectively? How they influence one another?</p> <p>-How the IT context (e.g. how the system was developed and implemented, training, support, and functionalities of the system) affected you?</p> <p>-How the organisational context (e.g. structure, culture, users’ jobs, autonomy, and remuneration) affected the WSC project?</p>

#### **4.3.4. Type of Theory**

While the above section described the role of theory in the thesis, this section is concerned with the type of theory used with respect to the central goal of the research, which was explaining the imperfectly understood dynamics of the phenomenon of user IT adaptation to IT events. Considering Gregor's (2006) taxonomy of types of information systems theories, the application of CMUA in this research can be categorised as type two: theory for explaining.

Although Beaudry and Pinsonneault (2005), as mentioned in the literature review chapter, initially developed CMUA to integrate both variance- and process- oriented streams of research in IS, this study, by adopting the high-level view of the CMUA and highlighting the processual aspect of the model, used CMUA solely for understanding purposes. Using CMUA together with the new typology of behaviours helped to explain how, why and when events happened as they did, with the aim of bringing about an altered understanding of how things were or why they were as they were (Gregor, 2006).

#### **4.3.5. Type of Research Question**

Following the type of theory, the research question should also have some practical or theoretical significance, adding to our existing knowledge or contributing meaningfully to the field. For so doing, the research questions should, on the one hand, be specific enough for guidance purposes, but on the other hand, be broad enough so as to allow the investigator to rephrase them if he/she thinks that this would be necessary. Consequently, in this study, the research questions were designed to narrow down the topic while at the same time they were flexible enough to be adjusted to the scale of investigation and to be answered reasonably well in the framework of my research.

#### **4.3.6. Role of Researcher**

As to the role of the researcher, Walsham (1995) explains "interpretive researchers are attempting the difficult task of accessing other people's interpretations, filtering them through their own conceptual apparatus, and feeding a version of events back to others, including in some cases both their interviewees and other audiences" (p.77). In carrying out this work, Walsham stresses that it is important that interpretive researchers have a view of their role in this complex human process. As to this research, the author took the stand of

'outside researcher' (Walsham, 2006). Taking this stand had the merit that employees did not view or perceive the researcher as being aligned with a particular individual or group within the workplace, or being concerned with making money or having strong prior views of specific users, systems or processes (Walsham, 2006). The author, thus, was seen as a normal researcher not having a direct personal stake in interpretations and outcomes. These allowed individuals to feel safe and comfortable to talk, which enabled them to more frankly share their experiences and express their views. A summary of the research methodology section can be seen in Table 4.3.

**Table 4.3 - Summary of research methodology**

Level of decision	Choice
Epistemological Assumption	Interpretive
Research strategy	Single in-depth interpretive case study
Research Methods	Interviews, Observation and Document analysis
Unit of Analysis	Individuals
Timeline	July to September 2011, August to September 2012
Subject of the Study	The influences of user IT adaptation behaviours on system usage
Theoretical Framework	CMUA
Role of theory	As a guide to design and data collection
Type of theory	Theory for explaining (understanding)

#### 4.4. Research Strategy

In this study, the main research strategy adopted is an interpretative in-depth case study of a work system computerisation (WSC) project. The following section discusses the case study as a research strategy in IS and then reflects on the limitations involved with the adoption of a case study as a research strategy. Subsequently, the conditions in which case studies are most appropriate as a research method are also discussed. Finally, the section concludes by discussing the motivations and circumstances that influenced the selection of the project that acted as the case study.



#### **4.4.1. Qualitative Research Method: Case Study**

Case study research is the most common qualitative method used in IS. There are several definitions, but Yin (2003) defines the scope of a case study as “*an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident*” (p.13). Case studies can follow either qualitative or quantitative approaches or a combination of both (Yin, 2003; Stake, 1994). Walsham (2006) highlights the significance of interpretive case studies in IS research. In interpretive case studies, the researcher becomes a “*passionate participant*” through a close interaction with actors (Guba & Lincoln, 1994: p.115). In this study, the author recognises that the research is strongly influenced by the underlying philosophical assumptions of the researcher and the nature of the topic under study. As mentioned earlier, this study follows the interpretive approach, thus an interpretive in depth case study strategy was selected as an appropriate method because it can relate a broader view to continuous processes and their relation to context (Walsham, 1993).

A single case study of the computerised work system project was conducted in order to investigate the complex relationship between user adaptations and individual-level IT use outcomes. A rationale exists for conducting a single case study if it characterises a critical case to investigate and analyse a phenomenon that has not previously been observed or was poorly or imperfectly understood beforehand (Yin, 2003). Since the work system computerisation project in the public sector represents an emerging IT intervention in Iran with no formal comprehensive evaluation process since its inception, it provides a good reason to conduct a single in-depth case study. The unit of analysis was employees who were Information Systems (IS) users<sup>16</sup>. According to Benbasat et al. (1987) the unit of analysis can be an individual, group or an entire organisation. Alternatively, the unit of analysis may be a specific project or decision. For this research, the work automation beneficiaries (i.e. IS users) were selected in order to understand the inter-linkages between an IT event, user adaptation behaviours and IT use outcomes.

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<sup>16</sup> The unit of analysis in this case study is individual’s adaptation strategy, that is, patterns in streams of users’ coping efforts. In order to discover these patterns, the author documented the different adaptation acts used by IS users in different divisions and group them into adaptation strategies.

As it is evident from the above paragraphs, this chapter refers to and cites Yin's various studies in different case study-related views and definitions. The reason is although Yin adopts an implicitly positivist stance in describing case studies, some of his views concerning case study research, such as: *case studies are the preferred research strategy to answer 'how?' and 'why?' questions* are also acceptable by the interpretive school (Walsham, 1995). While this research will cite researchers from the interpretive stance, it also considers some views from other authors that overlap with the interpretive paradigm.

The study also acknowledges the limitations and implications of the case study research strategy. Galliers (1991) sets out three prejudices against case studies in information systems research. Firstly, because social reality is interpreted by the researcher, research supported by case studies might be biased. The second criticism of the case study is the difficulty in clearly defining variables, making it almost impossible to control them. Finally, Galliers argues that case studies are very difficult, if not impossible, to generalise using statistical techniques. Walsham (1993) responds to this criticism, arguing that the validity of the case study does not depend on statistical generalisation "*but on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them*" (p.15). Walsham (1995) further identifies four more types of generalisations by asserting that case studies are also helpful in developing concepts, generating theory, drawing specific implications and contributing rich insights. By improving the initial model based on the findings of this study and proposing an alternative framework, the author attempts to provide richer insights (Walsham, 1995; Orlikowski, 1991) into the phenomenon of users' IT adaptation behaviours and its relationship with users' subsequent IT use outcomes and thus, generalises from empirical statements (as inputs to generalising) to theoretical statements (as outputs of generalising) (Lee & Baskerville, 2003), analytic generalisation<sup>17</sup> (Yin, 2003, 2010; Dibbern et al., 2008) or as Walsham (1995) puts it 'contribution of rich insight'. The next section provides a discussion on conducting an interpretive case study.

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<sup>17</sup> Analytic generalisation (Yin 2003) means that a previously developed theory is used as a template that will be compared against the empirical results of the case study. Analytic generalisation is not generalisation to some defined population that has been sampled, but to a theory of the phenomenon being studied, a theory that may have much wider applicability than the particular case studied (Maxwell, 2007).

#### 4.4.2. Conducting an Interpretive Case Study

As discussed in the previous section, case study research is accepted as a valid research strategy within the IS community. While a number of researchers (See Benbasat et al., 1987) have formulated a set of methodological principles for case studies of a positivist nature, Klein and Myers (1999) have drawn upon the philosophy of hermeneutics to provide a set of principles for interpretive field research. They noted that, although the definition of a predetermined set of criteria might infringe the emergent nature of interpretive research, the deployment of some basic standards for conducting and evaluating interpretive research is significant and useful. Table 4.4 below presents a summary of the seven principles defined by Klein and Myers and how they have been applied in this research. The application of the principles described above has been made obvious through the presentation of this research.

**Table 4.4 - Summary of principles for interpretive field research by Klein and Myers (1999) and the application of these principles in this research**

Summary of principles for interpretive research	Application of the principles in this study
<p><b>1- The fundamental principle of the hermeneutic circle</b></p> <p>This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all other principles</p>	<p>The use of this case study research in a longitudinal manner made the application of the hermeneutic circle possible. By examining user IT adaptive behaviours in terms of their parts in different sequential points in time (i.e. appraisal, coping efforts and reappraisal), then integrating this analysis into the whole (IT adaptation processes), a more complete understanding of user coping with IT-induced changes resulted.</p>
<p><b>2- The principle of contextualisation</b></p> <p>The contextualisation principle requires that the subject matter be set in its social and historical context so that the intended audience can see how the current situation under investigation emerged</p>	<p>This study provides a detailed description of the research setting, as well as participants of the study, thus enabling the reader to grasp the full picture. It provides a critical reflection on the way the organisational dynamics and power relations influence the subjective sense making of individuals.</p>
<p><b>3- The principle of interaction between the researchers and the subjects</b></p> <p>Requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and the participants</p>	<p>The role of the author in this study is clearly described as an outside researcher. This stance is not only considered an impediment, but an advantage that led to rich insights into the research context. The author was seen as a normal researcher not having a direct personal stake in interpretations and outcomes. These allowed the participants to feel safe and comfortable to talk, which enabled them to more frankly share their experiences and express their views.</p>
<p><b>4- The principle of abstraction and</b></p>	<p>This research can claim to offer generalisation to</p>

<p><b>generalisation</b></p> <p>Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action</p>	<p>theory (Lee &amp; Baskerville, 2003), as it has modified the initial guiding theoretical framework based on the findings from the field data, which can be fruitful for both academic and practitioners and guide future studies in the same or similar areas.</p>
<p><b>5- The principle of dialogical reasoning</b></p> <p>Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision.</p>	<p>The use of this principle in this research is evident in the presentation of the theoretical framework, where the limitations of the initial theoretical framework (CMUA) based on the finding from the field data (through the thematic analysis) was corroborated with another framework from Roth &amp; Cohen (1986).</p>
<p><b>6- The principle of multiple interpretations</b></p> <p>Requires sensitivity to possible differences in interpretations among the participants as they are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it</p>	<p>This study by presenting, discussing and analysing the viewpoints of the various IS users within the medical centre under study revealed its sensitivity to possible differences in interpretations among the participants. The study, for example, shows how the decisions made by the clinic’s management with respect to the employees’ computer training classes were characterised by conflicting interpretations among the IS users about what happened, who was to blame and how successful the decisions were.</p>
<p><b>7- The principle of suspicion</b></p> <p>Requires sensitivity to possible “biases” and systematic “distortions” in the narratives collected from the participants</p>	<p>Being aware that individuals in different situations and positions may bring different biases to the interview, the principle of suspicion was seriously taken into account by this research. For example, the author treated with caution some overly positive or negative views of interviewees in order not to see the situation one-sided.</p> <p>The author therefore sought to validate issues raised by such interviewees with the collection of multiple perspectives via different modes of enquiry. This solution helped to ease the effect of this phenomenon on the research results.</p>

In the next section details concerning the rationale behind the selection of the case study and details about the case study under investigation are given.

#### **4.4.3. Case Study Selection**

The selection of the field site for this interpretive case study research was based on theoretical as well as practical considerations. At the theoretical level, Benbasat et al. (1987) stress that the choice of case study should be based on the nature of the topic under investigation and the questions to be answered. This study as previously mentioned was exploratory in nature and was carried out to investigate the dynamic processes through

which individuals adapt to new IT systems in a work setting. The goal was twofold. First, to provide a deeper insight into how one's coping mechanisms are shaped initially and how and why they are readjusted over time. Second, to give a greater awareness of how different types of user adaptation contribute to or diminish the IS adoption and use at the individual level. In doing so, users' subjective meanings and interpretations of the IT event had to be investigated in their natural setting (Myers, 1997) and the work system computerisation project in a medical centre in Iran had the required characteristics to fulfil the aim of this research. These characteristics are represented in the following ways.

First, this clinic had undergone a major IT-related organisational transformation to computerise and/or upgrade the existing inefficient work systems in its different divisions. However, the clinic's inability to improve the work systems (considering the available resources in terms of technical and financial supports) had led to low quality services to patients in different divisions and remained a mystery for both patients and employees. This project was, in essence, part of a huge project known as the country's largest office automation system in terms of scale, investment and impact on those who had to use it for daily routines (staff) and on those who were not in contact directly but could be affected by the new system (e.g. clients, patients)<sup>18</sup>. Second, it was implemented under the government umbrella; hence, prone to bureaucratic inefficiency in the hierarchy system existed in the country's public sector. Third, in this medical centre, while some divisions were benefiting from fully customisable and state-of-the-art computers and software packages, other units were struggling with rigid, faulty and non-customisable IT systems, and the system usage was mandatory in all divisions. This aspect was important in order to study how appraisal of the perceived consequences of the new technology might have influenced how users adapted to it. Fourth, this project was representing an emerging trend among public organisations in Iran with the aim of improving the efficiency and effectiveness of employees and facilitating the inter- and intra-organisational flow of information. Lastly, user IT adaptation efforts in this medical centre could be explored in detail using the individual-level theoretical lens with regard to employees with no or very

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<sup>18</sup> The implementation of the country's largest office automation system in oil industry, accessed 12/10/2013, <http://www.shana.ir/fa/newsagency/138906>

little computer knowledge (IT skills) required to work with the new technology which accounted for the majority of employees in the public sector.

At the practical level, the matter of access dictated the selection of the case. Usually, gaining access to an organisation to conduct research is difficult, especially if the nature of the research is concerned with topics that may question the quality of decisions made by the top management. In this regard, Buchanan et al. (1988) suggest an opportunistic approach to gaining and maintaining access to organisations during fieldwork: *“This opportunist approach is supported by wider trends. Research access has become more difficult to obtain for at least two reasons. First, further education has widely recognised the value of project work across a range of courses and many organisations have been deluged with requests for research access. We have been denied access in some cases because someone else got there first. Second, as the economic climate has become harsher, in the private and public sectors, managers increasingly feel that they and their staff have little time to devote to non-productive academic research activities. These trends encourage the organisational researcher to become more innovative, devious and opportunistic in the search for sites and data”* (p.55)

While the above view does not ignore the relevance of philosophical and theoretical aspects of the research, what Buchanan et al., (1988) are indicating is the difficulty in gaining access to data. Crompton and Jones (1988), similarly, acknowledge the difficulties researchers encounter when negotiating access to organisations for fieldwork. For example, managers may often be suspicious about the nature and purpose of the study and whether the research may affect them personally or professionally. In this study, the author had a family relation who was a General Practitioner (GP) in the medical centre. He introduced and referred the author to the medical centre’s management to discuss the research topic and planning of the research if he had been able to continue. The medical centre’s management became interested in the proposed research topic since the work system computerisation project had never been evaluated formally or even informally since its implementation in that medical centre. Thus, the author was offered access to information and staff of the medical centre without any hindrance. The following section provides a brief overview of the case study site selected.

#### **4.4.4. Overview of Work System Computerisation (WSC)**

Although the very first attempt to computerise the work system in the medical centre dates back to around 1996, the enforced wave of Work System Computerisation (WSC) was re-initiated in 2010 (after several unsuccessful attempts within different managerial periods over the years). Ministry of Petroleum's (MoP) medical centres (also called *HealthCare Service Providers'* or HCSP in short) are in direct contact with and operate under strict observation of PIHO (Petroleum Industry Health Organisation) which is a subdivision of MoP that is responsible for all health-related matters and issues concerning this ministry and its employees. HCSPs are adjusted based on PIHO's rules and regulations that echo MoP's instructions and guidelines particularly for its health-related sections and employees. In 2010, PIHO forced main medical centres in major cities to seriously consider work system automation in order to address the poor and inconsistent responses to requests and communication breakdowns between PIHO and regional HCSPs. According to the interviewees, huge efforts and investments were made into first computerising divisions with traditional paper work systems or upgrading those with out-dated systems, and second, to connect them to one another or to the MoP's centralised work system to improve the flow of organisational communication and to increase employees' efficiency and effectiveness to provide better services.

The stated poor cooperation between PIHO and HCSPs could be described as 'conflicts' stemming from the difficulty in handling documents and receiving precise information from one another, being disorganised in searching their archives for necessary information (e.g. files, invoices or reports with regard to an employee's past medical records) and difficulty of dealing in a timely manner with requests of various HCSPs. These impediments had consequently prevented both HCSPs and PIHO to progress and suitably manage volumes of papers in order to achieve MoP's intentions: to provide quick and high quality services to patients (MoP's employees). According to the key interviewees, reviewed documents and the ministry's website<sup>19</sup>, the WSC was intended to serve two purposes. First, to initiate a revolution in the administrative system and services by creating a sustainable internal work

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<sup>19</sup> Work system computerisation in National Iranian Oil Company, accessed 15/08/2013, <http://hrm.nioc.ir/Bahrevari/Pages/auto.aspx>

system with specific objectives of: (a) improving employees' efficiency and effectiveness by providing them with better and faster access to the required information in every department; (b) replacing the paper-based archival records with an electronic version; (c) replacing the traditional exchange of letters with an electronic form; and (d) connecting different divisions to one another in order to facilitate the flow of information and increase responsiveness to patients (e.g. making a link between the reception, GPs, pharmacy and laboratory units). The second purpose of WSC was to connect the medical centre's internal administrative system to the ministry's central administrative network to facilitate the communication and correspondence with other HCSPs and PIHO and decrease costs. In the next chapter the detailed description of the research site is provided.

#### ***4.4.5. Implication of Selecting WCS***

While this study acknowledges that most of the criticisms previously discussed with regard to a case study research strategy are valid, it also supports Silva's (1997) claim that these criticisms can be overcome by carefully conducting all research tasks such as a proper research design and the collection and analysis of data, be it interpretive or positivist research. The study also acknowledges that, due to the choice of research strategy, the findings related to the case study cannot be generalised. The findings can provide insights by drawing specific implications for decision makers involved in the initiation and implementation of complex IT projects as well as for researchers planning to investigate similar subjects in different contexts. In chapter seven and eight, a more detailed description of the contributions of this study to practice and theory will be presented.

One of the situations in which it is appropriate to select a single case study, as discussed earlier, is for under-researched areas where the phenomenon under study has not previously been investigated in depth. This thesis offers an in-depth case study of the contribution of IT-related user adaptation to individual-level IT use outcome which has not been investigated previously with this level of focus neither in Iran nor in other contexts. In the next section, the techniques for data collection and analysis used in this study within the case study strategy are presented in detail.



#### 4.5. Ethical Considerations

Before proceeding to the qualitative research techniques it is noteworthy to emphasise the study's ethical safeguards which served to ensure research integrity, protect research participants, and promote the safe and ethical conduct of research. 'Evidence of consideration of ethical issues' which is one of the criteria for assessing the quality of qualitative research studies (Spencer et al., 2003) is provided in this section through quotes and as appendices to the thesis. In accordance with the ethics approval requirements of the Human Research Ethics Committee of the School of Information Systems and Computing at Brunel University, West London, United Kingdom, this research employed several measures in order to protect the participants from ethical issues, namely, lack of informed consent, invasion of privacy and deception (Bryman, 2012).

In doing so, the purpose of the research and data collection procedure were initially explained in detail to the participants. Each participant was then provided with an information sheet and consent form to sign before engaging in the research. Participants were assured that the transcripts and other data would be used for academic purpose only and the confidentiality of participants was guaranteed. They were also informed that they could withdraw from participation at any time if they were dissatisfied with any aspects of the research. Moreover, considering that direct observations took place, participants were assured that no disruption of the physical setting and intrusion of the participants' activities would take place.

Since no research whatsoever had been carried out prior to this study in the medical centre<sup>20</sup>, participants were not familiar with the procedures of conducting research and thus they were excited when the author was explaining their ethical rights and ensuring their anonymity and confidentiality, avoiding any impersonation. For instance, one of the participants explained this matter by saying:

*"I'm excited right now hearing my ethical rights from you. I did not know academic studies pay attention to these things... it feels nice to see someone understands your rights, explains them to you honestly and respects your decision even if you say no to them. Your research is*

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<sup>20</sup> To the best of the author's knowledge the research was even the first of its kind in Iranian organisations in general and governmental organisations in particular.

*very interesting to me, but what is extremely important to me that gives me the peace of mind is that you are going to protect this interview and my privacy at any cost. So I see no reason not to cooperate with you in this research” (PHC5)*

Since the researcher is not only the observer but also the ‘observed’ in the sense that organisational members tend to analyse researchers’ actions, particularly in the initial stages, the author attempted to develop and maintain independent academy identity, to ensure that he is not seen as an agent of management. The author attempted to maintain credibility and trust by always being well prepared for the interviews and preserving anonymity and confidentiality of the participants at all costs (Myers & Newman, 2007).

*“If these people [referring to employees in the medical centre] were seeing you as the management’s agent it was impossible to get a word from them, but they know that you are here for an academic research and whatever they say remain confidential, that’s why they are willing to talk. They trust you because you are an outsider” (MDI3)*

Furthermore, the author was treating respondents, their knowledge and their time with respect as the author readily rescheduled meetings on some occasions to fit the schedules of the interviewees.

*“Sorry for rescheduling this meeting. I really had to briefly meet one of the PIHO’s inspectors. Thanks for giving me this flexibility otherwise I did not know what to do with him [referring to the inspector]. This is our first experience of having a researcher on site which is very interesting and I hope future researchers to behave professionally like you do and be flexible in their approach” (L1)*

In order to deal with anonymity of participants, but simultaneously represent the role and location of individuals to readers, the author used the following naming convention for the interviewees: <location in which the individual is/has been based><optional number to distinguish between individuals in the same location(s) and same position>. For example, the quotations related to an interviewed doctor in the PHC unit were identified as PHC1.

All these safeguard measures, as the quotes indicate, resulted in a great rapport between the author and participants, which consequently allowed the researcher to gather participants’ perceptions and meanings of a specific experience such as dealing with a

disruptive IT system and the surrounding context, their adaptive behaviours and performance-based consequences of IT adoption and acceptance which represents the phenomenon of user IT adaptation behaviours.

#### **4.6. Research Techniques**

In this section, the research techniques adopted for conducting the case study are discussed. The qualitative research techniques for collecting data were semi-structured interviews, observation and interpretations of material and documents.

##### **4.6.1. Data Collection Process**

As illustrated before (see Figure 4.2) both phases of the research, and thus the process of data collection, were conducted in the same research site in Mashhad State which houses one of the major and well-known medical centres of MoP in the country<sup>21</sup>. During the period of data collection, formal interviews were conducted as the main method of data collection technique. The author also attended a few local meetings in different departments with respect to the WSC in that department. Apart from observing users in meetings, observation of the use of technology in the workplace also took place to obtain a better understanding of the user's system usage behaviour on typical working days. The author also had the opportunity to have a quick look at few private IT-related documents with respect to the computerisation project. Apart from the formal modes of inquiry, the author also investigated the IT event informally based on informal interviews with members of staff during break times.

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<sup>21</sup>To put the case in perspective, Iran is an energy superpower and the Petroleum industry in Iran plays an important part in the country's economy (Takeyh, 2006; Balamir, 2009). Accordingly, the oil and gas industry in Iran has been the engine of economic growth, directly affecting public development projects and the government's annual budget. Analysing the current structures of the Iranian economy is not an easy task due to the fact that the borders between public and private are very ambiguous. What creates the ambiguity is the existence of semi-state institutions, which were created after the Islamic Revolution to manage the confiscated assets of the Royal family. Hence, if one includes all the mentioned semi-public entities, it is estimated that the public sector controls some 80% of the Iranian economy (Khajepour, 2000). This sector over the past few years have undergone several reorganisation and modernisation in terms of 'work system computerisation' or 'office automation' to improve the efficiency and effectiveness of organisations, nevertheless the number of organisations that could successfully complete the WSC project and benefit from it is limited. One of this governmental organisations which its inability to properly manage the WSC project especially across its medical centres, despite its huge resources, has become a mystery for the citizens of different states is the National Iranian Oil Company (NIOC). A detailed description of the case study context is presented in the next chapter.

During the first phase of the fieldwork, the author met with the assistant director of the medical centre who granted access to investigate the IT project and shared her ideas on the vision of 'Work System Computerisation (WSC)' within MoP's medical centres and how she thought it is linked to the medical centres' developments and growth in terms of performance. She directed the author to the heads of each department in the medical centre including: IT, Public Health Centre (PHC), Medical Documents and Insurance (MDI), Finance, Laboratory, Reception and Pharmacy. Each head of department provided important information about different aspects of the research such as the aim of the IT project, the design model of work system computerisation, how delicate the issue of user adaptation to disruptive IT event is and how the contextual and historical trends of the medical centre have influenced or been influenced by the IT-related changes, to name a few. They also emphasised the critical role of such a system for MoP's medical centres from both the organisation/ administration and patients perspectives.

The author also interviewed representatives of the software contractors in charge of the supply and maintenance of the software packages for two departments. In addition, interviews were conducted by the author with respondents in all departments, whether they were using the automated work system or used to work with such a system (i.e. in case of system termination). This allowed the author to also investigate the business process underlying the automation project in this MoP's medical centre. Data collection continued until theoretical saturation was reached, that is, when the incremental insights provided by additional interviewing were judged to be insignificant.

#### **4.6.2. Data Collection Techniques**

The issue of reliability and validity of case study research can be tackled by using a triangulation of various sources of data (Yin, 2003). As suggested by Lennie (2006), the use of different modes of inquiry, for the purposes of triangulation, gives richer data and access to the views of a broader and more diverse set of individuals involved in the topic under investigation. Denzin (1970) indicates that the use of triangulation helps to increase validity of qualitative studies, decrease the investigator's bias, and strengthen the interpretative potential of the study. In this section, each of the applied data collection techniques will be explained in detail.

Denzin (1978) identifies four basic types of triangulation: (1) data triangulation or data sources triangulation depicts the use of multiple data sources in the same study for validation purposes; (2) investigator triangulation is defined as the use of different researchers in any of the research stages in the same study; (3) theoretical triangulation is defined as the use of multiple theories in the same study for the purpose of supporting or contradicting findings since different theories help researchers to see the problem at hand using multiple lenses; and (4) methodological triangulation is defined as the use of more than two methods in studying the same phenomenon under investigation such as the use of both qualitative and quantitative data collection methods and analysis in studying the same phenomenon. Pettigrew (1990) similarly explains that the aim of the triangulated approach is to draw on the particular and different strengths of various data collection methods. Interviews, for example, can provide depth, subtlety and personal feeling. Documents can provide facts, but are also subject to dangers of selective deposit and survival. Direct observation provides access to group processes and can confront the researcher with discrepancies between what people have said in interviews and what they actually do (Pettigrew, 1990). The data collection method in this thesis involves multiple modes of data sources, which helped with theoretical and data triangulation and cross checks. Interviewing was the main data collection technique used within this research. However, other forms of data in interpretive studies, such as observations, document analyses, field notes, and a few local publications of the state being studied, were also used to supplement the interviews (Walsham, 2006).

#### **4.6.2.1. In-Depth Interviews**

The three basic approaches to conducting qualitative interviews include structured, semi-structured and unstructured (Oates, 2006). The structured interviews are based on prearranged, standardised, identical questions for every interviewee. Semi-structured interviews are conducted with a fairly open framework, which allows for focused, conversational, two-way communication. With the unstructured interview, the researcher has less control over the flow of conversation, the questions are not specifically limited or set and the conversation can flow freely.

In this study, the semi-structured interview was used as the main method of data collection. The author prepared an interview protocol based on the theoretical framework seed categories and the literature areas reviewed earlier to guide the interview without constraining it and the respondents were allowed to express their views and opinions on aspects they considered of importance. The focus of this study was to enhance our understanding of user IT adaptation behaviours as a form of mediation that could contribute to or detract from IT use. Thus, the interview protocol (attached in the appendix section) focused on questions concerning: 1) the history and background of the research context; 2) the motivation for considering such an IT project; 3) how system users interpreted the IT event and the influences of the computerisation project on their efficiency and effectiveness; 4) how system users interpreted the available coping options; 5) how they coped with the IT-induced changes (by investigating what coping strategies they used); 6) the organisational context (e.g. structure, users' jobs and autonomy) and IT context (e.g. how the system was developed and implemented, training, support, and functionalities of the system), and 7) the reappraisal of the IT event over time (to give an indication of the feedback loops that could lead to a new series of adaptation).

During the data collection process, a total of 68 interviews were conducted at an average duration of 1.5 to 2 hours in various divisions with IS users with different backgrounds and roles, thus helping the author gain and collect different views about the same subject matter (i.e. user adaptation to WSC and consequent outcomes). Participants of the study were selected using the "snow balling" technique. The snowballing technique involves the use of participants to contact other respondents and particularly applicable when discussing sensitive issues (Streeton et al., 2004). Owing to the novel<sup>22</sup> nature of this research, the interviews were expected to build up discussions on various sometimes-sensitive issues (or at least felt 'sensitive' from the employees' perspectives) such as personal *thoughts and actions or management's policy and decisions*. As a result, conducting research under these conditions was delicate since participants were not familiar with expressing their views to a researcher, confidentiality, and to be valued and

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<sup>22</sup> The research was 'novel' in the sense that it was the first of its kind that carried out in this medical centre and to the best of author's knowledge at any other ministry-related work settings or even in the context of Iran in general.

interviewed formally for a subject matter. Snowball sampling begin from a core of known elements/participants and are then increased by adding new contributors given by members of the original sample. Accordingly, the interviewees were asked to introduce other potential participants/informants to the researcher- those who had been affected to various degrees of intensity by diverse facets of the IT event (i.e. personal, social and technical dimensions of the WSC IT event). This technique increased the number of appropriate referrals within a short time frame.

Hence, it was essential to select those participants who were willing to be interviewed on such topics and were in direct contact with the work IS for daily routines. Some respondents were contacts of the author (knew the author from the past) who were then used to recruit further participants. For example, as noted earlier, one of the doctors who was also a respondent was a relation to the author, who in turn identified other users who were directly involved in system usage. This helped in gathering a large respondent base for the study. The snowballing technique continued throughout the data collection in the first phase. Table 4.5 (page 114) summarises the details of the fieldwork conducted, including people interviewed and the number of interviews conducted. Interviews were conducted on a one-to-one basis, but on a few occasions the conversations took place over the phone and by email in order to clarify aspects that were not clear in the face-to-face interviews. Some key users were interviewed more than once. Usually, the interviews were conducted in the interviewees' office (in the case of managers) or at their desk (in the case of users). That allowed interviewees who constantly work with computers to demonstrate how they use the system.

All interviews were tape-recorded, but notes were also taken occasionally about interesting points being discussed with interviewees. This study benefited from the advantages of the tape recording of interviews in the way Washam (2006) describes them. One advantage is an accurate record of what was said compared with the taking of notes during the interview no matter how extensive the description is. Tape recording also allows the researcher to return to the transcript later for alternative forms of analysis. It is also useful for picking out direct quotes when writing up. Finally, it allows the researcher to focus on engaging with the respondent rather than being under pressure of remembering and

writing down all the discussion points. Note taking was used to highlight particular points. They were also helpful to document situations, participants' characteristics, behaviours, expressions, and any related issues.

Since the research was concerned with respondents' subjective meanings and interpretations of the IT event, it was crucial to enable and help the interviewees to feel free and safe to share their stories and experiences about the subject matter. In order to achieve this goal, the author needed to engage more with informants and develop a good rapport with them. In doing so, the author tried to reassure the interviewee at the beginning about the purpose of the study and about the confidentiality. The author also did the most of the talking for the first few minutes with the purpose of getting the interviewee to relax. This approach significantly increased the quality of interviews in terms of honesty and responses. The semi-structured type of questioning and the rapport between the author and respondents encouraged them to talk about their concerns and reveal information that wanted to talk about but maybe they have never had the opportunity to do so.

All the interviews were conducted in Persian language (or Farsi), which is the national language of Iran. Walsham (2006) signifies the importance of 'language' in qualitative field research and states "it is clearly better to be able to speak the local language fluently in order to carry out field research there" (p.323). As to this study, since the author needed to understand people's mind-set, thoughts and actions and to discuss about the complex and multifaceted phenomenon of user IT adaptation, speaking the same language and knowing the culture of people allowed the researcher to freely talk about the phenomenon, to manoeuvre around topics and to obtain high quality responses.

Interviews were conducted at different levels at the medical centre. At the managerial level questions aimed to discover the motives for the new system, how the top management felt the whole IT project could affect the medical centre's overall performance, the objectives of the organisation to achieve that goal, the expected functionalities and benefits from the new work system and the medical centre's overall information system strategy. Interviews with heads of each department (senior managers), aimed to understand the functions and



goals of the particular implemented work system, how the new Information System was being used, how employees reacted to it (initially and after few months) and the impact of the new IS on employees' IT use outcomes.

Finally, interviews with IS users (i.e. ordinary employees who were using the system for daily routines) which was the core of this research aimed at understanding how users originally evaluated the consequences of the technology; the specific transformations that the system had made to their daily routines (improvements or otherwise); what control they felt they had over the technology, their work, and themselves to adapt to the new work IS; the functionality of the system and their interpretations of the IT event as a whole, how they coped; and what effects they perceived the new system had on them personally and on their performance at work. An additional objective was to develop a sense of how the system was reassessed after a year of usage to give an indication of the feedback loops that could lead to new series of adaptation efforts. For doing so, all interviews ended with an open discussion of how they perceived their system at the time of the interview.

Interviewees were also asked to provide a detailed narrative description of the implementation process, all the related major events, and their individual reactions. However, in order to minimise recall biases, we considered Collopy's (1996) as well as Hufnagel and Conca's (1994) recommendations and anchored questions with significant event flags, for example, questions such as "Do you remember the moment when you were first made aware that a new work IS would be introduced?" and "What was your reaction when you saw the computer on your desk for the very first time, how did you feel?" Finally, the organisational context (e.g. structure, culture, users' jobs, autonomy, and remuneration) and IT context (e.g. how the system was developed and implemented, training, support, and functionalities of the system) were also considered as they may potentially influence user adaptation.

The author also used the projective technique, which indicates an indirect way of questioning. The question "Could other MoP's medical centres benefit from the use of the company-wide computerised work system? How?" was an example of this technique. It enabled interviewees to project their beliefs and feelings on the possible limitations of

using this particular system onto a third organisation or individuals. Under such circumstances individuals were expected to interpret the situation based on their own experiences, attitudes and personality (Zikmund, 1997).

Interviewing various individuals in different divisions and at different levels of hierarchy helped the author to evaluate the extent to which WSC applications were contributing or not to the enhancement of users' efficiency and effectiveness and overall IT use performance. The interviews were often accompanied by observation, which is discussed in the following section.

**Table 4.5 - Summary of the fieldwork**

Period Location Research site	Department	People interviewed	Content of interviews	No. of Interviews	
				Phase 1	Phase 2
Jul - Sep 2011 AND Aug - Sep 2012  MoP's Medical Centre, Mashhad State, Iran	Management	Assistant director	Motives for the new IS, expected functionalities, overall IS strategy, aims and implementation	1	1
	PHC	Head of PHC	Functions of the IS, user reactions to IS, implemented work IS, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	7	7
	MDI	Head of MDI	Functions of the implemented work IS, how new IS was being used, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	4	4
	Finance	Head of Finance	Functions of the implemented work IS, how new IS was being used, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	3	2
	Laboratory	Head of Laboratory	Functions of the implemented work IS, how new IS was being used, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	4	4
	Reception	Head of Reception	Functions of the implemented work IS, how new IS was being used, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	3	3
	Pharmacy	Head of Pharmacy	Functions of the implemented work IS, how new IS was being used, impact on employees' outcomes	1	1
		Staff	Evaluation of and experience with WSC, user adaptation to IT	3	3
	Secretariat	Secretariat	Evaluation of and experience with WSC	1	1
	IT	Head and deputy of IT	Motives for the new IS, expected functionalities, overall IS strategy, preparations, milestones, aims and implementation	2	1
N/A	IT vendors	Experience with WSC, type of support, cooperation with the Medical Centre	2	0	
Total interviews conducted in each phase				36	32
Total interviews conducted				68	

#### **4.6.2.2. Observations**

Observations are usually carried out by taking note of and recording a phenomenon for scientific purposes. The observer does not manipulate or intervene in the phenomenon being observed; rather, he or she should simply follow the flow of events (Bryman, 2012). Qualitative observation is naturalistic in the sense that it records the events of the everyday life of the phenomenon under study in its real context (Silva, 1997). Observations allow the researcher to witness relationships and connections and open the phenomenological complexity of the world.

Observations helped in collecting data on IS users' everyday actions while they were using the system for daily routines. The observation technique was also beneficial to gain further insights into users' ideas, feelings and reactions with respect to IT usage in everyday actions and interactions. By adopting this mode of inquiry, the author also obtained a glimpse of how the system was working in practice and the surrounding conditions such as infrastructure. It also helped to enhance the validity and reliability of the study. While observing employees, informal discussions occasionally occurred between the author and system users derived from hardware or software failure, network failure or the extent to which the new IS had changed (desirably or undesirably) the way users used to work. The author was then asking questions for clarification of what was taking place and what difficulty they had faced with the system to complete their tasks. The conversation was eliciting the system users' own explanations, evaluations, and perspectives in the immediate context of use, rather than retrospectively.

It is also noteworthy to mention that although the author started off the study as a relatively neutral observer, as time went on there were few occasions that users were asking the author, instead of the IT unit, to help them with basic computer tasks. At that time, the author felt the need to help users, as this was expected by the personnel in return for the time and effort they put in for my research (e.g. attending the interview and helping with the snowballing technique). Furthermore, a refusal to their request would reflect a lack of concern for the employees and the author could simply risk the rapport he had developed with employees. During both phases of data collection, the author conducted several hours of daily observation at different departments accounting for more than two

hundred hours of observation. The following section discusses the final method of data collection, which is the document analysis.

#### **4.6.2.3. Document Analysis**

Documents can be treated as another source of data, as alternatives and/or a supplement to observations and interviews. For this research, the author was looking for documents and materials to reveal background information and provide explanations about the IT event such as: published material on the medical centre's performance prior to and after the computerisation project, reports on alternative information systems prior to final choice and evaluation reports and training manuals. Surprisingly, none of these documents existed. In other words, there were no documents about the details of the IT project and specific functionality of the implemented systems in each division (except one) and how they could contribute to the development processes. The only exception was one of the divisions (i.e. laboratory) which the author found some documents about the details of the new implemented system, specific functionalities of the system, reports on alternative information systems, a complete training manual and a local report which represented the department's performance prior to and after computerisation.

The author, however, was granted permission to review some documents on site such as internal mails, clinical reports with respect to the IT event and off the records notes that could represent the ICT policy plan to some extent. These documents were analysed with a view to discovering the research setting, the background data on the medical centre's WSC project and the different contractors and actors involved in the project, as well as the underlying social and cultural issues that could have emerged in the research setting. In this case, a broad classification of the documentary data was made, which identified the data as either background information to the WSC project in the research setting or from the popular press, pointing to social issues influencing or being influenced by the initiation and implementation of the computerisation project. These documents played a significant role in establishing triangulation, validating of the data collected during the interviews and in maintaining the chain of evidence.

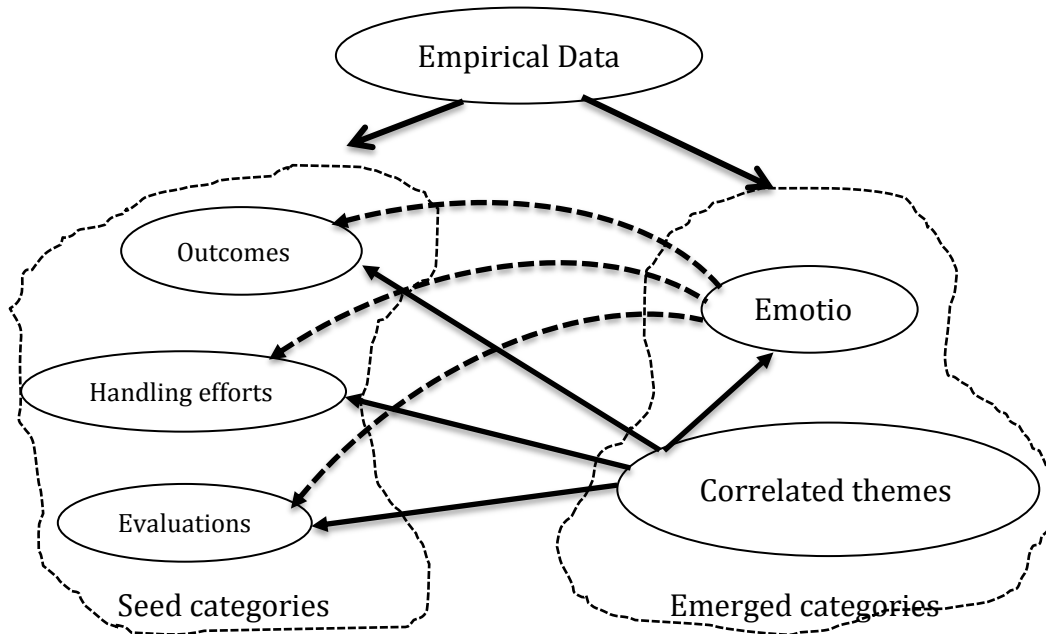
#### **4.7. Qualitative Modes of Analysis**

Interview data were transcribed verbatim and then analysed following the set of principles of thematic analysis (Braun and Clarke, 2006). This study used thematic analysis for the purpose of finding, analysing and reporting patterns (themes) within the collected data. Some key advantages of thematic analysis can be summarised as: it is a relatively easy and quick method to learn, results are accessible to the educated general public, and it can generate insights and allows for social and psychological interpretations of data. The important point regarding thematic analysis is that writing is an integral part of analysis and not something that takes place at the end, as it does with statistical analysis. In general, the process began with careful reading and re-reading of the interview transcripts in order to gain a holistic overview of the main themes discussed by the participants and to look for patterns of meaning and issues of potential interest in the data. This allowed the classification of similar materials and insights to be captured (Dey, 1993). The interview data were then coded and a set of themes was identified in relation to the theoretical concepts described in chapter three (Boyatzis, 1998; Dey, 1993).

In particular, the process of coding was done in different phases. In the initial phase, the similar materials and themes in the interview transcripts concerning the theoretical concepts were identified and coded into the broad categories of 'evaluations', 'handling efforts' and 'outcomes' while two extra categories were also considered. One category was named 'emotion', after realising that users' emotions were among the influential factors that had significant impacts on users' thoughts and actions with respect to IT usage. As mentioned earlier, investigating users' emotions was neither the objective of this study, nor had been considered in the CMUA. However, case analysis revealed that this concept played a critical role in users' IT adaptation processes. Hence, the author felt the need to consider a separate class to contain all the identified emotion-related themes to ensure the comprehensiveness of his analysis. Additionally, while analysing the transcripts, specific themes with personal and socio-technical characteristics emerged with significant direct or indirect impacts on the above four categories. The second extra category was then named 'correlated themes' Figure 4.3. Consideration of additional categories was the result of the author's attempts to remain flexible in his thinking and to preserve a substantial degree of

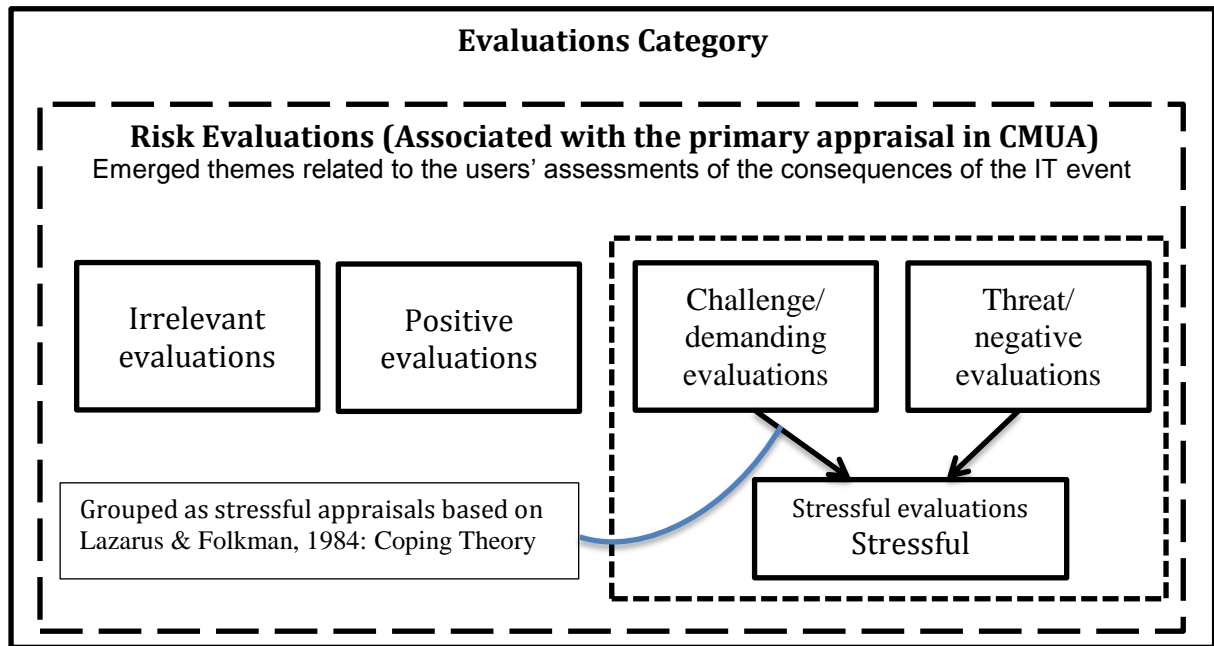
openness to the field data for any additional themes/concepts that might not have been considered in the initial theoretical framework.

**Figure 4.3 - Classification of the empirical data based on the theoretical framework**



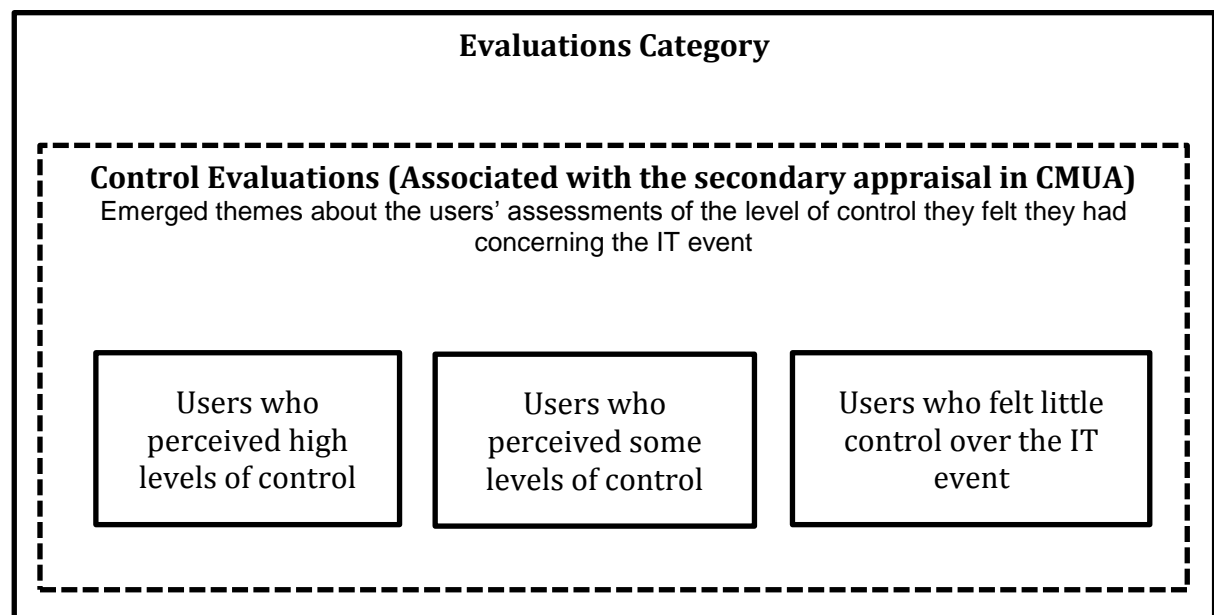
Next, a finer-grained coding was performed in different categories. In the ‘evaluations’ category different themes were found including: positive/desirable evaluations, irrelevant/indifference evaluations, challenge/demanding perceptions (feeling stressed but with an opportunity for mastery and gain) and threat/negative appraisals (feeling stressed with anticipation of harm/loss). Since both the challenge and thread evaluations were of the same nature and stemmed from stressful evaluations (Lazarus & Folkman, 1984: coping theory) these two identified sub-themes were grouped into stressful evaluations. Since CMUA was mute about different kinds of risk evaluations, coping theory was considered (i.e. CMUA’s underlying theory) to manage the patterns properly. Later, since all the sub-themes (i.e. desirable, irrelevant and stressful) were related to the users’ assessments of the IT event, they were grouped into one and named ‘risk evaluations’ that were associated further with the primary appraisal in the theoretical framework Figure 4.4. Furthermore, since irrelevant appraisals have nothing to do with individuals’ coping processes, the three appraisals which were considered in the analysis part included the positive, challenge and threat appraisals.

**Figure 4.4 – The emergence of different primary appraisal themes**



In the 'evaluation' category other sub-themes were also identified about users who felt they could do something about the situation (with regard to the task, technology and self) or those who felt they had little or no control to cope with the new system Figure 4.5. Since all these sub-themes were concerned with the level of control IS users thought they had, these patterns were grouped together and named 'control evaluations' and were associated further with the secondary appraisal in the theoretical framework.

**Figure 4.5 – The emergence of different secondary appraisal themes**





Finally as depicted in Figure 4.6, re-evaluation sub-themes, including ‘reinforced loops’ (i.e. negative perception becoming more negative or vice versa) and ‘reversed loops’ (i.e. negative assessment becoming positive or vice versa), were appeared which associated further with reappraisal/feedback loops in the CMUA.

**Figure 4.6 – The emergence of different reappraisal themes**

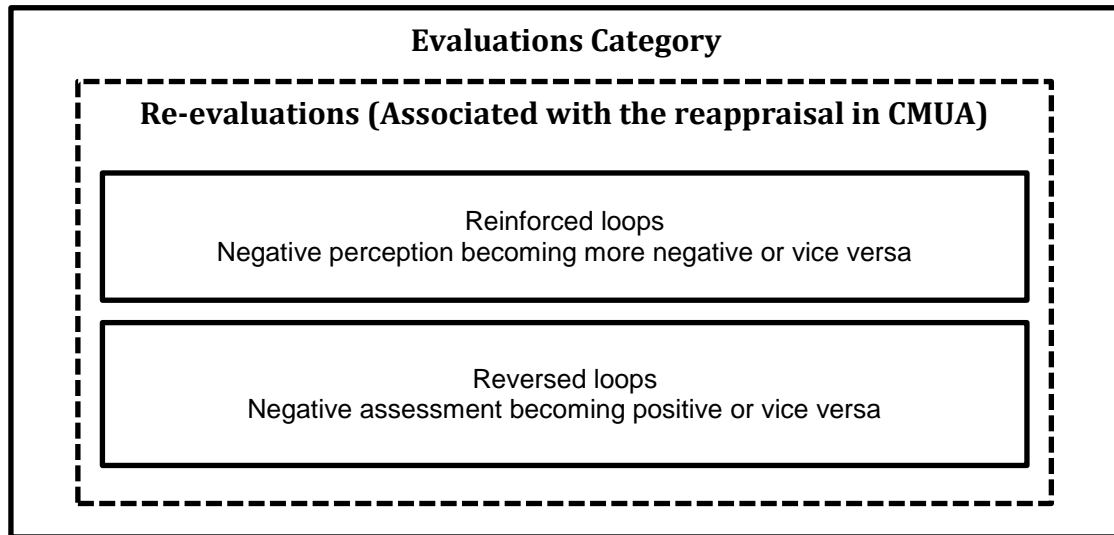
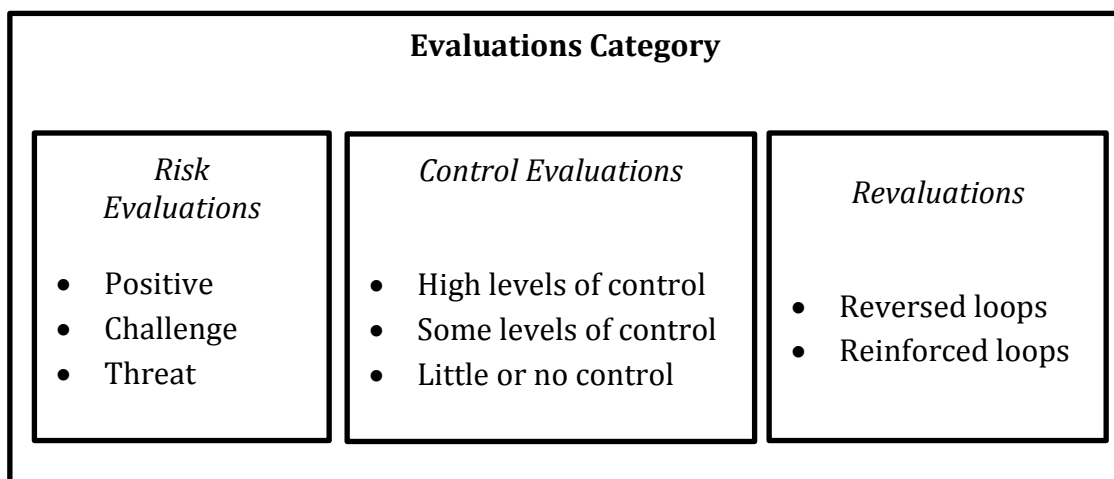


Figure 4.7 illustrates an overview of the extracted sub-categories in the evaluation class.

**Figure 4.7 – Overview of extracted sub categories in the appraisal category**



In the ‘handling efforts’ category, the identified patterns concerning users’ concrete attempts with respect to self, tech and task were named ‘practical efforts’ which associated further with problem-focused acts in CMUA. The identified sub-themes about users’ emotive and intangible efforts were combined into ‘emotional efforts’ and were associated

further with emotion-focused acts in CMUA. Again, since CMUA does not distinguish between the different types of emotional acts, the identified sub-themes of emotional efforts could not be explained with CMUA alone. As a result, this research adopted another typology to explain the different types of emotion-related acts that were influential on system usage. The new categories were named 'avoidance emotional attempts' and 'approach emotional attempts' to group and distinguish the emotional-related acts. Themes could then be interpreted flawlessly and fully explained without confusion. Finally, in the 'outcome' category the identified themes could be classified as 'high performance', 'partial/limited performance' or 'no performance'.

In the 'correlated themes' category, various themes were uncovered about either (1) management's poor decision-making regarding the preparation, implementation and use of the IT system as a whole, or (2) lack of commitment and support for the made decisions regarding the IT system. These themes were grouped into 'poor decisions about IT' and 'lack of support for IT' respectively. Finally, these themes were classified under 'top management influences'. Similarly, themes related to system issues were categorised into 'hardware issues' and 'software issue' and both were then grouped into the 'system operation' class. Personal-related themes were categorised as 'personal characteristics'. Finally, based on the emerged themes two categories of 'group discussions' and 'colleagues' attitudes' were considered which were labelled under the class of 'social influences'. As to the 'emotion' category, themes of extreme emotions surfaced which represented the vital role of this concept in the user adaptation process (i.e. influencing subsequent thoughts and actions) including: 'empowering positive emotions' (e.g. made the user feel more powerful and confident about using the system); 'disempowering negative emotions' (e.g. weakened the user and made them hostile, irritable and unpleasant to be around).

The final step, searching for complete themes, started with the construction of the chains of evidence that grouped quotes from each user about their evaluations (primary and secondary appraisals) and their adaptation efforts into patterns of actions, thereby identifying adaptation strategies under study and their subsequent IT use outcomes. These steps were repeated for each person in each division in the clinic and finally, divisions with similar patterns of adaptation strategies were grouped together. Also, field notes taken during observations were analysed using codes that were the same as those used for the

participants. A sample of significant quotations and relevant themes from the transcripts are described in Table 4.6 to clarify the thematic coding exercise. The process of analysis approach taken broadly follows the set of guidelines and principles given in relation to the conducting of thematic data analysis when attempting qualitative field studies (Braun & Clark, 2006).

**Table 4.6 - Summary of linkage between psychological constructs and assigned codes**

Psychological Components	Assigned Codes
Primary Appraisal	<ul style="list-style-type: none"> <li>• Positive Primary= <b>Ppr</b></li> <li>• Challenge Primary= <b>Cpr</b></li> <li>• Threat= <b>Tpr</b></li> </ul>
Secondary Appraisal	<ul style="list-style-type: none"> <li>• High Control Secondary= <b>Hse</b></li> <li>• Some Control Secondary= <b>Sse</b></li> <li>• Lack of Control= <b>Lse</b></li> </ul>
Emotion	<ul style="list-style-type: none"> <li>• Positive Emotion= <b>Pem</b></li> <li>• Negative Emotion= <b>Nem</b></li> </ul>
Adaptation Efforts	<ul style="list-style-type: none"> <li>• Problem Focused= <b>PF</b></li> <li>• Emotion Focused= <b>EF</b> <ul style="list-style-type: none"> <li>○ Approach oriented= <b>Apr</b></li> <li>○ Avoidance oriented= <b>Avo</b></li> </ul> </li> </ul>
IT Use Outcome	<ul style="list-style-type: none"> <li>• High Efficiency= <b>Heff</b></li> <li>• Low Efficiency= <b>Leff</b></li> <li>• No Efficiency= <b>Neff</b></li> </ul>
Reappraisal	<ul style="list-style-type: none"> <li>• Reversed loop= <b>Revlo</b></li> <li>• Reinforced loop= <b>Reilo</b></li> </ul>

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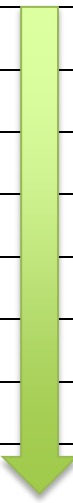
Initial IT adaptation behaviours: Ppr, Hse, Pem, PF, Heff, Reilo



Evolved IT adaptation behaviours: Ppr, Hse, Pem, PF, Heff, Reilo

**Table 4.7 - Summary of the coping behaviours of the stressed employee in laboratory**

Initial	Tpr, LCse, Nem, EF-Avo, Neff, Reilo (Negative→Negative)
Over time	Tpr, LCse, Nem, <b>EF-Apr</b> , Neff, <b>Revlo (Negative→Positive)</b>
Over time	<b>Tpr/Cpr</b> , <b>Lse/Sse</b> , Nem, <b>PF&amp;EF-Apr</b> , Neff, <b>Reilo (Positive→Positive)</b>
Over time	Cpr, Sse, <b>Pem</b> , <b>PF&amp;EF-Apr</b> , Neff, Reilo
Over time	<b>Cpr</b> , <b>Sse</b> , <b>Pem</b> , PF&EF-Apr, <b>Neff/ Leff</b> , Reilo
Over time	Cpr, <b>Sse/Hse</b> , Pem, PF&EF-Apr, <b>Leff</b> , Reilo
Over time	Cpr, Sse/Hse, Pem, PF&EF-Apr, <b>Heff</b> , Reilo
Over time	<b>Ppr</b> , <b>Hse</b> , Pem, <b>PF</b> , Heff, Reilo



Similarly, documents (clinical reports with respect to the IT event, off the record notes, newspapers and ministry's websites) were analysed with a view to discovering the research setting, the background data on the WSC projects and the different contractors and actors involved in the project, as well as the underlying social and cultural issues that could have emerged in the research setting. In this case, a broad classification of the document data was made, which identified the data as either background information to the WSC project in the research setting or from the popular press, pointing to social issues influencing or being influenced by the initiation and implementation of the computerisation project.

Walsham (1993) argues that empirical research without theory produces a series of anecdotes, and the research aims to avoid this by using theory both to guide the fieldwork carried out and to provide ways of synthesising and communicating the results. Therefore, theory provides a framework for the critical understanding of a phenomenon and a basis for considering how what is unknown might be organised (Silverman 2000). In conclusion, in this chapter, the author has presented the details of the epistemological and methodological perspectives underlined in this study including the research process, research methods, data collection techniques and modes of data analysis.

**Table 4.8 - Sample of themes and transcript excerpts used in thematic coding**

Sample Themes	Meaning and Sources	Sample-coded extracted from transcripts/ field notes
<p><b>Risk evaluation</b></p> <p><b>Resulted in: challenge*, threat, irrelevant* and positive perceptions</b></p>	<p>Source: Pre-reading of transcripts and theoretical concepts</p> <p>Meaning: Refers to users' evaluations of the situation and determines the probable effects of the IT event and how they are likely to affect him/ her both personally and professionally</p>	<p><i>"I thought with the new system I could spend time on more important tasks and fine-tune my daily work routines... I thought it was going to be a cutting edge software application that would allow me to personalise it in the way I wanted. I was so excited and knew that I could develop new IT skills by going to the training sessions and ask my friends to help me"</i></p> <p><i>"It was great news for all of us you know... we could finally use computers in doing our jobs like foreign countries... it was stressful because I did not know a thing about computers but I looked at it as a challenge... when I could become a doctor I can learn computer too..."</i></p> <p><i>"Computerisation meant nothing to me... we do not use it formally to do our jobs... our job is 100% paper-based so why should I even think about it... the concept is good and I admit it but... this is a very strong but... but it's not yet ready for us"</i></p>
<p><b>Emotions</b></p>	<p>Source: Pre-reading of transcripts</p> <p>Meaning: Refers to IS users' feelings and the extent to which it influences and is influenced by users' thoughts</p>	<p><i>"He [referring to his employee] was not feeling very well during those stressful moments, it was a big change for everyone, especially for him... I had to do something, but he was so down and desperate... I did not put any pressure on him or push him forward with force... when your mind is locked you can't do much...the problem with beginners [in terms of IT skills] is that they become too emotional right away, one second they were excited about the system and a while later they were angry and upset"... just extreme emotions (Manager)</i></p> <p><i>Field Note: similar to the previous local meeting, the employee [4] is so active and determined to participate in discussions and share his experiences. He enjoys explaining things to others. This gives him confidence. He asks too many questions from the instructor who has come from Tehran to train them for the new added [software] features.</i></p>
<p><b>Correlated themes*</b></p>	<p>Source: Reviewing transcripts</p> <p>Meaning: five major themes with personal and socio-technical characteristics were identified that not only influenced one another, but also had huge impacts on</p>	<p><i>"Consider you are tired of working with a really faulty system [which was used to be acceptable more or less], and you are actually right about the matter but there is no one to complain to. Then you realise that management ignores your comments and force you to use the system despite its difficulties. Then you see your colleagues are also complaining and comparing</i></p>

	users' psychological perspectives and adaptation process.	<i>us with laboratory people, for example, for having a good system. When you are exposed every day for several months to these frustrating conditions with disappointing group conversations and useless arguments with no work efficiency, your attitudes, your mood or even your personal trait are engaged and affected over time. All this happened to me sadly..."</i>
<b>Avoidance-oriented* emotional attempts</b>	<p>Sources: Reviewing transcripts and considering another theory</p> <p>Meaning: avoidance behaviours are oriented away from it such as wishful thinking or distancing</p>	<p><i>"I could not stand the situation so I took a few days off. I needed that break to reorganise myself. During the first couple of weeks even when I was in the office I was trying to occupy myself with some paper works. I asked my colleagues to cover my work during that time... my mind was locked. I thought I was not able to learn and use the system, I was not even attending the one hour meeting in the department"</i></p> <p><i>"At that time I was so upset and had no idea how to cope. The software seemed to be so complex and the whole thing was new to me. Although I think it was about time for fundamental changes but when I faced such major changes in my routines it was shocking...I am not a person with a high level of IT innovativeness, I was good with my old system... I am an old school guy...I couldn't work with the new system"</i></p>
<b>Approach-oriented* emotional attempts</b>	<p>Sources: Reviewing transcripts and considering another theory</p> <p>Meaning: Approach behaviours are oriented towards the sources of stress, such as positive reappraisal or seeking social support</p>	<p><i>"I could not believe I did it. I was so afraid and discouraged at the beginning. I only knew how to work with papers and with the Dos-based system. The new system was a big change for me and overwhelming, but I managed the situation with the help of my colleagues and the local manager, now I am the person who does most of the talking in the daily meetings"</i></p> <p><i>"The atmosphere was great, my colleagues were so friendly and supportive since the very beginning, This motivated me to share my feelings and talk to my colleagues about my condition..."</i></p>

\* = These themes were initially identified in transcripts, however, since they did not exist in CMUA, this study for the purpose of analysis and explanations considered other theories as explained earlier. This strategy helped to group the relevant identified themes of 'challenge' and 'threat' evaluations, for example, into the stressful category.

## CHAPTER FIVE - CASE STUDY FINDINGS

### 5. Introduction

This chapter provides the background details of where the study was conducted. All the necessary background and required information about the case study context is thus presented in this chapter. In the following section the author presents the physical location of the country and gives some contextual information about Iran. The subsequent section focuses on the country's IT aspects and gives information about Iran's ICT infrastructure. Next, the author provides the background details of the medical centre under investigation, including how it operates, the reasons behind moving towards the Work System Computerisation (WSC)<sup>23</sup> plan and the medical centre's IT related history over different managerial periods. Finally, the status of each department within the medical centre prior and after the WSC is described. Concerning this chapter, it is also necessary to mention that since the contents of the referred websites were fully in the Persian/Iranian language, maximum effort was made to translate the obtained information verbatim into English. Nevertheless, the stated links in the footnote refer to the original Persian language.

#### 5.1. Country Background Information

Iran or Persia, officially the Islamic Republic of Iran, is a country in Western Asia (Figure 5.1). The country is bordered on the north by Armenia, Azerbaijan and Turkmenistan, with Kazakhstan and Russia to the north across the Caspian Sea. Iran is bordered on the east by Afghanistan and Pakistan, on the south by the Persian Gulf and the Gulf of Oman, on the west by Iraq and on the northwest by Turkey. Iran is the 18th-largest country in the world in terms of area at 1,648,195 km<sup>2</sup> (636,372 sq. mi). Tehran is the capital, the country's most populous city and the political, cultural, commercial and industrial centre of the nation. The population of Iran is estimated at some 77 million, 12 million of which live in the capital and its suburbs. The official language of Iran is Persian (Farsi) and is taught and practiced in all schools from the first grade across the country. Other local languages that are spoken include mainly Turkish and Kurdish. Major Cities in Iran are Mashhad, Isfahan, Tabriz, Ahvaz and Shiraz.

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<sup>23</sup> Work System Computerisation (WSC for short) in this study refers to both the replacement of manual work processes with computers as well as modernisation of the existing out-dated computerised work systems.

Iran is a regional power<sup>24 25</sup> and holds an important position in international energy security and the world economy as a result of its large reserves of petroleum and natural gas. Iran has the largest proven natural gas reserves in the world<sup>26</sup> and the fourth largest proven petroleum reserves<sup>27</sup>. Iran is a founding member of the UN<sup>28</sup> and OPEC<sup>29</sup>. Iran also possesses enormous mineral resources, including coal, copper, iron, zinc and gold, much of which has to be developed. All large industries and the majority of medium-scale enterprises are run by the government organisations, which were set up during the revolution. These entities own some 20 per cent of the country's assets, however, they are generally mismanaged (Khajehpour, 2000). In recent years, economic growth has not kept pace with labour force growth, leading to an unemployment rate, which is estimated about 20% (CIA Fact Book, 2005). The political system of Iran, based on the 1979 constitution, combines elements of a parliamentary democracy with a religious theocracy run by the country's clergy. The highest state authority is the Supreme Leader and Shia Islam is the official religion.

The case study setting was located in 'Mashhad'. This city is the second most populous city in Iran and is the capital of 'Khorasan' Province. It is located in the north east of the country close to the borders of Afghanistan and Turkmenistan. Its population was 2,772,287 at the 2011 population census.

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<sup>24</sup> IRAN @ 2000 and Beyond, accessed 16/10/2012, <http://wayback.archive.org/web/20100103021931/http://www.petro-hunt.com/lectures/LectureOpen.htm>

<sup>25</sup> The Committee Office, House of Commons, "Select Committee on Foreign Affairs, Eighth Report, Iran", accessed 16/10/2012, <http://www.publications.parliament.uk/pa/cm200607/cmselect/cmfaaff/363/36310.htm>

<sup>26</sup> BP Cuts Russia, Turkmenistan Natural Gas Reserves Estimates", accessed 16/10/2012, <http://online.wsj.com/article/BT-CO-20130612-706046.html>

<sup>27</sup> CIA World Factbook. "Iran", accessed 16/10/2012, <https://www.cia.gov/library/publications/the-world-factbook/geos/ir.html>

<sup>28</sup> United Nations: UN is an intergovernmental organisation created in 1945 to promote world peace, economic and social development, and other forms of international cooperation.

<sup>29</sup> Organisation of the Petroleum Exporting Countries: OPEC is an oil cartel whose mission is to coordinate the policies of the oil-producing countries. The goal is to secure a steady income to the member states and to secure supply of oil to the consumers



**Figure 5.1 - Location of Iran in Western Asia**

## 5.2. ICT Infrastructure and Use in Iran

There are very few published resources (including both local and internet-published reports) about the state of Information and Communication Technology in Iran with surprisingly no investigation whatsoever about the WSC projects and/or the related issues in organisations. Those that do exist have been exploratory in nature to provide general information about Iran's IT circumstances compared to the 1990s. In so doing, these studies have reviewed different areas such as the country's technological developments, national policies and strategies for IT development, IT infrastructure and access (e.g. Phone lines, mobile phones, etc.), penetration of the Internet, broadcasting, the computer and telecommunications hardware industry and ICT<sup>30</sup> issues including political, social and cultural concerns (Abbasi et al., 2008; Asemi, 2006; Kousha & Abdoli, 2004). While these studies more or less replicate similar information, they have not covered the topic of IT-related organisational transformations (e.g. work system computerisation) in Iran. In this section, thus, the author reviews some parts of these studies that are relevant to this thesis to provide an overall picture of the country's ICT status.

<sup>30</sup> ICT stands for Information and Communication Technology

Abbasi et al. (2008) stress that over the past few years major steps have been taken in Iran to maintain a steady growth in the ICT sector. With the increased application and diffusion of IT over a decade or more, problems associated with IT use have also increased including the lack of appropriate technologies, qualified professionals, absence of required infrastructures and lack of explicit IT policy. The latter had resulted in organisations defining their own IT master plans with diverse infrastructure, technologies and budget allocations. Presently, the ministry of ICT is responsible for the nationwide development of ICT and Information Technology Council Excellence (ITCE) is responsible for national level decision-making and IT policies (Asemi, 2006).

Concerning IT issues, these papers explain that technology acquisition raises a number of political questions such as the dependence of the receiving nation on the supplying one, which considering Iran's current political situation and sanctions, this issue has become very important. Additionally, the possible transfer of political power from political elites to the technical specialists would raise another problem. Those at the management level are mainly from non-technical backgrounds and thus there is always a tension between the two groups (Abbasi et al., 2008). Social issues were another covered area in these papers. Asemi (2006) explains that the most important impact of IT is on the labour market where there is no agreement about whether the number of jobs increases or decreases when IT is adopted. The question of introducing IT in countries where the unemployment rate is increasing each year becomes important. On top of that, Asemi (2006) refers to migration of highly qualified individuals that has created a big gap in skilled human resources.

The above studies, as previously stated, have not covered the IT-related organisational (e.g. WSC) changes and/or the impacts of such IT events on individual employees. One reason for such deficiency, as mentioned in chapter 1, could be the lack of interest among researchers to study the user side of technological innovations, the subject that has never been taken into account as important by the researchers, practitioners and managers of this country. Another reason has been undoubtedly political issues that have extensively limited the access of investigators to internal resources, consequently, have discouraged researchers to take topics concerning the country. Additionally, obtaining information about such IT-related projects from government organisations is considered a sensitive matter as these

organisations strictly hide their IT plans/ reports from public view and do not share them openly with third parties or on online portals.

This study obtained part of the required information from various corporate websites; but the detailed and contextual information was gathered and triangulated during semi-structured interviews with key respondents supplemented by observation and the review of available documents. Such detailed information that could not be obtained via online portals included the research setting's IT-related history, the way medical centres (HCSPs) operate and communicate under the Ministry of Petroleum's (MoP) umbrella and why the ministry felt the need to computerise the medical centres' work systems. The following section explains the case study and the interrelated connections among different parties in detail.

### **5.3. Iran's Ministry of Petroleum and Related Companies**

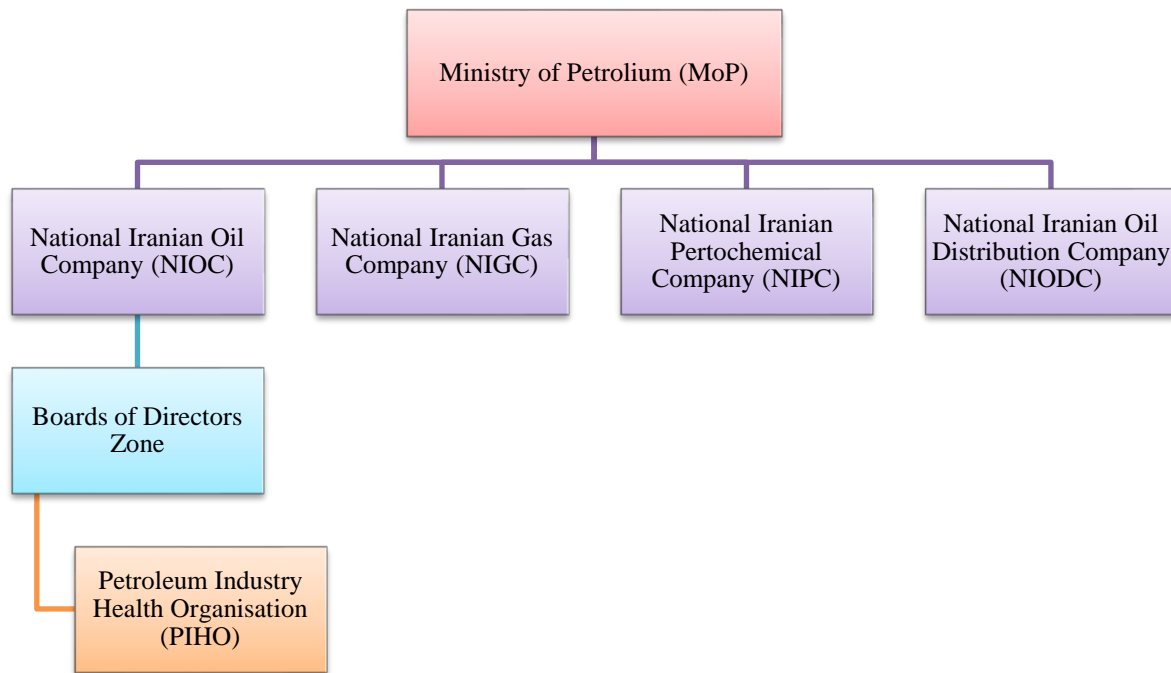
Iran's Ministry of Petroleum (MoP for short), as the name implies, manages the oil industry and is responsible for the production of oil and petrochemical products. MoP is generally in charge of all matters concerning the exploration, extraction, exploitation, distribution and export of crude oil and oil products nationally and internationally. This ministry has four fundamental companies called<sup>31</sup>: National Iranian Oil Company (NIOC), National Iranian Gas Company (NIGC), National Iranian Oil Distribution Company (NIODC) and National Iranian Petrochemical Company (NIPC). In addition, MoP also has a subdivision called 'Petroleum Industry Health Organisation'<sup>32</sup> (PIHO) which is responsible for all health-related matters and issues concerning this ministry and its employees<sup>33</sup> (Figure 5.2, next page).

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<sup>31</sup> MoP's official hierarchy, accessed 17/10/2012,  
<http://mop.ir/Portal/Picture/ShowPicture.aspx?ID=c8a6180b-5150-49b7-96b5-9e97a4b2e8b4>

<sup>32</sup> Health and Treatment Organisation: explanations and responsibilities, accessed 17/10/2012,  
<http://www.nioc.ir/portal/Home/ShowPage.aspx?Object=GeneralText&ID=97091d02-1263-4cac-acbd-a35c9b45dd1b&LayoutID=434e06e5-ac33-4c53-8c59-bcd473f7f0ab&CategoryID=d7d95987-15cb-4032-9f2a-be66a31b0c38>

<sup>33</sup> PIHO's aims and objectives, accessed 17/10/2012,  
<http://piho.ir/Global/Fa/DynamicPages/Page.aspx?nwsid=352>

**Figure 5.2 - Abstract view of PIHO in MoP's hierarchy**

Each above-mentioned company has its own dedicated services (e.g. small clinics, medical centres and hospitals) in different cities and towns, but mostly in oil- and gas-rich states of the country. These 'HealthCare Service Providers' (HCSPs<sup>34</sup> for short) are in direct contact with and operate under the strict observation of PIHO. They are adjusted based on PIHO's rules and regulations that echo MoP's instructions and guidelines, particularly for its health-related sections and employees. The aim is to facilitate the process of employees' medical treatments (and up to three members of their family) and fully cover their medical expenses (both retired and active employees). These HCSPs used to merely provide medical services to employees from the host company. For instance, NIOC's medical centres were only available to the employees of NIOC. However, around the year 1997, the MoP changed the regulations and announced that medical centres and their facilities would be available to the MoP's entire workforce. Therefore, employees of NIOC, for example, could benefit from the services of NIGC's HCSPs and vice versa. Although this change in regulations made the

<sup>34</sup> In this study the term 'HealthCare Service Provider' or HCSP is used interchangeably with the terms 'medical centre' and 'clinic'.

medical treatment process much easier for employees, it however made the medical centres overcrowded.

#### **5.4. How Do HCSPs Operate?**

Apart from MoP's personnel, these HCSPs are also available to members of the public; nonetheless MoP's employees have priority to be visited by doctors and more importantly, their medical expenses as mentioned earlier will be completely covered. Besides HCSPs, there are private hospitals in major cities under contract with PIHO, which provide the required medical services to employees when HCSPs are not capable to do so. In this case, when a clinic cannot give the necessary medical services (i.e. a patient must be visited by specific experts or needs immediate surgical treatment), the MoP's employee is sent from the clinic with necessary documents to one of the equipped hospitals under contract in the same city or to the nearest one in other cities. After being discharged from the hospital, the employee's updated medical documents as well as the receipt of expenses will be sent back to the former clinic to be checked and confirmed. As soon as the clinic approves the medical expenses, the document is sent to PIHO to arrange the payment to the hospital giving the services.

The condition is similar when HCSPs themselves provide the required medical services to patients. In this case, the clinic entirely covers the medical expenses of the MoP's employees but collects the necessary documents from them. After checking the accuracy of the expenses and medical documents by the 'Medical Documents and Insurance' (MDI) department, once a month the HCSP sends all the documents to PIHO to receive the expenses the clinic is claiming for. As a result, the MDI department is considered as one of the key divisions of HCSPs as they check the documents for probable fraud and deception and to confirm the actual medical costs of MoP's employees or their family members. The next section describes the situation in the medical centre under investigation.

#### **5.5. NIOC's Medical Centre**

This study exclusively focused on the NIOC's main clinic<sup>35</sup> in one of Iran's major cities, 'Mashhad'. NIOC, which is responsible for all oil-related matters in the country, is the richest company with huge turnovers compared to other business firms in this domain. NIOC

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<sup>35</sup> NIOC's Medical Centre for North East, accessed 10/09/2013, <http://msh.piho.ir/Global/Fa/default.aspx>

annually assigns a budget for health care plans to take care of its employees and thus everyone's dream is to get employed at one of the MoP's companies such as NIOC at all cost in order to benefit from the advantages it offers such as a high salary, good pension and great healthcare scheme. The medical centre under investigation, however, faced difficulties in its latest attempt (which was also the clinic's major attempt) towards work system computerisation that negatively affected the quality of medical care provided. Taking into account the NIOC's strength in financial terms and available resources, the medical centre's inability to manage an IT plan such as WSC, which had led to low quality services to patients, became a mystery in this city. People were constantly complaining about this medical centre which was considered once as one of the well-known HCSPs in the country<sup>36</sup>.

According to respondents, the major wave of computerisation in this clinic started around 2008 with the modernisation of the corresponding network. As a result of that evolutionary move, a central computerised correspondence network, called 'Barid', was set up to connect the 'secretariat' unit<sup>37</sup> to the PIHO's centralised correspondence network. The aim was to facilitate the flow of information and communication within and outside the clinic, eliminate the paper processes and to improve the efficiency and effectiveness of employees in different administrative units in order to provide higher and quicker services to patients<sup>38</sup>. This system was however terminated after about 10 months and a newer software, called 'E-Org', was introduced in mid-2009. The new application was prepared by a specific group called 'WSC group'<sup>39</sup> at NIOC's IT department in the capital.

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<sup>36</sup> NIOC's Medical Centre for North East survey result, accessed 10/09/2011 and 20/08/2013, <http://www.nioc.ir/Portal/Home/ShowPage.aspx?Object=RelatedTopics&CategoryID=40295507-1e70-49ec-af82-e5eeba6870bc&WebPartID=88fe251c-cbd4-44b2-84d3-d8bd847b4643&ID=01f0c8c6-f9ae-4e1e-9d48-223b9c102d71>

<sup>37</sup> The Secretariat division is one of the key departments within Iranian organisations which is responsible for monitoring and recording the outgoing and incoming mails from all institutions and following the flow of correspondence within the organisation and taking necessary measures to ensure their return.

<sup>38</sup> NIOC's work system automation group, aims and objectives, accessed 30/08/2013, <http://ict.nioc.ir/automation/goal/index.htm>

<sup>39</sup> NIOC's work system automation group, duties, accessed 30/08/2013, <http://ict.nioc.ir/automation/home/index.htm>

In 2010, PIHO instructed HCSPs to rapidly move towards work system computerisation in order to improve their performance. According to PIHO's guidelines, divisions with traditional work systems (paper-based processes) had to have automated work systems and those with out-dated systems had to enhance and upgrade their computer systems in terms of both hardware and software. The medical centre under investigation, hence, underwent major IT-improvements and replacements in different divisions to meet the required standards but faced challenges that affected the effectiveness of the computerisation idea. Since the aim of the present study was to enhance the current understanding of user IT adaptive behaviours to disruptive IT events, the case of NIOC's medical centre was realised to suit the research purpose. It allowed an in-depth exploration of various users' IT adaptation processes in a disruptive situation to investigate the relationship between users' IT adaptation efforts and the subsequent IT use outcomes.

It is worth briefly noting that this thesis does not evaluate the WSC project or offer a critique of its operations but reports on the challenges the IS users faced and describes the situation as expressed by them during the research in order to explain their interpretations of the situation and IT adaptation behaviours (i.e. IT usage and outcomes). The following information regarding the unreliable collaboration between HCSPs and PIHO and the clinic's IT related history have been taken directly from various employees in different departments who have been working in the medical centre since the very beginning, supplemented by a review of documents and archival records. This approach allowed for careful triangulation of information sources, crosschecking of data, enhancing the information quality and gaining insight into the history of the medical centre in terms of technology adoption.

### **5.6. Unreliable Cooperation between HCSPs and PIHO**

Over the years HCSPs became overcrowded as more people were employed by the ministry and its interconnected companies; employees who wanted to benefit from the free medical treatments. The number of HCSPs hence increased to address the increased medical needs of the ministry's employees. One of the interviewees in the MDI unit explained the situation as:

*"What else could you ask for? Employees want to benefit from the free of charge medical treatments. Here [at NIOC] they cover the employees' health and their families up to three members. Getting employed in this ministry itself is like being in the heaven... the salary is*

*good and the health scheme is amazing... they [the ministry and PIHO] take care of everything, but apart from NIOC's employees we became open to other employees too, MoP had to increase the number of HCSPs to overcome the problem of overfull medical centres" (MDI3)*

This growth in the number of HCSPs, nevertheless, made the collaboration between medical centres and PIHO more difficult. For example, HCSPs faced difficulties in manually searching their archives for necessary information (e.g. employees' past medical records, invoices, claims and receipts) and thus sometimes could not provide the PIHO with precise and updated information. Furthermore, clinics belonging to each company were storing the patients' information differently from those of other companies. This had made the communication between clinics complicated. Finally, due to receiving large volumes of medical documents, PIHO was not able to deal with requests of various HCSPs in time, which had resulted in long delays and complaints among patients.

*"We were managing our patients' records, documents and folders differently from another clinic... we [every HCSP] were like independent islands with our own ways of doing things. For example, the way we were storing the patients' records was different from NIGC's clinics so it was taking a long time to get to a specific record. PIHO had the same problem and could not deal with the stack of medical documents from various HCSPs with different formats" (MDI1)*

Additionally, the use of traditional means of communication and information exchange between PIHO and HCSPs (e.g. sending instructions and official documents to HCSPs via the usual postal mail services and responding back the same way) had worsened the situation. These impediments had consequently prevented both HCSPs and PIHO from being able to meet the ministry's expectations: to provide rapid and quality medical services to MoP's employees. For instance, delays in managing paperwork in a timely way (e.g. receipts and reports), were leading to interruption of payments to hospitals under contracts with PIHO. Hence, they would become reluctant to accept and treat MoP's employees in the future. One of the interviewees in the MDI unit stressed:

*"There were so many complaints, arguments and in some rare occasions physical fights in this clinic... checking documents for frauds is sensitive and time consuming, if we make any mistake then the blame is on us, we can't make any mistake... you consider we are A, the*



*hospital is B and PIHO is C, now employees' medical documents transfer like this, A to B, B to A, A to C and C to B with payment. All these used to happen manually and the pressure was on us. We have to be aware of all the patient's costs and expenses. We have to be aware of any changes to patient's financial records" (MDI2)*

To this end, around the year 2000, MOP asked PIHO to review the regulations, rearrange the ministry's health strategies and work harder to satisfy employees' medical needs<sup>40</sup>. During that time PIHO informally announced that they were working on a project known as 'comprehensive computerised work system' that would only take a few months to get prepared. The head of laboratory recalled the situation as follows:

*"It was around [1379 or 1380 in Persian calendar] 1999-2000 that the clinic's manager, head of MDI and I attended a meeting at headquarter in Tehran. The manager was not feeling well at that time but he asked us to accompany him to the meeting. At that time we were told that the ministry was working on a huge software package that simplifies the work routines in different divisions... they also said this package would connect HCSPs to one another and would be ready in six months... but they could not do it anyway, they are still saying we are working on it, Working on what? Who is working on what? If I had not got the new software for my division a year ago, we would still have been working with the DOS-based software. They always just say we are working on something big but no one does anything" (L4)*

While the head of MDI confirmed the meeting at the headquarters, he revealed more details about it:

*"I remember that meeting because it was my last business trip with the first manager, he was quite ill but he wanted to attend anyway. At the meeting they [PIHO officials] talked about two big projects if I recall right: one was about making clinics computerised and the other one was about creating a central correspondence network. I was excited that our department would be finally upgraded to a better and newer system. I liked the computerisation idea because they said they were trying to write a consistent software for different departments at HCSPs, for example one consistent software for HCSPs' laboratory*

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<sup>40</sup> MoP's health strategies and guidelines, accessed 30/09/2013, [http://www.nioc.ir/computer\\_services/automation/naft.pdf](http://www.nioc.ir/computer_services/automation/naft.pdf)

*divisions or a uniform software for MDI departments. That would make our work much easier... it would have been excellent if they had done it or could do it" (MDI1)*

The reviewed archival documents additionally revealed that although the computerisation plan had been referred to as a big project consisting of two parts or phases (i.e. computerising each division and automating the corresponding channel), nevertheless it was essentially three projects. PIHO also wanted to link the interrelated medical divisions within HCSPs to one another such as connecting the GPs' division to the pharmacy, reception and laboratory or connecting the administrative units (i.e. MDI, finance and secretariat units) to each other with the aim of streamlining the flow and pace of information within and outside HCSPs. In late 2008, PIHO finally after about eight years introduced the 'Barid' work system as its official corresponding channel, which was replaced shortly after (about ten months) with a newer work system called 'E-Org'. The 'Barid' application was faulty and employees were complaining about its reliability issues. The software company, on the other hand, was in a rush to sign a big deal with the clinic. Once they realised the deal had changed, they removed the application from the clinic's computers and deleted the entire database without informing employees to make copies of their e-documents. One of the respondents in the finance department who had the experience of working with both systems stressed:

*"It's a shame that within this ministry and its subsidiary companies we cannot have a reliable correspondence channel. The previous one [Barid system] was a headache and an actual waste of money and time. The company just wanted to make a deal with this clinic and earns millions of 'Tomans' [Iran's national currency unit]. I lost all my work when they terminated 'Barid'. The strange part was that the management [the medical centre's manager] was happy that the deal was off but was not concerned about the data we lost... The new one [E-Org] that is the current one is slightly better although it has faults that I have decided to use it only when I have to use it" (F4)*

Despite not being successful in achieving the other objective (making consistent software applications for HCSP's divisions) the assistant director considered the 'E-Org' work system a success for PIHO and the ministry:

*"Introducing the 'E-Org' was a success for PIHO and ministry; you do not have to expect too much from them. We had another system prior to this 'E-Org', which I did not use personally,*

*but I heard that it had too many problems but the new one seems to be better, I haven't tried the new one personally either but I have heard that it is better. The progression of such huge projects depends on people who are in charge so I think we should be happy for now for having such a system, the rest is for the future" (AD)*

One reason for this poor outcome according to informants could be that this ministry despite having all the necessary resources (e.g. big budget, powerful human resources, computer programmers, etc.), has suffered from the absence of a comprehensive approach towards this WSC project, which itself derives from the lack of stability at the managerial level. The assistant director explained this concern as follows:

*"As I mentioned before these huge plans depend on people in charge. There was no division or committee responsible for such a system in the past. Maybe they have a committee now to decide for these kinds of developments. One manager comes and introduces a plan but the next one comes and shuts the whole thing down or changes it to a high degree. That is what has happened in this medical centre over different managerial periods. If it [WSC project] was based on a systematic plan independent of who was actually in charge it would have been completed by now" (AD)*

As the comment indicates the constant change of ministers and senior managers has had a significant impact on the development of the WSC plan over the years. As a result, for some periods of time the person in charge had no faith in the computerisation project and considered the IT plan as 'a waste of money and time', implicitly or explicitly. Conversely, at other times, managers were optimistic, had power and more importantly, belief in this project and pushed everything forward. One of the interviewees referred to the role of 'connections or rapport with powerful people' in being appointed to such positions as follows:

*"Managers are usually appointed based on the connections they have instead of merit. You do not need to necessarily have the required knowledge or experience to become a manager at this clinic or generally in this country. The head of the clinic here for example does not have the managerial experience to run a place like this [a busy clinic]. They put him in charge because he might have just seemed better than the other candidates or may have had a good rapport with senior managers... and when you are assigned like this you cannot make important decisions when needed cause you do not know what to do and when to do it. For*

*example for the IT project, he [the clinic's manager] seems in between like does not say do not do it but does not push people forward either. He relies on other people's words. Sometimes managers just want to achieve their personal goals through organisational positions; we had examples of this kind of people here [referring to the second and third managers]. He [the current manager] is not like them but seems so much middle-of-the-road because does not know how to supervise and manage" (PHC2)*

According to respondents, over the past decade there has not been a single piece of news or official announcement with regard to this project; no milestone has been set and there has been no dedicated section for this project on MoP's or its related companies' websites. One of the interviewees explained her understanding of the PIHO's strategies as follows:

*"You cannot find that much information about this automation project on the ministry's or NIOC's website. There might be just general information about it, the benefits it has and so on, but do not expect to find something in detail, I mean any useful source of information that explains their strategies because they do not have any [strategy]. They do not announce such things because if they do then people may ask 'ok what happened to that project?'; therefore they keep it low, they suddenly introduce changes, you come and see computers on desks... I think they like surprises" (PHC7)*

## **5.7. Medical Centre's Computerisation Status over Different Managerial Periods**

### **5.7.1. Between 1996 and 2000**

According to interviewees, introducing the information technology and computer systems to the medical centre in terms of taking basic steps towards computerisation has a long story and heads back to around 1996. At that time, the very first manager of the clinic was a wise and respected person, who was known as a successful and determined manager within NIOC and PIHO. The head of laboratory who has been working at the clinic from the very beginning explained the first manager as follows:

*"He was an excellent manager... I have never seen anyone like him yet, he loved this medical centre, I can say this is his medical centre because he looked after this place like it was his second home... he was doing his best to provide the best possible services to patients... He did not have computer knowledge but he was receptive to new ideas and had positive attitudes towards using technology. He had an intense desire to help his employees to work*

*faster, easier and more efficient in order to provide high quality services to patients whether they were ministry's employees or public patients. He was simply great" (L4)*

At that time, when computers were quite new, very expensive and considered more as a luxury device for managers than a practical tool, PIHO sent computer desktops to every head of HCSPs in major cities. Shortly after, the head of clinic asked for additional PCs which was accepted by PIHO. The head of the laboratory recalled the situation in his memoirs:

*"One day the manager asked me to meet him in his office; Mr X [head of finance] and Mr Y [head of MDI] were also present in the office. We discussed about three or four hours about the ways we could benefit from computers. He then called the headquarter in front of us and asked for more computers... you can also ask the other two about that day if they recall. He gave his own computer to the laboratory that day. That is why I remember that day clearly... that was the very first computer in our unit. He did not want the computer to show off but to be used for the clinic" (L4)*

He then introduced the IT unit consisting of two IT-savvy employees<sup>41</sup> to start developing limited small-scale computer applications for the MDI<sup>42</sup>, reception and laboratory units. These IT staff had been asked to prepare DOS-based computer applications according to the employees' needs in these divisions. The head of MDI who was one of the two IT staff at that time explained the situation as follows:

*"Although those written computer programs were simple and could help operators with simple daily routines, since they were according to the requirements, employees became highly interested in using those applications. Besides, the clinic had four computers with totally four operators and two IT officers. This had resulted in excellent training sessions for operators to question the program's effectiveness, solve their problems and ask for new features" (MDI1)*

The clinic's manager was working constantly to get the necessary permissions from the minister to buy additional computers and expand the usage of computer systems in order to increase efficiency and reduce manual effort. He had planned to get the necessary budget in

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<sup>41</sup> IT-savvy here refers to employees who had technical and programming knowledge compared to other ordinary employees at the time.

<sup>42</sup> Medical Documents and Insurance division.

order to increase the number of computers and enhance employees' computer skills. The head of finance stresses:

*"Even until 2004-2005 [1383-1384 in Persian calendar] buying computers was very difficult in NIOC and within the ministry itself. It needed a direct order and a letter from the minister and executive directors. It was not like now you see several computers in each division... all these hardware [computer desktops] have been purchased over the past few years. The first manager was working very hard to get the necessary signatures to buy computers for this clinic" (F3)*

However, the head of clinic passed away in the fourth year and PIHO selected a replacement director for the clinic.

### **5.7.2. Between 2000 and 2002**

The second manager, in contrast, had no belief in such developments and cancelled the expansion of the computerisation project. He decreased the number of IT officers to one and announced that no budget would be spent on this or other similar projects. No improvement therefore was made to the fresh idea of computerisation within this medical centre during that time. According to the respondents, after two years PIHO replaced him due to embezzlement. His secretary who was working at the finance unit at the time of this study commented:

*"Unlike the first manager who was such a relief for us, the second one was a miserable experience. After all the first manager's efforts, he destroyed everything... I was his secretary at that time and when PIHO wanted to send more computers he replied back that we don't need any. I do not know how PIHO considered him for this position. He completely ignored the expansion plan the first manager had prepared" (F4)*

### **5.7.3. Between 2002 and 2005**

The third manager had similar attitudes and was against the computerisation project. He even tried to sell the adjacent building the first manager had bought for the future expansion of the clinic but PIHO found out and his action was instantly stopped. Similar to the previous managerial period, no development was made to the computerisation plan. As recounted by interviewees, he was finally replaced after three years due to incapability in

management and embezzlement. One of the interviewees at the MDI department recalled the situation during this managerial period as follows:

*“He tried to sell the building without their [PIHO’s senior directors] knowledge... we could not believe those things were actually happening to us... I think we were the first medical centre in the country which had started using computers in daily routines, can you believe that? The very first clinic... if the first manager was still alive and his expansion plan had been put into practice we were in a very different and better situation. He [the third manager] was so old school in his thinking... he was only thinking of himself and how to benefit from the clinic. The second and third managers had no idea about such modernisation efforts” (MDI5)*

#### **5.7.4. Between 2005 and 2007**

The fourth manager, nonetheless, was to some extent interested in the computerisation idea (compared to the latter two) and tried to start the whole process once again. He steadily added more computers to some departments and allowed the heads of finance and pharmacy units to purchase their required software applications. The assistant director who has held her position since 2004 explained the situation during the fourth management as follows:

*“He [the fourth manager] knew that PIHO was working on something and waited for them to introduce the long-delayed and long-awaited applications for different divisions. But around 2006, they [PIHO seniors] told us that the development of those applications was not possible and required more time, efforts and additional resources. He then decided to allow some divisions to purchase their required applications if wanted to. I think this [decision] made divisions like independent islands with different packages from different companies that resulted in further complications” (AD)*

Those complications concerned the expandability<sup>43</sup>, flexibility and interoperability<sup>44</sup> of the application software in the future. Negligence concerning the quality of purchasing software

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<sup>43</sup> According to the BusinessDictionary.com definition, the term ‘expandability’ refers to the ability of a computer system to accommodate additions to its capacity or capabilities. Similarly, the TechTerms.com uses the term ‘Scalable’ to refer to the same notion and explains that a ‘Scalable’ hardware or software can expand to support increasing workloads. This capability allows computer equipment and software programs to grow over time, rather than needing to be replaced.

had resulted the pharmacy software, for example, not to have a proper 'after sale' support and become out-dated over time. The head of pharmacy explained the situation as follows:

*"We could not go for the best software package out there. We had shortlisted three or four software packages from different companies, well-known companies. Two of them were expensive and top of the range but the manager had given us a limited budget to buy the required application. You cannot expect to pay less and get much in return. We knew that the software did not have a proper customer service or might not be expandable in the future. I told the manager about the available options, but he said that was fine... we cannot pay more. I think we could pay more but anyway he decided not to" (PHA4)*

According to interviewees, the fourth manager was neither concerned with the quality of the purchased software, nor was he concerned whether the new computers were being used properly to improve the users' efficiency and effectiveness at work. Instead, he wanted to introduce himself as a successful manager who computerised the clinic's work system after two disappointing managerial periods. One of the interviewees at the MDI department described the fourth manager's attitude with respect to the WSC as follows:

*"He just wanted to see computers on desks, the rest was not so important to him... this was his view of the work system computerisation. When PIHO inspectors were coming to this clinic, he wanted to show them that he has done something big for the clinic... but most of the time computers were off or not working" (MDI4)*

His managerial period took two years and the fifth manager who was the current director at the time of this study was assigned in early 2008.

#### **5.7.5. From 2008 to Present**

The current manager was promoted from a General Practitioner employee to this position in 2008 and according to the interviewees 'he got the job without having previous administrative experience at this level'. According to the respondents' comments, the current clinic's manager approaches new situations cautiously and attempts to handle them with extreme care and sensitivity, preferably with the agreements of PIHO seniors. He has very little computer knowledge and particularly with regard to the 'computerisation plan',

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<sup>44</sup> Interoperability is the ability of making systems and organisations to work together or as WEBOPEDIA definition the 'interoperability' refers to the ability of software and hardware on different machines from different vendors to share data.



has impartial attitudes. In other words, while he is not opposing the automation actively, he is not keenly pushing it forwards either. One of the respondents described him as follows:

*“When you see a person in the managerial chair who cannot make proper decisions, it means that they have probably been put in that position. We are used to these types of managers at this clinic like if otherwise happens we may wonder. He looks more or less like the previous manager. He just wants to pass the time calmly. He does not aim for big” (PHC3)*

Respondents in different divisions repeatedly mentioned two main issues about the current manager: he is either relying excessively on his secretariat’s recommendations on different matters, or using the policy of ‘wait and see’. For example, one of the interviewees explained these strategies as follows:

*“They [PIHO seniors] have assigned an experienced secretariat to an inexperienced manager to have everything under control. The secretariat division is where all the communication within and outside the clinic takes place. So I think they wanted to make sure previous problems [embezzlements and other issues during the second and third managements] never happen again” (PHC5)*

According to respondents, such recommendations to the manager concerning the computerisation project can be pointed out as follows:

- Purchasing second-hand and old-fashioned computer machines and peripherals such as scanners, printers and CRT monitors for some divisions but purchasing the cutting-edge computer systems for others including the secretariat
- Signing contracts with new-founded local IT companies for the clinic’s IT infrastructure in order to save money
- Sending employees to ICDL classes at two different times (i.e. a group of employees were sent in the morning and during the medical centre’s working hours while another group had to attend classes after the clinic’s official working hours in the afternoon)
- Severely limiting employees’ access to computer resources such as blocking USB ports, removing sound cards and CD-ROMs
- Blocking employees’ access to the Internet

As to the policy of 'wait and see', the head of clinic usually waits to receive instructions and directions from PIHO to act suitably, otherwise he leaves the situation as is. According to respondents he is a respected person, however, on the subject of decision-making he is not capable of making important and suitable decisions when needed, compared to the very first manager of the clinic who was remarkable in this regard.

*"This is his first managerial experience and he waits to be told what to do from headquarters in order not to be replaced. I am not saying that he is a bad person no, he is actually a calm and respected person but sometimes and about some events he does not know what to do such as the work system automation. The events like this [WSC] require management's extreme attention. We are not IT professional people; we need to be pushed to adopt the new ways of doing things. Currently the secretariat is deciding what needs to be done about the computerisation and he [the manager] just approves it. This is why people here are concerned and upset. He does not know most of the things that are happening here"* (PHC2)

In late 2009/beginning 2010, PIHO instructed the medical centres to: (1) computerise the manual work system in the doctors' division; (2) upgrade the out-dated computerised work systems in the MDI, laboratory, reception and pharmacy units; (3) connect the administrative divisions to the central corresponding network (i.e. connecting the secretariat to the finance and MDI units); and (4) link the medical units to one another (i.e. connecting doctors' division to the reception, laboratory and pharmacy units). Nevertheless, in doing so the medical centre faced difficulties, which affected the employees' IT adoption and IT use outcomes.

### **5.8. Status of Clinic's Divisions Prior and After the WSC**

The medical centre under investigation which was one of the MOP's main HCSPs<sup>45</sup> had several divisions, comprising of both medical and administrative units: (1) Public Health Centre (PHC); (2) Laboratory; (3) Pharmacy; (4) Medical Documents and Insurance (MDI); (5) Reception; (6) Finance; and (7) Secretariat. The first three divisions comprise the medical section and the rest of departments are considered administrative. Apart from the

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<sup>45</sup> HCSP stands for 'HealthCare Service Provider', which is used interchangeably with the terms 'medical centre' and 'clinic' in this study.

employees at the finance division<sup>46</sup>, the rest of employees who were interviewed in different divisions believed that the new computerisation project was a 'big change' to their existing work processes and a 'disruptive' event in that it had made significant alterations to their familiar work practices and thus required users to engage in extensive IT adaptation efforts. This section explores the status of each division prior and after the work system computerisation highlighting the differences, key functionalities of the new system and how changes have come about in specific instances.

### **5.8.1. Public Health Centre (PHC)**

The PHC unit consisted of doctors and nurses who did not have the necessary computer skills to work with the implemented computer-based 'patient record system'. Prior to the new IT initiative, although work processes in PHC were completely paper based, manually driven and not fast, there were no complaints from either employees or patients. Nevertheless, the clinic's management (based on PIHO's regulations and guidelines) decided to computerise the work system in this unit in order to increase the doctors' efficiency and effectiveness and at a higher level the medical centre's overall performance.

Although the aim of the WSC project at the PHC unit was to increase the pace of information flow and efficiency across this unit and related divisions (i.e. reception, laboratory and pharmacy), however, management's ambiguous strategies and the consequences of those ambiguities prevented the medical centre from implementing the system successfully. Such ambiguous strategies included: the absence of definite milestones for IT implementation progress; no clear IS strategy and allocating inadequate budgets for effective implementation, improvement, maintenance and employee training, to name a few. Additionally, the low quality of the purchased computer systems worsened the situation and gave rise to various personal and social concerns over time.

*"The whole concept [WSC project] was new to me since I had no experience of working with a PC beforehand. The traditional paperwork was fine with me but the automation was*

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<sup>46</sup> Although working with the new computerised administrative system was not mandatory for the employees in the 'Finance' department (due to the nature of their jobs which requires them to rely heavily on paper work), the interviewees, however, mentioned that if usage was mandatory, the system would have been extremely useless and disruptive. Since the focus of this study is on users' adaptive behaviours working with disruptive IT systems, the Finance unit excluded from the analysis, but employees' viewpoints and concerns were considered helpful in providing a richer context.

*something that I had no idea about it. It was disrupting to me because I had to put my mind-set into a different direction. I had to first learn computer skills and then develop them on the job. This clinic is most of the time crowded so you can imagine how difficult the situation was for me to handle both jobs... on top of these difficulties the clinic's management was not supportive, so problems that could be somehow managed, gradually evolved into one big problem... to the extent that we did not want to work with the system anymore" (PHC2)*

And with regard to the functionalities of the IT system, one of the doctors referred to the balance that was needed between the hardware and software:

*"The hardware looked so bulky and old-fashioned... it did not give me the impression I needed to engage in, you know... Although I was excited about the computerisation I was also expecting a nice hardware like, for example, seeing a nice thin LCD monitor or a thin case... the PC they put on my desk had occupied half of my desk... the software was the other part of the story... although it was eye-catching at first [since it was my first experience] but over time I realised it was not what I expected. For instance, I could not save or define a prescription that I was using the most. So every time I had to type the same medicines for different patients like antibiotics or other common medicines and I was slow in typing... although I figured it out and found a way to save it but it took me about 3 months... the application was so slow and had many bugs. Sometime in the middle of working it was causing the computer to freeze and get restarted... or it was resetting the tab I was working on without any reason. I was unable to do the basic things I needed but, for example, had a fancy feature to show the patient's photo on the screen so I knew who was entering my room. There should be a balance between the software [functionality] and hardware [power]. It was lacking the critical features but had several fancy features to change the colour of tabs and so on" (PHC4)*

Consequently, the new troublemaking IT system, which was supposed to modernise and simplify the PHC's work processes, make the patients' visit experiences effortless and improve the users' performance outcomes, was completely terminated after about eight months from its introduction.

*"I do not know how the software work behind the scene and to be honest I do not care, it is not important to me that how the storage or search processes work in a software, I just want them to work. These are the basic and 'under the hood' functionalities an office*

*automation software should have, which in our case these core features were not working properly. But, I really wanted to see features that, how can I describe it, I could really see and use in my daily routine to improve my performance, such as having a section with different templates of prescriptions for different sicknesses and being able to customise each template simply and rapidly like filing the gap. For example, having a general prescription for people who have caught a cold, and just feeling the gap for the dosage of medicine based on the patient's condition. We needed these kinds of features that speed up our daily routine not typing the whole prescription manually, which was really a frustrating experience. We had so many problems with the application, we lost our patients' records for the period we were working with the application, but I think we were lucky it was terminated." (PHC3)*

### **5.8.2. Laboratory**

Although the laboratory unit had received its first computer during the first managerial period, however the computerisation plan in this unit had not been actively developed since the late 1990s. This unit consisted of employees who had very limited and basic computer knowledge of the DOS operating system for daily routines. The old DOS-based application according to the respondents' comments was quite basic and limited in functionality to the extent that employees had to heavily rely on paperwork on a daily basis.

Due to the head of laboratory's efforts this division experienced a huge upgrade in terms of both hardware and software, and subsequently the situation was desirably and encouragingly changed for computer users in this unit. In terms of hardware, this unit (unlike other divisions) was equipped with brand-new computer systems, which could be linked to the laboratory's new purchased advanced equipment. In terms of software, this unit was equipped with one of the most advanced fully customisable Windows-based laboratory software packages available in the market. Despite its comprehensiveness, the new Windows-based application had revolutionised the work system in this unit. It had simplified, standardised and changed employees' daily routines significantly, reduced the workload over time, and increased the efficiency and effectiveness of the computer users in this division. The system was being used at the time of this study, during both phases of the research. According to the respondents and the reviewed documents some of the main functionalities of the application included:

- Creating a comprehensive archival for fast access to patients' records over time
- Ability to send SMS to patients about any delay in preparing the test results and the new estimated date
- Ability to send test results via e-mail or fax and, could be linked to other standard applications for intra-organisation activities
- Creating diagrams of the laboratory's financial position and referring patients
- Ability to insert additional information for patients (national code, email address, etc.)
- Reporting based on various individual parameters such as gender (man, woman, child and infant), insurers, disease, etc.
- Ability to add sections in accordance with laboratory experiments and needs
- Fully compatible with the laboratory's advanced equipment
- The software is regularly updated with feature extensions and improvements

*“Whatever I can think of or may need to do my job this software has it... it is rich in features, fully customisable but easy to use. At the beginning, I was a bit stressed facing all these new changes, but I learned how to use the features rapidly and properly. The software company has thought of everything to help us make the best choice to meet our needs. When I do something wrong, the pop-up error message tells me what I did wrong and guides me how to resolve it. The reporting section is really rich... apart from default pre-define reports we can also add or remove different parameters to create comprehensive and informative reports. The software also allows us to trace a specific factor in a patient's blood test, for example, to see how the pattern of that specific factor looks, so we can help doctors to make better decisions. I am quite satisfied with the application. It is more than what I was expecting. I have customised my main screen by adding the tabs and functionalities I use the most so I can rapidly access them” (L3)*

### **5.8.3. Pharmacy**

Prior to the upgrade in this unit, pharmacists were already working with a Windows-based application, although according to the interviewees' comments it was slow, unreliable and lacked key features. The employees of this unit were also working at other pharmacies in the city after the working hours of the medical centre; therefore they had a good level of computer knowledge and were familiar with different versions of pharmacy applications.

Based on their comments, however, the upgrade to the work system was still huge and disruptive to them. One of the respondents explained the situation as follows:

*“It was a huge update for us compared to the previous system. I had not worked with this specific software in other places. When I started to work with the application I was like where am I now? Where should I go now to do this task? Where is that thing? Why that tab is not here? And so on. Although these kinds of interruptions had caused disruption to my work but I was relying on my previous experiences and telling myself that over time I will learn it properly. It had slowed me down at first but I could get the job done and it was fine with me. At first, I underestimated the software and thought I could handle it based on my previous experiences but in some instances when I was in a rush I had a very hard time finding the tab I needed. At that time I realised I had to spend some time and learn the application thoroughly. Now I can say this app is one of my top choices” (PHA1)*

According to respondents, the new Windows-based software application was quite comprehensive in terms of functionality, customisation, interface and performance. A number of key features and functionalities of the new application based on the users' explanations were as follows:

- Ability to search a drug by:
  - The five-digit code of the medicine
  - Specific codes defined in the pharmacy for medicine
  - Persian name drug
  - English name drug
  - Barcode
- Ability to report on drugs sold in emergency situations
- Ability to calculate the total price of a prescription in advance
- Ability to alerts for drugs with near expiration date
- Providing comprehensive information on drug usage
- Ability to determine different selling prices according to producer companies
- Ability to change an insured prescription to a free prescription
- Ability to define the drug consumption and automatic printing
- Ability to report on insured prescriptions

- Ability to report on returned goods in a specified time interval
- Restrictions based on the expertise of the physician prescribing the drug, the dosage and type of insurance

One of the interviewees compared the functionalities of the old and new systems and indicated:

*“I knew some of the features I told you about from other places but we needed these functionalities here [in this medical centre] which the old application was lacking. I am quite happy that we have this package now. It has saved me a lot of time and efforts and it gets updated every six months or so with new features and functionalities. We also receive great customer service from the software company. Although the software initially made a disruption in our work system but now that we have learned how to use it everything is fine. They have recently updated the application and added a right-click pop-up windows which allows me to add or remove specific medicines or jumping to a new prescription instead of going all the way up the screen and click the delete button for example. I really liked the new update” (PHA1)*

At the time of the study, the software was still being used by IS users in this unit and everyone was feeling happy about it.

#### **5.8.4. Secretariat**

The secretariat, who was the only user in this unit, had the experience of working with both administrative systems (i.e. ‘Barid’ and ‘E-Org’). According to her, ‘Barid’ was the ministry’s first comprehensive attempt towards a unified administrative and correspondence network. By computerising the administrative work processes, the ministry wanted to achieve the following objectives<sup>47</sup>:

- Evolve the managerial and supervisory processes and services
- Remove paper-based correspondence and move towards paperless work processes
- Remove paper-based archival records and create digital archives
- Increased responsiveness to customers
- Decreasing costs
- Training the employees working with computers

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<sup>47</sup> NIOC’s work system computerisation: aims and objectives: accessed 16/10/2013, <http://ict.nioc.ir/automation/goal/index.htm>



- Ability to correspond with other agencies outside of the oil industry via email-exchange

Nevertheless, the 'Barid' application did not meet the expectations of IS users within the ministry and its related companies and therefore was replaced by a newer, more comprehensive application called 'E-Org'. According to the secretariat, 'E-org' was a huge enhancement in terms of features and stability compared to 'Barid', it was easier to manage and didn't seem to be losing speed compared to the prior software. Some of the added and/or improved features of the 'E-org' as described by her were as follows:

- Send and receive internal messages (existed but stability improved)
- Send internal messages to distribution lists (added)
- Ability to add a note or reminder on the received messages (added)
- Ability to define public and private records (added)
- Ability to share all or part of a workbook with another user (added)
- Defining permissions on different folders (existed)
- Search facility on the folders (improved)
- Automatic notification of receiving new messages (added)
- Fax Management System (improved)
- Record management (added)
- Defining users and their access rights (improved)

*"Now I work a lot faster. I put less effort on tasks but get more out of it. I can now make better decisions by having all the sent and received letters in front of me. I could not work this fast with Barid. Barid was ok but now that I have worked with this [E-org] I can admit that this is a lot better. The new features have modernised my work routines because as I said it has standardised the clinic's communication network and allows me to focus on the most important tasks of my job. I can find letters easier with its search facility and then by right-clicking on the file I can share it with a colleague immediately. I could not do this with Barid, with Barid I had to go to the compose tab and attach the file... E-org is life-saving to me [laughing]" (S1)*

During both phases of this study she was working with the 'E-Org' system and was quite happy and satisfied with the quality and features of the 'E-Org' application.

### **5.8.5. Medical Documents and Insurance (MDI)**

The department of 'Medical Documents and Insurance' (MDI) was another division with an out-dated DOS-based computerised work system. Since this division is one of the key units within the MoP's HCSPs with huge responsibilities<sup>48</sup> and workloads, the unit's work processes and performance needed to be upgraded in order to allow users to handle the organisational tasks more efficiently. The DOS-based application which had been created during the first managerial period was no longer able to handle the complexities of the medical documents and insurance policies, which had been evolved over the years. Because of that, users had to rely on both paperwork and computer systems and use them in parallel to perform their daily routines. According to respondents, since this division only exists in the body of MoP, very few software companies could deliver the expected software application with certain functionalities to deal with the complexities of the structure of this unit. The new Windows-based software as described by employees had several advantages over the old system as follows:

- Easier access to various accurate statistics
- Easier access to the financial records of employees in terms of past medical claims and expenses
- Enable the IS user to process the medical claims and expenses accurately and timely
- Easier access, storage and retrieval of information about statistics of the population covered by the medical centre
- Ability to share the information with another department in an integrated and comprehensive way
- Comprehensive reporting based on various parameters and factors

However, the new windows-based application had also certain limitations that undesirably influenced the positive side of the comprehensiveness of the software. Employees described two main drawbacks of the new software as follows:

1. Not being up-to-date with the latest user requirements

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<sup>48</sup> This unit checks the accuracy of employees' medical expenses and claims

2. Complexity of the new software (not being user friendly) for users with basic IT skills; as a result working with the DOS-based application was more convenient for users due to its simplicity and the basic knowledge required from them

The first issue was, in essence, very problematic for IS users in this unit. While they had asked for the addition of necessary features to the application, due to financial issues between the clinic and the software company, the addition of such details had been postponed until further agreements between the two sides. Consequently, users had to rely on three work systems (i.e. Windows-based application, DOS-based application and paperwork) for daily routines. One of the employees described the situation as follows:

*“The software is complex to me, I am not saying it not good or useful, it is but for us who have not been properly trained it is difficult to deal with. With our basic IT skills using the software is really challenging. The quality of the software is good but, for example, it is hard to navigate between the sections we are looking for but once you find the needed tab it is really great. Another problem is the addition of new features to the software... this software needs to be updated at least once a month but because of some financial problems we can get what we want so have to rely on this system [the new one], the old one [DOS-based system] and paperwork. It is too much hassle for us, why should we bother for this management? We are already under too much pressure because of the nature of our job; I personally prefer to use the old familiar application until they fix the new one” (MDI4)*

At the time of this study, the frequent visits to the MDI unit revealed that users were relying on the three work systems and were extremely disappointed. When possible, however, they were using the DOS-based version for daily routines due to their familiarity with the system and its simplicity.

#### **5.8.6. Finance**

IS users in this division due to working with financial applications for several years had reasonable IT skills and WSC in this unit only concerned the administrative/correspondence network. As to the computerised administrative network, IS users were to a high degree indifferent about the installation of such a system in their unit. The reason according to interviewees was related to the nature of their entirely paper-based work routines, which

had affected their willingness to embrace the new work system as well as the legitimacy of such work routine transformation.

*“We were not mandated I can say to use the system since they [clinic’s management] knew we are fully paper-based, and that [not being mandated] was the only good thing about our WSC... I cannot imagine myself working with that disastrous application [referring to E-Org]... there would have been severe disruption to my daily routines if I had to use it on daily basis...” (F2)*

Moreover, IS users in this unit also referred to three types of issues which had negatively affected their views with respect to the ‘E-Org’, namely: software issues<sup>49</sup>, usage issues<sup>50</sup> and support issues<sup>51</sup>. Such concerns discouraged the employees and prevented them from engaging in with the IT tasks, which was ‘formality’ to them. To this end one of the IS users explained the situation after the IT event in this unit as follows:

*“To be honest I was indifferent about the computerised administrative network because working with it was not mandatory. Although it is nice to have an automated paperless work system but I think it is too early for us to put the paperwork aside. So automation was not a big deal to me personally but the way the system was put into practice was terrible. Those three issues made me pessimistic about the chances of having a proper system in the near future. So unless we want to work with our own financial application or play a game when we are free the PCs are off” (F1)*

### **5.8.7. Reception**

The reception unit was also among those divisions that required an upgrade to its DOS-based work system, towards a better, newer, faster, more accountable and more efficient computerised work system. While the old DOS-based system had been initiated during the first managerial period in the late 1990s, it had not been developed over different

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<sup>49</sup> Software issues refer to the limitations of the E-Org application which in some instances allowed the manipulation of information by an unauthorised user and thereby made a negative influence on the beneficiary user

<sup>50</sup> Usage issues refer to the way the system was being used by the secretariat unit. For example, users in the finance unit were receiving rotated, low quality scanned letters or receiving the first page of multiple pages letters

<sup>51</sup> Support issues refer to the expectation of users in the finance unit to be thoroughly trained for the ‘E-Org’ work system, which did not happen.

managerial periods. According to the receptionists' comments, the new Windows-based reception application has made dramatic improvements in the services it offers and in the way the clinic treats patients. During both phases of this study employees were working with the new software. Some of the improvements based on the receptionists' comments were in the following areas:

- Ability to instantaneously send multiple copies of an e-letter to multiple recipients
- Ability to scan the received letters and store them in the system for further access
- Tracing the distributed letters is now possible
- Benefiting from the automated backup ability
- Ability to create various reports from different parts of the program according to the needs of the medical centre
- Ability to create various reports based on different parameters such as: doctors, insurers etc.
- Ability to customise the application based on system users' preferences

One of the respondents in this unit explained the situation after the upgrade in the work system as follows:

*"The new system has really empowered me. Although I am a beginner in terms of using the application and there are still so many functions that I may not know about but still working with the above features gives a good impression. I had a hard time working with the DOS-based software. I had to do my tasks partially on the computer system and partially on papers... it was a headache. It was a repetition of task but with the new one I save my time and efforts" (R4)*

Next Chapter presents a thematic analysis of the research findings followed by a critical discussion based on the key elements of the CMUA, which served as the theoretical lens. It exclusively focuses on the individual-level analysis of IS users' IT adaptation behaviours in each division within the medical centre.

## CHAPTER SIX - CASE ANALYSIS

### 6. Introduction

As mentioned in the methodology chapter, this study used the CMUA framework as an initial guide to design and data collecting. The reason as Walsham (1993) argues, was that empirical research without theory produces a series of anecdotes, and the research aims to avoid this by using theory to guide the fieldwork carried out as well as to provide ways of producing and communicating the results. Such a framework would aim to direct the focus of the investigators' attention to those concepts or factors that are of his/her interest. Additionally, the theory provides a framework for the critical understanding of a phenomenon and a basis for considering how what is unknown might be organised (Silverman, 2010).

However, as Walsham (1995) indicates, using theory in this way has the potential of the researcher only seeing what the theory suggests and hence using the theory in a rigid way that prevents potential new issues and avenues of exploration. In order to avoid this pitfall and remain flexible in his thinking, the author used the "thematic analysis" as the method of analysis for the purpose of finding, analysing and reporting patterns (themes) within the collected data. This allowed the author to preserve a substantial degree of openness to the field data and a willingness to modify (or reassess) the initial theoretical framework (drawing on Klein & Meyer's (1999) dialogical principle). In presenting the results, the CMUA framework was used as the main theoretical lens to systematically explain the empirical findings; however, in areas where the CMUA was silent and could not explain the emerged patterns (i.e. new findings based on the field data), two supplementary theories were used: (1) coping theory (the CMUA's underlying theory), and (2) a new typology of behaviour (approach vs. avoidance). Jointly, they helped the author to provide a more nuanced understanding of the relationship between user's IT adaptation behaviours and their subsequent IT use outcomes at the individual level. Accordingly, consideration of the supplementary theories to better explain the types of users' emotional efforts, identification of the correlated concerns (a web of major personal and situational concerns) and its relationship with the user IT adaptation process or improvement of the initial CMUA model in different areas based on the findings of the field data were the result of this flexibility and openness to the empirical data.

This chapter exclusively focuses on the analysis of IS users' IT adaptation behaviours/coping in different divisions within the medical centre to provide a better and richer understanding of the complex, processual and dynamic links between user adaptation behaviours and individual-level IT use outcomes such as performance. In so doing, the findings of the case study which comprise the following themes are presented with respect to the users' IT adaptation processes in each division: (A) the key interrelated concerns which influenced the users' dynamic adaptation processes directly or indirectly over time; (B) users' initial perception of the IT event, their early IT adaptation behaviours as well as the subsequent IT use outcomes; (C) users' evolved adaptation strategies affected by the contextual factors and the subsequent IT use outcomes; (D) other identified influential patterns such as 'emotion' in employees' adaptation processes or a particular type of IS appraisal. Before proceeding to the division-by-division analysis of user IT adaptation behaviours, it is necessary to first explain and clarify what is meant by the key interrelated concerns/contextual factors in the case study which is reflected in the 'theme A'. Accordingly, the following section (Section 6.1) includes five sub-themes and explains the main identified interrelated contextual concerns in details.

The purpose of the study, as previously mentioned, was to investigate the development of [non-IT savvy] users' IT adaptation behaviours by studying both the intended and unintended consequences of such behaviours on system use outcomes, and the way in which their reflections on these consequences altered or maintained their perceptions and thus influenced their subsequent adaptive behaviours. Such a nuanced study of users' IT adaptation processes would provide insight on how specific types of users' IT adaptive acts, which stem from specific IS appraisal, contribute to or detract from system usage and result in different IT use outcomes.

### **6.1. Major Concerns (Interrelated Contextual Concerns)**

After careful analysis, five major themes (or forces)<sup>52</sup> with personal and socio-technical characteristics were identified which not only influenced one another, but also had significant impacts on users' psychological perspectives and adaptation processes, namely:

1. *Top management influences*: the effects of top management's decisions and support

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<sup>52</sup> These major concerns are sub-themes of the theme A, which are referred to in the text as 'major concerns' or 'major issues'.

with respect to the WSC project

2. *Group discussions*: including both hopeful and undesirable discussions about the IT event
3. *Colleagues' attitudes*: becoming helpful or distant to one another as a result of the impacts of the IT event
4. *System operation*: the IT artefact, including both software and hardware aspects
5. *Employees' personal attributes*: the effects of users' IT innovativeness, self-efficacy and belief on their adaptive acts

These major themes were extracted from transcripts through thematic analysis procedures. It was noticed that these themes were the key concerns amongst employees of different divisions and had continuously affected their evaluations of the computerised work system, coping efforts, IT use outcomes and their quality of system use. The first three themes refer to the social aspects and dynamics of the IT event while the fourth refers to the technical characteristics of the IT system and finally the last one represents the employees' personal characteristics. During the course of the users' IT adaptation process, the direct and indirect impacts of these interrelated themes on users' evaluations of the situation were significant (Figure 6.1, page 156). One of the doctors explained these correlated concerns in more details:

*"Consider you are tired of working with a really faulty system that was used to be acceptable, and you are actually right about the matter but there is no one to complain to. Then you realise that the management ignores your comments and forces you to keep using the system despite its difficulties. Then you see your colleagues are also complaining and comparing us with other people [referring to the laboratory unit] for having a good system and a great atmosphere. When you are exposed every day for several months to these frustrating conditions which is worsened with disappointing group chats and useless arguments; your attitude and mood are eventually engaged and are affected over time... this happened to me sadly..." (PHC1)*

The head of the MDI (Medical Documents and Insurance) unit similarly indicated the crucial role of 'management' in WSC projects as someone who is at the top of the pyramid as follows:



*“This is my personal opinion that to be able to change, I mean a proper change, existing beliefs and behaviours have to be challenged, reconsidered or changed accordingly... to be able to change you have to be willing to consider change and take action towards it. For example, here the manager is quite indifferent, he only accepts the common paper-based letters, or the traditional paper-based instructions and letters come faster than the digital one and so many other things. The management does not support and push things forward. The culture here is like nobody does anything unless they are told and pushed forward. To me, the management’s approach and the system functionality were the main issues which affected the employees’ views directly... they were the main source of discussions in this unit and even in the clinic” (MDI1)*

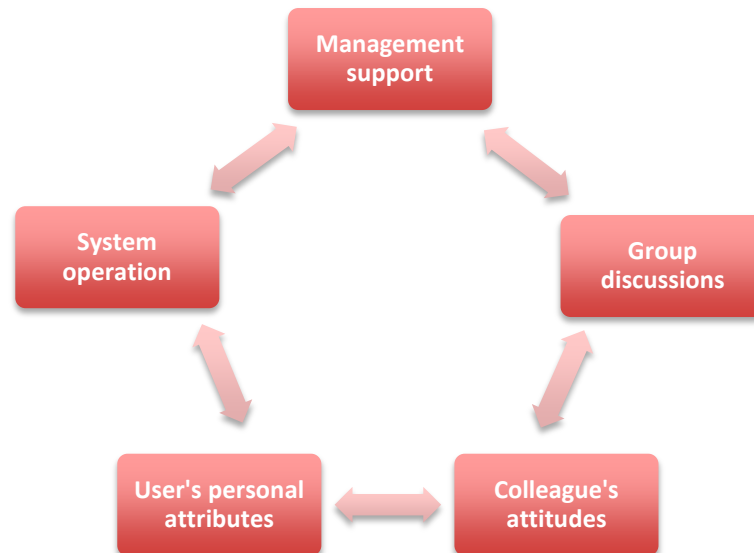
He then explained the necessity of a balance between the three dimensions of management, employees and technology to make major events like WSC a success:

*“As I said earlier, all these elements should closely work together to achieve a desired goal. People have to change themselves in the first place to think differently and to do things differently, which is a difficult task. For ordinary employees who have been working manually or with the old DOS-based systems for years, dropping familiar routines and adapting to new ways of doing things was problematic and very demanding. Using a mouse instead of a pen, facing a completely new platform like the Windows, using a brand new application with a completely new user interface, tabs, new labels and new functionalities... they were scary to employees. But the other two dimensions should also be in place to bring a harmony you know... majority of the problems we had here stemmed from these two dimensions [referring to management and technology] which gave rise to other problems” (MDI1)*

As the above quotes clarify, the identified themes were connected to one another and influenced employees’ understanding of the situation (directly and indirectly) to various extents. These correlated concerns altered users’ understandings of the IT event and led to the reconsideration of the situation in terms of either reinforcing loops (i.e. negative perception becoming more negative or vice versa) or reversing loops (i.e. negative assessment becoming positive or vice versa). These themes are explained in the following section with relevant quotes for each topic. The code names of employees in each division

will be as follows: PHC (PHC), MDI (MDI), IT (IT), Finance & Accounting (F), Laboratory (L), Reception (R), Secretariat (S) and Pharmacy (PHA).

**Figure 6.1 - The identified correlated concerns in the case study**



### **6.1.1. Top Management Influences**

Top management influences, the most prevalent theme, was noted to underlie and interact closely with other concerns, directly or indirectly, such as group discussions, colleagues' attitudes, users' personal characteristics and the system operation. This major theme surrounded two sub-arguments, including the management's (1) poor decision-making and approaches regarding the IT event (i.e. WSC); and (2) lack of commitment and support for the decisions made concerning the use of the computerised work system. Furthermore, although this theme embodied more the negative aspects of the top management's influences on employees' perceptions and subsequent adaptive acts, some contrary viewpoints were also noticed. These multiple interpretations were expressed in several narratives of the same sequence of events (e.g. computer training sessions) and helped to examine the influences that the social context had upon the users' adaptation behaviours under study by seeking out multiple viewpoints along with the reasons for them.

For example, with regard to the computer training classes, employees who had been assigned to the morning classes were pleased and satisfied with the management's decision, while those in the afternoon allocation had an undesirable and unpleasant feeling

about it. One of the respondents in the morning allocation of the computer training sessions stated:

*“The quality of training classes was not good, but at least I was in the morning sessions and I went to these classes during my working time not my personal time and getting paid like I am doing my daily routines... It was good because I could stay away from this clinic for a few hours. I heard that some of my colleagues in other units had to go in the afternoon. Going to such a low quality classes after work during your personal time without any extra bonus would be very frustrating and if I were them, I would have been complaining or something” (PHC2)*

While one of the respondents in the afternoon allocation explained the situation as:

*“Everything was terrible, everything is still terrible. No planning, no strategies, no proper training, and no reliable software, nothing. I was in the afternoon allocation and it was really frustrating. I asked the IT department, the secretariat and the management to make an exception and move me to the morning allocation, but they said no, it is impossible; this has been planned and cannot be changed. After some time I realised that they moved some of the colleagues to the morning allocation easily. I had to attend because it would increase my salary, but I did not have the required motivation to learn the computer properly... I was physically in the class, but I was either too tired to focus on what was being said or my mind was somewhere else. At least those people in the morning sessions wasted their working time not their personal time and were happy about it. But I also have to say that even those employees who were happy with some aspects of the management’s decisions were gradually overwhelmed with other concerns” (PHC8)*

Likewise, employees who had completed the computer training classes were happy to some extent (despite not learning much about how to work with the Windows platform), but those who were prevented from completing the training classes had very negative views in this regard. One of the respondents in the second group mentioned:

*“The computer classes were not too bad to me. Although the IT instructor knew that employees were attending just for getting the certificate [to have the raise in the salary] and thus wanted to pass the time, but I wanted to actually learn about the Windows environment and its features. After attending a few sessions I was suddenly told that*

*because of staff shortage I could not complete the course. We [the interviewee and his colleagues] had to stay in the clinic and we were never asked to attend another course. We had the increase in our salary anyway and by this strategy they made us silent, but they destroyed our motivation” (MD12)*

In the following, decisions with the above pattern (multiple interpretations of the same situation) are indicated by (\*). According to the interviewees’ comments, management’s poor decision-making could be summarised as follows:

- \*Employees’ multiple interpretations of the computer training courses (time allocation)
- \*Employees’ multiple interpretations of the computer training courses (course completion)
- \*Limiting users’ access to computer resources such as ‘USB ports, CD-ROMs and Internet (still perceived positively by those who had computers with full features)
- Addressing employees’ complaints regarding the IT-related issues by stating that it is their duty to make good relations with the IT department and secretariat in order to receive good attention and have their computers fixed
- Keeping the communication between the management and employees to the minimum
- Refusing to add to the number of IT staff (there were only two IT technicians for the medical centre as well as another six to seven smaller clinics in nearby counties)
- Relying excessively on the secretariat’s opinions regarding IT implementation and use among other issues
- Selecting low-cost and low quality computer institutes for ICDL training sessions
- Using the policies of “wait and see” and “keep employees silent, no matter what you do”

The lack of commitment and support was another side of the raised issues. Concerns of this kind originated from the management’s negligence and indifferent attitude regarding the use of the IT system by employees. Still under the title of top management influence, the following concerns point to the other difficulties that according to respondents were significant. These concerns included:

- \*Management’s double-sided behaviours towards the use of the WSC by stating publicly that usage is mandatory, but individually telling employees not to rely too much on it (this made some employees more comfortable but demotivated others)

- Adherence to traditional managerial approaches which were unfavourable to the computerised work system (i.e. accepting letters in paper as before, giving no response to the electronically received messages whatsoever)
- Inattention to the actual outcomes of the computer training courses and whether employees benefited from it by using the computers in practice at work
- Inattentiveness to employees' complaints and criticisms concerning the various aspects of difficulties of the new work system including both hardware and software issues
- Neglect of the loss of a large amount of information in the 'Public Health Centre' and Finance divisions
- Top management's indifference attitude towards users' system usages
- Neglect of the importance of the quality of training sessions

As to the last bullet point, several employees in addition to the difficulties they had concerning the general computer training classes, were also complaining about the number and quality of training sessions held at the clinic with respect to the PIHO's correspondence network. One of the interviewees angrily described the training workshop as follows (which was correspondingly echoed by other employees):

*"Training sessions? What training session you are referring to? There were no training sessions in that sense. I found out about the training session by myself. There was no announcement about it. They had pasted a small paper somewhere on the board downstairs where nobody could see it. The workshop was continued for more than two hours in a hot room, in the middle of summer and the quality of the slides were quite low... we could barely read the screen and understand what features or tabs she was talking about, it was very disappointing. And there was nobody from the software company... it was just the secretary in the workshop and was instructing us based on her experiences of working with the software" (PHC1)*

And disappointedly continued his talk about the quality and surrounding conditions of the training workshop:

*"The training session was a real headache... we just sat there and the secretary showed several low quality images about the different features of the application and that was it. They did not care about employees' comfort. For example, they did not even put*

*refreshments or something there [referring to snacks and bottled waters]. They even [clinic's management] do not know how to professionally hold a training session or workshop. They do not know how to motivate people; sometimes a small attention makes a big difference in employees' attitudes because we then understand that we are important to them" (PHC1)*

As it is perceived, while the first group of issues mentioned earlier represented the top management's poor decision-making and choices with respect to the IT event, the second group indicated the complementary side of the manager's responsibilities that was about providing support and required resources to encourage employees and push them forward to adapt to the IT-induced changes. Jointly, these two perspectives give a comprehensive picture of the identified obstacles in the category of 'top management influences'.

### **6.1.2. Group Discussions**

This theme represents the effects of employees' shared experiences (concerns or values) on each other's perceptions and on their subsequent adaptive actions. This theme had a close association with the pattern of colleagues' attitudes as well as personal attributes to the extent that when employees were talking about the social issues and shared influences they were referring to these concerns simultaneously. For example, the head of PHC unit stated:

*"We had numerous group discussions at that time, before starting our work in the morning or during lunchtime, sometimes both. These discussions had an undesirable effect on my mood, attitude and behaviours. Group talks are completely and directly related to people's behaviours and reactions. You cannot discuss about disturbing things and yet remain calm and relaxed... or when you are down and you hear positive talk your mood is changed positively and feel empowered. You may control yourself in a short time, but over time these talks and thoughts get you" (PHC5)*

This theme in essence signifies how influential the group discussions were in terms of affecting users' perceptions of the situation and how these dialogues gave rise to other issues. Regarding this theme another interviewee in the PHC indicated:

*"Some colleagues could not tolerate the management's indifferent attitudes and so this gave rise to negative and discouraging group discussions among us during lunch or breaks. Actually, my colleagues were right about what they were complaining about, but when you talk about something unpleasant continuously it eventually affects your behaviour... prior to*

*the system termination my colleagues had become just too harsh on each other. The system had made everything worse than what it was before. Working with such a system did not make any sense anymore” (PHC4)*

Similar to top management influences, although this theme more embodied the undesirable consequences of the group discussions, however, contrary views were also expressed. For instance, while employees in different departments were complaining about having undesirable group discussions with respect to the WSC, users in the pharmacy and laboratory units were quite satisfied with their positive, encouraging and helpful group discussions. Such group discussions in these divisions had resulted in a great atmosphere and helpful interpersonal relationships and consequently helped those with low personal innovativeness to change their mind-set, trust the technology and adapt to the new IT system. In contrast, the perception of individuals with high personal innovativeness (e.g. employees in the PHC and MDI units) were negatively affected due to undesirable discussions, which made them discouraged and reluctant to suitably use the new system.

### **6.1.3. Colleague’s Attitudes**

This theme as mentioned above was highly related to the theme of ‘group discussion’ and signifies the importance and influences of one’s attitudes on his or her colleagues’ perceptions and approaches.

*“Management’s decisions were the origin of most negative talks (if not all) which consequently affected my behaviours badly... For example, I am usually a relaxed person and do not get angry very often but during that time I was quite harsh with colleagues... you cannot talk every day about negative things and still keep your happy face, it affects you, I was treating my colleagues in a way so they knew I did not like to be bothered again with computer-related questions, I can’t believe I was behaving like that” (PHC3)*

And a receptionist’s view in this regard:

*“Negative conversations bring negative and harsh attitudes and since no one shows their anger to the management, employees become harsh to one another, I tried not to go in that direction...” (R3)*

#### **6.1.4. System Operation**

This theme apparently refers to the technical aspects of the IT event in the medical centre. While almost all of the interviewed users in different divisions were complaining about numerous technical difficulties, employees of the laboratory and pharmacy units had desirable experiences due to working with high performance and cutting-edge software applications as well as receiving great after sale support. Nonetheless, the difficulties of the IT systems based on the conducted interviews could be divided into two main groups:

- Software problems included:
  - The simultaneous use of two inconsistent work systems (Windows-based applications and DOS-based applications)
  - Unreliable and defective software applications (e.g. showing different results each time for a unique key word, not storing the entered data into the database, freezing, crashing, etc.)
  - Tedious, time consuming and non-user-friendly applications
  - Absence of proper after sale support for the purchased applications
- Hardware problems included:
  - \*Purchasing old-fashioned and second-hand computer machines, (still few employees were happy with their brand new and equipped computer systems)
  - Unreliable network equipment (e.g. printers, scanners and a slow rate of data transmission in the local network)

One of the doctors explained the difficulties he had with his new system as follows:

*“The application was not user-friendly at all. It was lacking some basic features that I could not believe it was not there. For example, it did not have the auto save option, sometimes it could not save the prescription in the database at all or sometimes the application was freezing and had to do everything from the beginning. It also did not have many routine items that we use regularly for writing prescriptions and did not allow us to customise the application the way we wanted. There was also no after sales support, can you imagine that? I was given a number that when I was calling nobody was picking up the phone and then when we complained, they [the software company] gave me a personal mobile number to call and ask my queries which again nobody was picking most of the time. Can you imagine these difficulties?” (PHC4)*



Still employees at the laboratory unit were quite happy and enjoying talking about their system:

*“Everything is great here, we have fast and modern computers, peripherals and advanced laboratory equipment which are all linked together perfectly. The system itself makes me motivated... we have LCDs now not the old-fashioned monitors, the computer case is also thin and does not occupy too much of my desk space. The application is also great, runs smoothly and it is really a comprehensive application with excellent features. We have also excellent after sales support so there is nothing to complain about” (L3)*

#### **6.1.5. Personal Attributes and Characteristics**

This theme represents the effects of employees’ personal characteristics (e.g. one’s belief, personal innovativeness and self-efficacy) on their evaluations of the IT event, which affect their subsequent adaptation approaches. This theme in essence represents how employees’ personal characteristics affected/were affected by the contextual factors or the surrounding environment in the medical centre. The head of PHC unit explained how his mood was affected:

*“Sometimes it really does not matter how open you are for example to the technology or any other new ideas, what really matters is that how well you are actually socially supported by friends, colleagues, and management. I am not saying that personal things are not important, they definitely are. But from my personal experience I think the peoples’ characteristics can be affected by the surrounding conditions over time. For example, I am a person with high personal drive and enthusiasm and at that time [the introduction of the new system] I was really excited to use the system to its fullest potential and see how things work. But the issues and problems [referring to major concerns] overwhelmed my interest after a few months... I lost my motivation totally and became completely reluctant to use the system and I stopped using it” (PHC5)*

Similarly, another employee in the MDI unit described his experience as follows:

*“I think that compared to other concerns that usually become more influential and get stronger over time [referring to the management’s influences and group discussions] peoples’ characteristics lose their impact and get weaker as time passes. I think it [personal characteristic] is important at the beginning though because it determines how you enter a*

*stressful situation like this computerisation... when you are a confident and relaxed person you usually deal with situation with ease but if you are not a confident person, you are overwhelmed by the stress; you lose your concentration and finally your efficiency. So it is important how you enter a situation but over time it is affected by the surrounding environments. Being continuously exposed to some conditions [referring to the concerns] affects you accordingly, either positively or negatively. At least I think this way because sadly it happened to me in a negative way. Management by making appropriate decisions could initially push employees forward in the direction of IT use and then by encouraging them further could get a performance out of their system usage” (MDI2)*

This pattern, however, occurred in a reverse arrangement in the laboratory and helped one of the users to cope with the situation and therefore improve his IT use outcomes gradually. He explained his conditions:

*“I really did not know how to cope with the new computerised work system at the beginning. I did not have the confidence to accept the big changes, I did not believe in myself and I was not like other people who want to try new things. At the time of introducing the new system, when I was looking at my new screen [the new Windows-based application], I was seeing different labels, menus and options inside options. I mean so many options with different functionalities which had made me feel scared, desperate, nervous and helpless. The problem was that everything was totally new... nothing similar to the old application. I was like I could no way learn all this stuff. This [WSC] was a huge change for me. I was in shock and my mind was locked... but I adjusted myself to the new situation. The great atmosphere here in this unit helped me a lot... encouraging talks, one-hour daily meetings and supportive colleagues... they shifted me to a new direction” (L5)*

As the quotes clarified, the above-mentioned themes were highly interconnected and had significant impacts on employees’ perceptions, subsequent coping efforts and finally their IT use outcomes both directly and indirectly. While in some divisions the individual-environment relationship had undesirable effects on users’ IT adaptation processes and their subsequent IT use outcomes, in some units conversely the context had promoted the users’ IT adaptive reactions and outcomes.

## **6.2. Division-by-Division Analysis of User IT Adaptation Behaviours**

The following sections represent a detailed analysis of the IS users' IT adaptation behaviours in every department of the medical centre according to the four themes of A, B, C and D introduced earlier in this chapter. Simply put, the relationship between users' IT adaptation behaviours and subsequent system usage in each division are explained with respect to these four themes. Accordingly, themes B (users' initial perception of the IT event, their early IT adaptation behaviours as well as the subsequent IT use outcomes) and C (users' evolved adaptation strategies affected by the contextual factors and the subsequent IT use outcomes) allow for a richer understanding of the process of development of IT-related user adaptation behaviours and its relationship with system usage and individual-level performance over time. Theme A allows for a comprehensive description of how such adaptation processes affected and were affected by the interrelated contextual factors. Finally, theme D allows for a connection to other identified influential patterns/ factors such as 'emotion' in employees' adaptation processes, users' specific types of coping strategies or particular types of IS appraisal.

The Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation (CMUA) was used as the main theoretical lens to systematically explain the users' IT adaptation processes. Nevertheless, since CMUA was not able to explain a number of emerged themes from the thematic analysis (e.g. users' emotion, different types of emotional efforts, etc.), the coping theory (the CMUA's underlying theory) jointly with another supplementary typology of adaptive behaviours were used (Roth & Cohen, 1986) to help explain the adaptation process. At the end of each section a table outlines the main identified patterns in each division to indicate what was so important in each division with respect to users' IT adaptation processes.

### **6.2.1. User IT Adaptation Behaviours in the PHC Unit**

Doctors and nurses in the PHC unit had initially appraised the new computerised work system optimistically and thought it would help to improve their individual efficiency and effectiveness. This perspective was the mainstream view and a common evaluation among employees of this division. The reason for such desirable risk evaluation (i.e. primary appraisal) according to respondents was derived from the fact that they were medical professionals and permanent employees of the MoP and thus had job security, saying that:

*“I was thinking to myself that working with a computer would not be harder than becoming a doctor, so this ‘computerisation thing’ wasn’t just about stress and negative thoughts for me; rather I was somehow optimistic about the new situation. Apart from this we are permanent employees so they cannot do anything to us... so nothing was really threatening me” (PHC4)*

Initial Primary Appraisal (Risk Evaluation)	Reasons
Positive	<ul style="list-style-type: none"> <li>• System users were medical professionals</li> <li>• Job security</li> </ul>

Moreover, they assumed that by introducing the new IT system they no longer needed to use paper (e.g. for writing prescriptions), their daily routines would be simplified (i.e. to be electronically linked to the reception, laboratory and pharmacy units for sharing medical results and prescriptions) and they could work faster and more accurately in dealing with patients. As a result, and despite not having the required computer knowledge to work with the new implemented IT system, users in PHC perceived the IT event (i.e. WSC) optimistically and a challenge that would hold the possibility of mastery or gain.

*“At that time I was happy about the concept of computerisation and implementation of a new work system in our division. I was personally thinking that it would be ideal. I had no idea how disruptive the system could be later on” (PHC1)*

They also initially considered the availability of the required coping resources as sufficient (i.e. secondary appraisal), meaning, they felt they had some level of control over the situation to learn and use the system (control over self and technology) and to change their traditional time-consuming daily routines. One of the doctors explained her initial perceptions of control over the situation, which made her even more positive about the IT event in this unit as follows:

*“New ways of doing things were interesting, but I felt more positive when I realised that the clinic was sending us to training sessions and paying for our classes. I was convinced that with such training classes I would become proficient in using the system in no time. I thought with the new system I could spend time on more important tasks and fine-tune my daily routines. In addition, I was expecting a cutting edge software application that would allow me to personalise it in the way I wanted... I was so excited and knew that I could develop*

*new IT skills by going to the training sessions and also asking my friends for help” (PHC6)*

The PHC Employees’ adaptation process was quite interesting since the interviews allowed the author to clearly delineate three phases. The first phase occurred from the implementation of the IT system until about two months later, the second phase afterwards until two months later (i.e. four months from the implementation), and the third phase afterwards until four months later when the system was terminated completely after eight months. In the initial phase, based on the initial promising evaluations, employees’ adaptation attempts were oriented towards taking full advantage of both the available coping resources (e.g. enhancing their computer skills) and opportunities offered by the IT system. While users were excited and engaged in practical approaches (i.e. problem-focused adaptive acts), their affirmative perspectives generated positive emotions that, in turn, reinforced their practical engagement with the new IT. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches (at least for the first couple of months) were improvements made to daily routines (e.g. writing prescriptions), faster accessing of the patients’ previous records and reporting. They felt that the system had provided them with improvements in some aspects of their daily routines and were happy about it. One of the doctors stressed his positive feeling at that time as follows:

*“At the beginning I was happy and motivated enough to work harder and spend considerably longer time to compensate the wasted time in system interruptions such as freezing, crashing, registering and so on due to the system’s random technical problems and software errors which were ultimately distracting me to do my job properly [disruption]. It was not just me though, all my colleagues had these issues but I tried to ignore those weaknesses and use the system as best as I could because I had good feelings at the time about the system. It was a new thing to me. It was kind of giving me hope to change things around here... the top management also told us that there was no need to make a hard copy of the records, just electronic records and so we just focused on the electronic one by using the system” (PHC2)*

Initial Secondary Appraisal		
Control Over Task ✓	Control Over Technology ✓	Control Over Self ✓
IT Adaptive Behaviours		
During the first phase, IS users engaged in problem-focused adaptive efforts, which were also reinforced by the users' positive emotions. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches were enhancements made to daily routines.		

As to the second phase (about two months later), the situation in the PHC unit was negatively changed since the increasing rate of both system and network failures made employees displeased. The top management's poor decision-making, on top of the technical aspects, had worsened the situation by giving rise to diverse social/group issues among employees, which influenced the users' evaluations of the WSC negatively and resulted in the generation of negative emotions. The rise in negative emotions had subsequently affected the users' practical approaches towards IT adaptation and use. One of the respondents described the situation at the time as follows:

*"System had started to malfunction after a couple of months... it had glitches that was interrupting my work and day by day these issues kept getting more serious. For example, the application started to slow down noticeably, to turn off or reboot the system or to freeze in the middle of use... but the IT department and top management did not care about our conditions. They did not even listen to our complaints. I could not do my job properly but I was being forced to use the system and get the job done at the end... I reduced my working time with the computer as a result of these problems, but I was also trying to keep myself motivated somehow, for example, by telling myself that the software application will be upgraded and adjusted soon" (PHC5)*

One of the nurses pointed out to other difficulties they faced as:

*"Management did not know how to benefit from our intense positive emotions and enthusiasm towards the adoption of IT. At first, I felt quite motivated and was eager to learn computer skills that were needed to work with the system, all because of the positive thoughts and emotions I had. But management did not use that power in the right way, instead they discouraged us. There was no training for the application at all. They installed the application and then told us that it is ready to be used... We had nothing in terms of support, neither a guidebook to see how to work with the application nor a proper after-sale*

*support, nothing, and that was only the beginning. I can say that after about three months or so we had various software and hardware difficulties. During that time I did not have the initial positive thoughts but still I was doing my best to keep myself motivated. I did not want to give up only after about four months of its introduction. I did not want to get completely discouraged” (PHC8)*

This situation lasted about two months and according to the respondents’ comments during this period employees’ perception of control decreased dramatically. As a result of this reduction, the employees’ both emotional and practical efforts were noticeably affected. The users’ positive reinforcing thoughts and emotions gradually decreased and moved towards restoration of emotional stability by seeking social help and appraising the situation more positively in order to carry on with the situation and remain motivated (approach-oriented emotion-focused acts). Moreover, the users’ problem-focused adaptation efforts was also decreased and oriented mainly towards the ‘self’ (towards learning and developing skills) since they could not do much at this point about the ‘technology’ and ‘task’ adaptation.

*“At the beginning, when I was excited about the CWS I was doing my best to learn and use the application in my daily routines. However, facing so many interruptions and realising that I could not do my job properly put me under stress; I was thinking that by improving my skills I could avoid those frustrating errors but I that was not the case. At that time, besides working with a faulty system, I had to also deal with my stress and anger which was very demanding... because of this I could not fully focus on my job, every second I was expecting something to happen” (PHC1)*

<b>Evolved Secondary Appraisal During Second Phase</b>		
Task ✘	Technology ✘	Self ✓
<b>IT Adaptive Behaviours</b>		
During the second phase, employees’ perception of control decreased and thus they engaged in the approach-oriented emotion-focused acts to carry on with the situation and remain motivated. At this stage, while users were relying on emotional efforts to reinstate their emotional well-being, they were still using the system but to a lesser extent.		

As to the third phase, after about four months from the introduction of the computerised work system, when the demanding situation continued without much improvement, doctors and nurses stopped working with the system at different points in time. However,

every time they were forced to reuse the system, which had undesirable effects on employees’ cognition and emotions. At this stage, the PHC employees who initially were excited and motivated about the automated work, and were taking tangible steps towards the use of the computerised work system, found the situation extremely disappointing and unacceptable when confronted with various situational concerns. Negative social influences such as colleagues’ attitudes and group discussions resulting from management’s poor commitment and support in addition to the technical difficulties eventually affected employees’ willingness through iterations of re-appraisals and made them discouraged to further use the computerised system.

As to the three components of adaptation (task, tech and self), doctors perceived that they no longer had control over the work since with a faulty hardware and software and no after-sales-support not only they were unable to adjust their work routines but they could hardly spend time on daily tasks (work). Furthermore, the software had started to fail months ago and the promises about adding features by the responsible company were not kept (technology) which had resulted in inoperative software. According to the respondents there was no point after all to take the ‘self’ component seriously in the absence of the ‘work’ and ‘technology’ components.

<b>Evolved Secondary Appraisal During the Third Phase</b>		
Task ✖	Technology ✖	Self ✖
<b>IT Adaptive Behaviours</b>		
During the third phase, when the stressful situation continued, users’ adaptive strategies were heavily dedicated to emotional efforts and moved towards avoidance-oriented emotion-focused acts in order to reduce the stress level and restore their emotional stability which diminished users’ practical efforts and their outcomes.		

*“Why should I have put too much effort on that automated work system when they [the clinic’s management, IT department and IT company] did not care at all about the whole automation project or our frustrating experiences working with the system? I stopped several times working with the system since everything was terrible... working with that faulty system was even difficult for IT-skilled people” (PHC6)*

And explained her experience of the IT event as a whole:

*“Apart from the technical problems the quality of training sessions was quite low... I personally did not expect that... over time we realised we could rely on neither the*



*automated work system for daily routines, nor the technology as hardware and software, nor the training sessions to learn something useful... nothing, we were just trying to minimise the drawbacks of the IT system on ourselves and on our daily routines..." (PHC6)*

Some of the drawbacks of the IT system included: considerable wasted time and efforts due to slow running computers as well as faulty and difficult to navigate software applications (e.g. writing a prescription was taking a long time due to system crashes), conflicts with patients about the excessive waiting time and struggles with colleagues (e.g. group discussions and colleague's attitudes). In this regard, one of the doctors stressed:

*"Tell me why would a clinic automate the work systems? To worsen the situation or to make it better than what it was before? The appointment time for each patient had been increased from roughly 10-15 minutes up to two hours... it was frustrating, for us and our patients... still management was asking why the performance is low, work harder or I will force you to work harder... The replacement of such a traditional paper-based work system with a reliable and faster networked database system would, if effective, be quite revolutionary" (PHC2)*

During that period, employees relied heavily on their emotional stability to deal with the stressful situation (avoidance-oriented emotional acts) that resulted in a minimum or no usage of the IT system. They used the system to the extent not to get blamed by the top management and engaged in superficial use. According to the interviewees' explanations of the situation some doctors had tried to cognitively detach themselves from the situation by not thinking about the situation. Others tried to avoid using the system whilst others tried to escape the situation not only by trying not to learn it but also by not using it. They were taking frequent breaks to be away from the situation. One of the interviewees explained his avoidance and escaping strategies as follows:

*"I took a few days off to move away from that disappointing and upsetting situation for a short time... when you are at the core of a problem you are overwhelmed with stress and thoughts... sort of emotional pain... that was what happened to me, it is difficult to detach yourself emotionally when you are exposed to problems... I needed that space to think and plan my next move" (PHC3)*

Similarly, another respondent explained his emotion-oriented avoidance strategies as:

*I tried not to think too much about all the troubles we had gone through. It had negatively affected the quality of my services to my patients that once I was delighted about it. These problems [referring to major concerns] affected every single person in this division. I had become too discouraged to use the system, although I tried to keep my hope and courage but I could not... I even took a few days off to calm myself down” (PHC1)*

Another employee gave these reasons for his short-time breaks:

*Problems [referring to major concerns] had negatively affected our [referring to himself and other doctors] attitudes to a high degree. I was in a circle of negative thoughts and talks that was discouraging. I did not want to even touch the computer. We had become unfriendly and unsupportive to each other... I am a calm person, for example, and handle everything with ease, but during that time I was so upset, even at home... I had many arguments inside and outside of the clinic. I preferred personally not to use the system than asking others for help” (PHC2)*

<b>Patterns of User IT Adaptive Behaviours</b>
IS users’ positive and challenge appraisals were negatively influenced by the major concerns and altered over time through the re-appraisal process. The correlated themes embedded in the context first altered users’ coping efforts negatively and then reinforced their undesirable perceptions over time and resulted in a shift from the approach-oriented acts towards avoidance-oriented emotional acts.

Finally, another doctor described the changes in his adaptation process as follows:

*“Few months back, I was doing my best to keep my initial hope and optimism by trying to learn more or at least asking other people to support me. I was telling myself that everything would be fine eventually, but people who were responsible for the automation process and the system maintenance did not do what they were supposed to do. All those good perceptions and emotions changed to semi-good feelings and then became bad feelings to me and directly affected my system usage. Doctors preferred to stay away while they could. We finally stopped working with the system. What was the point of computerising the work system after going through all these difficulties and not having the efficiency and effectiveness?” (PHC4)*

Finally, after eight months of its introduction, the computerised work system in the PHC unit was completely terminated. They rolled back to their prior traditional work system while

they completely lost the digital records of their patients during the automation period. Frequent dialogues with both doctors and patients in the PHC division during the both phases of the research also revealed that they were feeling more satisfied compared to the computerisation period. One of the patients explained the situation after the WSC termination in this division as follows:

*“Now everything is much better compared to last year this time. It was a very bad experience for us... we had to queue here for hours... it was also frustrating for doctors too, I could see how desperate they were to visit us and to work with the computers. Now everything is again paper-based with less hassle” (Patient9)*

Table 6.1 (next page) summarises and outlines the explained patterns in the PHC unit.

**Table 6.1 - Summary of the key user adaptation behaviours in the PHC unit**

Highlights of user IT adaptation behaviours in the PHC unit
<ul style="list-style-type: none"> <li>• During the first phase, IS users engaged in problem-focused adaptive acts, which were also reinforced by the users’ positive emotions. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches were enhancements made to daily routines.</li> <li>• During the second phase, employees’ perception of control decreased and thus they engaged in the approach-oriented emotion-focused acts to carry on with the situation and remain motivated. At this stage, while users were relying on emotional efforts to reinstate their emotional well-being, they were still using the system but to a lesser extent.</li> <li>• During the third phase, when the stressful situation continued, users’ adaptive strategies were heavily dedicated to emotional efforts and moved towards avoidance-oriented emotion-focused acts in order to reduce the stress level and restore their emotional stability which diminished users’ practical efforts and their outcomes.</li> <li>• IS users’ positive and challenge appraisals were negatively influenced by the major concerns and altered over time through the re-appraisal process. The correlated themes embedded in the context first altered users’ coping efforts negatively and then reinforced their undesirable perceptions over time and resulted in a shift from the approach-oriented acts towards avoidance-oriented emotional acts.</li> <li>• Users’ extreme emotions (positive or negative) and appraisal influenced one another in a reciprocal way.</li> <li>• IS users in the PHC unit switched between different types of adaptation strategies which led to various system usage and IT use outcomes.</li> <li>• Users’ secondary appraisal (evaluation of coping resources) in different instances influenced their primary appraisal (evaluation of risk) representing parallel processes and not a sequential order.</li> </ul>

### 6.2.2. User IT Adaptation Behaviours in the Laboratory Unit

All IS users in the laboratory, except one, welcomed the new system and saw it as an opportunity to improve their jobs and overall performance although they were to some extent computer users (due to working with DOS-based systems). Users also felt that they had high levels of control over the situation to learn and use the system (i.e. an advanced fully customisable Windows-based software application) and to integrate and improve their work routines. One of the employees who had welcomed the new system explained his positive feeling and understanding of the situation, saying:

*“Although I welcomed the new system and was seeing it as a big positive change in our unit and in my daily routines but I was also a little bit stressed to be honest... but I was relieved after I felt that we had the proper coping resources to deal with the new system. We were going to the clinic’s training sessions; we had several workshops specifically for the new application and the software company sent someone to guide us step by step. We also had a daily one-hour meeting here [the laboratory unit]. I can say that viewing the resources available helped me a lot to get over the stress and feel positive.” (L3)*

While other employees were emphasising the importance of having a powerful and reliable application software, they considered the matter of availability of coping resources as ‘more influential’ in adapting to big organisational projects such as WSC:

*“This is my opinion, if you do not have the necessary coping resources such as good training/ preparation classes, good after-sale support or supportive colleagues, it does not matter whether you have the best software in the world or not, because you cannot use the software as it is intended? You cannot benefit from it.” (L2)*

Dominant Initial Primary Appraisal	Reasons
Positive	<ul style="list-style-type: none"> <li>• Employees were to some extent computer users</li> <li>• Job security</li> </ul>

One of the employees, however, had a different perception and appraised the system as a threat. According to his comments, he was not an IT innovativeness person, had little self-esteem and was afraid not to be able to work with the new complex system. Therefore, he had been preoccupied with distracting thoughts that the new system might cause him to make errors or lose data in this sensitive unit. He also felt that he had little control over the

technology and its usage, to develop his IT-kills and to adapt his daily routines to better fit with the technology. He explained his condition at that time as:

*“During that stressful situation I was so scared and had no idea how to cope. The software seemed to be so complex and the whole thing was new to me... it was about time for fundamental changes in every aspect of our work... for example, when I was looking at the computers’ screen I was seeing new names, new features and, more importantly, a completely new working environment which was scary to me. Others were happy about new features but I wasn’t. For example having an option to email, fax the results or texting the patients about their results, reporting based on various individual parameters or having new classifications of tasks were too much for me to bear. I am not a person with a high level of technological innovativeness; I was good with my old system... I am an old school guy” (L5)*

Stressed employee’s Initial Primary Appraisal	Reasons
Negative	<ul style="list-style-type: none"> <li>• He was not an IT innovativeness person</li> <li>• Lack of self esteem</li> <li>• Preoccupied with thoughts that the new system might cause him to make errors</li> </ul>

As to the adaptation strategies, the first group engaged in practical approaches to take full advantage of the opportunities offered by the new system. Employees were happy for several reasons. First, they had been equipped with one of the most advanced laboratory software packages available in the market which had revolutionised, simplified and standardised their work routines. Second, due to the efforts of the laboratory’s manager this department had been equipped with brand-new computers (unlike other divisions). Third, the laboratory manager had organised a daily local one-hour meeting in the department so employees had the chance to share their experiences, make suggestions and help one another. As a result of these efforts, IS users in this unit adapted the technology (e.g. learned to personalise the software application by modifying the system interface based on their needs), the work task (e.g. focused their time on more important activities by modifying the procedures and learned to make comprehensive reports) and themselves (e.g. developed their IT skills by attending the clinic’s training sessions and the software company’s training sessions, seeking help from both the laboratory’s manager and software company and using the support documentation). All these aspects jointly had resulted in a great atmosphere in this unit.

*“Thanks to our manager [the laboratory’s manager], his idea of group discussions was very supportive and extremely useful... we learnt (and we still do learn) a lot from each other... we shared our mistakes too... everything was so good and encouraging and we were trying to use the system to its fullest.... For example, the new software has a feature that we can text patients to come and collect their results. At that time we were working around this feature trying each other’s mobile number to see how it works or how to fax the result or to email it. The reporting feature was also comprehensive. We could report on whatever we wanted something that we could not do on the previous system. But I should also tell you something that he [the laboratory manager] tried to keep us on the track by repeatedly saying that this system is tricky, you have to be very careful with its options, don’t think just because it is the best package out there you can be laid-back” (L2)*

<b>Highlights</b>
Users in the laboratory equipped with a state of the art hardware and software which desirably influenced the first group’s evaluation of the IT event.

Another respondent explained the consequences of the adoption of such a strategy by the laboratory’s local manager as:

*“To be honest it was stressful when the laboratory manager was telling us every now and then to be careful, it's tricky and so on... I was double-checking everything... but I think this strategy at least worked for me and I am sure it worked for others too. This motivated me to attend the meeting sessions to learn more about the new system’s features and capabilities. He [the laboratory manager] did not want us to be laid-back about the system... My feeling was like I was happy about the new system’s features because it had simplified and professionalised my work routines [referring to the comprehensive reporting features and providing a better customer service experience], but at the same time I was also worried whether I had done some tasks properly so I was telling myself let’s do it again” (L1)*

<b>Highlights</b>
IS users’ (first group) positive appraisal were reformed into the appraisal of challenge by the laboratory’s manager in order to keep them engaged with learning and using the system.

In contrast, the adaptive acts of the user with the threat appraisal oriented toward addressing his emotional distress. According to his comments, while he had no system usage and outcome, he relied extensively on distancing strategies in order not to think too

much about the stressful situation. He also engaged in avoidance-oriented emotional efforts to lessen the pressure of the new situation by taking a break for a few days. He explained his conditions as follows:

*“I could not stand the situation so I took a few days off. I needed that break to reorganise myself. During the first couple of weeks, even when I was in the office I was trying to occupy myself with some paper works and I asked my colleagues to cover my work during that time. My mind was locked. I thought I was not able to learn and use the system, I was not even attending the one hour meeting in the department” (L5)*

The laboratory’s manager explained the employee’s situation during that time as:

*“He was not feeling well during those stressful moments, it was a big change for everyone especially for him... when he came back from the break I thought I had to do something but I did not put any pressure on him and did not push him forward with force, when your mind is locked you can’t do much... I decided to help him to cope with the new situation but not by forcing him, rather by persuading him that the new system is worth the hassle” (L4)*

He then explained his strategy to keep the first group on the right track, stating that:

*“I had to make him [the stressed employee] motivated but keep others motivated... I tried to make this ‘change in the work system’ and ‘upgrade in the computer system’ a challenge for the first group because when you feel challenged you think you can do something but you also have worries, this keep you on the track and to work harder, this strategy actually helped them to learn the new features quickly... otherwise just making them feel positive about the system does not guarantee they will use the system to its fullest potential” (L4)*

Stressed User’s Initial Secondary Appraisal		
Control Over Task ✖	Control Over Technology ✖	Control Over Self ✖
<b>IT Adaptive Behaviours</b>		
Due to his initial negative IS appraisals (primary and secondary appraisals) and personal characteristic, the threatened user relied heavily on the ‘avoidance-oriented’ type of emotional efforts to address his emotional distress. As a result of the distancing and avoidance strategies he had neither problem-focused adaptive acts nor IT use outcomes.		

In order to address the issue, the local manager asked the threatened user to attend the daily meeting without having to participate in discussions. Through these meetings he realised that the new system could be more of a help than hindrance:

*“Conversations and colleagues’ experiences of the new system were motivating but I still doubted it. They were initially just normal conversations to me... but one day the manager asked me to prepare a comprehensive report manually. It was tough but I did it in about 3 hours. Then he showed me the whole reporting process with just a few clicks and got it done in 4-5 minutes... It was amazing” (L5)*

Apart from the local meetings, he also referred to other influential factors which had resulted in a more positive and hopeful re-evaluation of the situation:

*“The atmosphere was great. My colleagues were so friendly and supportive since the very beginning to the extent that I never asked the clinic’s IT department for any help. I was also in contact with the software company’s customer service and they were also very helpful. The system was fast and reliable, although complex but it was easy to understand and easy to be personalised based on our needs. The workshops held here were managed in a professional way. Two IT personnel from the software company came and presented the software and its features. Then in a one- to-one basis we went through the different options and menus... about the workshop everything had been professionally managed. This level of attention to details really caught my eye. For example, during the training sessions, the manager were providing us with refreshments... when I saw this kind of attention and support from the laboratory’s manager I wanted to do my best and learn the system” (L5)*

<b>Highlights</b>
Users in the laboratory benefited from a friendly and supportive atmosphere, which desirably influenced their IT adaptation process.

His avoidance-oriented emotion-focused strategies gradually changed and improved into continuously seeking help and positive reappraisals (approach-oriented emotion-focused acts). While he still did not have noticeable personal performance, positive evaluations and actively seeking help encouraged him to be more engaged in practical efforts such as developing IT skills and learning how to use the system and its features. After a few months, the system was no longer a threat to him but an opportunity to do his daily routines in a



more efficient and effective way. He had restored his emotional stability, minimised the perceived negative consequences of the IT by learning how to use it in his daily routines, and was happy about it.

<b>Highlights</b>
The threatened IS user switched between different types of adaptation strategies which led him towards gradual enhanced system usage and IT use outcomes.

*“I could not believe I did it to be honest. I was so afraid and discouraged at the beginning. I only knew how to work with papers and with the DOS-based system. The new system was a big change for me and overwhelming but I managed the situation with the help of my colleagues and the laboratory’s manager... now I am the person who does most of the talking about the system in the daily meetings” (L5)*

<b>Stressed User’s Evolved Secondary Appraisal</b>		
Control Over Task ✓	Control Over Technology ✓	Control Over Self ✓
<b>Evolved IT Adaptive Behaviours</b>		
After a period, the unit’s great atmosphere resulted in a more positive and hopeful reappraisal of the situation by the stressed user to the extent that his avoidance-oriented emotion-focused strategies gradually improved towards approach-oriented emotion-focused acts. He eventually reached IT performance outcome as a result of achieving positive IS appraisals (appraising the system as an opportunity and taking advantages of the coping resources), having empowering positive emotions and engaging in problem-focused acts.		

Observation of the department’s local meetings for several weeks also confirmed his comments as well as other users’ involvement in conversations, their willingness to openly share their experiences, mistakes, new findings of the system’s capabilities or working together to address a raised issue. At the time of interview the user mentioned that he had both efficiency (e.g. work faster, make fewer errors, save time and effort) and effectiveness (e.g. reach improvement in the look and quality of reports and the comprehensiveness of the produced reports and provide higher quality services to patients) in his job.

During the second phase of the research, the laboratory’s manager indicated that IS users in this unit, including the ‘used-to-be-stressed employee’, were using the new system proficiently and had reached the performance outcomes he was expecting:

*“Now I am pleased with the way they do their daily routines. They are now very good at using the software package and they have reached performance outcome that I expected.*

*They can now create complex and comprehensive reports which they were unable to make beforehand. They now work in a managed way and use the system's features in an effective way. I am really happy about the situation now" (L4)*

They mentioned that since the first interview in 2011 several features had been either enhanced or added to the application which had made their works more organised, updated and timely. The second phase interviews also revealed that users in this unit had quite positive IS appraisals (both primary and secondary appraisals) backed up with positive and empowering emotions which had resulted in users' practical approaches (problem-focused adaptation efforts) to take advantage of the system's capabilities.

*"Over the past year we have learned how to use the software's various features. For example, now we are able to prepare complex reports which have so far helped us to identify and relate some of the patients' syndromes to each other, to create diagrams of the laboratory's financial position and so many other charts and useful visual representation of data. Now we all feel that we are doing something interesting and valuable" (L2)*

The used-to-be-stressed employee also explained the situation as quite encouraging, saying that:

*"Now I don't get upset when I see a new feature in the software. They recently updated the software which allows us to compare someone's recent test with his/her previous results so we can provide doctors with better information. If the workload allows sometimes I even work on my own to practice various reports and charts. I have also bought a computer for my family and every night I spend some time learning more about various features of the Windows operating system and reading online news" (L5)*

Table 6.2 outlines what was specific about this unit with respect to the user IT adaptation behaviours.

**Table 6.2 - Summary of the key user adaptation behaviours in the Laboratory unit**

Highlights of user IT adaptation behaviours in the Laboratory unit
<ul style="list-style-type: none"> <li>• Due to his initial negative IS appraisals (primary and secondary appraisals) and personal characteristic, the threatened user relied heavily on the 'avoidance-oriented' type of emotional efforts to address his emotional distress. As a result of the distancing and avoidance strategies he had neither problem-focused adaptive acts nor IT use outcomes.</li> <li>• After a period, the unit's great atmosphere resulted in a more positive and hopeful reappraisal of the situation by the stressed user to the extent that his avoidance-oriented emotion-focused strategies gradually improved towards approach-oriented emotion-focused acts. He eventually reached IT performance outcome as a result of achieving positive IS appraisals (appraising the system as an opportunity and taking advantages of the coping resources), having empowering positive emotions and engaging in problem-focused acts.</li> <li>• Users in the laboratory equipped with a state of the art hardware and software and benefited from a great, friendly and supportive atmosphere, which desirably influenced their IT adaptation process to a high degree.</li> <li>• IS users' positive appraisal were reformed into the appraisal of challenge by the laboratory's manager in order to keep them engaged and enthusiastic about learning and using the system.</li> <li>• Users' extreme emotions (positive for the first group and negative for the threatened user) and their IS appraisals influenced one another in a reciprocal way.</li> <li>• The threatened IS user switched between different types of adaptation strategies which led him towards gradual enhanced system usage and IT use outcomes.</li> <li>• Users' secondary appraisal (evaluation of coping resources) in different instances affected their primary appraisal (evaluation of risk) representing parallel processes rather than sequential.</li> </ul>

### **6.2.3. User IT Adaptation Behaviours in the MDI Unit**

Although all IS users in the MDI unit principally liked the idea of 'work system modernisation' and saw it as an opportunity to gain new skills, improve their working procedures and even achieve career progression (primary appraisal), however, their evaluations of the availability of the coping resources and the level of control they felt they had over the situation to deal with the IT event varied (secondary appraisal). Out of the five interviewed, four users in this unit indicated that they had initially welcomed the upgrade to their existing system and saw it as a 'challenging task' which required time, effort and various coping resources to be handled successfully. These users also felt that their coping resources were satisfactory to learn and use the system (self, tech) and to improve their

sensitive and huge work processes (task). One of the respondents in this group described his perception of the IT event as:

*“At first I was really optimistic and kind of hopeful about the new system in our unit. When I was talking to my colleagues about the new system our views and conversations were positive and encouraging. We all thought that we would be equipped with a reliable software that fits the sensitivity of this unit and could address the difficulties we had with the old DOS-based application. But having a good training is as important as having a strong and reliable software because if they provide you with the best available software, but you do not know how to click a button, for example, it’s no use having such an enhancement in your work system... I personally thought that we would receive good trainings and support about both working with computers and the new MDI application. I was therefore very motivated and excited to work with the new system, I stressed a little bit, but I was hopeful” (MDI3)*

Similarly, another interviewee who felt challenged about the IT-induced changes in her unit described the situation as:

*“The IT event was not a threat to me... In no way it could be a threat because I am the permanent employee of the MoP and have the peace of mind; so I did not see it as a threat. In fact, I was happy about the IT changes, but I can say it was more than just happiness to me. I was kind of happy and stressed at the same time, a mixture of happiness and worry... I can say, maybe because I was going to experience something completely new. Although I had no idea about the new system [referring to the Windows platform and the new application] but I felt like with training sessions and a proper support I could learn it fast and use it in my work” (MDI4)*

<b>Highlights</b>
As a result of their preliminary desirable evaluations (both primary and secondary appraisals) and positive emotions, MDI’s employees were engaged in problem-focused adaptive acts, and their positive perspectives reinforced their practical and emotional adaptive efforts.

One of the employees in this unit, nevertheless, had a different perception and despite appraising the system as principally helpful, he did not feel he had control over the situation and considered the availability of the coping resources as inadequate. This employee was

the head of MDI who was pessimistic about the consequences of the IS changes in his unit. He explained the reasons behind his views at the time of upgrade as follows:

*“From the very beginning I knew that there would be a problem in terms of either the application itself or the IT infrastructure or the support or even all of them together. I have been in this clinic for so long and therefore I knew how things were going to turn out. Once at this clinic the problem was getting the hardware, now it has moved towards getting the right software with proper support. Having a proper support is in fact very critical especially for people who are beginners in terms of IT skills and does not have the required computer knowledge... I could not be excited about the IT changes but had to control my opinions as the head of the unit” (MDI1)*

The IT adaptation behaviours of employees in the MDI unit were noticeable and revealed two major alterations in their IT adaptive processes. The first phase occurred during the preparation phase when employees were being sent to the computer training sessions, and the second phase occurred afterwards, when employees were working with the new Windows-based application software. Based on their preliminary desirable evaluations (both primary and secondary appraisals), employees’ adaptation efforts were initially oriented towards taking full advantage of the computer training sessions in order to enhance their computer skills needed to work with the new system. They were engaged in practical approaches and as mentioned during the interviews; their positive perspectives reinforced their practical and emotional adaptive efforts. One of the respondents explained her practical approaches as follows:

*“I was working hard at that time to learn how to work with the Windows environment. It was before the installation of the application on our computers and we were practicing, chatting and supporting each other to better understand the new working environment [Windows] and its various features. I was extremely happy about learning the Windows program, or as professional people like you call it ‘Windows operating system’, because I have children at home and I could also use this training sessions for personal use and see what they do on the computer. I even studied on my own initiatives to increase my knowledge about the Windows and computer in general” (MDI4)*

Nevertheless, the clinic’s management due to staff shortage decided to reduce the number of attendees and only allow the head of MDI to carry on with the course, therefore

prevented the rest of employees from attending the training sessions. After this incident, employees' perception of control decreased and their positive reinforcing thoughts and emotions oriented towards restoring their emotional stability. According to the interviewees' comments, their positive emotions decreased into seeking social help, positive thinking and positive comparisons in order to carry on with the situation and remain motivated (approach-oriented emotion focused acts). One of the interviewees whose training classes had been cancelled explained the situation as:

*"You can't believe how disappointed we were. They did not know how to use the employees' positive emotions for learning and maximum efficiency. I was feeling down but we were told that it would be temporary so I tried to remain optimistic and keep myself motivated by saying that, for example, the situation would get better soon or saying to myself that management might be right, we are busy in this unit and there was nothing I could do about it" (MDI2)*

<b>Highlights</b>
The users' evolved adaptation behaviours went through different stages. First, the prevention of computer training sessions decreased employees' perception of to a degree that their positive reinforcing thoughts and emotions decreased into approach-oriented emotion-focused acts (e.g. seeking social help, positive thinking and positive comparisons) in order to carry on with the situation and remain motivated.

However, a dramatic undesirable shift occurred in employees' evaluations and emotions once they realised that the cancellation was not temporary but permanent (from approach-oriented emotion-focused acts decreasing towards avoidance-oriented emotion-focused acts). At this stage, employees who originally had high personal innovativeness were excited and were ready to take tangible steps towards developing their computer skills, found the situation extremely disappointing and unacceptable.

*"I was angry and very disappointed at that time. I was feeling completely down by this decision. They killed the motivation in us. I was really speechless. We were the only people whose classes were cancelled and we were definitely among the minority who were really motivated about the 'learning' idea. The top management at the end increased our salary similar to other employees like we had obtained the certificate... to make us calm or silent... but the cancellation decision demotivated us" (MDI5)*

During that period, employees heavily relied on their emotional responses such as distancing and avoidance strategies (avoidance-oriented emotion-focused acts) which even affected the usage of their not yet upgraded DOS-based systems. They used the system to the extent that not to get blamed by the top management. One of the respondents stressed:

*“Management’s decision gave rise to negative talks in our unit and affected our moods dramatically. I could not concentrate on my work at that time. We were talking a lot about the management’s decision. I took a few days off... It had demotivated me to even use the existing system. I was trying not to think about the management’s brilliant decision-makings. For example, they did not even change the time allocation; they just cancelled the whole thing. When you do not have something, it is ok, but when you are given something that makes you feel empowered and then it is taken from you it hurts” (MDI4)*

<b>Highlights</b>
Once they realised that the cancellation was not temporary but permanent, a dramatic undesirable shift occurred in employees’ adaptation behaviours from approach-oriented emotion-focused acts towards avoidance-oriented emotion-focused acts. Reliance on the avoidance and distancing strategies resulted in a minimum or no usage of the current system.

And the head of MDI explained the situation as follows:

*“There was no logic whatsoever behind that decision. I even talked to the management to at least allow two or three of them attend the course or reallocate them to the afternoon classes, but they said no. My employees were so disappointed and down. We had so many negative discussions here. They even reduced their system usage. They had negative opinions about everything. They had become short-tempered, poor listeners and distracted. I tried hard to ease the situation and moderates their views by teaching them how to work with the Windows operating system or other software such as Microsoft office” (MDI1)*

Local manager’s efforts, according to interviewees’ comments, were described as helpful, hopeful and quite positive. One of the interviewees explained the influences of such attempts on his approach:

*“He tried to change our negative views gradually and he succeeded. He started to teach us how to work with the Windows program and his attitude was very supportive. His encouraging attitude influenced me positively and lessened the disturbing feelings I had. I cannot say I was motivated again like the very beginning, but it was ok. I started to chat*

*about the system with others and telling myself that the situation would get better over time” (MDI3)*

As the quote clarifies, the head of MDI’s efforts progressively changed the employees’ disturbed views about the IT event to some extent and resulted in an improvement in their IT adaptive behaviours from avoidance-oriented emotion-focused acts (e.g. avoiding and distancing themselves from using and thinking about the system) towards more engaging behaviours and approach-oriented emotion-focused adaptation acts (e.g. seeking help from colleagues, reappraising the situation positively and engaging more practically with the current DOS-based system).

<b>Highlights</b>
Due to the MDI’s manager’s efforts, employees’ IT adaptive behaviours were improved to some extent from avoidance-oriented emotion-focused acts (e.g. avoiding and distancing themselves from using and thinking about the system) towards more engaging behaviours and approach-oriented emotion-focused adaptation acts (e.g. seeking social help, reappraising positively and engaging more practically with the existing system).

As the head of unit, the MDI’s manager explained his difficulties in bringing back the atmosphere to the unit as follows:

*“You see how things may turn out? I was the only person in this unit who knew something would go wrong and to be honest, I did not have the energy and courage to move towards IT transformation in this unit but situation changed and I had to push other users forward. I had to hide my perceptions and feeling and be supportive. Sometimes it was really challenging to carry on and getting this done [supporting employees]. I could not teach them everything; I was just trying to be brief and up to the point and teach them what they needed to learn in the Windows environment. I first and foremost tried to change their attitudes” (MDI1)*

After a not very promising preparation stage, the second phase of the users’ IT adaptation behaviours was triggered when new computers were brought in and the new Windows-based software application was set up on these computers. According to the respondents’ comments, although the new software application was offering several advantages over the previous one and initially made a good impression on them (e.g. various ways of processing and accessing information and comprehensive reporting), however two concerns undesirably affected the IS users. The first issue was the application's lack of key features



(which had limited its usability) and the second issue was the top management's decision to limit the employees' access to the computer resources. As to the first issue, employees were not able to fully adjust their routines to the new application so they had to rely on all the available work systems in the unit such as the DOS-based and manual paperwork systems. One of the interviewees complained about the condition of the new application explaining the situation as follows:

*"The software was good in general, we still have the application, but it lacks certain features that our work depends on it. Since several months ago that we asked for the addition of these features no improvements have been made and so we have to do some tasks on the new one [Windows-based application], some on the old one [DOS-based application] and the rest manually. It means we have to work with three inconsistent ways of doing things in this sensitive unit" (MDI2)*

<b>Highlights</b>
Due to various difficulties (i.e. software and hardware issues and top management's decisions), users' adaptive behaviours had been shifted once again from approach-oriented emotion-focused acts towards avoidance-oriented emotion-focused acts to deal with the stressful situation. This resulted in the least possible usage of the new system.

And the head of unit provided more details about the application's current state and its weaknesses:

*"The administrative structure at the MOP and PIHO is very complex. It is like laws on laws and notes on notes. In this unit each month we have at least one item that needs to be added to the application. For example, they have removed the physical archival of the stagnant records but they have not considered such an area in the application. So now when a vote is made we do not know where to store it. We have asked the company to add this feature to the software, for example, but they say clinic has to pay us first. The clinic does not pay them and we do not have this feature and many other features. The software company needs their money and they have right to be angry about this matter. This condition has made the employees angry and upset again. The workload has got doubled" (MDI1)*

The head of IT while explaining that nothing can be done with respect to the MDI's software issue explaining the situation as follows:

*“Nothing can be done about these kinds of problems at the moment, at least from our side [IT department]. The problem is not just for the MDI unit you know, this can happen to any division. These applications are not in-house so we can do nothing in terms of programming to make them right or adding the required features, vendors has to maintain their applications. We [IT department] are more into the administrative system so we cannot do much for these packages, we can only help the system users to find what they are looking for such as specific tabs and so on. We just told them that if they purchase the software through us [IT department] we will help them with these types of problems, but we can do nothing for units which have purchased the application directly” (IT1)*

The representative of the software company while complaining about the clinic’ policy and management’s promises with regard to the payments, explained the situation as follows:

*“We were the only company who could prepare such an application for this unit and they [the clinic’s management] know it. They first told us that you need to do this for free for a couple of months and we did it for seven months, wasn’t that enough? They are just not keeping their promises, so we stopped supporting them. We do not do anything anymore like improving the software’s stability or adding new features to the application unless they resolve the financial problems. If they want a reliable application they have to pay for it. I think we have to contact PIHO or other people in the capital because the management here does not seem to do anything useful” (V1=Vendor1)*

The head of MDI also explained the influences of such difficulties on employees’ perceptions and feelings:

*“I tried hard to change my employees’ views after that scandal during the preparation stage. Now they are going back to the same situations and feeling upset, angry, frustrated, short-tempered and overwhelmed. The clinic’s management is making another mistake by neglecting what we need here to do our job properly. We are under pressure here. My employees say why should they care when they [the company and clinic’s management] do not care about them? and they are right” (MDI1)*

<b>Highlights</b>
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IS users’ appraisals of challenge were negatively influenced by the major concerns and altered over time through the re-appraisal process.
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The second issue, limiting access to computer resources, worsened the situation even further and made the IS users upset again and to a high degree discouraged.

*“You just on second imagine what they did to us... first they cancelled the training sessions and destroyed our enthusiasm. Then when we hardly recovered from that condition, they made another unique decision and limited our access to computer resources without giving any reason... and now we are dealing with several software and network difficulties” (MDI4)*

Another employee explained such limitations as:

*“They came and removed the sound cards, CD-ROMs and modems from the computer cases right in front of us. It gave us a very bad feeling... then they blocked the USB port by filling in the sockets. Can you believe these things really happened to us? They did all these to us and they expect us to be energetic and accept the work pressure and have efficiency in our jobs?! No way!” (MDI3)*

As to the three components of adaptation (task, tech and self), during the first research phase in summer 2011 and after seven months from the introduction of the new system, employees perceived that they had no control over neither of these components. Users of this unit had already been prevented from attending the training classes so they were not able to develop their computer skills properly (self). They also felt that they no longer had control over the work since with such an application missing after sale support and key features, they could hardly manage the three inconsistent work routines (task). Additionally, the new software started to malfunction and the promises about adding features by the responsible company were not kept (tech).

Evolved Secondary Appraisal During the Third Phase		
Task ✖	Technology ✖	Self ✖

Due to these difficulties and the huge workloads employees relied heavily on their emotional stability to deal with the stressful situation (avoidance-oriented emotional acts) this resulted in minimum or no usage of the new IS system. The MDI’s manager explained the situation as follows:

*“They are currently trying not to use the new system. They are so discouraged. Their performance is even less than when they were working with the DOS-based. They are tired, upset and they are right. We sadly have similar conditions to the preparation stage” (MDI1)*

During the second phase of the research in summer 2012, the regular and occasional observations of the MDI unit revealed that users were relying on the three work systems and were extremely disappointed. When possible, however, they were using the DOS-based version for daily routines due to their familiarity with the system and its simplicity:

*“At least I now know what I am doing with the old software and I do not need to circulate the room to store some data on this computer, some on the other computer and some in a folder. When I think about what I was expecting and what I got [referring to the whole IT event, including training sessions, software and hardware problems] I feel upset. I do not care anymore about the IT system. I have decided to minimise my outcome, why should I go under pressure for this management? What I cannot do today I will do it tomorrow or after tomorrow, you have to be like this in here [clinic]” (MDI3)*

<b>Highlights</b>
IS users switched between different types of adaptation strategies (between the problem-focused adaptive acts, approach-oriented emotion-focused acts and avoidance-oriented emotion-focused acts) which led to various IT use outcomes.

Finally the head of MDI, when concluding his talk, explained the aftermath of the WSC in his unit as follows:

*“They [management] came to correct the work routines, but destroyed everything here. They took the motivation, happiness and excitement from my employees, manipulated their perceptions and feelings and made them discouraged. They now do their daily routines slower than before, but management does not say anything, they know what they did here. The way people were excited here the management could take advantage of the situation and push them forward to get the best possible outcome from them. I did my best, but so many things were out of my hand” (MDI1)*

Table 6.3 (next page) summaries what was noticeable about this unit with respect to the users’ IT adaptation behaviours and their subsequent IT use outcomes.

**Table 6.3 - Summary of the key user adaptation behaviours in the MDI unit**

Highlights of user IT adaptation behaviours in the MDI unit
<ul style="list-style-type: none"> <li>• As a result of their preliminary desirable evaluations (both primary and secondary appraisals) and positive emotions, MDI's employees were engaged in problem-focused adaptive acts, and their positive perspectives reinforced their practical and emotional adaptive efforts.</li> <li>• The users' evolved adaptation behaviours went through different stages. First, the prevention of computer training sessions decreased employees' perception of to a degree that their positive reinforcing thoughts and emotions decreased into approach-oriented emotion-focused acts (e.g. seeking social help, positive thinking and positive comparisons) in order to carry on with the situation and remain motivated.</li> <li>• Once they realised that the cancellation was not temporary but permanent, a dramatic undesirable shift occurred in employees' adaptation behaviours from approach-oriented emotion-focused acts towards avoidance-oriented emotion-focused acts. Reliance on the avoidance and distancing strategies resulted in a minimum or no usage of the current system.</li> <li>• Due to the MDI's manager's efforts, employees' IT adaptive behaviours were improved to some extent from avoidance-oriented emotion-focused acts (e.g. avoiding and distancing themselves from using and thinking about the system) towards more engaging behaviours and approach-oriented emotion-focused adaptation acts (e.g. seeking social help, reappraising positively and engaging more practically with the existing system).</li> <li>• Due to various difficulties (i.e. software and hardware issues and top management's decisions), users' adaptive behaviours had been shifted once again from approach-oriented emotion-focused acts towards avoidance-oriented emotion-focused acts to deal with the stressful situation. This resulted in the least possible usage of the new system.</li> <li>• IS users' appraisals of challenge were negatively influenced by the major concerns and altered over time through the re-appraisal process.</li> <li>• Users' extreme emotions (positive or negative) and their IS appraisal influenced one another in a reciprocal way.</li> <li>• IS users switched between different types of adaptation strategies (between the problem-focused adaptive acts, approach-oriented emotion-focused acts and avoidance-oriented emotion-focused acts) which led to various IT use outcomes.</li> <li>• Users' secondary appraisal (evaluation of coping resources) in different instances affected their primary appraisal (evaluation of risk) representing parallel processes.</li> </ul>

#### **6.2.4. User IT Adaptation Behaviours in the Finance Unit**

IS users in the finance department were to a high degree unconcerned about the installed computerised work system and the future of such a development in their unit. The reason as mentioned before was related to their entirely paper-based work routines, which had affected their enthusiasm to embrace the new work system as well as the legitimacy of such a work routine alteration.

*“The new system was not threatening to me because here the emphasis is completely on paper-based documents. If I was supposed to bring the system into my daily routines then I would have been worried with such a system I have seen so far... at first I was actually feeling kind of positive about it compared to now that I am totally and completely indifferent or I can say indifferent towards a pessimistic view, if that makes sense to you. I mean because of the nature of our job the existence of such a system is not yet a requirement so I am indifferent but based on my personal experience with the system I am pessimistic about any real computerisation idea in this unit and in my work routines” (F2)*

Furthermore, while the head of finance was referring to the crucial role of ‘papers’ in their work procedures he explained the status of the WSC as a ‘formality’ in the finance department as follows:

*“WSC has been just a formality here. We do not have automation as it implies. It was not really important for this unit to have such a software application because we entirely work with papers. When the external bodies and inspectors come here to check the documents they want to see the hard copy of documents and actual signatures. We have our own financial applications separately so the installed administrative application [referring to E-Org] just concerns the correspondence purposes with other units such as the secretariat. We receive instruction manually and results are printed and sent back manually to the secretariat or other sections. We do not act based on what we get electronically. We must just act upon the real signed and printed signature on the papers. The new application is used solely to see what is heading to this unit... although there have been difficulties associated with the application” (F3)*

Such difficulties based on the interviewees’ comments in this division could be divided into three groups of (1) software issues; (2) usage issues; and (3) support issues. With respect to

the first concern, one of the interviewees explained her experiences of using the E-org as follows:

*“Here the WSC has been just a stylish name. The application freezes a lot. Additionally I often get different results with a same key word which is totally unacceptable... other times when I use the system to search the archival records; it just shows the name of the file but does not give me the location or path of the file so I have to search the entire folders on the hard disk manually. So why should I bother about using the new system?” (F1)*

Another interviewee however pointed to the untrustworthiness of the application, which had undesirably affected her views about using the system in her daily routines:

*“I had a bad experience with the previous work system [Barid] but told myself that this one [E-Org] is different and therefore tried to learn it as much as I could. It was actually better and I was using it until something bad happened to me. A few months back one day I prepared a financial letter and wrote my name at the bottom of it and then sent it to the secretariat unit via the E-Org. After a few days, I suddenly noticed that another person’s name was under my letter as she had done it not me... I could not believe it. Since then I decided to use the system just for light ordinary works. Now I print everything manually and send it manually to the secretariat division. I was doing the hard work but another person was getting the credit and the increase in the salary” (F4)*

<b>Highlight</b>
Software issues refer to the limitations of the E-Org application which in some instances allowed the manipulation of information by an unauthorised user and thereby made a negative influence on the beneficiary user.

As to the second concern, system usage issues, one of the respondents complained about the way the system was being used by another unit as follows:

*“Most of the time, by ‘most’ I mean 8 out of 10 or 9 out of 10, the electronically received documents have not been properly scanned. We have had this issue from the beginning. For example, half of the paper has been scanned upside down, or it is rotated, sometimes 90 degrees, which is useless for us and there is no option to rotate the scanned file within the E-org application. Additionally, the electronic version most of the time does not come in full, for example the first page says please find the attached list of employees’ name but there is*

*no list... so we wait for the actual paper-based documents. The computers here are most of the time off. Sometimes the actual paper comes faster than the electronic version” (F2)*

<b>Highlight</b>
Usage issues refer to the way the system was being used by the secretariat unit. For instance, users in the finance unit were receiving rotated, low quality scanned letters or receiving the first page of multiple pages letters.

Examples of such defective correspondences were also shown to the author, which confirmed the interviewee’s claims regarding the system usage issues. Next the third issue, (support issues), one of the interviewees angrily explained the day the application was set up on their computers in this unit:

*The IT department installed the E-Org application for us but the same day the secretariat and the clinic’s manager came together and told us that do not rely on this [E-org] and do the job as usual. So why did you install it in the first place? If it cannot be used and trusted why it is here? They did not even explain the usage and features of the application to us” (F1)*

While another respondent had similar views with respect to the computerised work system in this unit, she explained her understanding of the new administrative system as:

*“The funny part was that they did not explain the features of the application and how we were supposed to use it in our work. We had no idea how to use it [application] and after about two or three months later I heard that there was a training class for employees about this application in the medical centre which I missed. There was no announcement about it at all. I am completely demotivated to use or even learn it properly” (F2)*

<b>Highlight</b>
Support issues refer to the expectation of users in the finance unit to be thoroughly trained for the ‘E-Org’ work system, which did not happen

As the above comments clarify, employees of this unit, due to the sensitivity of the department’s fully paper-based work routines, did not feel the need to actively learn the new computerised work system, although principally they liked the work automation concept. However, the three mentioned issues altered their positive views undesirably over time and made them discouraged to take tangible steps towards learning and using the application.



*“When usage [system usage] is not mandatory and you see a new work system as an overload to your regular duties, you should have either a reliable system to give you a simpler, nicer and more secure way to manage your daily routines or a strong managerial support to nicely push you forward and encourage you to use the system... we had neither of these advantages. On top of these issues, we also have difficulties with the way the system is being used by another unit. Facing all these issues, there is no room left for motivation” (F2)*

Frequent observation of the unit also confirmed users’ lack of interest in using the system to the extent that some of the employees were using the computer just to play games when they had the time. One of the employees in this regard mentioned:

*“You cannot believe how reluctant we are about using the system. I decided to fully free myself from learning and using it. Even when they ask about the quality of the system I say it is fine, why should I bother for this management and for such a system? I don’t need it and I do not use it unless for playing game which is the only good thing about the system” (F1)*

One of the author’s personal notes about this unit is as follows:

*“28<sup>th</sup> Aug 2011, 13:40pm – In 20 minutes the official working hour is finished and the finance department is quiet. Three people are playing with computers in two different rooms. They are behaving like they are working on a document or something but they are playing cards on the PC. They are careful for unusual activities like when someone steps into the room. In that situation one of the employees handles the situation and goes back behind the computer”*

During the second phase of the research no difference was noticed in people’s behaviours, comments and actions. People were as reluctant as they were a year ago regarding using the system and the first two issues (software issues and usage issues) still existed, especially the usage issue as employees showed several instances of new usage issues to the author. One of the interviewed explained the situation during the second phase of the research as follows:

*“We have learned to play different games since last year you were here. The USB ports are open so I can bring some games and play when we are bored. As long as it is about non-work-related matters, we are happy to use the system, otherwise it will be off” (F1)*

*“2<sup>nd</sup> Sep 2012, 10:40am – employees are busy doing their daily routines and the computers are off. Similar to past few days they have not turned the computers on.”*

And the author’s field notes during the second phase of the research in this unit:

*“5<sup>th</sup> Sep 2012, 1:10pm – The unit is quiet after the launch time. They finally turned on one of the computers. They started the E-org application and showed me some letters that according to them had been processed two- three days ago. They then started playing card with the computers”*

Table 6.4 outlines the summary of this unit with respect to IT-related user adaptation behaviours.

**Table 6.4 - Summary of the key user adaptation behaviours in the Finance unit**

Highlights of user IT adaptation behaviours in the Finance unit
<ul style="list-style-type: none"> <li>• Users in the finance unit were to a high degree indifferent about the CWS and the future of such a development due to the nature of their paper-based work processes.</li> <li>• Due to users’ indifferent attitudes and the ‘formality’ role of the E-Org work system in this unit, no particular user IT adaptation behaviour was noticed.</li> <li>• The only highlighted and noticed theme was the users’ doubtful views on the future of the WSC in this unit because of the difficulties they had encountered such as software issues, usage issues and support issues. Thus, while the users were still indifferent about the WSC, their initial positive views about an automated work system had been negatively changed to disappointment of working with an appropriate system at least in the near future.</li> </ul>

### **6.2.5. User IT Adaptation Behaviours in the Pharmacy Unit**

As stated previously, prior to the upgrade to the work system, pharmacists were working with a Windows-based software package which was slow, not reliable and lacked many key features. However, according to the interviewees’ comments, due to their familiarity with similar applications, the advancement of the work system was not threatening to them (primary appraisal). All pharmacists also perceived a high level of control over the situation (secondary appraisal) to develop their computer skills even further (self), customise the system in the way they wanted (tech) and to simplify and optimise their daily work processes (work). One of the interviewees explained the situation as follows:

*“I work for other pharmacies too but they are part-time jobs and I go to those places after the clinic’s working hour. I spend most of my time here and working with such an old*

*application [the prior system] was really frustrating. It was really a pain for me to sit behind the computer and use it continuously but the new one was good. I first thought it might not be as advanced as some of the applications I had worked with but it was more than good for this clinic” (PHA1)*

Similarly, another interviewee described the IT event as an interesting and important one, saying that:

*“The old system was really a dinosaur. I was happy about this huge upgrade in our unit... I knew how to work with computers and I had the experience of working with several pharmacy applications so the IT event was totally pleasant to me. Compare to the old system it was a significant change to our daily routines. In this unit everyone has the required knowledge to work with the PC unlike other people in other divisions. Here the problem is the English language. We need to be sent to the English language schools not to the computer institutes or at least to both” (PHA3)*

Initial Primary Appraisal	Reasons
Positive	<ul style="list-style-type: none"> <li>• Employees were computer users</li> <li>• Job security (permanent employee)</li> </ul>

Their adaptation efforts were exclusively problem-focused acts inspired by positive emotions and oriented towards all three components of the self, technology and task with an emphasis on the latter to enhance their work conditions and procedures. With respect to the first two components, users of this unit were confident about their computer skills and were heavily relying on their experiences of working with similar applications. The head of pharmacy provided more details into the adaptation process of his employees as follows:

*“They were too confident about themselves. I had even scheduled a couple of workshops for them to better learn the application but they were not interested. Although working in different places and using different applications had given them a great deal of confidence and experience but there were some occasions that showed them they were not ready to use the application in full capacity. For example, in few instances when were quite busy and there was a long queue of patients waiting for their prescriptions, my employees were looking for the required form [change an insured prescription to a free prescription] and were not able to find it. They just knew that the feature was there somewhere but since they*

*had neglected to familiarise themselves with different sections of the application they did not know where to find that feature.”(PHA4)*

Initial Secondary Appraisal		
Control Over Task ✓	Control Over Technology ✓	Control Over Self ✓
IT Adaptive Behaviours		
During the first phase, IS users engaged in problem-focused adaptive efforts, which were also reinforced by the users’ positive emotions. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches were enhancements made to daily routines.		

Interviewees mentioned that the new system provided significant improvements to various aspects of their daily work processes. The new system according to their comments helped the pharmacists to work faster, save a great deal of time and energy by minimising errors in daily routines, reduce the patients’ waiting time and focus on other more important tasks.

One of the pharmacists pointed out the features of the new software as follows:

*“The new application had lots of new and cool features, features like ability to report on drugs sold in emergency situations or ability to determine different prices according to producer companies which had really helped us to work faster and better. I was confident that I could use the software with no hassle but some incidents happened that put me and my colleagues under pressure. For example, in one incident I could not find the feature that would allow us to calculate the total price of a prescription in advance considering different options on producers’ companies for the best price, or another one was the ability to change an insured prescription to a free prescription. After that I decided to get some help from others and started learning about the software’s features” (PHA3)*

Highlights
The key emerged theme was the users’ quite positive IS appraisal about the upgraded system which although had generated positive emotions and led to practical approaches, but made them too confident to fully learn the software.

Additionally, IS users in this unit could also produce more informative reports about the pharmacy's stock and the patients' prescriptions.

*“After few months I realised that the application was better than what I had thought and imagined. I knew that it was a good software from the beginning, but I had no idea about its*

*functionalities until I started to familiarise myself with the application. I thought initially that because I knew other applications I would have no problem working with this one but I was mistaken. After several disappointing incidents that my colleagues and I were not able to find what we were looking for, which made us stressed, I began to discover different parts of the program and at that time I realised the potentials of the application” (PHA2)*

The pharmacy’s manager described the status of IS users after those incidents as follows:

*“After those incidents they understood that they were too confident on themselves, too much positivity I can say... they therefore started to learn the features, the software’s real potential. They were trying all the options in each menu for example. They wanted to compensate those incidents and show that they are good at what they are doing. They could not believe they did not know about those feature or could not find them” (PHA4)*

<b>Highlights</b>
After facing few disruptions/ incidents, pharmacists then started to learn and relied on approach-oriented emotional efforts (e.g. seek help) to balance their stress level. They also employed practical strategies to learn the software and customise it according to the needs.

During the second phase of the study, pharmacists in the medical centre mentioned that they had familiarised themselves with the applications months ago, thus could use the system to its fullest potential. According to their comments, they could ‘work a lot faster in a shorter time frame’ and provide ‘high quality services’ to patients and prepare ‘high quality reports’ to the local and clinic’s managers. The results of the observation also confirmed their comments about being motivated and determined to achieve a desired outcome in the face of obstacles or challenging circumstances. During the second phase of the study, the head of pharmacy explained the situation after about two years from the introduction of the system as follows:

*“This application just lacks two or three reporting features that the company under contract has promised to add them to the application. They are not crucial so we are not in rush for having them. As you may have noticed employees are motivated, relaxed, working faster compared to the last year and sitting behind the computer for at least 5-6 hours per day. Previously they were doing their best not to sit behind the computer” (PHA4)*

And one of the interviewees explained his situation after about two years of system usage:

*“Our desirable emotions have resulted in positive reactions. Previously we were upset about a couple of things; particularly about working with a faulty and time-consuming system but now everything is great. I feel empowered by the new system. We all feel positive here and that is encouraging. It gives me energy... I sit behind the system for at least four or five hours per day. Previously I was running away from it every ten minutes or so. This is a very nice experience of a workplace” (PHA1)*

Table 6.5 outlines the summary of key identified themes in the pharmacy unit with respect to the user IT adaptation processes and subsequent system usage behaviours.

**Table 6.5 - Summary of the key user adaptation behaviours in the Pharmacy unit**

Highlights of user IT adaptation process in the Pharmacy unit
<ul style="list-style-type: none"> <li>• Users in this unit had positive evaluation of the situation (primary appraisal) and were confident that they could cope with the new system due to their prior experiences (secondary appraisal). Their adaptation strategies included practical approaches (problem-focused acts) towards using the new system and fine-tuning their performance. The consequent outcomes were enhancements made to their daily work processes, higher quality services to patients and comprehensive reporting.</li> <li>• The key emerged theme was the users’ quite positive IS appraisal about the upgraded system which although had generated positive emotions and led to practical approaches, but made them too confident to fully learn the software. They thought they could learn about the full features gradually and relied heavily on their prior experiences which resulted in some disruptions. They then started to learn and relied on approach-oriented emotional efforts (e.g. seek help) to balance their stress level. They also employed practical strategies to learn the software and customise it according to the needs.</li> </ul>

#### **6.2.6. User IT Adaptation Behaviours in the Secretariat Unit**

The secretariat had welcomed both of the automated administrative systems (i.e. ‘Barid’ and ‘E-Org’) and seen them as a challenge to improve her efficiency and effectiveness at work (i.e. primary appraisal). Since during both phases of this research the secretary’s initial and evolved adaptation behaviours were quite similar, in order to avoid duplicating the information, the author synthesized the comments into a coherent whole to reflect on both stages effectively. She expressed her perception of the ‘E-Org’ computerised work system in her unit as follows:

*“I saw the new computerised work system as a challenge that could be easily turned into an opportunity. I had both the positive and stressed feelings together, more into the positive feelings though... I believed I could achieve a positive outcome rather than only protecting*

against a negative one. I already knew how to work with computers and had attended the computer training sessions in both here [Mashhad] and in Tehran where I attended the advanced level. I also had a very brief experience of working with a kind of similar local administrative system when I was working at headquarter before getting assigned to this medical centre... this was the positive thoughts that gave me confidence” (S1)

Initial Primary Appraisal	Reasons
Positive	<ul style="list-style-type: none"> <li>• She had the computer knowledge to use the administrative system professionally</li> </ul>

The secretariat then described her stressful thoughts and perceptions about the ‘E-Org’:

“But I was also a bit stressed since this division is very sensitive and all formal letters goes through this unit. I have to know what is happening under my nose. So I was stressed that how things may unfold with the new application. Although the first one [Barid] did not really work out and raised some issues here and there [referring to the finance department and the loss of a huge amount of financial documents], but the new one is very good, reliable and has improved my performance... so I think these thoughts [feeling challenged] were pushing and pulling me at the same time. One of them was giving me hope and the other was poking me to on track and learn how to use the new system” (S1)

She then described the ways the new system empowered her to increase her performance:

“Now I work a lot faster, you can’t compare the new situation to the previous one. The Barid system was not as fast and reliable as this is. I can make better decisions by having all the sent and received letters and correspondences in front of me; I can make sure just certain users can see the sensitive letters. I can track everything from the sources to the destination to see whether they [recipients] have received it or not and act accordingly” (S1)

She considered the availability of the required coping resources as suitable and adequate (i.e. secondary appraisal), meaning, the secretary felt she had high control over the situation to learn and use the system (control over self and technology) and to fine-tune her daily routines (control over the work system). Similar to doctors’ attitudes, she also mentioned that since she had always been successful in her previous jobs, she was to a high degree confident that the new tool would help her in becoming even better. She explained her evaluations as follows:

*“I felt that I would become an expert in using the new work system and that I would use it to level up my overall performance. I was thinking to myself that when I have been successful in my career without using the technology, I could do even better with it. Apart from this, my computer training sessions were great, I got a brand new fast computer and the software was full of different features. I felt that I could do things more easily and more effectively”*

<b>Highlights</b>
She had access to various high quality coping resources (e.g. a brand new computer, an up to date application, various training sessions, having access to customer/IT support)

Resulting from her encouraging, hopeful and affirmative evaluations, the secretary’s IT adaptation efforts were entirely based on problem-focused acts oriented towards mastering the new work system. She also referred to the generation of positive emotions which affected her subsequent actions:

*“Because the new system had simplified and standardised my work routines it had a very positive influence on me. I was happy and excited about the different features. These positive feelings were pushing me forward. I am still very positive about the system and I enjoy working with it. There were some minor issues about the way the letters were being sent out to other divisions [referring to the improper scanned documents, improperly referring the records], but they were minor issues and user errors. The software is updated but since other divisions don’t use it much we decided to focus mainly on this division” (S1)*

<b>Initial Secondary Appraisal</b>		
Control Over Task ✓	Control Over Technology ✓	Control Over Self ✓
<b>IT Adaptive Behaviours</b>		
During both phases, the secretariat engaged in problem-focused adaptive efforts, which were also reinforced by her positive emotions. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches were enhancements made to daily routines.		

By engaging in practical approaches and empowering herself with positive emotions, the secretariat’s adaptation efforts addressed herself, the work system and the technology. She explained her adaptation behaviours as follows:

*“I attended a two-day workshop in Tehran about this application. Apart from that I was using trial and error to figure things out. I am still calling the support team in Tehran to help me with some features and they are really supportive. I also adjusted my work processes*



*based on the new system and modernised my work routines because as I said it has standardised the clinic's communication network and allows me to focus on the most important tasks of my job. I am monitoring the corresponding network in the best possible way. I also learned the shortcuts of the application, customised the features and tabs I was using the most so I am working a lot faster now" (S1)*

According to the secretary, the subsequent outcomes of such positive appraisals and emotions as well as practical adaptation approaches were dramatic improvements to her daily routines which had significantly improved her efficiency and effectiveness and ultimately increased her salary.

*"The E-Org really helped me to improve my performance and to be efficient. I can now respond faster to the ministry's letters and requests. I can also better monitor the status of the distributed instructions within the clinic. In every aspect of my job it has helped me to be more effective. Everything is more straightforward now and I feel that I am in control of the communication channel which is a critical role. Sometimes I think to myself that I cannot go back to the old way of doing things. Even the manager has noticed the improvements and increased my salary since few months ago" (S1)*

The findings of the second interview with her during the second phase of research also indicated that she had maintained her prior positive evaluations and problem-focused adaptation behaviours. According to her comments, after two years and regardless of some minor issues, her views about the system were completely positive.

*"Everything is currently as good as last year you were here. I have learned a lot since last year about different features such as the fax management system or how to share a folder or document with a colleague with different access rights and so on. I am also typing letters faster now by learning how to make sample letters and customising them quickly when needed. So everything is great, so far so good. I am happy and excited about handling my work rapidly and effectively while not putting too much effort. I am quite positive in every aspect" (S1)*

<b>Highlights</b>
She maintained her prior positive perceptions and adaptive strategies (problem-focused adaptive acts) over time.

Table 6.6 (next page) outlines what was specific about the secretariat unit with respect to the user IT adaptation behaviours.

**Table 6.6 - Summary of the key user adaptation behaviours in the Secretariat unit**

Highlights of user IT adaptation process in the Secretariat unit
<ul style="list-style-type: none"> <li>• The secretariat saw the new work system as an opportunity and a challenge to improve her performance (primary appraisal) while considered the availability of the coping resources as sufficient (secondary appraisal). Her adaptation strategies were oriented towards problem-focused adaptive efforts to modify and/or enhance the three components of task, tech and self. Her subsequent IT use outcomes were dramatic improvements to her efficiency and effectiveness.</li> <li>• She maintained her prior positive perceptions and adaptive strategies (problem-focused adaptive acts) over time.</li> <li>• The secretariat's appraisal of challenge and the influence of such an appraisal on her subsequent adaptive acts was evident.</li> <li>• Having access to various high quality coping resources (e.g. a brand new computer, an up to date application, various training sessions, having access to customer/IT support)</li> </ul>

### **6.2.7. User IT Adaptation Behaviours in the Reception Unit**

The reception unit was among those divisions that required an upgrade to the existing DOS-based work system towards a better, newer and more efficient computerised work system. In this unit all interviewees, except one, had welcomed the new WSC and were happy about it. Nevertheless, one of the receptionists, unlike others, felt threatened that the medical centre by moving towards a more efficient computerised work system might use the new IS to cut his job or replace him. Since he was a contract employee (and hence did not have the job security), the potential consequences of the new IT system were threatening to him. It is worth briefly noting that since the IT adaptation efforts of the receptionists with positive perspectives were similar to those of other IS users explained earlier, this section exclusively focuses on the exception to the norm. Accordingly, the threatened receptionist described his concerns at that time as follows:

*“When I heard about the WSC in this unit I got desperate and quite stressed. I was a contract employee and they could terminate my contract easily if I was unable to adjust myself to the new conditions and meet the expectations. You know people like me [receptionists] can easily lose their jobs and can be replaced easily. I did not have the necessary skills to obtain a*

*better career. All sorts of thoughts were going through my head at that time. I was frightened and frustrated. I just wanted to get employed at this clinic and the MoP" (R2)*

Initial Primary Appraisal	Reasons
Negative	<ul style="list-style-type: none"> <li>• The threatened receptionist was a contract employee</li> <li>• He did not have the required IT skill to work with the new system</li> </ul>

Although the perception of likely negative consequences of the WSC had affected his primary appraisal undesirably, the stressed receptionist found the availability of coping resources satisfactory and felt he could manage the situation to some extent, by learning how to use the system properly in the first place. Such evaluations based on those three components (work, tech, self) included: the receptionist was initially pleased about the management's decision about sending employees to the computer training classes hence he had the chance to develop his computer skills and remain optimistic to keep the job (self). He also thought that by learning computer skills he would be able to perform the daily routines faster, and by doing this, he could show himself to the management to get the offer to become a permanent employee (work). Finally, he felt that the new system would allow him to customise the important features of the software application to do things easier and faster, although according to his comment, this was not actually a concern to him but was more an extra option. He explained his thoughts and feelings before the IT implementation as follows:

*"Before the introduction of the system I was scared because I did not know how the new system would affect my daily routines or what type of system I had to work with. The only thing I knew was that the application was Windows-based compared to the DOS-based version which I was working with... I was just hoping to somehow manage the situation by going to the training sessions and asking colleague and the local manager [the reception's manager] for practical and moral helps to adapt to new changes and get the offer, the software's features was the least of my concerns. I just wanted to learn the Windows environment and do my daily routines with the new system" (R2)*

And his view after WSC as:

*"But I was lucky that when they brought the new computers in this unit it was almost at the end of our computer training sessions and so I could practice what I had learned. This helped me to become more hopeful... Although my head was still full of various stressful thoughts*

*but at least I knew what I should deal with in terms of the software’s features and its working environment and so on... while practicing with the new system, I had to do something about keep myself motivated, so I was thinking about my available resources and how I could benefit from those resources to show myself and get the offer... I started to practice with the system although I did not know much about its features” (R2)*

The receptionist’s adaptation behaviours had two different facets. Before becoming a permanent employee at MoP (during the first phase of this study), his adaptation efforts had oriented towards both problem- and emotion-focused adaptive acts to deal with the stressful and demanding work situation. According to his comments, due to his initial undesirable perception about the potential consequences of the IT event, his early adaptive strategies were mainly influenced by the emotion-focused adaptation efforts to reduce the stress level and to a lesser extent by problem-focused acts to develop new IT skills. Concerning his emotion-focused efforts, he stressed that having a positive perception about the availability of coping resources pushed him towards activities such as positive thinking and comparison, positive reappraisal, and seeking social help (approach-oriented emotion-focused efforts).

*“We have a good atmosphere here in this unit. My colleagues have been a great help to me since the IS implementation in here and their supportive attitudes have helped me not to distance myself from them. They [the reception’s manager and colleagues] really push me forward. So I am like if you want the job you must also accept its difficulties. I am giving hope to myself telling that my system usage would get better and that I will get the offer hopefully. I am trying to look at things positively you know, like seeing this WSC as an opportunity to learn and develop new skills which I can also benefit from it in my personal life” (R2)*

Initial Secondary Appraisal		
Control Over Task ✓	Control Over Technology ✓	Control Over Self ✓
IT Adaptive Behaviours		
Before being made permanent, the threatened user had a negative primary appraisal but a positive secondary appraisal. The combination of these IS appraisals and his personal characteristic enabled him to engage in the approach-oriented emotion-focused efforts. Subsequently, he was able to restore his emotional stability, use the system properly in his work routines and reach performance outcome.		

He then continued his conversation by pointing out the advantages of approach-oriented strategies and the importance of social context in such a situation:

*“I couldn’t do this on my own without my colleagues’ help. If you distance yourself you cannot benefit from what other people can offer you. I think if I had distanced myself from others I would never have made it this far. I tried to take advantage of every resource I had to level down my stress and develop my skills. At the beginning, I was slowed by the stress and had to somehow manage it. I did not want to enter a loop of negative thoughts. I did my best not to go down that path. I think my strategies have worked so far and I have made progress in learning and using the new system” (R2)*

Concerned his practical strategies, the receptionist’s problem-focused adaptation efforts were mainly oriented towards himself to develop new skills and learn how to most effectively use the new application to reach the performance expectations. He described his practical efforts as follows:

*“I was putting too much effort to develop new skills needed for the new system [learning Windows and related applications]. On top of that, I decided to use the new system in practice and to get involved practically with issues rather than running away from it. I believe that the best way to learn something is to use it in practice... I also asked my friends from outside of the clinic to assist me with the learning process. I have realised that the system is not that much threatening. In fact it has helped me to be more efficient in some aspects of my job” (R2)*

According to the head of reception’s comments, the stressed receptionist’s adaptation strategies have been quite successful as he was able to restore his emotional stability and use the system properly in his work routines. He was able to improve the conditions from initially threatening towards a more positive and promising situation with an improved overall performance.

<b>Highlights</b>
Patterns of the appraisal of challenge was noticed. This helps the receptionist to restore his emotional stability and use the system properly in his work routines.

The head of reception explained the IT use outcomes of the receptionist as follows:

*“Once he overcame his stress he was fully engaged in system usage. He improved his performance after about two months, which I did not really expect that. He is now really determined and motivated because of his job condition. He is even preparing reports about the software and network issues he is faced to share with the IT department. He wants to show them and he is doing his best to use the new system. For now he is a very efficient employee and I think in few months the clinic will decide about his job condition. He keeps himself away from distractions to do his daily routines; he is so determined to get the offer”*

After the change of job status and being made permanent (i.e. between the first and second phase of the research), the receptionist, however, changed his attitudes and IT use behaviours due to securing his position or as he put it “being influenced by the situation and the surrounding situation”. He no longer had any personal and professional concerns at stake in this encounter (IT system) and thus his primary evaluations became positive accordingly. Concerning the secondary appraisal, the receptionist after few months realised the management’s attitude and mind-set with respect to the IT-related matters, hence felt discouraged about using the system optimally.

<b>Highlights</b>
The receptionist’s emotion-focused efforts were limited because he did not feel the need to extensively reduce tensions stemming from the new IT event. His problem-focused efforts also became limited since he no longer feel to need to carry on with the high level of efficiency and system usage.

He explained the situation as:

*“After becoming permanent I was fully relieved because there was no risk to my job anymore. At that time I could better see and understand what was happening around me... I mean prior to my employment I was afraid of losing my job so I was not listening to the group discussions and was not interested to participate in those conversations. I was exposed to various group discussions about different matters from management and policies to IT event, to training classes to almost everything. But after becoming permanent I noticed that those talks were actually true. My participation in the group discussions made me reluctant to have high performance in this clinic with such a management. Now I am just doing my daily routines without having to be worried about anything. Nowadays I do not force myself to do things in a single day to show my efficiency, if it happens it happens, if it doesn’t it doesn’t” (R2)*

<b>Highlights</b>
After being made permanent, he no longer had any personal and professional concerns at stake (positive primary appraisal) but realised that he had limited control over the situation (secondary appraisal). His adaptive strategies were oriented towards minimal adaptation efforts, limited problem- and emotion-focused efforts, resulted in limited benefits with no efficiency.

At the end, the stressed receptionist indicated the importance of individuals' understanding of the situation as it affects one's subsequent activities and made an example of himself:

*"Sometimes I think to myself how appraising a situation differently might change peoples' thoughts, actions and their priorities dramatically. Here, for example, at first the system was a threat to me but I saw the availability of resources satisfactory and managed to have efficiency despite the difficulties I had. Then my situation changed and so did my evaluation of the situation. With that change my negative view about the IT event became positive but my positive understanding of my resources such as management's support became unsatisfactory. Honestly, I have no performance now; I am just doing my job to the extent not to get caught by the management" (R2)*

Table 6.7 (next page) outlines what was specific about the secretariat unit with respect to the user IT adaptation behaviours.

**Table 6.7 - Summary of the key user adaptation behaviours in the Reception unit**

<b>Highlights of user IT adaptation process in the Reception unit</b>
<ul style="list-style-type: none"> <li>• Before being made permanent, the threatened user had a negative primary appraisal but a positive secondary appraisal. The combination of these IS appraisals and his personal characteristic enabled him to engage in the approach-oriented emotion-focused efforts. Subsequently, he was able to restore his emotional stability, use the system properly in his work routines and reach performance outcome.</li> <li>• After being made permanent, he no longer had any personal and professional concerns at stake (positive primary appraisal) but realised that he had limited control over the situation (secondary appraisal). His adaptive strategies were oriented towards minimal adaptation efforts, limited problem- and emotion-focused efforts, resulted in limited benefits with no efficiency.</li> <li>• The user's emotion-focused efforts were limited because he did not feel the need to extensively reduce tensions stemming from the new IT event</li> <li>• The user's problem-focused efforts also became limited since he no longer feel to need to carry on with the high level of efficiency and system usage</li> <li>• Patterns of the appraisal of challenge was also noticed</li> </ul>

### **6.3. Cumulative Analysis of IT-Related User Adaptation Behaviours**

By comparing the users' IT adaptation processes (and the changes in the patterns of such behaviours) in different divisions, it was observed that their IT adaptation behaviours could be categorised into four groups (or trends) of (1) constant positive; (2) evolved positively; (3) evolved negatively; and (4) fluctuating adaptive behaviours. These patterns are represented in the following ways.

#### **6.3.1. Constant Positive IT Adaptation Behaviours**

This group includes the 'Secretariat' and 'Pharmacy' divisions as well as other system users in different units who had appraised the situation positively, continued to have a promising outlook and remained engaged in practical approaches to benefit from the new system and enhance their IT performance outcomes. Based on their initial promising IS appraisals (both primary and secondary appraisals), users in this category engaged in problem-focused adaptive acts which were reinforced by the users' positive emotions. The consequent outcomes of such positive IS appraisals, emotions and practical adaptation approaches were dramatic enhancements made to daily routines, higher quality system usage and individual-level efficiency and effectiveness. IS users in this category continued their problem-focused adaptive responses with productive IT use over time which indicates their constant desirable reevaluation of the situation.

#### **6.3.2. Positively Evolved IT Adaptation Behaviours**

This trend was related to the stressed user in the laboratory unit. He initially relied heavily on the 'avoidance-oriented' type of emotional efforts with no practical efforts and IT use outcome (derived from a negative primary, negative secondary and low self-esteem). Due to his positive reappraisal, the laboratory's user's IT adaptive behaviours gradually shifted from avoidance-oriented strategies towards approach-oriented emotional efforts with limited system usage and no efficiency. His adaptive acts improved further towards practical approaches to take full advantage of the system's features, higher quality IT use and performance outcome.

#### **6.3.3. Negatively Evolved IT Adaptation Behaviours**

This trend was related to the IS users in the 'Public Health Centre' (PHC) unit. The results of the analysis indicate that users' IT adaptation behaviours in this category occurred in a reverse arrangement compared to the above trend. In this unit, IS users initially engaged in



problem-focused adaptive acts and system usage to improve their performance. However, IS users' positive and challenge appraisals were negatively influenced by the major concerns and altered over time through the re-appraisal process. Therefore, they engaged in the approach-oriented emotion-focused acts to carry on with the situation and remain motivated. Eventually, when the stressful situation continued, users' adaptive strategies decreased towards avoidance-oriented emotion-focused acts in order to reduce the stress level which diminished users' practical efforts (system usage) and their outcomes.

#### **6.3.4. *Fluctuating IT Adaptation Behaviours***

As to the fourth trend, fluctuating IT adaptation behaviours, this trend was related to the IS users in the MDI unit as well as the stressed receptionist. Information System users in these units switched between different types of adaptation strategies (between the problem-focused adaptive acts, approach-oriented emotion-focused acts and avoidance-oriented emotion-focused acts) to adapt to the IT event which led to various levels of system usage and individual-level performance outcomes.

#### **6.3.5. *Summary of the Highlighted Findings***

By reviewing the highlighted findings for all divisions, it was seen that some patterns were beginning to manifest themselves repeatedly in different divisions. For example, the importance of appraisal of challenge in users' subsequent IT adaptive acts was evident in almost all divisions. Another apparent theme was the users' secondary appraisal (evaluation of coping resources) which in different instances had affected their primary appraisal (evaluation of risk) representing parallel processes rather than sequential processes. Moreover, as explained in the above 6.3.1., 6.3.2., 6.3.3. and 6.3.4. subsections, IS users switched between different types of adaptation strategies which led to various individual-level IT use outcomes. The bidirectional influences of users' emotions (positive or negative) and IS appraisal on each other was also evident. Moreover, the influence of context (e.g. major concerns) in the person-environment relationship through the re-appraisal process on users' IT adaptation behaviours was significant. In this study, the context, by influencing users' emotions (either positively or negatively), determined their level of engagement with system usage and performance outcomes.

Finally, the results found an association between the process of IT-related user adaptation behaviours and subsequent IT use behaviours. Accordingly, IS users who had employed practical efforts had been oriented towards taking full advantage of the features and potential of the new system; who then reached high quality system usage (deep use) and performance outcomes (see 6.3.1. trend above). IS users who had appraised the situation (IT event) to some extent stressful, had been engaged in approach-oriented emotional efforts and partial system usage without having individual-level performance outcome. In the case study, users with this type of IT-related adaptation behaviours had been engaged in superficial IT use, were not interested to learn or use the systems' advanced features and, were using the system to the extent not to get caught by the top management. Lastly, IS users who had assessed the situation (IT event) extremely stressful, had entirely relied on avoidance-oriented emotional efforts with no room for practical efforts. Evidently, IS users with this adaptive behaviour had neither system usage nor individual-level performance outcomes.

## **CHAPTER SEVEN - DISCUSSION**

### **7. Introduction**

In the previous chapter, the case study analysis which signified the complex, processual and shifting nature of users' IT adaptation behaviours and the influences of such adaptive efforts on individual-level IT use outcomes in one of Iran's MoP's major medical centres was represented. As to this chapter, the purpose is threefold. First, the findings are discussed in the context of the extant literature on this topic to evaluate the contributions being made. Second, the research questions are addressed according to the findings from this study. Third, the outcomes of the practical case study will be used to establish a revised model of IS users' adaptation behaviours.

It is worth emphasising that this study by no means seeks to generalise the results and findings of the case study to infer that IS users' IT adaptation behaviours would provide similar results across other contexts as this study. Rather, it merely focuses on the conducted case study and the way IS users dealt with the IT event in various conditions in order to make the findings more readily available to industry and business, as well as to the academics and researchers. However, due to the comprehensiveness of the underlying theories, the suggested framework could also be insightful to other similar contexts, organisations and IS users' characteristics. In the following section, the major discoveries of this study are explained.

#### **7.1. Findings of the Study**

The case analysis suggests that the process of user IT adaptation behaviour is highly iterative and it is conceivable that initially observable levels of user adaptation may be very different from those observed at later points- as adaptation continues. The findings also showed the patterns of alterations in the users' adaptation processes over time, which in some cases significantly influenced users' subsequent system usage and individual-level performance outcome. This study differentiates itself from the existing CMUA-based literature in that it approached and investigated the phenomenon of IT-related user adaptation behaviours from a process-oriented perspective while adopting a longitudinal research design and an interpretive standpoint. This strategy, which has never been tried before with regard to this model, allowed this research to take a step further among the

existing CMUA-based studies and highlight the role of time and the person-environment relationship in the process and evolution of user adaptation, explore the dynamic and cyclical process of adaptation from IS appraisal to IT use outcomes to reappraisal (i.e. the steps IS users went through to deal with the situation), explain how adaptive behaviours could be reinforced or altered over time via the reappraisal process due to the changes in the surrounding situation<sup>53</sup> and what the consequences of such development on IT use and performance were at the individual-level.

Furthermore, while the author believes taking the longitudinal process-oriented perspective was necessary for a richer understanding of the dynamics of the process of user IT adaptation behaviour, this method was consistent with current approaches in IS literature with respect to the aim of process-oriented perspective in research (Orlikowski & Gash, 1992; Markus & Robey, 1988; Gidden, 1984; Orlikowski & Hofman, 1997; Orlikowski, 1993; Beaudry & Pinsonneault, 2005; Fadel, 2011; Beaudry; 2009). For example, Orlikowski and Hofman (1997) indicate that the changes associated with technology implementations constitute an ongoing process rather than an event with an end point after which the organisation can expect to return to a reasonably steady state. Orlikowski and Gash (1992) similarly indicate: “we adopt a process-oriented perspective to examine how frames are created, used, and how they may shift over time by drawing on structuration theory” (pp.9). Markus and Robbey (1988) also explain that “process theories have lower aspirations about ‘explained variance’, but provide richer explanations of how and why the outcomes occur when they do occur” (p.595).

From recent studies in the field of IT adaptation behaviours, Fadel (2011), for instance, asks for future research to investigate how ongoing reappraisal processes affect the adaptation strategies over time. Beaudry (2009) supports the coping theory by stating that “it offers a complementary perspective to the more techno centric models such as TAM and allows for studying the dynamics underlying users' reactions to new IT in a way that is unattainable with more static models” (p.524). Beaudry and Pinsonneault (2005) similarly ask for future

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<sup>53</sup> Such changes may be due to the adaptation efforts that changed the technology, the work, or the user (or self); to changes in the environment that might have occurred independently of the person (e.g. management's actions); or to changes in the meaning and subjective understanding the user has of the situation (i.e. IT event).

studies to explore and refine CMUA and examine the user adaptation process in depth. As it is perceived from these quotes, all these studies concern how adaptation behaviours as a process change over time. They, in fact, ask for deeper understanding of the underlying dynamics of user adaptation, which variance models are mute about, but can be captured through longitudinal in-depth process-oriented approaches. Finally, Burton-Jones et al. (2011) explain: “the process approach focuses on entities participating in events<sup>54</sup>. The process approach focuses on accounting for an outcome by reference to a sequence of events<sup>55</sup> involving the focal actors. This approach assumes that entities, or focal actors, change over time” (p.13).

The focus of this research as Orlikowski (1993) puts it was on developing a context-based, process-oriented description and explanation of the phenomenon, rather than an objective, static description expressed strictly in terms of causality. The aim was to understand the adaptation process and explain how a sequence of responses and patterns in users' IT adaptation behaviours in a developmental period over time could lead to diverse IT use outcomes. This approach helped the author to investigate how system users went through the process of IT adaptation, how, why and to what extent their adaptation tactics shifted and the reasons behind those adjustments, and the dynamic relationship between user adaptive acts and the subsequent IT use outcomes.

Thus far, the few CMUA-based studies have generally used the model for testing purposes to link the topic of users' IT adaptation processes to other related topics such as information systems success model (Elie-Dit-Cosaque & Straub, 2011; Elie-Dit-Cosaque & pallud, 2011), infusion of information systems (Fadel, 2011), IT adoption and use studies (Fadel & Brown, 2010), to examine the relationship between users' IS appraisal and adaptive strategies (Fadel, 2012) or to examine the antecedents of the end user's perceived behavioural control (PBC) with respect to IT (Elie-Dit-Cosaque et al., 2011). Neither of these studies has approached this phenomenon the way this thesis did; to investigate the relationship

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<sup>54</sup> If the entities can act, they are often referred to as focal actors (Burton-Jones et al., 2011; Ramiller & Pentland, 2009). For example, CMUA explains how users adapt to IT events in their organizations. In this theory, the focal actors are the users, and the events are the introduction of new systems or the modifications of old systems.

<sup>55</sup> The sequence is probabilistic rather than deterministic because a different sequence of events may occur (Burton-Jones et al., 2011).

between user adaptation as a dynamic, cyclical and long-term process that is in constant evolution and renewal, with subsequent system usage and individual-level performance outcomes.

The author is confident that by exploring the CMUA from a process-oriented longitudinal perspective, he will enrich and improve the current understanding of how, why and to what extent users' adaptive strategies to disruptive IT systems influence their system usage (or the quality of such IT use) and performance outcomes. Disruptive IT provides a suitable ground for studying users' adaptation behaviours, because it involves pervasive and radical transformations in work settings. Nevertheless, some of the findings of this study were not explicable on current views of the CMUA. Apart from the new findings, this study also differentiates itself from the original study done by Beaudry and Pinsonneault in terms of scale and context, thereby contributing to the Beaudry and Pinsonneault's call for researchers to apply the model to different contexts including numerous participants and investigate various types of users dealing with diverse technologies. Moreover, the encapsulation of the CMUA and Roth & Cohen's (1986) typology of behaviours has also allowed this study to take a step further and offer a more nuanced perspective that explains how the various types of users' coping reactions and the alterations in such efforts may influence their subsequent IT adaptation processes resulting in diverse IT use outcomes. The complete theoretical and practical contributions of this thesis are provided in chapter 8. In the following sections the findings of this study are explained.

### ***7.1.1. The Significance of the 'Appraisal of Challenge' in User Adaptive Acts***

The results of this study represent that there is a strong interrelationship between the users' appraisal of challenge<sup>56</sup>, their productive adaptation efforts (deep system usage) and constructive IT use outcomes. The analysis found that this type of IS appraisal particularly influences the problem-focused adaptational acts that are of particular importance for researchers and practitioners since these practical efforts are oriented towards altering and improving the existing situation and achieving the most beneficial possible outcomes (e.g. achieving efficiency and effectiveness through using the new system in daily routines). Many studies in IS domain (e.g. Orlikowski, 1996; Tyre & Orlikowski, 1994; Majchrzak et al.,

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<sup>56</sup> Appraisal of challenge occurs when the appraisal entails both positive and stress components.

2000) have thus far argued that increased practical actions taken by users (i.e. problem-focused adaptation acts) leads to deeper, higher quality use and meaningful appropriation and adjustments of the new IS, which subsequently produces more favourable IT use outcomes. Such beneficial outcomes could be referred to as the use of potential and advanced IS features that enhance the users' efficiency and effectiveness at the individual level and productivity at the organisational level. Furthermore, prior literature on IT adoption and use has generally argued that IS users who have positive evaluations towards the characteristics of the new IS (i.e. perceived ease of use and usefulness) will be more likely to form intentions to use the new IS, which eventually leads to actual use behaviours (Venkatesh et al., 2003).

While the findings of this study support the findings of the above studies, it expands on them by demonstrating that simply perceiving the new IS positively (i.e. positive primary appraisal) may not necessarily produce the type of adaptation (problem-focused adaptation behaviours) that leads to infused system use behaviour as well as constructive outcomes at the individual-level (similar to the case of pharmacists in the case study). This study argues that although viewing the IT event optimistically could be a necessary step toward the adoption of technology and IT use behaviour, it however corresponds with Lazarus and Folkman's (1984) arguments that a lack of adequate challenge can discourage and prevent the person from engaging in or continuing to engage in the activity concerned, or as Schmidt (2010) stresses can result in disengagement with the IT task. For instance, users who had viewed the new IS merely positively (i.e. pharmacists in the case study) felt they would not need to engage in extensive adaptive efforts that lead to deep IT use behaviours or restore emotional stability. As a result, their IT adaptation efforts were minimal. In contrast, the head of laboratory referred to the importance of having a low level of stress as a "necessary impetus" that helped the IS users in the unit to continue to stay engaged with the system, energised and alert although he managed and controlled the users' stress level by providing full technical and moral support.

While CMUA considers the 'threat appraisal' as the only stressful appraisal with counterproductive consequences with respect to IT use outcomes, this study, in contrast, differentiate itself from the original study by finding significant association between the

appraisal of challenge (as another type of stressful appraisal) and subsequent productive IT use behaviours. The findings of this study in the investigated context indicate that users' practical approaches towards reaping the benefits of the new IT system and reaching performance and constructive outcomes were most likely when they appraised the new IT as a challenge (e.g. feel positive stress similar to the case of laboratory), less likely when users perceived it merely positively (i.e. the case of pharmacists) and least likely when IS users considered it as threatening (i.e. the stressed user in the laboratory). This view (the importance of viewing a new IS as a challenge for subsequent IT adaptive acts), which is supported by emerging research (Fadel, 2012; Schmidt, 2010), has shown that users who view an IS as a challenge (unlike others who do not) are more expected to be cognitively engaged and oriented towards quality system usage. This study shows that 'being stressed' or experiencing stressful situations is not always threatening with counterproductive consequences or outcomes, rather this kind of appraisal can also be an opportunity to keep the user on the right track of IT adaptation. This means that future theoretical development and empirical studies should realise the importance of 'appraisal of challenge' and look beyond mere positive perceptions of an IS (Fadel & Brown, 2010) to explore how challenge appraisal leads to deeper, quality IT use with value-added results that IS managers seek.

### ***7.1.2. Sequencing of the Primary & Secondary Appraisals***

The results of the analysis also showed that the primary and secondary appraisals might not necessarily happen in sequence as their titles imply. Coping theory, which is the underlying foundation of CMUA, indicates that for the purpose of analysis these sub-processes are considered separately, however they go hand in hand or sometimes the secondary appraisal occurs first and affects the primary appraisal and one's motivation (Lazarus, 1984, 1990, 1993). However, the CMUA considered these sub-processes in one's IS appraisal as sequential processes. The finding of this study supports the coping theory's argument, since it was noticed that in some instances of the case study research the users' evaluations of the availability of coping resources<sup>57</sup> (secondary appraisal) had influenced their subsequent thoughts (feeling more positive or discouraged), motivation and actions with respect to the IT usage. For instance, in the laboratory, the IS users' positive views about the availability of

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<sup>57</sup> Coping resources refer to both moral and technical supports an IS user may receive including: training classes, colleague's support, IT support (internal), customer support (external), application leaflet, management support and so forth.



coping resources encouraged them to take tangible actions (practical approaches to adjust the task, tech, self) towards IT adaptation and use although the IT system was totally new and complex to them. In the case of the head of MDI unit, in contrast, his undesirable evaluation of coping options (i.e. secondary appraisal) influenced him negatively, earlier than his evaluation of the consequences of the new system, therefore discouraged him to take tangible actions towards IT use behaviours.

The consideration of primary and secondary appraisals as parallel processes based on the outcomes of this study indicates their equal status, importance and interconnected relationships, which can open up a new avenue of thinking and a new perspective on how an IT event can be perceived by certain employees or IS users. In other words, evaluations of having sufficient coping resources to deal with a disruptive IT event in this study were as important as evaluation of having a reliable and functional system in determining the extent to which users were engaged in IT adaptation behaviours. For example, while in different units some IS users were not sure about the likely consequences of the new introduced IS on their practical operation terms, they had relied on their evaluations of the coping resources to see how much control they had over the situation to adapt and handle the new system. Apart from the theoretical importance of this consideration in future investigations<sup>58</sup> in the IS domain, it also has practical significance for current practitioners who are grappling with issues and challenges of IT adoption and use in clinical and non-clinical health care settings. From a practical perspective, this consideration can help IS managers to better understand and foresee the system users' coping processes, thus they can better control (and/or shift) their undesirable evaluations of the IT-induced changes.

### ***7.1.3. The Importance of Approach- & Avoidance-Oriented Adaptation Behaviours***

The results of this study highlight the theoretical importance of the approach and avoidance distinction in adaptation behaviours in exploring how various types of emotional efforts

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<sup>58</sup> The author believes that the consideration of primary and secondary appraisals as parallel processes is very important theoretically for future studies. The reason is this consideration provides a qualitative answer to the question of how and why IS users' evaluations of the availability of coping resources (or facilitating conditions)(which is processed by the secondary appraisal) mediate the users' understanding of the consequences of a new implemented IT system (which is processed by the primary appraisal). It appears that the effects of parallel appraisals on subsequent adaptation strategies, at least with regard to non-IT savvy employees dealing with disruptive IT systems (which was the case in this study), might be more readily detected when constraints are imposed (e.g. mandatory system usage).

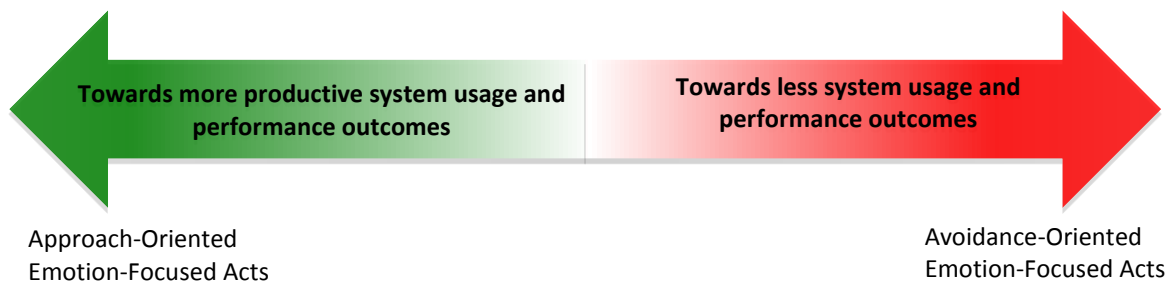
could lead to diverse IT use outcomes at the individual level. CMUA which does not distinguish between approach- and avoidance-oriented emotion-focused behaviours suggests that performance/beneficial outcomes are influenced by IS users' problem-focused behaviours rather than emotion-focused behaviours (Beaudry & Pinsonneault, 2005). This study by considering a supplementary typology of behaviours from Roth and Cohen (1986) differentiated itself from the original study and attempted to offer a more refined perspective on aspects of the collected data that CMUA was mute about.

The results show that while avoidance-oriented emotional behaviours such as avoidance and distancing strategies can dramatically diminish the users' degree of system use and lead to lower levels of IT-related performance outcomes (e.g. stop using the system or using the system in its very basic function), the approach-oriented behaviours, conversely, play a crucial role in elevating the users' thoughts and emotions towards a more desirable perspective and IT use performances. The reason could be that whether the source of stressful perceptions is the primary-related appraisal or the secondary appraisal or both, the undesirable evaluations generate negative emotions, which in a dynamic reciprocal way, these negative emotions feed further thoughts and evaluations of the user (Lazarus & Folkman, 1984; Folkman et al) and generate psychological stress. In order to lessen these perceived adverse impacts and deal with the situation, users in the case study engaged in different types of emotional efforts, which depends on the level of stress they felt, their efforts oriented towards either the avoidance- or approach-oriented emotion-focused strategies with diverse subsequent IT use outcomes.

According to the findings of this empirical study, engaging in avoidance-oriented strategies in stressful situations could separate and isolate the IS user (with undesirable thoughts and emotions) from the surrounding social context to the extent that the person may feel overwhelmed by the demands, and prefer not to use the IT system and/or to be absent in the workplace which was the case in the laboratory, PHC and MDI units. While the findings of this study support the existing research and corresponds with Fadel's (2012) proposal that deep use of IT could be hindered by avoidance-oriented behaviours, unlike Fadel's (2012) study, the results indicate that approach-oriented emotion-focused adaptation behaviours were equally as important as avoidance-oriented behaviours and noticeably

affected users' degrees of system usage and performance outcomes. Engaging in approach-oriented emotion-focused approaches helped users in the case study to achieve a sense of emotional equilibrium, which in turn resulted in a noticeable change/shift in their evaluations from negative reinforcing loops (i.e. negative appraisal becomes more negative) towards reversing loops (i.e. negative assessment becoming positive). This pattern also had occurred in a reverse arrangement in some divisions (e.g. MDI) which led to a significant reduction in users' performance outcome and IT usage. The results, in essence, revealed that rather than being considered as one single adaptation strategy as in Beaudry and Pinsonneault's study or being viewed as alternatives as in Fadel's study, these different kinds of emotional strategies (approach- and avoidance-oriented emotional efforts) can be considered as two ends of a spectrum (Figure 7-1).

**Figure 7.1 - The spectrum of emotional efforts emerged from the field data**



In this spectrum, depending on the user's evaluation of the stressful situation, the individual is oriented towards one of the two emotional approaches with diverse IT use outcomes. For example, when the approaches of the threatened users moved from avoidance-oriented emotional acts towards approach-oriented strategies (e.g. MDI and laboratory units), the degree in which the system was used also improved. This had occurred by moving from one side of the spectrum to the other end, decreasing the level of negative thoughts and emotions and simultaneously increasing the level of desirable evaluations and engaging in practical efforts. The gradient colour in Figure 7-1 indicates that as users' appraisals, emotions and motivation were shifted positively from right to left, they initially engaged in more system usage (lighter red), which over time led to productive system usage (i.e. deep IT use such as using the advanced features). Deep green (red) represents the users'

complete engagement (disengagement) with IT use and achieving (failing) performance outcome.

Consequently, both types of IS user's emotional approaches were found to be equally important and play a crucial role in one's engagement with IT tasks and IT use outcomes. IS managers by realising the importance and consequences of different types of IS users' emotional behaviours (which are highly interrelated to the quality of system use and individual-level performance), can better deal with employees' disengagement with IT tasks and encourage them towards a more approachable and problem-oriented coping with IT-induced changes in organisations.

#### ***7.1.4. The Interplay of Problem- & Emotion-Focused Adaptive Efforts***

The existing literature on user IT adaptation behaviours (Beaudry & Pinsonneault, 2005) and infusion (see: Cooper & Zmud, 1990; Saga & Zmud, 1994) indicate that users who are engaged in practical approaches are more likely to achieve individual efficiency and effectiveness resulting from their deeper and quality use of the IT system. While the results of this study confirm these arguments, they contradict with Fadel's (2012) proposal that users' appraisal of high control (secondary appraisal) has less to do with their efforts to alter their environment and more to do with regulating emotional responses.

The findings of the case study suggest that the perceptions of having some or high levels of control over the IT event (with respect to task, tech and self) not only influenced the system users positively at the emotional level (by reducing the need for regulation of emotional responses), but also made significant impact on the system users' practical efforts. This means that by having a positive secondary appraisal, users became motivated to engage in practical efforts and enhance the components (task, tech, self) to alter the aspects of the IT event they thought they could improve (one, two or all three components of the task, tech and self).

#### ***7.1.5. Importance of Users' Emotions in the Adaptation Process***

As mentioned earlier, investigating the users' emotions was neither the objective of this study nor had been considered in the study's main theoretical framework (CMUA). Nevertheless, the case analysis revealed that at different points in time the impacts of users' extreme emotions on their subsequent thoughts and actions were significant. Although

emotion is among the main concepts of the coping theory and its close dynamic mutual relationship with one's cognition and actions has been well acknowledged (Lazarus, 1991a; Lazarus 1993; Lazarus & Folkman, 1984; Bartunek et al., 2006; Choi et al., 2011), this concept was however not considered in CMUA. In the IS domain, prior studies on organisational changes (see Liu & Perrew, 2005; Antonacopoulou & Gabriel, 2001; Klarner, et al., 2011; Huy, 1999, 2002) and IT-related organisational changes (Stam & Stanton, 2009) have also reported on the importance of employees' emotions in work settings. There are generally two arguments with respect to individual's emotions: (1) emotion mediated by one's evaluation, and (2) emotion mediated by social influences.

According to the appraisal account, emotions are reactions to the meaning of a situation and that meaning is due to an individual's perception of the situation (situation specific). Therefore, users' evaluations resulting from their primary and secondary appraisal generates desirable or undesirable emotions, which contribute to the subsequent adaptive acts (Lazarus, 1991, 1993; Lazarus & Folkman, 1984). From this perspective, and based on the findings of this study it can be said that the experience of extreme negative emotions by users was related to the lack of required computer skills among the employees to work with the new systems. This resulted in various evaluations of personal loss (the receptionist) and personal change (laboratory and MDI users) which had made them particularly emotional about the computerised work systems and IT usage. The reasons behind experiencing of positive emotions, on the other hand, were the result of having a proper software and hardware, positive evaluation of the IT event and the way they thought it will affect their jobs and positive evaluation of the coping resources or reappraising the situation more positively over time. In this sense, all these extreme emotions (either positive or negative) had stemmed from personal evaluations of the new IS.

However, Parkinson (1996) indicates that appraisal may also be partly mediated by social interactions (context specific). This view has also been echoed by other researchers such as Bartel and Saavedra (2000) as the phenomenon of 'emotional contagion'<sup>59</sup> or by Goleman et

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<sup>59</sup> The term 'emotional contagion' refers to the transfer of emotion from one person to another.

al. (2002) as 'group emotions'<sup>60</sup>. For example, the evaluation of the likely consequences of an IT system (risk evaluation) in terms of personal relevance may be developed over the course of conversations one has with his/her colleagues. In this case, the possible outcomes are negotiated dynamically between users rather than merely formulated within individual's mental systems. In this regard, Zorn (2003) similarly indicates that if what people are feeling as they try out a new initiative is ambiguous, it suggests their openness to influence and be influenced by others.

While the findings confirm the crucial role of emotion in one's IT adaptation behaviours, this study considers IS users' emotions as significantly circumstantial and dependent upon a close relationship between one's private cognitive-interpretive process (argument1=situation specific) that is mediated by social influences and correlated themes (argument2=context specific). In other words, the findings of this study confirm both prior arguments, at least in this context. In this research, it was noticed that a static definition of emotion is problematic since it does not capture the process dimension of the emotion (Scherer, 2005) and its continual and mutually informative nature (Fineman, 2006; Lazarus, 2003). For example, although the stressed employee in the laboratory had initially appraised the situation as threatening which had led to negative emotions (situation specific), but over time his evaluation of the situation and emotion were affected by the group emotions (context specific) which led to more positive evaluation of the IT event and more productive adaptive acts. This indicates the sensitivity of users' emotions in IT-induced organisational changes which IS managers need to take into account if they want to maximise the way in which their teams make use of the new IT systems.

#### **7.1.6. The Importance of Feedback Loops (Revaluation of Situation)**

The findings also suggest that IS users' re-evaluations of the situation, which were influenced heavily by the correlated themes, played a vital role in their subsequent IT use behaviours and outcomes. Hence, the results of this study confirm the current research that indicates the one's adaptation behaviours are continuously mediated by cognitive re-appraisals over time (Jones & Bright, 2001; Beaudry, 2009; Lazarus, 1990, 1993; Lazarus & Folkman, 1984). As mentioned in chapter two, both coping theory and user adaptation

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<sup>60</sup> The term 'group emotions' refers to the overall emotional state of a group, which emerges from and influences the emotional states of the individuals who make up the group.

studies focus on similar components of the 'individual-environment' relationship, which in IS literature is usually referred to as the 'context' (Avgerou, 2001). This relationship between the user and his/her social surroundings affects users' reassessment continuously over time. Consequently, the results of this study expand on previous research and signify the direct and indirect impact of situational factors on users' reappraisal processes, which trigger the subsequent IT adaptive behaviours.

According to the findings, since the new IT system (WSC) had suddenly been introduced to employees in different divisions, the effects of social influences on users' adaptive acts were not initially significant. Instead, other factors such as technical aspects of the new IT system and personal characteristics of IS users were the early influential contributors to the IT adaptation process. Over time, however, the effect of social factors increased and became more dominant (e.g. management's support, group discussions and colleague's attitudes). Put it simply, the results suggest that personal characteristics played a role in users' early IT adaptation processes but its effect waned in later IS appraisals. At this stage based on users' preferred coping styles (e.g. low level of IT/technology innovativeness, low level of self-esteem), they employed various emotional (avoidance- or approach-oriented behaviours) and practical approaches. These adaptive acts, which had been reevaluated by users' reappraisal, influenced their IT usage outcomes either positively or negatively.

For example in the laboratory unit, the stressed user due to having low personal and IT innovativeness, had been initially engaged in avoidance-oriented emotional efforts. However, the supportive and encouraging social surrounding altered his perceptions, emotions and attitudes positively towards more problem-focused adaptive acts to the extent that he reached efficiency, effectiveness and higher quality system usage. This indicates that the association between the user's reappraisal process and the direct and indirect effects of the context, which represents itself in the relationship the user has with the surrounding situation (in terms of personal, social and technical factors), play a vital role in users' IT adaptation behaviours and IT use outcome over time.

## **7.2. Addressing the Research Questions**

As discussed in chapter one, this study considered two interrelated research questions in order to investigate the complex relationships between the users' IT adaptive behaviours

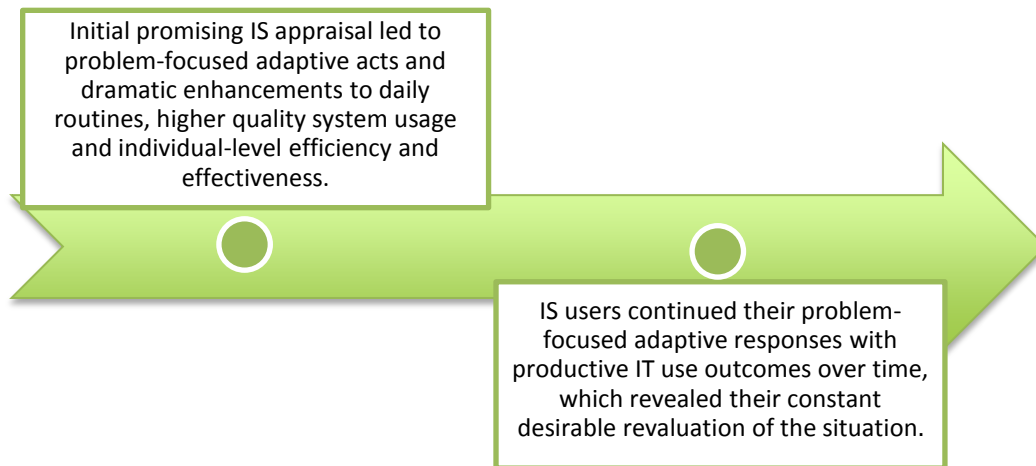
and their subsequent system usage and performance outcomes. The first question focused on the evolution of adaptive behaviours while the second question concentrated on the impacts of such evolutions/alterations on users' IT use outcomes. Now in this section the author attempts to address these research questions based on the findings of the study.

As to the first question "How do IS users' adaptation tactics and strategies evolve over time when dealing with a disruptive IT event?", in the previous chapter it was mentioned that findings of this empirical study found four trends in users' IT adaptation processes namely: (1) constant positive IT adaptation behaviours; (2) positively evolved IT adaptation behaviours; (3) negatively evolved IT adaptation behaviours; and (4) fluctuating IT adaptation behaviours. In order to avoid confusion and make it easier and more interesting to understand the tendencies in IT-related user adaptive processes and interpret such adaptive behaviours, these trends are visualised to provide maximum insight and address the first research question.

*The first trend*, constant positive IT adaptation behaviours, included the 'Secretariat' and 'Pharmacy' units as well as other IS users in different divisions who had appraised the situation positively, continued to have a promising outlook and remained engaged in practical approaches towards the new IT system (Figure 7.2 next page).

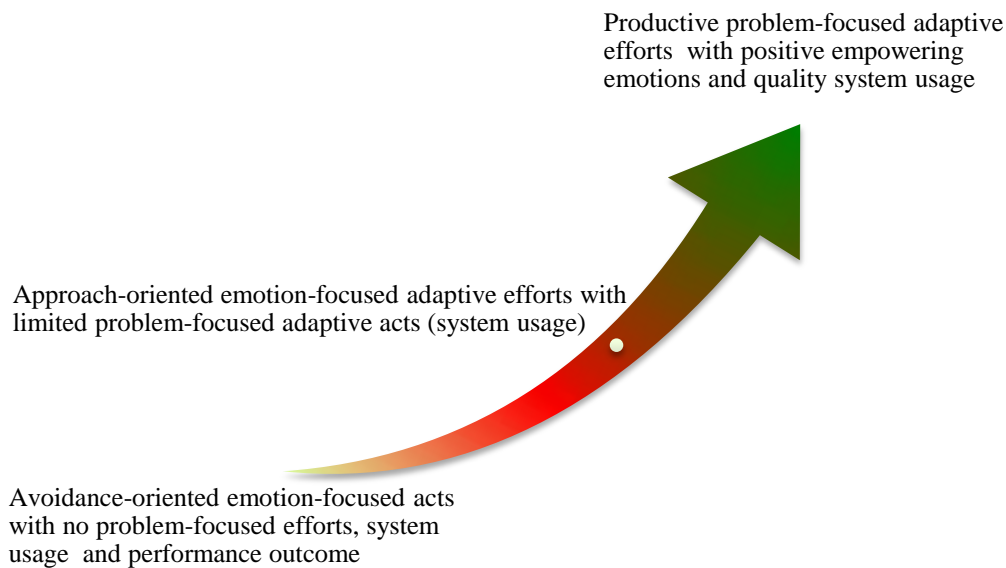


**Figure 7.2 - The constant positive IT adaptive behaviours (Pharmacy and Secretariat)**

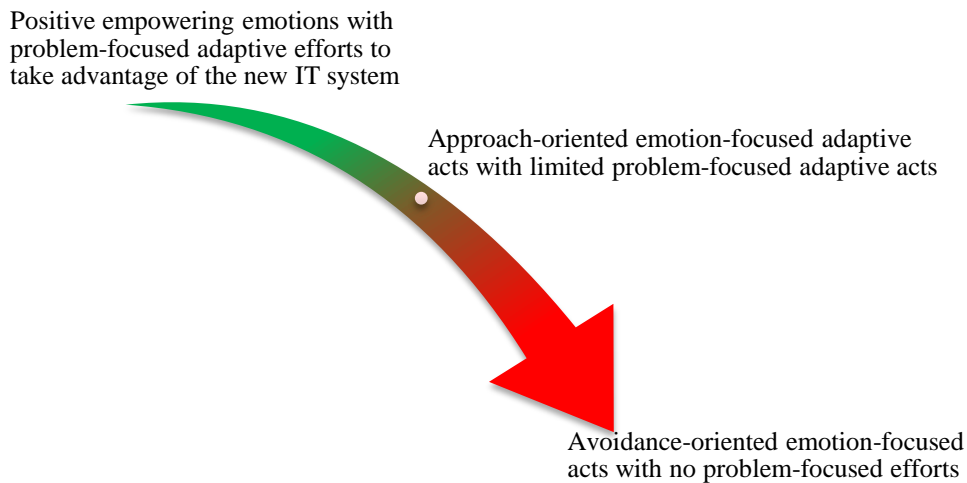


As to the second development, positively evolved IT adaptation behaviours, this trend was related to the stressed user in the laboratory unit. Figure 7.3 (next page) is shown in green and red similar to the Figure 7.1 to indicate that this type of alteration in the user's adaptive acts led to an increased system usage (and quality system usage) and performance outcome.

The exempted user in the laboratory had initially engaged in avoidance-oriented emotion-focused acts to deal with the high level of stress deriving from the negative primary and secondary appraisals combined with low personal and IT innovativeness. However due to the great atmosphere of the unit, the threatened user gradually restored his emotional stability and improved his coping efforts from 'intensive emotional efforts with no practical acts' towards a more enabling approach-oriented emotional efforts' (from red toward green). These enhancements had given rise to practical approaches with limited IT use outcomes (middle point in Figure 7.3). His coping efforts evolved eventually to the extent that he was engaged in productive problem-focused adaptation behaviours (i.e. modifying the task, tech, self) supported by empowering positive emotions with noticeable deep system usage and performance outcomes such as efficiency and effectiveness.

**Figure 7.3 - The positively evolved IT adaptive behaviours (Laboratory)**

As to the third development, negatively evolved IT adaptation behaviours, this trend was related to the IS users in the 'Public Health Centre (PHC) unit. IS users in this unit who initially appraised the WSC positively had been engaged in practical approaches (problem-focused coping) to address three components of IT adaptation processes (task, tech, self) and reach performance outcomes. Over time, IS users reappraised the situation as disappointing and stressful and in order to effectively deal with the issues associated with the IT event (i.e. correlated themes), they altered their adaptive strategies. IS users in the PHC unit relied on approach-oriented emotion-focused acts to maintain their motivation while they were still using the system (although to a lesser extent) (middle point in Figure 7.4). When the stressful situation continued, users' adaptive strategies were heavily focused on emotional efforts and moved towards avoidance-oriented emotion-focused in order to reduce the stress level and restore their emotional stability which diminished their IT use outcomes (Figure 7.4 next page).

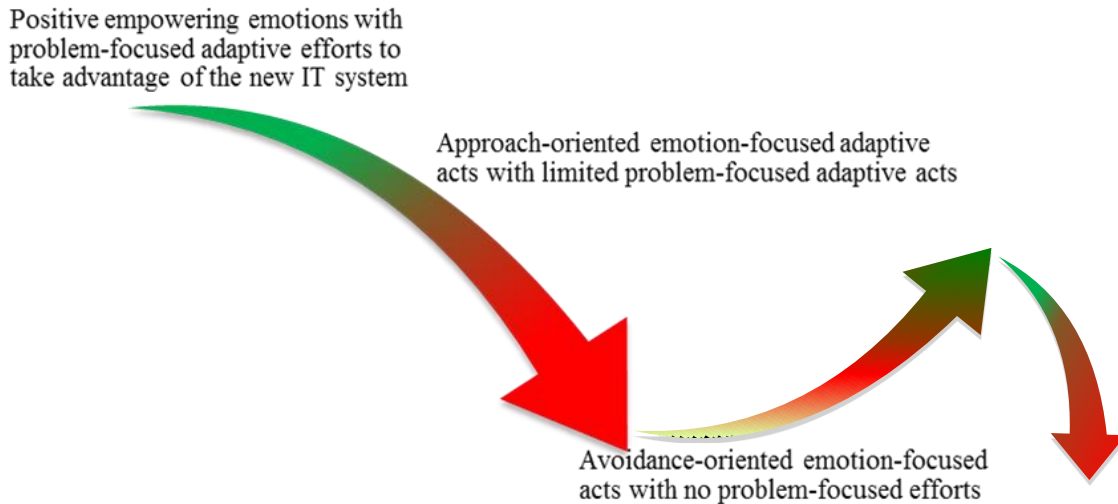
**Figure 7.4 - The negatively evolved IT adaptive behaviours (PHC)**

As to the fourth trend, fluctuating IT adaptation behaviours, this trend was related to the IS users in the MDI unit (Figure 7.5 next page) and the stressed receptionist (Figure 7.6 next page). Information System users in the MDI unit switched between different types of adaptation strategies over time (between the problem-focused adaptive acts, approach-oriented emotion-focused acts and avoidance-oriented emotion-focused acts) to adapt to the IT event which led to various IT use outcomes.

Due to their preliminary desirable evaluations and positive emotions, MDI's employees were motivated to take tangible actions to adapt to the new IT system and thus engaged in problem-focused adaptive acts to develop their skills. The prevention of computer training sessions, however, decreased employees' perception to approach-oriented emotion-focused and (first drop, middle point) then to avoidance-oriented emotional efforts with no system usage and performance outcome (first full drop). Due to the MDI's manager's efforts, employees' IT adaptive behaviours were improved to some extent towards approach-oriented emotion-focused adaptive acts with very limited system usage (rise, middle point). Due to various difficulties, users' adaptive behaviours had been shifted once again from approach-oriented emotion-focused acts towards avoidance-oriented emotion-focused acts to deal with the stressful situation. This resulted in the least possible usage of the new system (second full drop). However, as it is seen in Figure 7.5, the second drop in

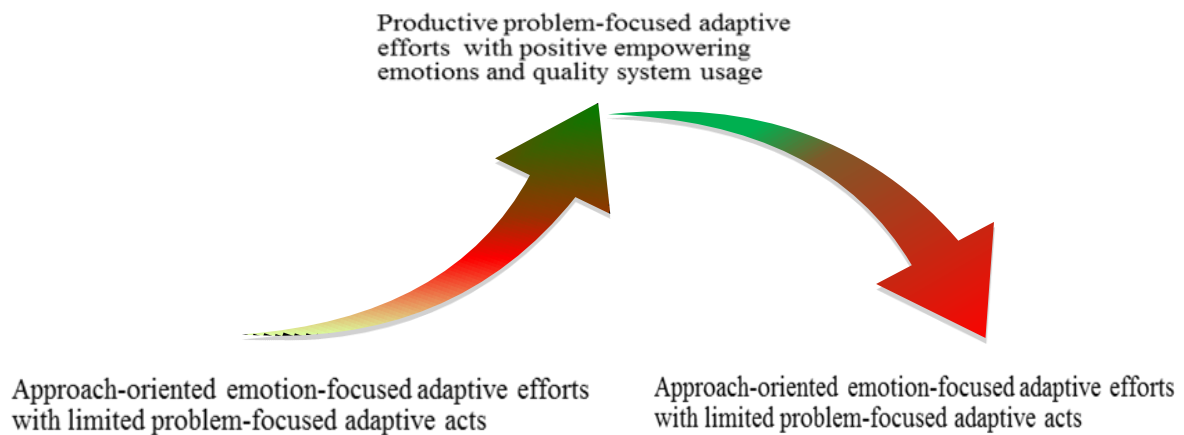
the users' IT adaptation behaviours was a steep fall. This finding (second step drop) could assist decision makers in assessing user adaptation concerns and take the intensity and importance of prior negative experiences on users' future adaptive acts in to account.

**Figure 7.5 - Fluctuating IT adaptive behaviours (MDI)**



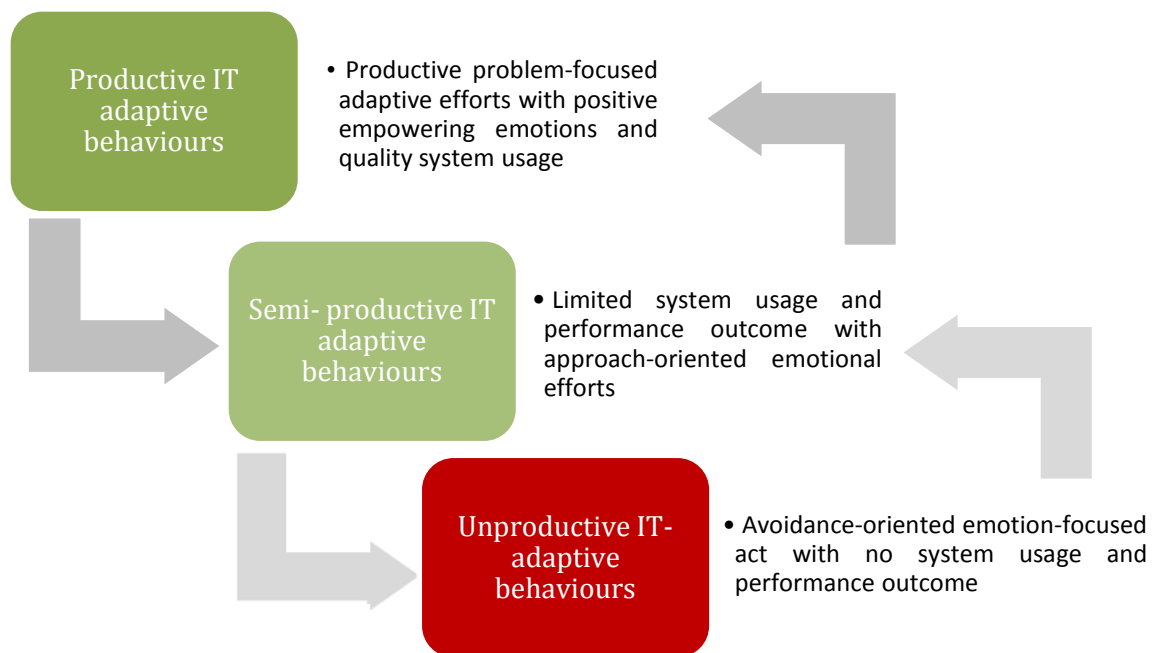
In the case of the stressed receptionist (before being made permanent), despite having a negative primary appraisal, the user was engaged in approach-oriented emotion-focused efforts due to benefiting from a positive secondary appraisal and high personal innovativeness. However, after being made permanent, there was a negative shift in his evaluation of the IT event, and his IT adaptive behaviours oriented again towards approach-oriented adaptive acts with limited performance outcome (Figure 7.6). He engaged in superficial system usage without having performance outcome.

**Figure 7.6 - Fluctuating IT adaptive behaviours (Receptionist)**



Subsequently, based on the findings of this study, it can be argued that at least in this case study the users' IT adaptation behaviours in four units (i.e. PHC, MDI and the stressed employees in the Laboratory and Reception units), went through steps or sequences over time (either positively or negatively) (Figure 7.7). Although users' IT adaptation behaviours in the finance unit were excluded from the analysis due to their indifferent attitude towards the WSC, still it can be said that their adaptation behaviours (voluntary system usage) tended to be similar to Figure 7.4, the negatively evolved IT adaptive behaviours, because of the difficulties they had faced. This signifies the context-dependent nature of IS users' coping efforts (Lazarus & Folkman, 1984) and that the gradual process of change in adaptive efforts beside the technical aspects depend on personal and social conditions (i.e. environment) (Beaudry & Pinsonneault, 2005; Avgerou, 2001; Beaudry, 2009).

**Figure 7.7 - The sequence of users' IT adaptive behaviours in four units of PHC, MDI, Lab and Reception**



As to the second question "How do alterations in users' coping strategies subsequently influence their IT use outcomes and overall performance?", according to the Figures 7.1 to 7.7, it can be argued that as users' promising IS appraisals and positive empowering emotions shifted towards relying more on emotional aspects to deal with the demanding IT event, their productive problem-solving efforts were also oriented towards limited IT use and their IT performance outcomes were gradually diminished (Figure 7.1, spectrum of

emotional efforts). However, this study took a step further and distinguished between the identified and noticeable approach- and avoidance-oriented emotion-focused behaviours. Approach-oriented emotion-focused coping efforts in this study were found to be critical in elevating individual's emotions (and the subsequent evaluations) towards the optimum conditions, which result in external tangible outcomes such as quality system usage and effectiveness.

For example, when the approaches of the threatened users moved from avoidance-oriented emotional acts towards approach-oriented emotional strategies, their degree of system usage was also enhanced (or vice versa). In another instance, IS users in the PHC unit employed approach-oriented emotional efforts to retain their hope and motivation by seeking social help or reappraising the situation more positively. When this failed, there was a significant alteration and reliance on their emotion-focused strategies to the extent that users' practical approaches disappeared from their activities and IT usage diminished. In the laboratory, this pattern occurred in a reverse arrangement and helped the stressed user to restore his emotional stability, minimise the negative consequences of the WSC and become optimistic and hopeful about the situation and engage in problem-focused acts. The relationship between the IS users' adaptation to IT and the subsequent IT use outcomes can be best described by the Figure 7.1. As mentioned earlier, on the spectrum of emotional efforts, depends on the user's evaluation of the situation, the individual is oriented towards one of the two emotional approaches with certain IT use outcomes. The more one relies on approach-oriented emotional efforts, the better his/her engagement with IT tasks (quality of system usage) and their performance outcome will be. The summary of the relationship between user IT adaptation behaviours and IT use outcomes based on the findings of this study is presented in the Table 7.1 (next page).

**Table 7.1 - Summary of the link between user IT adaptive acts and IT use outcomes**

<b>User IT adaptive behaviours</b>
<b>Productive IT adaptive behaviour</b> - IT event was evaluated quite positively - Productive problem-focused adaptive strategies to address the 'task, tech, self' components with empowering emotions - Deep system usage (learning and using system's advanced features) with performance outcome (efficiency and effectiveness) at the individual-level
<b>Semi-productive IT adaptive behaviours</b> - Situation was evaluated as stressful (to some extent) - Approach-oriented emotional efforts with limited superficial IT use (using basic features of the new system to just get the job done) - Very limited or no performance outcome
<b>Unproductive IT-adaptive behaviours</b> - IT event was evaluated as extremely stressful - Avoidance-oriented emotion-focused acts with no system usage and performance outcome

### 7.3. The Proposed Analytical Framework

The discussion presented above with respect to the findings of the case study analysis allowed us to clarify and explain the complex linkage between IS users' IT adaptation behaviours and their consequent IT use outcomes. In this study, the IT event under investigation was the introduction of various computerised work systems in different divisions of a major medical centre in Iran, with the aim of improving the integrity of the workflow and enhancing employees' performance and productivity. Using the interpretative phenomenological analysis of user adaptation to IT events and, based on the results of the study in the context of Iran, the author in this section proposes an analytical framework (see Figure 7-8) that is an alternative framework based on the CMUA for analysing and explaining IT-related user adaptation behaviours in this specific context. This alternative analytical framework contains the influential components (factors or concerns) that emerged from the field study data and about which the original CMUA was mute. While emphasising the importance of feedback loops (or the reappraisal process), the enhanced analytical

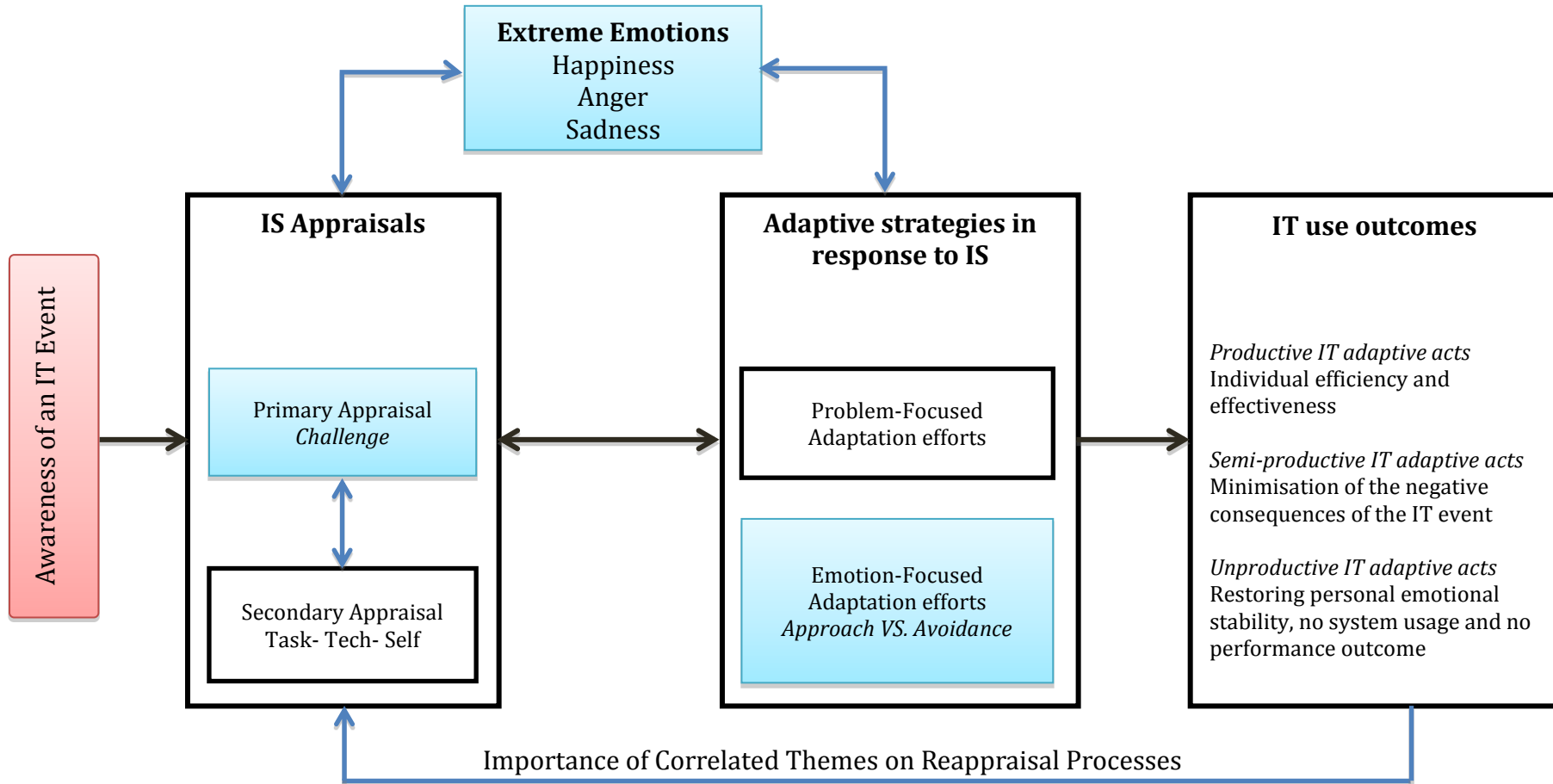
framework represents the users' appraisal-emotion-adaptation-outcomes-reappraisal in a fully dynamic, reciprocal and processual way.

By enhancing the initial model and proposing an alternative framework, the author generalises from empirical statements (as inputs to generalising) to theoretical statements (as outputs of generalising) (Lee & Baskerville, 2003). This study also corresponds with Klein and Myers's (1999) principle of 'dialogical reasoning' where the limitation of the original theoretical framework based on the current research with the data that emerged through the research process was corroborated with another framework. The author used the complementary strength of a well-known typology of adaptive behaviours from Roth and Cohen (1986): avoidance vs. approach, in order to address the CMUA's shortcoming to analyse and explain the role of different types of users' emotional efforts (identified in the study) on users' IT performance. In general terms, the CMUA framework draws upon the coping theory in the psychology discipline (Lazarus & Folkman, 1984) which was introduced to IS research by Beaudry and Pinsonneault in 2005 to be applied to situations where the new information technology represented the stressor to be handled.

By understanding that the new IT system constitutes a disruption to IS users (and at a higher level to organisations) and the fact that the benefits of an implemented IT systems highly depends on how the systems are used by IS users (Claggett, 2010; Fadel & Brown, 2010), the influence of user IT adaptation behaviours on users' subsequent system usage and performance outcomes has yet to be adequately recognised (Elie-Dit-Cosaque & Straub, 2011). Hence, the utility of this framework has been illustrated by drawing on an empirical case study of the WSC in Iran. The diagrammatic form of the alternative framework uses arrows to show the relationships between different components of the user adaptation process. It should be noted that these relationships are not simple-cause-effects relationships but rather interrelationships that are influenced by a wide range of contextual factors. In the following, the author demonstrates the proposed model and explains the suggested enhancements.



Figure 7.8 - The Proposed Enhanced Model of User IT Adaptation Behaviours



The suggested enhancements (shown in blue in Figure 7.8), which have been made to the original CMUA based on the findings of the case study analysis are justified in the following sections. The discussion chapter ends with a discussion regarding the so-what aspect of this thesis to explain why the findings of this study matter.

### ***7.3.1. Consideration of the 'Appraisal of Challenge'***

This enhancement considers the influential role of one's primary appraisal of challenge in his/her adaptation process towards the adoption and use of the new IT system. While the original CMUA was mute about this type of appraisal, the results of this study highlighted the theoretical importance of preserving the distinction between different types of one's IS appraisal. As noted earlier, since this type of IS appraisal has both components of positive and stress simultaneously, it plays an important role in mobilising IS users towards the adoption of IT-related changes and system usage. Accordingly, at least in this context, the author decided to include this type of IS appraisal in the users' IT adaptation process.

### ***7.3.2. Consideration of Parallel Processes in IS Appraisal***

This improvement to the original CMUA considers the interrelated sub-processes of primary appraisal and secondary appraisal in parallel than in sequence. The findings of the case study research revealed that when the nature of the new information system is disruptive, IS users have very little IT skills required to work with the new system or when the IT system is suddenly introduced to the work setting, some users may rely first and foremost on their secondary appraisal and their available resources to make sense of the IT event and its potential consequences, as was the case in the context of Iran. Accordingly, this study emphasises the importance of secondary appraisal in users' evaluations of the IT event and suggests parallel appraisal trends.

### ***7.3.3. Consideration of Users' Emotions in the IT Adaptation Process***

The proposed model also includes the concept of emotion due to its influential role on users' consequent thoughts and actions. The concept in this model exclusively refers to the users' extreme emotions such as happiness, anger or sadness/ feeling let down, as expressed by IS users during the interviews and observations. The arrow between the concepts of appraisal and emotion is bidirectional. It is a mistake to assume that feelings precede cognition or that cognition precedes emotion as the direction observed depends on one's point of entry into the on-going process. Thus, if the sequence seems to begin with (1)

thought, followed by (2) emotion, followed again by (3) thought, and if we begin at point (1) in the above sequence, we must discover that cognition occurs earlier and in a sense probably determines emotion. However, if we start at point (2) in the sequence, we must discover that emotion determines thought. Both principles, of course, are correct (Lazarus & Folkman, 1984). There is also another bidirectional arrow between the components of adaptive strategy and emotion in this model, which indicates the bidirectional connection between the two. For example, the type of emotion-focused adaptive acts employed by the system users (approach or avoidance) could feed their subsequent emotions, which in a reciprocal complex way could influence the adaptive strategies again.

#### ***7.3.4. Consideration of Different Types of Emotion-Focused Coping Efforts***

This enhancement considers the theoretical importance of the distinction between users' approach- and avoidance-oriented emotion focused behaviours in investigating how different types of emotional behaviours influence one's IT performance outcome. This suggestion offers a more nuanced perspective on how IS users' engagement with either of the emotional efforts would affect their efficiency and effectiveness, the restoration of their emotional equilibrium and the minimisation of the negative consequences of the IT event.

#### ***7.3.5. Emphasising the Importance of Feedback Loops***

This study highlights the crucial role of IS user's reappraisal processes, which is represented in the proposed model via the feedback loop. In the case study, the effects of the correlated themes embedded in the 'individual-environment' relationship on users' revaluations of the situation and the subsequent adaptive behaviours were significant. This enhancement, particularly concerns the linkage between the IT use outcomes and one's IS appraisal, which was noticeable in this study. While each of the personal, technical and social aspects have been reflected on in prior IS research, their interrelated linkage and the way these factors influence one another as well as user's IT adaptive efforts and subsequent system usage over time (particularly with respect to non IT-skilled users) have not yet been investigated. Accordingly, the improvement suggests that the outcomes of the user's adaptation process (e.g. efficiency and effectiveness, emotional stability, minimisation of the negative consequences) jointly with the effects of situational factors may alter the user's perception of the IT event, which can lead to the reappraisal of the conditions, generation of emotions and trigger a new or revised adaptation efforts sequence.

#### **7.4. Why is This Study Different and Important?**

The big so-what of this study is the way it differentiates itself from the current IT adaptation studies by providing a more nuanced perspective on the process and evolution of IS users' IT adaptation behaviours and the way they influence the subsequent IT use behaviours. Put it more simply, this study went in deeper details to investigate the phenomenon of user IT adaptation behaviours and attempted to understand and explain the dynamics behind such IT adaptation processes and their consequent system usage behaviours in all their facets. The result of this careful exploration of attention to detail was a deeper explanatory model of user IT adaptation behaviour for the investigated context.

The study, in essence, attempted to fine-tune the current understanding of IT-related user adaptive behaviour in work settings by shedding light on its complexities and explaining how various types of IS adaptation behaviours could contribute to or detract from IT use and individual-level performance outcome, the empirical patterns that could not be explained by existing theories in the IS literature. Furthermore, this phenomenon explored with respect to a Work System Computerisation (WSC) project in a context that seemed more likely to offer opportunities to discover relevant insights (Iran), with diverse IS users (employees with different levels of IT skills required to work with the new system) and IT systems (flexible and non-flexible technologies) through an in-depth interpretive case study research. None of these conditions, thus far, have been considered all together in a research in the IS literature regarding this phenomenon with this level of depth and analysis.

In chapter three, the author justified that the Coping Model of User Adaptation (CMUA<sup>61</sup>) was selected as the guidance theoretical framework over other models (e.g. TAM, TRA, TBP and so on) since it offered the best dynamic approach to achieve the desired outcomes, which was: (1) an in-depth exploration of the evolution of IT-related user adaptation behaviour (or as some studies name it: post-adoptive use behaviours) in a work setting with mandatory IS use, and (2) investigation of the linkage between changes in users' IT adaptive

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<sup>61</sup> CMUA (based on the Coping Theory) theorises that individual outcomes associated with use of the IS depend on adaptation behaviours users employ to cope with the new IS. These adaptive behaviours are in turn shaped by a process of cognitive IS appraisal, whereby the user assesses what is at stake with respect to the IS and what can be done in response to it. The outcomes of this process have implications for the way the IS is used and the benefits deriving from this use.

behaviours and their consequent system usage and performance outcomes. An exploration of such areas of user IT adaptive behaviour could allow this study to address the gap<sup>62</sup> in the IT adaptation literature to some extent. Regarding the gap in the IT adaptation studies, different researchers have acknowledged that research in IS has often neglected the need to take into account user post adoptive behaviours and the subsequent systems usage (Elie-Dit-Cosaque & Straub, 2011; Fadel & Brown, 2010; Fadel, 2012; Benbasat & Barki, 2007). Benbasat and Barki (2007), for example, argue that the intense focus on TAM has diverted researchers' attention away from other important research issues (e.g. adaptation and hands-on usage behaviours) and created an illusion of progress in knowledge accumulation:

*“One important unintended consequence of our heavy reliance on TAM can be viewed as the ‘putting of blinders’ on IS researchers, diverting their main focus from investigating and understanding both the design- and implementation-based antecedents, as well as the behaviour- and performance-based consequences of IT adoption and acceptance” (P.212)*

And in another page they propose courses of action as follows:

*“Longitudinal, multi-stage models are needed to better capture the influence of salient belief variables on system use at different stages of an implementation, and the subsequent influence of this usage on users' beliefs at later periods... many TAM studies typically focus on static models and measure all model constructs concurrently. As such, they do not adequately capture or describe the dynamic interplay that usually occurs between various user behaviours that revolve around system use... longitudinal studies that view and assess system use over time are likely to be particularly revealing, as they can help us better understand the fluid relationships that exist between an adoption model's constructs and a variety of mutually influential set of behaviours users typically engage in, such as their adaptation, learning, and hands-on usage behaviours, as well as the subsequent influence of these behaviours on users' future beliefs” (p.215).*

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<sup>62</sup> Fadel (2012) draws attention to the gap in the IT adaptation literature and stresses that the IS literature has lacked a comprehensive understanding of how and why adaptation behaviours occur. He argues that IT adaptation studies while generally agreeing that adaptation involves the adjustment of several structures such as task, tech, self, have not reached consensus on the nature of this adaptation or how different types of adaptation behaviours influence subsequent IT use (Benbasat & Barki, 2007; Fadel & Brown, 2010).

Fadel and Brown (2010), similarly, argue that a critical step in advancing a comprehensive theory of on-going IS use is to link our already established understanding of pre-adoptive processes with new, richer theoretical perspectives that can illuminate subsequent IS-related behaviour and CMUA was a ground-breaking description of such dynamic processes. Consequently, this study by focusing on this complex phenomenon in an IT context attempted to some extent redeem the imbalance in the IS literature. However, using the CMUA in this in-depth, interpretive research as a theoretical lens revealed the model's shortcoming to explain certain aspects of the IT-related adaptation behaviours. Accordingly, based on the findings of the case study research, the author developed the initial CMUA and proposed an alternative model of user IT adaptation behaviours. By considering different new components (e.g. expanding CMUA's opportunity/threat appraisal outcomes to include a more detailed set of appraisal outcome such as challenge, different types of emotional efforts, the emotion concept), or highlighting the CMUA's exiting feature (e.g. feedback loop), the proposed alternative model brings new insights into the dynamic processes by which individuals cope with information technology challenges.

The results of this study and the aspects, which were newly considered or highlighted in the proposed alternative model, can enable researchers to move a step further and better understand the adaptation processes that inevitably follow the disruption that a new IT implementation brings in the work environment of individuals. While the results of this study provide a high-level view of IT-related user adaptive processes, they also give a detailed analysis of the steps in such processes in a systematic, dynamic and reciprocal way, which can be informative for both academics and practitioners. The results can be particularly useful for practice by assisting practitioners and IS managers to identify IS users at risk of disengaging from IT tasks, before they have disengaged. They must see adaptation not as a static process but, rather, as a dynamic one, which over time and at different stages of users' interactions with IT systems is continuously evolved.

By returning to the Huy's (1999) dynamic model of change, it can also be shown that findings of this study corroborate with and illuminate upon this concept. For example, with regard to the stressed employee in the laboratory (undesirable perspective), his motivations and perceptions were affected negatively by undesirable evaluations of the consequences

of the disruptive IT event. Those undesirable evaluations of the situation consequently affected the user's willingness directly and generated negative emotions (Lazarus, 1993; Lazarus & Folkman, 1984) and thus made him not mentally ready and motivated (receptivity phase) in order to take concrete actions (mobilisation phase) towards the adoption and use of the new computerised work system.

It can be assumed that primary appraisal had limited the employee's receptivity. In other words, his negative evaluations and emotions, preoccupied with distracting thoughts that the new system might cause him to make errors or lose data in this sensitive unit, influenced the receptivity phase. Similarly, his secondary appraisal made negative evaluations of the situation (i.e. lack of available resources to cope with the new system as well as his lack of control over the situation), thus intensely and negatively affected the mobilisation phase and the employee's attitude. Those difficulties, subsequently, made the employee unmotivated to take tangible actions toward the adoption of IT. Those negative appraisals jointly caused the employee not to make sense of the technology (Orlikowski & Gash, 1993) properly and doubted the legitimacy of change, thus making the transition from receptivity to mobilisation very painful for him.

In brief, the mainstream concerns about the technology adoption occurred during the receptivity phase. The reason could be that while people still have concerns at the cognitive level, and cannot view a proposed change as an opportunity, negative appraisals about both their personal/professional concerns and lack of available resources may result in negative emotions. Those perceptions may make employees less receptive and unable to mobilise and act in a changed way. Accordingly, the user with negative appraisal (primary and secondary) also held negative emotions, was demotivated and less receptive and could not make sense of the computerised system in order to mobilise. Therefore, the linkage between the receptivity phase and mobilisation became loose and, since there was no learning due to passive acceptance of the computerised system by the employee, no progress was made. Moreover, consequent emotions, thoughts and evaluations made the receptivity phase even more complicated to the extent that the respondent mentioned that his receptiveness was almost zero.

To summarise, when both primary and secondary appraisals result in negative evaluations, those perceptions trigger intense negative emotions, such that employees become demotivated and less receptive and are not able to mobilise and learn ('undesirable' perspective). However, when, for example, primary appraisal is more amenable, but secondary appraisal is undesirable, it still can negatively influence the employees' cognition, motivations and receptivity and result in demotivation and passivity towards mobilisation. On the contrary, when there is no personal concern at stake and resources are considered as sufficient (even to some degree), employees may have the motivation to mobilise and take tangible actions ('affirmative' perspective), thus the link between receptivity and mobilisation will be stronger, some learning can occur and greater progress can be made.



## **CHAPTER EIGHT - CONCLUSION**

### **8. Introduction**

The purpose of this research was to understand the 'how' and 'why' facets of users' IT adaptation processes when facing and dealing with IT-induced disruptions in a work setting. The motivation was to make sense of how Information System (IS) users relied on a combination of coping strategies to adapt to new IT systems and how and why their efforts evolved over time. The understanding of such user adaptation behaviours is crucial since the outcomes of IS users' coping mechanisms subsequently affect the system usage, individual IT-use outcomes and their job performance which eventually would benefit the organisations. In essence, the study argues that users' diverse behaviours towards new IT implementations (i.e. their receptivity to and mobilisation for IT-changes) as well as their subsequent IT use outcomes can be better understood from a user IT adaptation perspective. In doing so, the Coping Model of User Adaptation (CMUA) was adapted to the domain of IS research and sub-domain of user IT adaptation behaviours which overlaps to some extent with areas of the psychology discipline. In the first section of this concluding chapter, the contributions of this study are summarised. In the second section, the implications of the research approach are discussed. Next, the limitations of the study are explained and the final section summarises the areas for future research.

#### **8.1. Contributions**

Despite the existence of a range of studies about user adaptation, the use of CMUA as a theoretical lens to analyse and investigate the dynamics of users' IS appraisal-coping-outcomes and the relationship between such adaptive behaviours and individual-level IT use outcomes is still in its infancy. These studies, although very insightful, have not yet shed light on how and why individuals' reliance on various coping strategies may lead to different IT adaptation behaviours (i.e. system usage) which is the main core assumption underlying the CMUA. This model, as mentioned in chapters two and three, has been so far mainly used for testing and predicting purposes in IS literature. With this in mind, this section focuses on the contributions of the thesis to the IS research and body of knowledge. The contributions are classified into two areas: theoretical and practical.

### **8.1.1. Theoretical Contributions**

From a theoretical perspective, this study expands on the work of Beaudry and Pinsonneault (2005) who suggested that the process of user adaptation could be understood in light of the coping theory and defined user adaptation as the cognitive and behavioural efforts performed by users to cope with significant information technology events that occur in their work environment. The results of this study and the additional identified perspectives could help to advance the field of user IT adaptation in IS research. These enhancements are represented in the following ways. First, this study revealed that the concept of emotion that is missing from CMUA has a great influence, especially on non-IT savvy users, which may lead to extreme emotions in them (both desirable and undesirable). Including user emotion as a mediator might also help to better explain individual responses to IT changes. Second, the 'appraisal of challenge' was another influential contributor to the users' subsequent adaptation process that CMUA is silent about. Third, the consideration of parallel processes for users' IS appraisal is another area of theoretical expansion. Fourth, CMUA does not distinguish between approach- and avoidance-oriented emotion-focused behaviours, while outcomes of this study highlight the theoretical importance of preserving this distinction in exploring how emotion-focused behaviours may influence behavioural outcomes such as system usage. Finally, this study represents the vital role of correlated themes (i.e. a web of complex personal, social and technical concerns) on the users' adaptation processes during the initial period following the installation of the new IT system and over time (i.e. referred to as window of opportunity in Tyre & Orlikowski, 1994). As such, this study gives greater insights into the 'individual-environment' relationship using the CMUA framework, thereby improving the understanding of how the direct and indirect impacts of such interventions can affect users' reassessments of the IT event and their subsequent efforts and outcomes.

Furthermore, this work contributes to the existing IT adaptation literature by taking a process approach to CMUA (which is new to this model and has not been done yet); an approach which Beaudry and Pinsonneault themselves were keen to see use of their model. Furthermore, this approach towards CMUA was an essential step towards better and deeper understating of the patterns of user adaptation to IS over time. Taking the process approach and the interpretation of the CMUA in this study may be seen as a theoretical

contribution to the IS field as it can be used to further the understanding of users' adaptation acts and the relationship between such behaviours, system usage and IT use outcomes such as individual efficiency and effectiveness. Additionally, taking the process approach allowed this study to explore the IS users' psychological constructs, initial patterns of their coping strategies and the alterations in such efforts over time in different divisions within a healthcare environment in the context of Iran. By exploring users' IS appraisal and adaptive acts, focusing on both positive and negative views and emotions associated with an IT event, and taking into account what objectives users seek to achieve when adapting, the model offers a complementary perspective to the 'variance' approaches to the study of user adaptation.

Apart from the novel longitudinal process approach application of CMUA, the encapsulation of the central aspects of the CMUA and Roth and Cohen's (1986) typology of behaviours has allowed this study to take a step further in the literature of user adaptation to IT events. This incorporation offers a more nuanced perspective that explains how the various types of users' coping reactions and the alterations in such efforts may influence their subsequent IT adaptation processes with regard to the three components of task, technology and self, resulting in diverse IT use outcomes. The addition of the above components allows for an innovative way of operationalising the CMUA by addressing its limitations in explaining the different types of users' IS appraisal, extreme emotions and emotion-focused adaptive acts that were significant in the investigated case study in Iran. Therefore, this study contributes to the field of IS using the CMUA framework and expanding the scope of theoretical analysis of user adaptation studies. It is believed that this more delicate view of user adaptation will not only help managers to better foresee adaptive responses to IS, but will also help to promote adaptive reactions that are most likely to produce desired IS outcomes.

Furthermore, the CMUA was explored under a variety of conditions and applied to a completely different circumstance compared to the existing studies based on CMUA and even the original study carried out by Beaudry and Pinsonneault in 2005. The original study was tested qualitatively and conducted with knowledgeable workers (e.g. six account managers) adapting to flexible technologies in two North American Banks. However, this study was conducted in the context of Iran involving sixty-eight participants who were non-

professional/IT-savvy users working with diverse IT systems, thereby contributing to the Beaudry and Pinsonneault's call for researchers to apply the model to different contexts including numerous participants and investigate various types of users dealing with diverse technologies. Furthermore, it also attempted to address the Beaudry and Pinsonneault's call concerning the effects of social factors (e.g. group norms, top management influences, colleagues' attitudes and personal factors), therefore it contributed to the IS research by demonstrating the complex relationships between the correlated themes (major concerns) and users' IT adaptation behaviours. This study also to a certain extent shed light on how adaptation strategies unfold at different points in time.

It also goes some way to addressing the Fadel's (2011) call for research to address the link between users' on-going reappraisal processes and possible changes in adaptation approaches. Therefore, this study contributes to a greater understanding of how users' reassessments of the IT event over time may re-direct their adaptation strategies and how these alterations affect the subsequent individual level IT use outcomes. Additionally the study to some extent addresses the call by Fadel (2012) with regard to future research into how specific patterns of both users' IS appraisal and coping strategies lead to beneficial post-adoptive outcomes such as individual efficiency and effectiveness. The findings of this study have also allowed the author to enrich our understanding of the IT adaptation processes of non-IT savvy employees in the context of Iran, a country where topics like this have not been investigated by prior researchers. Further, the study has also contributed to producing an empirical knowledge surrounding users' IT adaptive efforts towards a particular IT event (i.e. work system computerisation) in Iran. This substantive contribution has to some extent filled the gaps identified in chapter 2, namely the lack of focus on users' adaptation behaviours from a processual and psychological perspective to understand the flux of IT implementation, adaptation and use from their standpoint.

### **8.1.2. Practical Contributions**

As to the practical implications, this paper has sketched out the ways in which IS users' motivation, cognition and emotion can be disrupted due to the impacts of the 'correlated concerns' as a consequence of implementing new IT systems. The findings suggest implications for practice as well as directions for future research. Understanding how

employees' IS appraisals considerably affect coping efforts and ultimately their technology performance outcomes is critical for successful IT implementations and use in work settings. There are lessons to be learnt from the Iranian context that may be useful in other contexts. The results could assist decision makers in assessing user adaptation concerns and the intensity of such apprehensions at each phase of the change process and hence address them more effectively. In this study, for instance, management's inability to supervise the situation affected users with high personal efficacy and motivation negatively (e.g. PHC users), made them reluctant to adapt to the new IT system and hence IT use behaviours diminished and the system was terminated after a few months. In the laboratory, in contrast, the laboratory's manager by handling the situation and redirecting the stressed user's psychological perspectives, made him encouraged and determined to take tangible steps and adapt the work system, technology and self, which finally resulted in technology performance outcomes.

Our research also suggests that influencing the way an IT event is appraised can be a constructive way to ensure that users adapt to a new IS in order to use it to its full potential. In other words, what strategy one uses depends on one's evaluation of an IT and on a broader contingent of organisational factors. For instance, employees' attention to detail (e.g. availability of refreshments during computer training sessions, the conditions of the venue where the training sessions were being held or the type of information dissemination regarding the WSC project in some divisions) was evident throughout the case study research. Those employees with positive experience of the above conditions had a sense of 'being considered and respected' and thus, were motivated to engage in practical adaptation behaviours.

Furthermore, managers who wish to promote IS adaptation and use within their organisations should put emphasis on developing users' problem-focused adaptation efforts. Our results indicate this could be done by decreasing the degree to which the users appraise the likely consequences of new IT systems as a threat and by increasing the degree to which they feel control over the IT event. This can include providing additional training sessions, providing additional information about the new system and/or its concerns or temporarily decreasing performance targets. Such efforts can help users to develop their

skills and a sense of satisfaction at their mastery of system features.

Also, honestly acknowledging the likely difficulties of the new IS by the management (which did not happen in the PHC unit) and simultaneously supporting users' efforts in overcoming them, could lead to more productive adaptation behaviours and IT use outcomes than downplaying or camouflaging these obstacles. Practitioners should also be aware that certain emotional reactions might reduce individuals' performance outcomes. Hence, managers should focus on lessening avoidance-oriented behaviours or shifting them towards approach-oriented emotional reactions by helping users feel a sense of empowerment over the way they use the system in their daily routines.

The findings of this study also revealed that since users in this medical centre had very little or no computer skills required to engage with the new IT systems, they were sensitive to the management's decisions and were relying heavily on the social supports and available coping resources to evaluate the consequences of the dramatic changes in their work routines. Therefore, managers may find it particularly helpful to take the direct and indirect impacts of social influences into consideration. Evaluating an IT event based on the availability of coping resources- and not necessarily based on the quality of the implemented IT system- could be another area of concern for managers. In Iran while the quality of IT systems (in terms of both hardware and software) might be important for some managers, they often fail to provide employees with the required coping resources to adapt to the new technology. The findings of this study in this respect could be beneficial for other settings with similar characteristics.

Moreover, the proposed model is high-level enough to allow practitioners to make sense of users' processual IT adaptation behaviours as a whole, while at the same time it allows for detailed interpretations of results with regard to each concept. Further insights into how IS users go through IT adaptation processes to achieve performance outcomes can produce significant inputs in the formulation of adequate IT adaptation strategies.

## **8.2. Implications of the Research Approach**

The main contribution of this thesis is that it has generated important and valuable insights into the phenomenon of user IT adaptation behaviours within the context of Iran. Adopting

an interpretive approach through a longitudinal process-oriented perspective has provided a greater understanding of the patterns of user adaptation to IS, users' psychological constructs, initial patterns of their adapting strategies, the likely shifts in such coping efforts over time, and the consequences of these evolutions on subsequent individual level IT use outcomes in different divisions within a healthcare environment. Using the original CMUA framework as an initial template allowed the researcher to study the complex dynamic relationship between user IT adaptation behaviours and individual-level IT use outcomes. Based on the empirical findings of the case study the original CMUA model has been modified to reflect the context-based real-world outcomes. However, the findings of the study could have wider applicability than the particular case studied and still be relevant and insightful to the study of user IT adaptation behaviours in other contexts with similar characteristics.

As presented in chapter 4, this research can claim to offer generalisation to theory (Lee & Baskerville, 2003), an analytic generalisation (Yin, 2010, 2003; Dibbern et al., 2008; Maxwell, 2007) or 'contribution of rich insight' (Walsham, 1995), as it sought to enrich the current body of knowledge pertaining to the user IT adaptation behaviours and has modified the initial guiding theoretical framework, which can guide future studies in the same or similar areas. More specifically, Beaudry and Pinsonneault's (2005) CMUA, which has been revised to incorporate different characteristics, can be used for a more detailed examination of user adaptive acts to further understand the influence of the adaptation process on IT use outcomes. Interpretive research usually invites criticism of researcher bias. In this study, this argument was countered by using various sources of data.

### **8.3. Limitations of the Research**

This study has limitations that should be acknowledged. The first and foremost limitation was the scope of the study, as it focused only on one single case study in a medical centre related to Iran's Ministry of Petroleum. Nevertheless, the study participants included both professionals (e.g. doctors and expert administrative) and non-professional employees (e.g. receptionists) with different levels of computer knowledge required to work with the new IT systems. Therefore, it may be possible that the resulting patterns of this study could be parallel to that of similarly constructed organisations in another industry and context. In addition, because the data was collected from a single work setting, the generalisability of

our findings to other contexts may be limited. However, because of the broad and well-established theoretical foundation, the general tenets of this research could be beneficial in other cultural, national or industrial settings and common across multiple organisations and industries.

Another limitation might be that the focus of this study was on individual-level IT adaptation processes without exclusively considering the role of organisational culture on such behaviours. Of course, the concentration on users' psychological perspectives was not intended as denial that organisational cultures also contribute to this phenomenon-naturally they do. This was due to the objectives of this study to provide greater insight into the phenomenon of user adaptation to IT events and the possible IT use outcomes from a process approach. Since the phenomenon of user adaptation by itself provides valuable but complex information concerning the interaction of users' psychological constructs, the addition of another broad and complex topic such as organisational culture could prevent this study from exploring the dynamics of user IT adaptive acts in-depth. Nevertheless, the importance of organisational culture has been acknowledged in existing IS literature as a critical success factor in IS implementation (see Jackson, 2011; Leidner & Kayworth, 2006; Pliskin et al., 1993; Romm et al., 1991). Because organisational culture acts as a filter through which members grasp the realities inside and outside the organisation, it practically affects different aspects of the way people of a group interact with each other (Weber & Pliskin, 1996). This limitation, however, has left room for future studies to bring the notion of organisational culture into this framework and investigate the influences of such organisational factors on user IT adaptation and system usage outcomes.

#### **8.4. Areas for Future Research**

The process-approach of the CMUA was applied to understand the contribution of user adaptation behaviours to individual level IT use outcomes. Future research can build upon this study to answer several remaining questions to provide more insight into the adaptation behaviours of various types of users dealing with different technologies in different organisations and in different contexts. One area of investigation concerns how adaptive behaviours change over time. Do adaptive acts occur continuously throughout the system usage or during irregular intervals of disequilibrium as suggested by other research (Tyre & Orlikowski, 1994)? The results of this study indicate that interruptions and surprises



can serve an important role in triggering users to review and revise their adaptation behaviours and processes (e.g. in laboratory, PHC, pharmacy units). Further longitudinal studies would help to shed light on similar questions and enhance the existing framework.

Future research should also investigate the effects of political and social factors (e.g. group norms, organisational culture, and colleagues' attitude) on users' adaptation to technological changes. Job security (see Sverke et al., 2002; Hartley et al., 1990) is another topic, which can be investigated with respect to user adaptation behaviours. The findings of this study revealed that job security is an important intermediary in the way users appraise the situation with respect to their personal and professional status. In the case of the exempt stressed receptionist, job security represented "a distinct advantage, a sense of stability and the opportunity to have a steady income with which he could fulfil personal and family needs over the long term" as expressed by the user. Initially a lack of job security gave him the pressure he needed to be successful and show himself to the management, however being made permanent gave the receptionist a peace of mind that reflected itself in his IS appraisal and subsequently triggered a new set of adaptive acts. However, research is needed to shed light on this matter in greater detail. More research should also be conducted with regard to users with little or no computer skills needed to work with new introduced IT systems. The findings of this study reveal that users with such characteristics are prone to distractions and threatening appraisals that affect their subsequent adaptive acts.

The results of this study also uncover that the 'challenge appraisal' is most likely to lead to beneficial user adaptation and IT use behaviours. The findings also indicate that since the challenge appraisal represents a 'positive stress', some levels of challenge are useful to mobilise IS users towards IT adoption and use. However, Schmidt (2010) stresses that "overly high challenge in instrumental IT can reduce productive IT use" (p.1). More research is thus needed to concentrate on different aspects of users' challenge appraisals. Future research should also investigate the varying levels of challenge appraisal to determine how much challenge could lead to productive adaptation without overwhelming users. Scholars should also explore the mechanisms that influence the level of challenge they face when using a new IT system such as certain types of training programmes and coping resources.

Another direction for future research is to help managers to find ways to engage users in a beneficial user adaptation by influencing IS appraisal. For instance, what types of coping resources (or facilitating conditions) and communication strategies are most likely to trigger positive reactions to the new IS or transform threat appraisals into challenge appraisals? Or when and how these programmes could be deployed for maximum effectiveness?

From a practical perspective, future research should investigate methods that companies can use to boost adaptation behaviours that result in desired IT objectives. For instance, if an organisation wishes to promote the quality of IS usage, what should be done to stimulate problem-focused adaptation behaviours? Do certain types of training workshops and support programmes better suit this goal than others? The findings of this research have made some steps in this direction and confirm that certain types of training workshops stimulate positive emotions and attitudes in IS users towards learning and engaging with the new IT systems. For example, in the laboratory the local manager's attention to providing refreshments during the IT training sessions and local meetings had been noticed by all employees and stimulated positive evaluations, emotions and encouraging attitudes in them. Furthermore, the presence of the IT vendor in training sessions was also important to users and was referred to by all of them. Additionally, the quality of IT instructors, training sessions, learning resources and attention to users' needs and requirements to perform their daily routines were found to be critical in forming users' subsequent thoughts, emotions and efforts. This level of attention to such details showed that managers and practitioners should take the importance of the type and quality of training events into consideration.

Future research should explore the ways that managers can facilitate the transition of destructive avoidance-oriented reactions towards more optimistic and promising approach-oriented acts. In this study, there were few instances where managers actively intervened to turn disruptive events into opportunities for change. For example, the result showed that the one-hour discussion event in the laboratory unit helped users to informally communicate and learn from one another and challenge each other's opinions and choices concerning the system usage. Future research should focus on deeper empirical exploration of specific adaptation-use patterns based on CMUA to enrich our current theoretical

understanding of this phenomenon. The answers to these questions will help to determine areas for improvement and form a greater understanding of the implications of user IT adaptation dynamics. Finally, the framework should also be explored in other contexts, sectors and industries. This could result in a comprehensive inventory of IT-related adaptation efforts and development of a typology of adaptation strategies.

Until today, much more research still needs to be done for deeper understanding of the dynamics of user coping efforts facing disruptive IT events, since the success of any situation that utilises an IT artefact depends on the proper adoption and use of that artefact by the necessary users. This topic is an emerging area of investigation in IS research during recent years and several researchers have attempted to link this subject to other IS-related topics such as 'IS infusion' and 'IT acceptance' in order to use its strength to better understand and/or predict other IS-related issues or subject matters. This is based on the realisation that having a deeper knowledge of users' adaptation processes will enable researchers and practitioners to better understand IT acceptance (or resistance) related behaviours and thus to better manage them to achieve the desired IS outcomes. Thus, developing comprehensive theories in this area of research can inform change agents about the various aspects of the phenomenon of user IT adaptation behaviours, likely patterns of users' coping strategies and how particular types of adaptive acts could subsequently affect the quality of system usage and individual-level performance so they can better manage the situation.

Application of this knowledge, therefore, could be of particular value and help in a particular country or region to achieve the desired IS performance outcomes. One of these countries could be Iran, where its public sector over the past few years has undergone various reorganisation and modernisation in terms of 'work system computerisation' to enhance the efficiency and effectiveness of organisations, nevertheless the number of organisations that could successfully complete the WSC project and benefit from it is has been limited. In Iran, for instance, managers and practitioners by taking into account the crucial role of social side (employees) in dramatic IT-related organisational changes and knowing the subjects of change management and user adaptation, they can better manage the employees' receptivity to and mobilise for IT-related changes.

Although questions remain, this work represents an initial step towards greater understating of the linkage between users' appraisals, IT adaptation strategies and their IT use outcomes.

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## APPENDIX A – ETHICS APPROVAL

School of Information Systems, Computing and Mathematics  
David Gilbert, Head of School, Professor of Computing  
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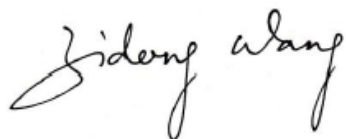
### STATEMENT OF ETHICS APPROVAL

**Proposer: Armin Kashefi**

**Title: Influences of employees' cognition and adaptation strategies on their IT adoption and use**

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

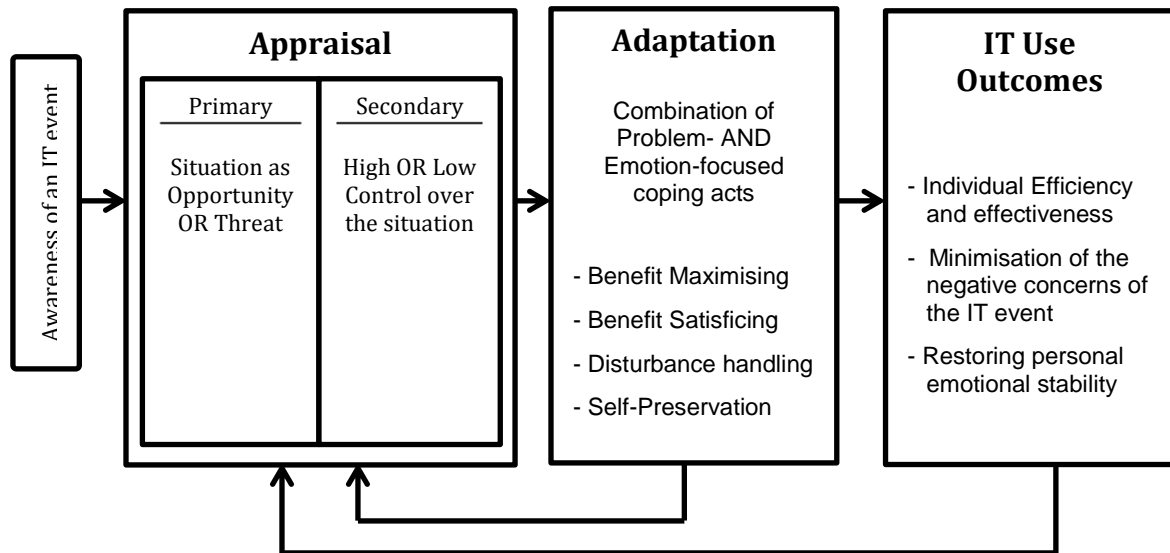
Yours sincerely,



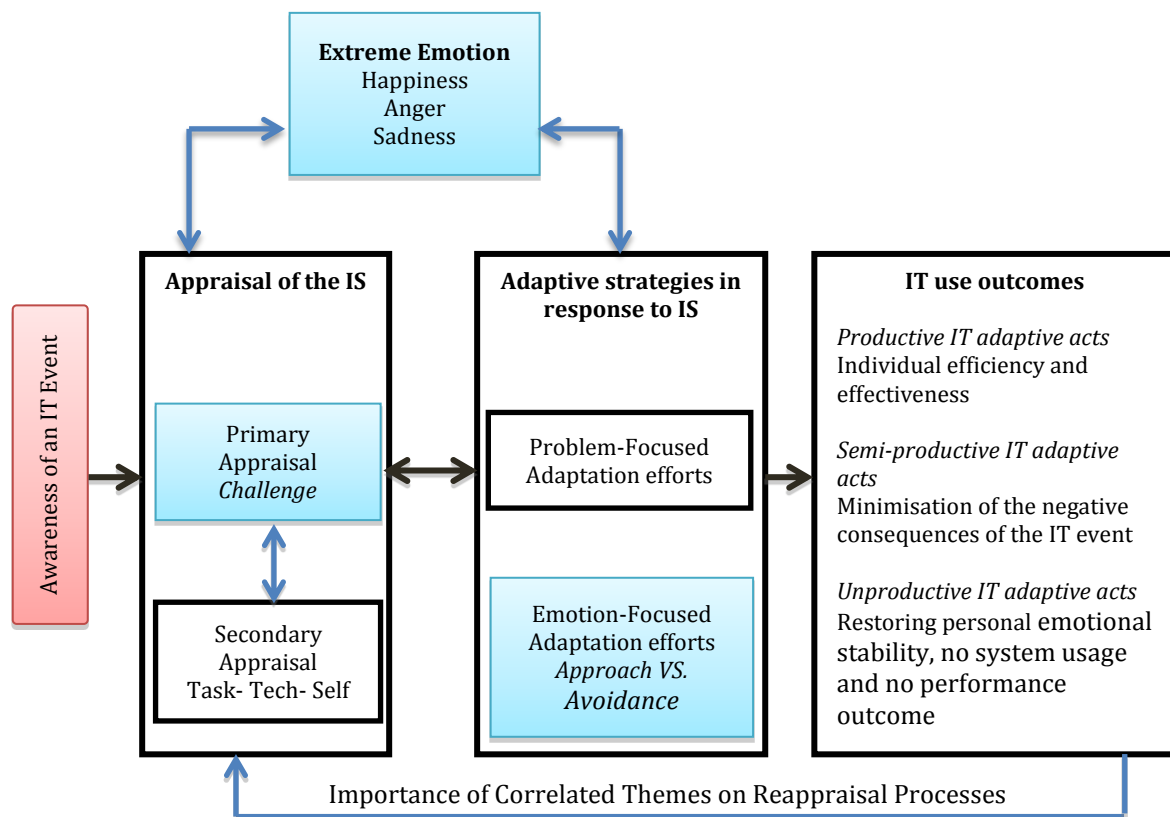
**Professor Zidong Wang**  
Chair of the Research Ethics Committee  
SISCM

## APPENDIX B – Comparison of the original CMUA model (A) and the proposed enhanced version in this thesis (B)

A) Original CMUA model, adopted from Beaudry and Pinsonneault (2005)



B) The proposed enhanced version of CMUA (based on the findings of the case study)



## APPENDIX C – PARTICIPANT INFORMATION SHEET

### Information Sheet

I, Armin Kashefi, am doing my PhD in the field of Information Systems Management (ISM) in the Department of Information Systems and Computing at Brunel University, London, United Kingdom.

The research topic under investigation is *'The influences of employees' adaptation strategies on subsequent system usage and IT performance at the individual level: A Case Study of the Computerised Work System'*. This thesis investigates the evolution of IT adaptation behaviours towards disruptive IT events in this NIOC's Medical Clinic. Given the fact that many organisational tasks highly depend on effective use of information technology (IT) systems, the degree to which computer users adapt to new IT systems can have a major impact not only on the efficiency of the operations at the individual level that are directly based on IT, but certainly on the performance of the organisation as a whole. The purpose of this study is to add a different way of looking at system users' adaptation to IT systems by focusing on the process of system users' IT-related coping strategies and the subsequent individual-level IT use performance.

### **Important Notices**

*-It is not compulsory for you to take part in this study/interview. However, if you agreed to participate in this study, you still have your right to withdraw at any time without any consequence.*

*-Your personal details will be kept anonymous. In other words, you will not be referred to by name or other personal information in any report concerning the study.*

*-If you have any concerns or complaints regarding this project please contact [siscm-srec@brunel.ac.uk](mailto:siscm-srec@brunel.ac.uk) or Professor Zidong Wang Tel. No. 0044 1895 266 295.*

## APPENDIX D – CONSENT FORM

Title of study: The influences of employees' adaptation strategies on subsequent system usage and IT performance at the individual level: A Case Study of the Computerised Work System

Name of Researcher: Armin Kashefi

I confirm that I have read the researcher participant information sheet.

I have had an opportunity to ask questions and discuss this study.

I have received satisfactory answers to any query I asked.

I am aware that my participation is voluntarily and I can withdraw anytime I so desire without giving reason.

I understand that this research is part of a thesis for a PhD program and therefore any information I provide can be disclosed to concerned academic supervisors for review purposes

**Tick all applicable**

I agree to be interviewed.

Be taped during interview.

Name of Research Participant \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

## APPENDIX E - SAMPLE INTERVIEW QUESTIONS

### Interview Protocol: Employees (System Users)

- What is your job in this division?
- What is your employment status in terms of permanent or temporary employee?
- How long have you been working in this unit in this job?
- Could you please explain your daily routines before computerisation?
- Were you happy with the old way of doing things? Or were you hoping for a computerised one?
- Did you have any experience of working with computers before WSC? If yes, for how long? What type of use?
- When did you first hear about the work system computerisation in this clinic?
- How did management announce the introduction and implementation of the WSC?
- Were there a good communication channel between employees and the management?
- What did you know about the WSC before that time? Please explain your initial understanding of the computerised work system.
- Did you think there would be improvements to your daily tasks because of the WSC?
- What are the technological equipment that you have in your division relating to your work as a result of WSC (Desktop, Printer, Scanner, and Internet)?
- Could you please tell me about the process of IT implementation? How was it? How long did the implementation phase take?
- What were your concerns (if any) about the WSC project after the implementation? How these concerns affected you (if at all)?
- Did those concerns (if any) disappear over time or did they trigger other problems?
- How different was the new computerised work system compared to the one you were hoping for or expecting? (If any difference) Did it affect you?

- How disruptive the WSC was in your case? Were you ready for such a change in your work routine? How did you deal with it personally? Explain it to me please.
- What was your initial understanding of this event? The day you saw a computer on your desk for example. What was your feeling your understanding?
- According to your initial understanding of the WSC, how did you cope with the new situation/ new IT system? What were your strategies?
- How the social surrounding and concerns you were dealing with affected your perception of IT event afterwards (over time)?
- How did you find the availability of coping resources for your adaptation? Were they sufficient?
- How did this availability/unavailability of coping resources affect your appraisal?
- Did you face any difficulty while you were trying to cope with the new situation (IT system)? Can you name those issues for me please? Can you explain what did you do to deal with those difficulties?
- Did you adjust/change your coping strategies accordingly? If yes, how did you change your strategies to better survive? How did you address the issues you had faced?
- If changes in strategies, what happened to your computer usage and performance after these changes?
- Did your new adaptation efforts help you to manage the situation? How?
- Tell me about your outcome in terms of efficiency and effectiveness (performance)? Had such adjustment also affected your individual performance?
- Did management send you to the computer training sessions? How was it in terms of both quantity (number of sessions) and quality? Explain it to me please.
- Apart from the general computer training classes, who trained you regarding the software application itself? Did anyone come from the software company to train employees? (vendor)

- What facilities (if any) management provided for you and your colleagues, to better cope with the new WSC? How this affected your appraisal?
- Is your current understanding of the WSC different from your earlier one? If yes, how? Explain it please.
- If this system is to be implemented somewhere else, what would be your recommendation to the management of that organisation?
- How satisfied are you with the current computerized work system?
- What are the barriers you are facing for using the IT system properly (if any) from your personal point of view?
- How did you find the management's role and involvement with regard to the WSC project?
- How do you think management should have behaved (or have acted) to encourage employees to use the IT system?
- If you were in management's shoes, what else would you do that this management neglected regarding the employees' adaptation to new technologies?
- Can you suggest any changes to the WSC project (technical and non-technical) that would make it more useful to you and other members of this unit?

### **Interview Protocol: Contractors**

- Tell me about your company.
- What type of services your company offers to this clinic regarding the WSC project?
- What is the history of your company in terms of developing this kind of applications?
- Which departments are you working with?
- Did your company train the employees to be able to use your software application effectively? If yes/no, why?
- How long have you been working with this medical centre?
- How were you able to secure the contract for the job?
- Did you participate in the bidding process for the project? If so, how?



- Do you see the WSC project as a good place to invest?
- What are some of the obstacles (if any) you faced with respect to the WSC in this clinic?
- What have you done to deal with such obstacles? Have you talked to the management?
- What are your requests from the clinic's management?
- How do you provide customer support to IS users in this clinic?

### **Interview Protocol: Heads of Departments**

- How long have you been working in this position in this unit?
- What is the first thing you can say about the 'WSC' in this unit?
- Have you had any experience of working with computers before WSC in this clinic? If yes, what kind of WSC? To what extent?
- How did you cope with this new wave of computerisation? What was your first impression? Your feeling?
- How did management announce the introduction and implementation of the WSC in this unit?
- When did you first hear about the work system computerisation in the clinic?
- What were your thoughts on the WSC in general?
- How do you describe the WSC project in this division?
- What do you think about the role that the clinic's management has played so far in this IT event?
- Are you satisfied with the WSC in this unit? If yes/no, why?
- Do you think the WSC project represents "performance"? Have you (and your employees) reached performance?
- Has the introduction of the project truly enhanced the efficiency and effectiveness of your employees?

- Did the clinic's management provide enough training for the staff with regard to using the system? If yes/no, how?
- What have been the benefits of WSC in this unit?
- What were the major obstacles affecting the WSC in this unit?
- How did employees in this section go through the coping process? Did they cope well or were there issues? Explain it please.
- How these types of issues can be dealt with?
- How do you think the WSC project can be further improved to meet the needs of the employees?

### **Interview Protocol: Management**

- Can you explain your understanding of WSC please? What are the benefits?
- Why this medical centre decided to computerise/modernise its work system?
- Can you please explain the history of WSC in this clinic? What happened over the different managerial periods until now?
- What do you think the role of the management should be in WSC projects?
- Can you explain how developmental policies in the MoP's Health Care section are being made and what institutions are in charge of making these policies?
- Is there any milestone dates with respect to WSC that this clinic must work toward? Any pre-defined plan from PIHO?
- Can you briefly explain how HCSPs work with one another and with PIHO?
- Please explain how the development of WSC has been going, which areas have been covered and how PIHO intends to expand it?
- Can you please describe the kind of issues that have been reported during the installation, expansion or usage of the WSC project? How has the clinic's management dealt with these issues reported?

- Let us move on to the usage and maintenance of the computerised systems. How has this clinic and this management convinced the employees to adapt to this technology?
- Can you please describe how this clinic has gone about maintaining the computerised systems? Have you been monitoring the signed contracts between departments and software companies?
- Briefly describe how the acceptance of this project has been so far, and whether it has done well in particular division and not in others? If so, why?
- Can you kindly explain the kind of arrangements that have been put in place for employees to benefit from the WSC project in terms of salary, training and so on?
- So far, WSC in one of the departments has been terminated due to technical and non-technical issues. Can you describe to me the steps that are being taken by this management to make sure that such terminations do not happen again?