KNOWLEDGE EVOLUTION WITHIN BUSINESS PROCESSES UNDERGOING PLANNED/RADICAL CHANGE: EMPIRICAL EVIDENCE FROM KUWAITI HIGHER EDUCATION INSTITUTES

A thesis submitted for the degree of Doctor of Philosophy

by

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Abstract

This thesis investigates changes in knowledge required to complete tasks within business processes that have implemented planned/radical change. The research is based on the synthesis of three scholarly domains: change management, knowledge management, and business processes.

Organisations implement planned/radical change for various reasons: due to perturbations in the external environment, to achieve strategic goals, or to improve profitability. Radical changes affect business processes and the people carrying out tasks within those processes. Yet, many radical process change initiatives founder. The conceptual argument underpinning this thesis is that planned/radical change initiatives are rarely fully implemented because knowledge does not fully evolve from pre-change to post-change knowledge. People can hold onto knowledge they have, or are unable to grasp new knowledge required, or attempt to apply knowledge that is redundant. This thesis posits that knowledge which does not evolve is a barrier to change.

Consequently, this study contributes by providing a deeper understanding of knowledge evolution in the context of processes that have undergone planned/radical change, and specifically the evolution of declarative, procedural and heuristic knowledge necessary to complete new or redesigned tasks within business processes, which form the bedrock to enhancing the implementation of planned/radical change.

Drawing on the literature related to change, knowledge, process and dynamic capabilities, a conceptual model is developed to explain evolutionary stages from pre-change to post-change declarative, procedural and heuristic knowledge within business processes. The model is based upon empirical data, collected qualitatively from two higher educational institutes based in Kuwait. This thesis also investigates redundant knowledge: knowledge that is no longer of use in post-change processes. In addition, the factors affecting knowledge evolution that exist during the period of implementing planned/radical change in a business process are identified and defined. Understanding these factors enhances the progression of staff members through the evolution stages. The model suggests that greater recognition of the pace at which knowledge evolves is important for implementing planned/radical change. The implications for practice are highlighted. This study has a number of limitations and suggestions for future research, which are set out in more detail in the concluding chapter.

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Author's Declaration

I declare that, except where explicit reference is made to the contribution of others, this dissertation is the result of my own work and has not been submitted for any other degree at Brunel University or any other institution.

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Chapter 1: Introduction

1.1 Introduction

This thesis studies the evolution of pre-change knowledge to post-change knowledge within business processes undergoing planned/radical change. The study offers an empirically-derived model to illuminate the stages that constitute knowledge evolution during planned/radical change, and explicates redundant knowledge during knowledge evolution. It sets out the factors that support or hinder knowledge evolution. Chapter 1 presents the research background of the thesis; the research problems and gap; research questions; definitions and key terms; and the thesis' structure.

1.2 Research Background

Radical change is the taking apart and restructuring of essential assumptions and organising logic of organisations (Lamberg et al., 2009). Planned change is the means by which organisations implement radical change (Bryant and Stensaker, 2011). Conjoining the two concepts, planned/radical change is defined as large-scale changes organised in advance and approved by senior managers. For organisations to survive, they need to align their business processes to external environments and meet the needs of their markets (Kodama, 2001). A business process is the arrangement of structured or semi-structured tasks performed in a particular order by staff members to reach shared goals (Weske, 2007; Puustjärvi, 2010; Dave, 2017).

The word "process" is used in a variety of ways and, in particular, the literature refers to changes processes, business processes and knowledge management processes. For the purposes of this thesis, change processes are activities carried out within an organisation to develop and enhance performance or innovation (Sghari, 2016). Business processes, on the other hand, are a series of activities that develop organisational outcomes (Tbaishat, 2017). Some researchers confuse the terms by framing corporate change initiatives as business process reengineering initiatives without delineating the two concepts (Stensaker and Falkenberg, 2007). Knowledge management processes consist of different activities including retrieving, measuring, gathering, categorising and deploying knowledge (Interzari et al., 2017).

Planned/radical change encompasses new information technology systems, redefined workflows, new management roles, new governance principles, restructured work

groups, cross-functionally integrated and empowered teams and corporate-level restructures. Organisations undergo planned/radical change to keep up with rapid changes in the external business environment (Tenkasi et al., 1998). Planned/radical change is necessary to create new sets of order-generating rules that allow organisations to prosper and survive (MacIntosh and MacLean, 2001; Armenakis and Harris, 2009).

Staff members and systems that perform tasks in business processes require knowledge to achieve specific process outcomes (Kueng, 2000; Berente et al., 2009). Solymossy and Gross (2015) explain that knowledge and skills are necessary for completing known tasks, regardless of their complexity. Knowledge work, in the form of tasks, represents the building blocks of individual job activities (Byström and Hansen, 2005).

This research addresses how pre-change knowledge evolves — including the evolution stages — to post-change knowledge required by staff members to complete tasks within business processes undergoing planned/radical change. The thesis identifies and explains factors that promote or inhibit stages of knowledge evolution. This study identifies redundant knowledge — that is, knowledge that is no longer required to complete new tasks once planned/radical change is implemented. The extant literature pays little heed to redundant knowledge; yet, it has the potential to derail planned/radical change initiatives because people attempt to apply this knowledge to new or changed tasks.

In order to address these issues, a conceptual model is developed to investigate the stages of knowledge evolution: from the initial point of pre-change knowledge, which is required to complete tasks before planned/radical change is implemented in the business process, to post-change knowledge, which is the knowledge necessary to complete new tasks after planned/radical change implementation. It follows that as business processes experience planned/radical change so do tasks within business processes — from existing tasks to new tasks.

The conceptual model developed by this research study investigates the evolution of declarative (DK), procedural (PK) and heuristic knowledge (HK) necessary to complete tasks within business processes undergoing planned/radical change. These forms of knowledge can be defined in various ways; however, the following definitions are most pertinent to this research:

Declarative knowledge is a set of facts and rules describing a domain of knowledge. It is a structure of knowledge providing an explicit explanation for the domain of knowledge. Declarative knowledge is a set of facts and rules describing a domain of knowledge. It is

a structure of knowledge providing an explicit explanation for the domain of knowledge. It is knowledge that describes specific actions to perform a certain task (Vasconcelos et al., 2000; Gottlieb, 2014).

Procedural knowledge enacts declarative knowledge into use and employs that knowledge in a series of combined steps and stages in a particular order. Procedural knowledge is a relationship of sequential steps, each step connected to another. The type of relationship and connection between the steps form the quality of procedural knowledge. The description of the action for the steps answers the question "How to?" (Vasconcelos et al., 2000; Holcomb et al., 2009; Gottlieb, 2014).

Heuristic knowledge is the bridge between declarative and procedural knowledge, gained through incremental experience. It involves individuals making decisions and judgements regarding how to deploy declarative and procedural knowledge. Heuristic knowledge is the judgments people make about options they have in uncertain conditions. This individual judgment results in decisions via searching for explanations to make sense of, and create value from, situations to simplify them. It affects the ability to choose the best option for the individual reacting to current and future events that require changes to be made (Vasconcelos et al., 2000; Holcomb et al., 2009).

The Knowledge Evolution Conceptual Model is designed to represent the evolution of knowledge within business processes that undergo planned/radical change. The model consists of a number of stages. The first stage in this model is the existing or pre-change DK, PK and HK required to complete existing tasks prior to the change. The second stage of the model is the event occurrence, which is the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process. As a consequence of the change to the business process, the tasks within that process change. The last stage in this model is post-change declarative, procedural and heuristic knowledge.

The start point for this research entailed a systematic review of the existing literature in the fields of change management, knowledge management, and tasks and business processes. In Chapter 2, the existing change management literature is examined and classified using a classification matrix developed for this research. This is followed by a critical analysis of the literature identified as relevant in the planned/radical quadrant in order to define the research gap regarding planned/radical change. Finally, relevant knowledge management literature is analysed focusing on knowledge evolution,

redundant knowledge, and the factors affecting knowledge management, along with literature examining business processes and tasks. This literature review assists in identifying the research gap addressed by this thesis and the building of the conceptual model contained in this study.

The methodological approach of this study is laid out in Chapter 3. This research follows the nominalist view and uses an anti-positivist perspective to study knowledge evolution in business processes where planned/radical change has been implemented. Data collection was carried out using qualitative research methods in the form of semi-structured interview-based case studies. Interpretative validity was increased by using member checking; theoretical validity via the systematic review of literature; and internal validity by seeking confirmation from interviewees regarding elements of the findings. Internal validity was increased via the identification of the study's unit of analysis and external validity enhanced using theoretical connections to consider general application. Details of a pilot study and a case study protocol are presented in Chapter 3 to provide reliability. The protocol was used to maintain researcher focus during the research. The relevant documentation from the organisations taking part in the case studies was compared with interview data and can be found in the appendices of this thesis.

1.3 Research Gap

The results of analysing existing literature show that greater academic scrutiny is required regarding the interplay between knowledge necessary to complete tasks carried out by staff members and implementation of planned/radical change within business processes in organisations. Arguably, knowledge is a vital element for the implementation of planned/radical change.

Within the knowledge management literature, reviewed in Chapter 2 of this thesis, some articles discuss knowledge evolution but these papers consider the evolution of knowledge as an accumulation and growth of knowledge. This thesis considers knowledge evolution as the stages of progression from pre-change knowledge to post-change knowledge necessary to complete tasks, in order to develop a model that demonstrates the stages of knowledge evolution through which staff members progress during planned/radical change implementation in a business process. Identifying redundant knowledge during the stages of knowledge evolution is important for completing tasks. The literature studying redundant knowledge provides little discussion

regarding how to identify and manage this kind of knowledge. The interrelationship between planned/radical change and knowledge has received limited attention in literature published within the fields of knowledge management and change management. Therefore, this research contributes to the literature by providing a conceptual model supported by empirical evidence that explains the stages of knowledge evolution within business processes undergoing planned/radical change. Furthermore, this thesis investigates the identification of redundant knowledge no longer required to complete tasks during the knowledge evolution stages. There is a need to further understand knowledge as an important resource for implementing planned/radical change that is necessary for organisational development and survival. The knowledge management literature demonstrates scholarly agreement that many factors affect knowledge management implementation. However, there is little agreement on what these factors are.

1.4 Research Aim and Objectives

To ameliorate the current state of the knowledge management literature, this thesis aims to identify and define factors that influence the evolution of pre-change knowledge to post-change knowledge during planned/radical change within business processes and considers their effect upon staff members' progression through the knowledge evolution stages. The aim of this thesis is to contribute to theory by adding the consideration of knowledge evolution within business processes to gain greater insights into the implementation of planned/radical change. Furthermore, this study enriches dynamic capabilities theory by providing an understanding of knowledge evolution to support staff members to better implement planned/radical change within business processes. The thesis shows that knowledge evolution is a dynamic capability that can be used to improve an organisation's performance. In addition, this work provides implications for practice via recognition of the importance of necessary knowledge for staff members to complete tasks within a business process undergoing implementation of planned/radical change.

The aim of this thesis will be achieved by fulfilling the following research objectives:

- To review the change management literature and develop a matrix to classify the extant literature.

- To review the literature in the area of knowledge management with a focus on declarative, procedural and heuristic knowledge.
- To develop a knowledge evolution model that explicates the stages needed for knowledge to evolve, and identify redundant knowledge throughout these stages within a business process undergoing planned/radical change.
- To identify the factors affecting knowledge evolution within a business process implementing planned/radical change.

1.5 Research Questions

The two central research questions are:

- How does knowledge evolve from pre-change knowledge to post-change knowledge within business processes that undergo planned/radical change?
- How is redundant knowledge identified during the knowledge evolution stages?

1.6 Definitions and Key Terms

For the purposes of this thesis, the following glossary of terms sets out the meanings of specific words and phrases.

- **Change management:** the process wherein an organisation shifts from one system to another by coordinating staff members, along with other resources, in order to carry out various duties to enhance performance.

- **Planned change:** change that requires preparation in advance initiated and supervised by senior managers.

- **Radical change:** large-scale organisational change that demands the re-engineering of business processes, causing changes in structure across many parts of an organisation

- **Planned/radical Change:** large-scale changes that are organised in advance and approved by the senior management of an organisation.

- **Business Processes:** A business process is the arrangement of structured or semi-structured tasks performed in a particular order by staff members to reach shared goals.

- **Event Occurrence:** the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process.

- **Task:** activities carried out by staff members to achieve specific outcomes.

- **Staff Members:** frontline workers responsible for completing tasks in a business process.

- **Knowledge:** the integration of information, skills and experience needed to carry out tasks.

- **Declarative Knowledge (DK):** a set of facts and rules describing a domain of knowledge. It is a structure of knowledge providing an explicit explanation for the domain of knowledge. It is knowledge that describes specific actions to perform a certain task.

- **Procedural Knowledge (PK):** enacts declarative knowledge into use and employs that knowledge in a series of combined steps and stages in a particular order. Procedural knowledge is a relationship of sequential steps, each step connected to another. The type of relationship and connection between the steps form the quality of procedural knowledge. The description of the action for the steps answers the question "How to?"

- **Heuristic Knowledge (HK):** the bridge between declarative and procedural knowledge, gained through incremental experience. It involves individuals making decisions and judgements regarding how to deploy declarative and procedural knowledge. Heuristic knowledge is the judgments people make about options they have in uncertain conditions.

- **Pre-change Knowledge:** required to complete tasks before planned/radical change is implemented in the business process.

- **Post-change Knowledge:** necessary to complete new tasks after planned/radical change implementation.

- **Knowledge Evolution:** progression of staff members from pre-change knowledge to post-change knowledge.

- **Redundant Knowledge:** a subset of pre-change knowledge no longer needed to complete new tasks within business processes that have implemented planned/radical change.

1.7 Thesis Structure

Chapter 1: Introduction

This chapter introduces the thesis as a whole and outlines its structure and direction of travel.

Chapter 2: Literature Review

This chapter is structured under the following headings: Change Management; Theories Used to Study Planned/Radical Change; Knowledge Management; Factors Affecting Knowledge Management; Business Processes; Research Gap; Theoretical Background and Research Focus; Research Questions; Research Conceptual Model.

Chapter 3: Research Methodology

This chapter focuses on the methodology of this thesis, explaining and justifying the selection of appropriate research approaches. The chapter begins by presenting the underpinning philosophy of this study. Based on this philosophy, the research strategy is described including qualitative approaches taken, data collection and analysis methods, validity tests, a case study protocol, and results of a pilot study.

Chapter 4: Case Study 1: Institute X

This chapter discusses the first of two case study settings and is structured as follows: Criteria for Choosing Institute X; Background of Institute X; Critical Analysis of Institute X – Change in the Processes; Process 1: Registration, Admissions Office; Process 2: Faculty Self-Evaluation Process; Conclusions. The data collected from the case study is then analysed. The case study investigates the evolution of knowledge within selected business processes of Institute X during implementation of planned/radical change.

In the course of completing the case study, data was collected using semi-structured interviews. These interviews were designed to focus upon the change from pre-change knowledge in Institute X's business processes to post-change knowledge necessary to perform new tasks. In addition to semi-structured interviews, a review of relevant institutional documentation regarding the change was also carried out. The analysis of this data facilitates the mapping of the stages of knowledge evolution. This is shown by ascertaining the steps included in tasks and changes that occurred regarding these tasks, as well as the pre- and post-change knowledge.

Chapter 5: Case Study 2: Institute Y

This chapter discusses the second case study. It follows the same structure as the first case study.

Chapter 6: Discussion and Synthesis

This chapter discusses the findings from the two cases study analyses in Chapters 4 and 5. Specifically, this chapter develops four theoretical strands, namely, the change in knowledge within a business process undergoing planned/radical change, knowledge evolution, redundant knowledge and factors affecting knowledge evolution. These strands form the basis of the contribution that this study makes to a deeper understanding of the effect of post-change knowledge on task completion and therefore the enhancement of the implementation of planned/radical change.

Chapter 7: Contributions

This chapter weaves the theoretical strands developed in the previous chapter to set out the contribution to theory in the form of a knowledge evolution model that establishes the stages of evolution from pre-change to post-change knowledge; identifies redundant knowledge during the knowledge evolution stages; and determines factors that affect the evolution of knowledge necessary to complete tasks during implementation of planned/radical change. The chapter also shows a contribution to dynamic capability theory and to practice via demonstrating the importance of identifying post-change knowledge to complete tasks within a business process undergoing planned/radical change.

Chapter 8: Conclusions

This chapter draws the thesis to a close with a discussion of the issues studied, a statement of findings based on evidence presented, research limitations, and recommendations for future studies.

Chapter 2: Literature Review

2.1 Introduction

Chapter 2 addresses the existing literature in the scholarly domains of change management, knowledge management, and tasks and business processes. First, the existing change management literature is reviewed and classified using a classification matrix developed for this research. Second, the relevant literature identified in the planned/radical quadrant is critically analysed in order to define the research gap in relation to this type of change. Third, relevant knowledge management literature is identified and reviewed focusing on knowledge evolution, redundant knowledge, and the factors affecting knowledge management. In addition, the existing literature examining business processes and tasks is reviewed and analysed.

The systematic review and analysis of the relevant literature across these three scholarly domains assists in elaborating the research gap addressed by this thesis. The review assists with the building of the conceptual model contained in this study. The chapter is structured under the following headings: Change Management; Theories Used to Study Planned/Radical Change; Knowledge Management Literature Review; Factors Affecting Knowledge Management; Business Processes; Research Gap; Theoretical Background and Research Focus; Research Questions; Research Conceptual Model; Chapter Summary.

2.2 Change Management

Change management is a commonly used phrase with a broad range of definitions, depending on the situation or subject. For instance, change management is defined in different ways within information technology projects than when defining organisational change management. Although different definitions exist, numerous scholars have developed definitions for use in a variety of circumstances.

According to Armenakis and Harris (2009), change management is the process by which an organisation prepares to shift from one management system to another. The process entails an evaluation of a company's adaptability to change, the impact the change will have within the organisation and a general assessment of the new changes before

implementation. Change management is the process of coordinating workers of an organisation, along with other factors of production, to prepare for variations in the business environment and ensure maximum production (Weick and Quinn, 1999; Feng et al., 2016). Change management refers to training of employees to enhance their knowledge and skills required for operating office equipment such as computers, so that organisations achieve competitive advantage via improved operational efficiency in contrast to firms employing older methods of training (Gist et al., 1989; Hoşgörür, 2016). Armenakis et al. (1993) argue change management is a process that involves employers and their ability to influence employee cooperation in ensuring efficiency when carrying out various duties.

Change management is defined as the process of ensuring champions of production are guided towards effective production techniques, while keeping up with technological advancements (Belasco, 1990; Lee et al., 2017). A study by Farjoun (2007) hypothesises that change management does not only involve adopting new changes but also includes implementation of existing strategies to suit organisations. Change management is about training the workforce, assessing their needs, and providing performance evaluation by upper management (Al-Abbrow and Abrishamkar, 2013).

Moreover, change management means identifying adaptations in employees' behaviour at work and responding to them in a supportive manner, while developing strategies to make organisational environments more suitable for employees (Beer and Nohria, 2000). The process entails exploration of an organisation's capabilities and competencies, as well as strategies for improving them. In other words, it is the act of an organisation to make inquiries to move to the targeted situation or maintain current best capabilities (Bhasin, 2012). For Kotter (2008), change management is the process of assisting people in an organisation to understand the need for adopting new technologies and skills to enable the organisation to thrive.

A further definition of change management is described by Meaney and Pung (2008), who describe it as the process of setting clear, high-level aspirations to ensure that a change in performance is achieved within an organisation. They note the significance of the organisation including its workforce in decision-making processes. This is because empowering employees as decision takers has a positive influence on workforce morale. Ashurst and Hodges (2010) posit that change management is a process wherein an organisation identifies elements that cause any form of change in an organisation, as well

as their influence over the process of change. After identifying the causal agent, organisations take appropriate actions to ensure change is achievable (Whelan-Berry et al., 2010). Ben-Menahem et al. (2013) present change management as the efforts of organisations to align external business environmental factors with internal factors, in order to achieve a favourable business environment.

Most of the definitions of change in the existing literature suggest that change is a process rather than an instance. This calls into play a temporal dimension to change, which requires time to be considered. As explained in Chapter 1, change processes are not the same as business processes. There is broad agreement within the literature that change involves people and other resources such as IT. As people are different in every organisation it is unlikely that any two changes will be replicated exactly. There is little agreement between scholars regarding the implementation aspects of change. Some articles identify causal agents as important factors, while others completely ignore agents. For many scholars, the external environment is important when investigating change but others see this as a minor concern. Therefore, any study of change management is entering a disputed arena of scholarship full of differing viewpoints argued by scholars who are unable to agree on basic definitions of terms.

Change management is present in almost all processes but requires keen observation and proper evaluation. The process brings forth a variety of benefits to organisations when it is planned and, more importantly, implemented with care. This form of planning has positive effects on performance and the potential survival of organisations. Change management enables companies to gain entry to new markets (Kempster et al., 2014; Sghari, 2016; van den Heuvel et al., 2017). Change management is vital in maintaining or dispersing the concentration of power. Power concentration by senior management may be harmful or unhealthy to an organisation. The process gives organisations an opportunity to replace less productive managers and increase organisational efficiency (Greve and Mitsuhashi, 2007).

Change management improves product quality and employees' skills (Zhao et al., 2013; Feng et al., 2016). Change management that entails workforce training and development ensures efficient, trained personnel carry out essential tasks (Saastamoinen and Järvelin, 2016; Pesch and Bouncken, 2017). Training provides workers with knowledge required to produce high-quality products that are competitive in world markets (Al-Abbrow and Abrishamkar, 2013). Change management enables organisations to develop new

products, which contributes to an increase in sales by meeting market demand. This motivates individuals, leading to self-driven people working with little or no supervision (Halpin and Daugbjerg, 2016; Feng et al., 2016).

Change is important for organisational survival. The more efficient planning and implementation of change is, the greater the benefits to the organisation (Kodama, 2001). Scholars focus on organisational members implementing change. The literature identifies clear correlations between training staff members and enhanced change implementation. Implementing change allows organisations to recruit more skilled managers, and increases staff member motivation when supervision is improved or reduced. While some scholars argue that change causes uncertainty and anxiety for staff members, many others present a strong counterargument showing that effective communication, management, and trust building reduces uncertainty. There are many conflicting definitions of change management and little agreement in the literature on what change management consists of. Change is positive when it empowers staff members, strengthens management and communication, and builds organisational capabilities; however, negative outcomes include job losses, lower staff morale, and failure to fully implement change. For the purposes of this thesis change management is defined as the process wherein an organisation shifts from one system to another by coordinating staff members, along with other resources, in order to carry out various duties to enhance performance (Armenakis et al., 1993; Weick and Quinn, 1999; Armenakis and Harris, 2009; Feng et al., 2016).

2.2.1 Change Management Systematic Literature Review

This literature review provides an overview, synthesis and critical assessment of extant research to challenge or problematise existing theories relating to knowledge management and identify research questions (LePine and Wilcox-King, 2010; Sandberg and Alvesson, 2011). Systematic Literature Reviews (SLRs) are a method that proposes a protocol for the search and appraisal of literature, providing a consistent method for literature reviews that is repeatable, clear, unbiased and thorough (Atkins and Louw, 2000; Okoli and Schabram, 2009 and 2010; Oates, 2011; Oates et al., 2012).

The SLR approach is part of the evidence-based movement aiming to advance policy and practice by providing the best evidence available from research (Campbell Collaboration, 2007; Morrell, 2008). SLRs are useful for researchers to answer a specific research question(s) by identifying and collating evidence from existing literature, and are used in a variety of ways and contexts (Okoli and Schabram, 2009 and 2010; Mohan and

Ahlemann, 2011; Boell and Cecez-Kecmanovic, 2015). The purpose of conducting the literature review is to enable researchers to assess current intellectual territory and decide on research questions, to further develop the existing body of knowledge (Tranfield et al., 2003). In management research, the literature review process is one of the main tools for dealing with the diversity of elements within a disciplinary topic (Tranfield et al., 2003; Spicer, 2011).

2.2.2 Adoption and Implementation of a Systematic Literature Review

Many researchers have followed the systematic review process. This study takes as its starting point three stages of reviewing the field to derive reliable conclusions. Table 2.1, below, sets out the stages recommended by Tranfield et al. (2003) and the ways in which each stage is used for the purposes of this research. The first stage of the model is planning the review. This stage is to assess the field of study and provide an awareness of the field's main characteristics in advance. The second stage is conducting the review. During this stage, relevant key words and search terms are determined. This scheme should be described in a manner that allows future replication. The third stage is reporting and dissemination. A well-structured and documented systematic review allows researchers to prepare an effective report of findings (Tranfield et al., 2003).

Stages	Implementation of the approach
Stage I: planning the review	- Determining search area - Setting search criteria and limitations - Developing search protocol
Stage II: conducting the review	- Conducting the search - Setting review and selection parameters - Developing a documentation structure - Examining the articles following the structure
Stage III: reporting and dissemination	- Creating the report outlines - Reviewing the selected articles in more depth - Deriving the conclusion linked with the contribution

Table 2.1: Summary of Implementing the Systematic Literature Review
(Source: adapted from Tranfield et al., 2003)

The first action taken in the research process was a search conducted to review the existing literature of change management to determine areas requiring further investigation. The field of change management has been investigated from different viewpoints. Within the literature many types of change are discussed. The SLR for this

study led to the development of a classification matrix to categorise the literature. The matrix assisted in having a better understanding of the classified literature in order to locate this research project within the literature. The search area is demarcated by empirical research used to study change. The search criteria were established at the outset by identifying databases, defining search key words, verifying search limitations and delimiting the timeframe of the search criteria. The EBSCO, ProQuest and Scopus databases were used to conduct the systematic literature review, as they contain a great deal of material relevant to the search field. The key words used were "Change OR Transformation AND Management OR Leadership." The systematic search covered published academic articles in the EBSCO, ProQuest, and Scopus databases over a fifteen-year period: from 1998 to 2013. This was an initial research activity and further searches were made throughout the period of writing this thesis including papers published before 1998 and from 2013 to 2017.

Database	Keyword	Limitation	Timeframe
EBSCO, Scopus, ProQuest	Change OR Transformation AND Management OR Leadership	Full Text, References Available, Scholarly (Peer Reviewed) Journals	1999-2013

Table 2.2: Systematic Literature Search Criteria (Source: thesis author).

This first round of searches included articles that contained the search terms but were in areas that had no relevance to the chosen area of study. To refine the search an additional criterion was included. The search was limited to journals included in the Association of Business Schools (ABS) list (Academic Journal Quality Guide, 2010, v4).

The basis for selecting articles included only those that used the word "change" in relation to organisations (rather than, for example, climate change). Applying the selection procedure, the first round involved reading the titles and abstracts of empirical research papers. The next round of analysis involved a study of these selected articles.

2.2.3 Classification Matrix for Change Management Literature

The first dimension of the matrix represents the nature of the change as a continuum between radical or incremental change. Burrell and Morgan (1979) argue that incremental and radical changes are extremely different aspects of the nature of change. These different forms are presented as distinct ends of a continuum. Incremental change is about maintaining unity, which entails the agreement of structural order among all

parties involved in the change process. Caldwell (2005) suggests that change is a contextual counterpoint to organised ideas of order and balance. The second dimension represents the implementation of change as a continuum between planned or emergent. The terms emergent and planned refer to the ways in which change unfolds. By (2005) argues that both types cannot exist together as they have different natures and require distinct conditions. Planned change is beneficial where it is prepared in advance from a senior manager's point of view (Doyle et al., 2000; Bryant and Stensaker, 2011). In contrast, emergent change occurs in unstable situations and is a more unpredictable change process developed within an organisation (By 2005; du Gay and Vikkelsø, 2012). For more detailed definitions of these types of change see Appendix 2.

2.2.4 Applying the Classification Matrix for Change Management Literature

The two dimensions of change create a matrix for classifying existing literature and is depicted in Figure 2.4. The empirical papers, identified from the SLR, are categorised in
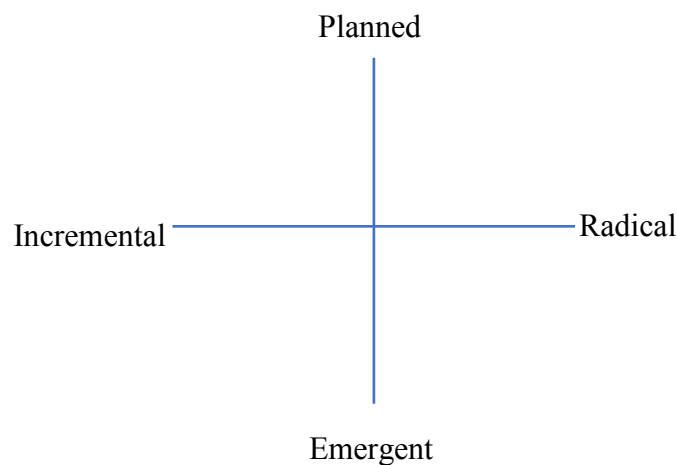
Figure 2.1: Classification Matrix for Change Literature (Source: thesis author).

the four quadrants based upon the following criteria. One, to include articles contained in journals found in the ABS guide v.4. Two, only empirical research articles based on evidence were included. Three, articles discussing change other than change management (for example, medical) were excluded. Using these criteria, a long-list of articles were reviewed and analysed based on the type of change studied. These articles were then classified and allocated to the relevant quadrant of the matrix, depending on whether the empirical work studied planned/radical change, planned/incremental change, emergent/radical change, or emergent/incremental change. Articles were located in a quadrant of the matrix by identifying key words regarding the type of change studied.

Where key words differed, the articles were allocated to a quadrant based on an understanding of the four types of change studied.

Given the four change types, the matrix assisted the focus of this research. As emergent change is defined as unplanned change dealing with sudden occurrences, this type of change cannot be anticipated and is difficult to track and study unless research is being conducted at the same time as the change happens. On the other hand, planned change is structured, documented change, which is available to track and study when the change implementation is completed. Since this research study is examining the evolution of knowledge within business processes, the change studied should be completed and recorded. Emergent change is inappropriate for this type of study, whereas planned change allows for monitoring and analysis.

Incremental change is small-scale change to achieve long-term goals and, as the tasks remain broadly the same, there is little knowledge evolution. Radical change, on the other hand, is large-scale change in the organisation. This kind of large-scale change requires people to perform their tasks differently, which requires different knowledge. These differences in pre-change and post-change knowledge make radical change more suitable for the study of knowledge evolution.

This research, as a result of the choices made via the systematic literature review and analysis of the matrix quadrants, studies knowledge changes within business processes undergoing a period of planned/radical change. The articles in the planned/incremental, emergent/radical, and emergent/incremental are summarised in Appendix 2. The literature for the planned/radical quadrant (the focus of this thesis) is analysed below.

Planned/Radical Change Quadrant

The following papers were identified during the systematic review of the literature and subsequent update searches carried out throughout the period of research. The discussion and analysis of these articles assist with understanding the importance of knowledge in the implementation of change. This section illustrates that knowledge is an organisational resource that should be identified and evaluated in order to enhance change implementation. These articles consider planned/radical change from different perspectives in a variety of contexts. The analysis that follows highlights that existing

literature does not consider knowledge or types of knowledge in detail but rather discusses knowledge, directly or indirectly, in general terms as an element of change.

Ashurst and Hodges (2010) note that although the literature on methods of change is extensive, there is still a need for more empirical evidence regarding implementation methods. The study considers the benefits of investing in IT skills to enable change. Ashurst and Hodges (2010) argue that organisations should create a number of steps to develop competency, and explore IT-enabled transformation and change, and organisations improve capabilities to attain greater benefits via change. The study uses a resource-based view and considers organisational dynamic capabilities. The paper presents a model to understand an organisation's competencies along with recommendations for sharing knowledge and practices to assist improving benefits realisation capability. The study shows that planned change is a process wherein senior management allocates resources available in the business within the period of change. Planned change is initiated and supervised by senior management that evaluate the availability of resources required to implement the change. The article identifies the importance of recognising skills available across organisations as resources. Ashurst and Hodges (2010) offer empirical evidence that IT investment of this kind brings benefits to organisations by enhancing the quality of change. Chen et al. (2013) study management behaviour and skills, local government plans and market forces that drive the change process in China. Deploying transaction cost theory, this paper focuses on the effect of marketing and R&D strategies on change regarding the performance of Chinese organisations. Evidence from semi-structured interviews shows management behaviour towards change and risk affects organisational growth. Furthermore, management that is resistant to change leads to organisations being unable to respond to external environments, bringing the possibility of reducing their capacity for organisational survival. Chen et al. (2013) show that knowledge sharing, planning and cooperation enhance change implementation. The paper concludes that knowledge is the most important resource for development of this kind and requires careful management for effective sharing and evolution.

While the identification of knowledge as a key resource for implementing change is discussed in the articles by Ashurst and Hodges (2010) and Chen et al. (2013), this thesis aims to understand the evolution of pre-change knowledge to post-change knowledge. This understanding adds value to knowledge as an organisational resource to be deployed during change implementation. As Noon et al. (2000) state, the existing knowledge is

insufficient to implement change effectively. Noon et al. (2000) apply management theory to study the effects of traditional management practices and change initiatives, and suggest that managers' thinking should be adapted when replacing old with new ideas. The data collected was coded to show that Royal Mail's introduction of two new management initiatives led to organisational frictions. Noon et al. (2000) argue that problems arose due to new initiatives and techniques being based on old modes of thinking. Reusing existing knowledge was found to have advantages; however, this existing knowledge is insufficient for managers to meet the demands of change.

This thesis offers further investigation into this issue. The ability to identify relevant and redundant existing knowledge is necessary to be able to recognise new knowledge needed to meet the change demands. The new knowledge is added to existing relevant knowledge and evolves into post-change knowledge.

The following two articles identify skills as a change-implementation resource. Lupina-Wegener (2013) investigates subsidiary mergers and acquisitions in a group of Polish organisations in a study of challenges faced regarding HR integration when working with overseas investors. The article focuses on skills and resource sharing, management skills transference, and benefits of improving these strategic elements. Lupina-Wegener (2013) concludes that the effective use of skills and resource sharing reduces change-related stress and makes change a more positive experience for staff members.

Kodama (2001) discusses how traditional organisations in the fields of IT and communications create new service markets and find a dominant position via new strategies. A case study, created via interviews and correspondence with NTT managers, is used to examine new practices for enacting radical change. Kodama (2001) considers practical applications of known success factors, including senior managers creating internal challenges regarding the use of organisational culture, skills, capabilities and experience to generate innovation via knowledge management.

Skills are a necessary resource for the implementation of change; however, skills should be integrated with information to develop experience. Skills, information and experience are elements of knowledge (Kluge et al., 2001). Information helps participants to understand the change circumstances; skills deploy this understanding into actions; and experience is developed from these informed actions (Tsoukas and Valdimirou, 1998). Therefore, these three elements enhance change implementation when this relationship is

recognised by those carrying out the change. This comprehension is achieved via effective communication within an organisation.

Authors Bryant and Cox (2003) explore bottom-top narrative effects on organisational change. This study into workplace violence, harassment, coercion, and reporting during organisational change offers opportunities to understand organisational dialogues, communication processes, insecurity and conflict in the workplace. Bryant and Cox (2003) show that the management of cultural and procedural change has significant impact on organisational morale should participants feel disempowered. The paper concludes that communication, feedback and trust building are keys to organisational change in these circumstances.

Sillince et al. (2001) study the need for institutionalising practices within the health sector. This paper explores motives and linguistic requirements that change during a period of transition, presenting an institutionalisation model detailing the focus of processes is justified within an organisation. Sillince et al. (2001) show that conflict arises when staff members take internal political stances to justify changes as these rhetorical forms of justification may not match. The paper examines and explains the variety of potential political standpoints that appear when introducing radically changed practices needed during a period of organisational change, and methods of justification for change that are valuable or ineffective. Sillince et al. (2001) show that different approaches are effective during the change; for example, persuading via rhetoric is valuable at one point but then opening dialogues during the process reduces resistance as staff members link initial arguments with positive change.

From a similar perspective, Nilsson (2010) applies mathematical theory of communication to examine strategic change communication via the idea that managers can be rhetoricians. Nilsson uses a case study involving interviews with managers at ABB, a Swedish organisation. The article considers the effects of communication upon change and, specifically, ways in which senior managers structure their communications during change. The study found that managers who attempted to win over audiences with emotionally-charged rhetoric swayed staff members in the first instance, yet risked being perceived as lacking clarity and transparency. This research demonstrates ABB managers were reluctant to admit deploying rhetorical devices and techniques. Nevertheless, the managers did recognise that effective communication is an important means for implementing change.

Sonpar et al. (2009) use institutional theory to explore experiences of undergoing institutional radical change. The paper demonstrates that organisation members implementing change face difficulties in justifying appropriateness and providing persuasive discourse within institutional logics to protect employee interests. The paper emphasises the need to consider processes during periods of radical change in terms of organising principles with which to direct the change. These principles, it is argued, include trust and institutional logics. Staff members were found to be resistant to change due to ethical concerns, and trust in the management diminished because of fear of job losses. Sonpar et al. (2009) conclude that communication and negotiation are required to implement change. Furthermore, staff members need to recognise that the change matches organisational values and that senior managers are trustworthy regarding their intentions.

The articles by Tsoukas and Valdimirou (1998), Kluge et al. (2001), Kodama (2001), Sillince et al. (2001), Bryant and Cox (2003), Sonpar et al. (2009), and Nilsson (2010) discussed above show links between communication and the enhancement of planned/radical change. Scholars examine use of appropriate language, persuasion via rhetorical techniques, logical justification, shared vision, the varied use of communication forms and structures, inclusivity, and ways to build trust. The literature recognises that effective channels of communication are organisational resources. Forms of communication allow knowledge to flow. Communication between organisation members as a conduit for the knowledge needed to implement change is not explicitly explored in these papers. This thesis offers a model for use by change managers to assist staff members to understand that knowledge evolves during periods of planned/radical change. The model presented here, combined with the ability to recognise the knowledge needed post-change, allows staff members to comprehend not only the nature of the change but also enhance the implementation of change. This occurs as a result of being aware of the types of knowledge identified in this thesis — pre-change and post-change declarative, procedural and heuristic knowledge — and the stages of evolution they will progress through during change, which may assist innovation.

Innovation is the creation of new methods and ideas (Oxford English Dictionary). As noted in the literature, knowledge is an organisational resource. The following articles discuss the implementation of innovative planned/radical change. Winther (2003) examines differences in European local production systems (LPS) and organisational networks. These systems act to include new competitive strategies to meet external

pressures. The paper examines the development and transformation of these systems, and shows that competition, innovation and cooperation play a part in enhancing organisational networks. Winther (2003) states that larger networks of production and organisation increase innovation and performance via communication and cooperation. Paulsen et al. (2009) investigate the relation between charismatic transformational leadership on team processes and innovation in an R&D organisation. The research collected data to explore charismatic leadership, how teams see themselves, and how they cooperate to bring about change. The findings show that there is a positive relation between the presence of charismatic leaders, cooperation and team innovation. Therefore, senior managers inspire staff members to enhance change implementation.

Pateli and Giaglis (2005) focus on the creation of contingencies for the development of an organisation under the impact of technology innovation. These contingencies were discussed during brainstorming sessions with staff members involved in the project, along with structured interviews with key industry experts. Pateli and Giaglis (2005) conclude by proposing a methodology useful for managers to apply when assessing a set of scenarios reflecting alternatives for business model evolution. This model includes evaluating the current business situation and the requirements for change; identifying the resources needed for the change; classifying new tasks and the manpower needed; action planning; and contingency planning. Building organisational resources and identifying assets helps to create competitive advantages. Agndal and Chetty (2007) explore the effects of relationships upon changes in small and medium enterprise's (SMEs) internationalisation strategies. The paper develops a framework showing that existing relationships are important to many strategies. Agndal and Chetty (2007) find that business relationships are more important than social relationships during this type of change. The article calls for future research into ways organisations view and deploy resources that are built from relationships such as reputation. Agndal and Chetty (2007) state that understanding the event leading to change, what resources are available, and planning, enhances the implementation of change.

Verity (2005) follows the resource-based view (RBV) and dynamic capability theories (DCT) to examine the change process, concluding that organisations should consider building resources using internal asymmetries. Verity (2005) examines a shift in the way Shell and JWT organise their marketing from a local approach to a global organisational focus. The paper draws on evidence from observations carried out during this period of change that were framed by RBV and DCT. Planning, as a dynamic capability, is shown

to be important for change in that it enables the identification of assets that become resources for creating competitive advantage. The paper recommends that internal asymmetries be the basis for effective change.

Garcia-Morales et al. (2008) study the effects of leadership transformation on innovation and performance in the context of organisational learning in technology firms. The research used online questionnaires to show a positive relation between transformation leadership and organisational innovation and performance. A positive relationship was found to exist between organisational innovation, capabilities, competencies, resources, and organisational performance. Organisations identify and evaluate tangible and intangible assets, including learning, to develop a competitive advantage. The article suggests that future research should focus on the effect of personal and environmental issues on innovation.

These articles do not specifically examine the use of knowledge as a resource. This thesis develops the concept of knowledge evolution as being an important element of implementing planned/radical change. For the pre-change knowledge to evolve to post-change knowledge necessary to complete tasks carried out by staff members, the deployment of information, skills and experience is required. This recognition, evaluation and deployment of post-change knowledge as a resource is an organisational dynamic capability that builds competitive advantage.

Planned/radical change based on the focused deployment of staff members' information, skills, experience, communication, and innovation to enhance change and create competitive advantage requires competent supervision by senior managers. Chetty and Stangl (2010) highlight a research gap regarding networks, innovation and internationalisation of SMEs. The main focus for Chetty and Stangl (2010) is on whether change necessary to move into new markets is incremental or radical. The article presents a matrix based on incremental versus radical internationalisation and innovation to demonstrate that SMEs with small networks experience incremental change, while those with a varied network undergo radical change. Chetty and Stangl (2010) state that network relationships are influential regarding both organisational change and sustainability. Managers need to understand the relationship between internationalisation, networks and innovation enhances the implementation of change.

Soparnot (2011) examines the change capabilities of organisations and the problems faced by managers during a period of change. The paper presents a framework for change

capacity and argues that its dimensions — for example, context, process and learning — are important for organisations carrying out effective organisational change. Soparnot (2011) concludes that managers need to identify tangible and intangible resources necessary for the implementation of change. This is important as these resources represent the organisation's change capacity, and so affect the change achieved. It is clear from the literature that implementing innovative planned/radical change effectively requires the use of organisational resources under the direction of competent senior managers.

Muratbekova-Touron (2005) explores organisational-culture change processes in a French-based organisation to gain insights into a period of corporate cultural change. The research identifies two modes of change: one focusing on changes within an existing system, and the other changing an old system to a new system. The main finding is the importance of quality leadership with a clear view of organisational values and the benefits of the change. Aspara et al. (2011) study the importance of holistic and dynamic business models and their effect on managing business transformation. Aspara et al. (2011) examine how management perspectives on business models are connected to business model evolution. This qualitative study of the Nokia Corporation uses a mix of conceptual business models and a historical approach, concluding that management thinking in terms of organisational goals should be considered as having strategic significance during a period of change. Aspara et al. (2011) provide a model to emphasise particular elements of change processes. The model conceptualises changes in performance and the evolution of an organisation, with a focus on system dynamics. The article demonstrates these change elements are linked on a number of levels within an organisation. Aspara et al. (2011) consider the thinking processes of key decision makers and the effects on business changes, performance and the organisation's engagement with the external business environment. The model offered by Aspara et al. (2011) presents ways to better understand and scrutinise change opportunities.

Judge and Douglas (2009) develop a construct for facilitating enhanced implementation of organisational change. The paper demonstrates a positive relationship between organisation change capacity (OCC) and financial performance support; OCC and organisational adaptability; and, environmental uncertainty and OCC. The paper concludes that OCC is important for gaining competitive advantage but that many organisations do not recognise this. Furthermore, Judge and Douglas (2009) emphasise the need for adaptability in order to meet changing market demands and state that this

adaptability needs to be considered from both a managerial perspective and from the wider point of view of organisation members. Judge and Douglas (2009) make the point that uncertainty allows senior management flexibility in planning for change, meaning that the organisation is more prepared for change.

Bhasin (2012) studies British manufacturing organisations creating tailored strategies for moving to lean practices, with a focus upon how tools, processes, and values affect lean performance. The article investigates the highest performing tier of these organisations noting significant connections between elements needed for change. Bhasin identifies these elements as sustainability, culture, profit-based outlook, change strategy, and organisational philosophy. The findings emphasise that the highest performing organisations are effective in managing change. The paper states that organisations should find a way to implement change appropriate to their specific situation.

As the literature shows, management competencies are important when implementing planned/radical change. This thesis demonstrates that the commitment and determination of managers is a factor that affects staff members' progression through the knowledge evolution stages from pre-change to post-change knowledge.

Croonen (2010) examines frictions within franchise relationships with a focus upon unethical or unfair behaviour, sensitivities regarding trust and fairness, and tools to develop and sustain trust during periods of change. Those managing franchise businesses need to develop and maintain trust with their franchisees to bring about change across the organisation. The article concludes that procedures and interactions need to be seen as fair by franchisees when the central organisation is implementing change. Perceptions of fairness that build or maintain trust reduce resistance and enhance the implementation of change.

Morgan and Zeffane (2003) use trust theory in an exploration of the relationship between change and trust in HRM, focusing on the importance of a senior manager's role in controlling the change process. The paper considers various organisational changes, employee involvement and the effects on change execution. Change implementation reduces staff members' trust regarding the senior management, as individuals worry about the personal impact of the change; for example, job security, working practices, and organisation survival. This research shows that methods of change are linked to the degree of trust maintained during the implementation of change, and that radical change

has the greatest impact. Effective communication between senior managers and staff members reduces resistance to change and the negative effects on trust.

The literature shows that senior management competencies are central to implementing planned/radical change. Senior managers must be effective communicators who are able to maintain the trust of staff members. This is particularly important during periods of uncertainty that trigger change. Staff-support activities, including training, assist an organisation to reduce resistance and maintain trust.

Chreim (2002) argues that dynamic organisational change management is developed via the concept of organisational identity. Individual members of an organisation require consistency during a period of change, but this needs to involve a degree of reinterpretation. Chreim (2002) focuses on the unfreezing stage in Lewin's theory, to understand change at staff member and organisational levels. The paper emphasises the importance of organisations involving individuals to enhance the change process. Effective communication that explains the transition needed for change assists staff members to see the links between the pre-change and post-change situation. Staff members need to maintain a sense of personal and organisational identity in order to implement the change. This sense of continuity of identity reduces resistance to change. Management strategies, such as communication and training assist with maintaining a sense of identity by locating the target situation within the existing organisational context; however, staff members need time to accept the change based on their own experiences and perceptions.

Eriksson and Sundgren (2005) examine managing-change activities within large organisations. These authors focus on a merger and how the leaders of both organisations managed change. They use evidence from interviews with managers to explain that communication containing shared language has a positive impact on acceptance in the change process. The article concludes that for organisations undergoing a merger, a combination of theories E (considering economic value) and O (organisational capabilities) is beneficial during the implementation of change. Hossan et al. (2013) demonstrate that there is a need for more integration among business units and an improved process of integration for effective adoption of eServices. Hossan et al. (2013) reconsider Lewin's theory in an Australian local government setting. They appraise the theory empirically with a focus on technology change management. The data shows that integration between departments poses problems. The study concludes by stating that

considering group behavioural dynamics, rather than individual behaviour, is necessary when implementing organisational change. This is because a group-behavioural focus allows task performance to be measured and monitored to enhance effectiveness.

Appelbaum et al. (1999) focus on the effective elements of planned downsizing, with a particular interest in HR factors, trust, leadership and organisational culture. Appelbaum et al. (1999) use a case study at Compaq during a period of change that involved redundancies. The staff members who remained in the organisation were encouraged to see the change as an opportunity rather than a threat. The study demonstrates that these individuals were experiencing feelings of insecurity and confusion while change was implemented, and that trust building and human-resource management were key to restoring staff confidence in the organisation. Bhatnagar et al. (2010) present empirical data analysis regarding developing trust and a sense of belonging with staff members. Bhatnagar et al. (2010) show an organisation improved organisational relationships and efficiency in order to meet the challenges of changing business environment in India and bring about improved individual and organisational efficiency and effectiveness. This involved carrying out a case study of a public-private power company and the paper makes recommendations to policy makers and change managers operating in emerging markets. These recommendations are focused on updating HR practices; providing training opportunities; communicating the change strategy within the organisation in a positive manner; the importance of effective management and leadership qualities; identifying the main aims of the change; setting clear objectives and benchmarks; and creating a suitable change plan, based on these recommendations, to enhance organisational performance.

The articles by Appelbaum et al. (1999), Chreim (2002), Eriksson and Sundgren (2005), Hossan et al. (2013), and Bhatnagar et al. (2010), consider ways in which staff are supported to implement change in a variety of settings. Scholars emphasise the importance of consistency, recognising the need for reinterpretation, staff member involvement and effective communication. The papers reviewed show the necessity of linking the existing situation and the targeted situation in order to maintain a sense of personal and organisational identity for staff members. These considerations allow staff members to become more familiar and comfortable with the change, which leads to a reduction of resistance to change. Shared language, values and trust within a clear cultural framework enhances change implementation. Training and other staff-support activities under the supervision of senior managers displaying a high level of competency

in key areas is seen to be valuable for enhancing change implementation. Furthermore, task performance and monitoring are identified as assisting organisations to implement planned/radical change effectively.

2.3 Theories Used to Study Planned/Radical Change Management

This section presents theories used by scholars to explain change in organisational contexts. Eight theoretical approaches were identified at the beginning of this research that had potential for aiding the study of planned/radical change. While developing the research topic, objectives, research questions, research design, and data collection and analysis methods, four theories were rejected (process theory, actor network theory, absorptive theory, and Kurt Lewin theory), and four examined more closely (stakeholder theory, resource-based theory, institutional theory, and dynamic capabilities theory). Each of these theories is explained below, along with the rationale for rejecting stakeholder theory, resource-based theory, and institutional theory. Finally, the reasons for selecting dynamic capabilities theory are presented. This section includes the origin of the theories and their deployment in a number of empirical and theoretical studies.

The first theory reviewed is Stakeholder Theory (ST). ST is developed in the literature using both theoretical arguments and empirical evidence. This theory describes the importance of recognising stakeholder expectations and ensuring synergy with the organisation to enhance performance (Freeman, 1984). Freeman's (1984) work stresses the importance of understanding stakeholder expectations, behaviours and values and argues that for a business to succeed managers need to recognise stakeholders' expectations to ensure synergy within the organisation. Donaldson and Preston (1995) analyse stakeholder theory from three perspectives: Descriptive: to define an organisation's circumstances and stakeholder status; Instrumental: giving consideration to interaction and lack of interaction between stakeholders and an organisation; Normative: to explain reasons for considering each particular stakeholder has value.

Pfarrer et al. (2008) develop a conceptual framework to illustrate an organisation's recovery from damage to its legitimacy with its stakeholders. Stebbings and Braganza (2009) show that stakeholder theory allows understanding of the interdependent nature of a stakeholder relationship dominant resource network. Isaksson et al. (2010) discuss linkages between business ethics, stakeholders' requirements and supply chain in order to

create sustainable organisations. Barnett (2011) investigates stakeholder perspectives regarding innovation by implementing new criteria in higher education admissions. Armenakis et al. (2011) focus on decision-makers' reactions towards organisational culture transformation.

Myllykangas et al. (2010) examine the business value creation process and the development of stakeholder relationships. Lindgreen et al. (2011) study change processes across Dutch organisations. Postema et al. (2012) design a method to explain the complexity of stakeholders' perceptions during the implementation of technological innovations. Miller et al. (2014) investigate change in a university business model through stakeholder perspectives. Miller et al. (2014) state that building business models with a variety of stakeholders increases competitive advantage. In order for this to happen, stakeholders should be categorised and the form of relationship analysed.

Another theory used by change management scholars is resource-based theory (RBT), which defines organisations in terms of tangible and intangible resources (Wernerfelt, 1984; Alonso et al., 2016; Adebanjo et al., 2016; Davis, 2017). This theory suggests that organisational changes should be designed to enhance resources that contribute to maximising the organisation's outcomes. The theory explains the relationship between resources and profitability from a strategic perspective. Wernerfelt (1984) explains the relationship between resources and profitability from a strategic perspective. Wernerfelt (1984) shows an organisation is defined by its tangible and intangible resources, and that this should be recognised in order to enhance performance and strategic benefits. Barney (1991) considers that for a resource to have a competitive advantage it should have four VRIN attributes, Valuable: a positive value to an organisation's strategy; Rare: rare within the operating sphere of the organisation and its competitors. Imitability: it should be hard for a competitor to replicate it. Substitutability: it should not be a strategic replacement by a competitor.

Bhatt (2000) discusses the reasons behind the difficulty of imitating knowledge in organisations and the power of knowledge as a resource to develop organisational capabilities that have a positive effect on transformation. Kearns and Lederer (2003) develop a model to examine how knowledge sharing in the alignment process supports the creation of an organisational strategy that leads to an advance in organisational capabilities. Verity (2005) advises organisations to search for internal asymmetries upon which to build resources. Verity (2005) notes that RBT takes a static view via auditing an

organisation's current resources, and assumes that these resources will always be available. Alas and Sun (2007) focus on the importance of considering and solving the problems facing HR personnel during the implementation of change. Lee and Rhee (2007) explore changes in an organisation's environment and the priority given by management toward slack resources when planning large scale changes.

Cuervo-Cazurra and Genc (2008) present the advantages and disadvantages for enterprises in developing countries considering internationalisation. Stebbings and Braganza (2009) use the theory to reconfigure the resources within a business process network, and to provide opportunities to change boundaries of the network. Annique Un and Montoro-Sanchez (2010) develop frameworks for investing in developing innovative capabilities to create and transfer knowledge for entrepreneurship and managing change in organisations. O'Regan et al. (2011) apply this theory to examine the relationship between organisational capabilities, the external business environment and organisational performance. Nakano et al. (2013) investigate mechanisms of process integration in internal supply chains throughout various functions such as production, logistics, and sales in a focal manufacturer to enhance the degree of its process integration from a dynamic resource-based view.

The third theory discussed is institutional theory. Meyer and Rowan (1977) show organisational structure is shaped by institutionalised context. Furthermore, Meyer and Rowan (1977) discuss the way organisations operate to integrate activities and producers, which is explained by existing rational notions of an organisation's work and how it is institutionalised in society. Dimaggio and Powell (1983) describe the process of institutional definition, which consists of four parts: first, high integration among organisations in an industry; second, emergent organisations are highly structured and patterned in the same field; third, in each industry, required information is available for organisations; and, fourth, all participants are aware of the set of organisations they are connected with among common enterprises.

Lewin and Volberda (1999) offer a coevolution framework contribution to mutation processes of existing organisational stock. Sillince et al. (2001) explain the need for new practices when undergoing institutionalisation in the health sector. Winther (2003) studies change in the European local production systems and organisations network. Lau et al. (2002) investigate the effects of institutional forces on change schemas of managers, showing that change schemas vary across different levels of management.

Elango and Pattnaik (2007) demonstrate organisations in emerging markets build capabilities to access international markets. Sonpar et al. (2009) consider the experience of undergoing institutional radical change. Nielsen and Riiskjær (2013) apply patient surveys as a tool to focus on planned change. The surveys provide feedback on performance as an input to problem-solving processes. Amis and Aissaoui (2013) explain institutions affect the readiness for change in organisations.

Dynamic capabilities theory (DCT) argues in favour of organisations incorporating internal and external resources to create sustainable competitive advantage, something which is difficult to replicate in the marketplace (Teece et al., 1997). The original work on dynamic capabilities by Teece et al. (1997) identifies capabilities as those with which organisations integrate, construct, and rebuild internally and externally, in order to adapt to rapid environmental changes. For organisations to maintain competitive advantage, their resource portfolios have to be exclusive and difficult to replicate by competitors. These capabilities are described as dynamic due to the need for organisations to respond to external environmental changes by redeveloping skill sets, procedures and resources (Chang and Wang, 2013; Kim et al., 2015). The term refers to the consistent need to transform capabilities to meet external changes (Salvato, 2009; Jiao et al., 2010; Ljungquist, 2013). Scholars differ in their descriptions of dynamic capability research and practice. Some label this a dynamic capabilities framework (Breznik and Hisrich, 2014; Jurksiene and Pundziene, 2016), while others term it a dynamic capabilities approach (Fraquet et al., 2013), or the concept of dynamic capabilities (Schweizer, 2015).

Dynamic capabilities include two elements of an organisation's capacity to generate disciplinary knowledge: the ability to review and improve competencies in competitive markets, and the strategic management knowledge required for reconfiguring these internal and external competences (Teece et al., 1997; Zott, 2003; Teece, 2013). Knowledge integration, using skills, systems, structures, and processes are at the core of dynamic capabilities theory and its practice (Leonard-Barton, 1995; Eisenhardt and Martin, 2000; Laamanen and Keil, 2008; Chang et al., 2013). As a result, skills and knowledge are acquired and managed in order to be effective. This is a strategic benefit to an organisation (Martin et al., 2013).

Eisenhardt and Martin (2000) explain that dynamic capabilities refer to recognising the strategic processes bringing together resources necessary to create value in terms of products and capabilities. Eisenhardt and Martin (2000) argue that dynamic capabilities

are a set of specific and identifiable processes such as product development, strategic decision making, and alliancing. Ashurst and Hodges (2010) show that an organisation improves its capabilities to succeed in change and transformation processes by realising the capabilities and benefits of technology. Dixon et al. (2010) develop a theoretical framework addressing changes in leadership style and how this leads to the development of different dynamic capabilities that enable organisations to adapt to new markets.

Dynamic capabilities are used to explain and understand how organisations develop their ability to adapt to major innovations (O'Connor, 2008). Verity (2005) suggests that organisations benefit from a conjunction of internal asymmetry with rational planning to create dynamic capabilities that enable change. DC allows organisations to update current resources and add new resources based on external market circumstances. This assists organisations to continue to respond to changing external environments. Hossan et al. (2013) argue that there is a need for greater integration among business units and an improved process of integration for effective adoption of eServices. Shibata and Kodama (2013) develop a theoretical framework to assist organisations in creating and maintaining a position of advantage in fast-changing markets. Newey and Zahra (2009) improve understanding of organisational evolution by focusing on the interaction between operating and dynamic capabilities within the incremental growth of an organisation.

Teece (2013) explains that dynamic capabilities theory concentrates on the creation and modification of resources and assets while dealing with issues of competition. Teece's theoretical model focuses on the growth and coordination of intangible resources and assets — knowledge, expertise, skills, and processes — rather than the tangible business elements emphasised in other approaches. This assists in understanding knowledge sharing processes and the creation of methods for solving problems (Chang and Wang, 2013). The renewal of competences using dynamic capability theory has been shown by Kim et al. (2015) to improve an organisation's performance in the financial, operational and supply chain arenas. Furthermore, this theory is seen as an accepted view regarding management practices assisting with greater comprehension of business operations (Teece, 2013; Denford, 2013). Frasquet et al. (2013) argue that dynamic capabilities theory assists organisations to make decisions but that the theory does not provide clear operating steps.

Dynamic capabilities are formed from knowledge (Chang and Wang, 2013). As knowledge sharing and management are so important to understanding business processes these dynamic capabilities should be reviewed and redeveloped for effective learning and deployment of knowledge to occur in rapidly changing business environments (Singh et al., 2013). Creating new knowledge and promoting learning improves an organisation's dynamic capabilities by adding relevant knowledge for dissemination within the organisation (Jiao, 2010). Knowledge creation brings new thinking and capabilities to organisations that, in turn, leads to innovation via new knowledge integration (Denford, 2013). Day (2014) states the dynamic capability framework is effective because it contains replicable skills and knowledge that are actionable via clear steps. The framework captures existing knowledge while generating more knowledge and better knowledge management to enhance performance within an organisation (Cheng et al., 2013; Karagouni et al., 2013). DC has been said to assist with organisational, technical and strategic change needed for an organisation's survival (Augier and Teece, 2009).

Zheng et al. (2011) consider dynamic capabilities from a knowledge-based perspective. Their study identifies relationships between dynamic capabilities and innovation performance, showing that knowledge acquisition is affected by diversity of networks and group problem solving. Pavlou and El Sawy (2011) propose a measurable model of dynamic capabilities by conceptualising, operationalising, and measuring dynamic capabilities. The study has two key findings. First, it identifies and articulates a set of dynamic capabilities and proposes a measurable model to represent the nature of dynamic capabilities. Second, it empirically supports a structural model in which dynamic capabilities have an indirect positive effect on performance by reconfiguring operational capabilities, an effect that is positively moderated, or reinforced, by environmental turbulence.

Filippini et al. (2012) explain that owing to limited resources and competitive pressure, small and medium-sized enterprises' dynamic capabilities first facilitate adaptation rather than knowledge absorption and innovation. This paper investigates the development path of four knowledge management (KM) projects in SMEs that lead to the emergence of dynamic capabilities. Frasquet et al. (2013) suggest a framework that makes a distinction between first level or generic dynamic capabilities relevant to the internationalisation process, and second level or specific dynamic capabilities that are linked to particular strategies used by individual retail organisations as they internationalise. Schweizer et al.

(2015) explain researchers overcome problems of division and diversity using the dynamic capabilities perspective, and build measurable propositions based on meta-theory in a context that requires the development of dynamic capabilities in an uncertain and changing environment.

DCT has a number of limitations and there is no universal agreement regarding its definition (Gärtner, 2011). Some scholars believe that this theoretical viewpoint does not have an articulate framework to underpin it, leading to an unscientific mix of different theoretical models. This absence of a primary concept has created a disruption within organisational studies as DCT is seen as generalising multifaceted situations (Bromiley and Fleming, 2002; Bromiley, 2004; Arend and Bromiley, 2009). Scholars argue that although DCT makes overt connections between change and performance linked to strategy, such modelling is often without specific context and does not take into account different elements and operational needs of diverse types of organisations; nor does DCT consider the impact of human error and ineffective decision making to a sufficient degree (van de Ven and Poole, 1988; Bromiley and Fleming, 2002; Bromiley, 2004; Arend and Bromiley, 2009). Tallott and Hilliard (2016) state there is a lack of empirical support for dynamic capabilities to be recognised and capitalised upon.

It has been suggested that DCT should be re-evaluated to provide direction for researchers as the term dynamic capabilities has been described as improperly linked to success and lacking clear operational concepts, leading to nonspecific methods for universal rather than specific deployment (Williamson, 1999; Winter, 2003; Newbert, 2007; Ambrosini et al., 2009; Barreto, 2010; Pavlou and El Sawy, 2011; Frasquet and Mollá, 2013; Breznik and Hisrich, 2014). DCT has been described as unclear and indefinable in that it is difficult to measure outcomes empirically (Kraatz and Zajac, 2001).

To address this lack of empirical rigour, more specific procedures are required to create increased operational effectiveness when deploying the theory (Easterby-Smith and Prieto, 2008; Pavlou and El Sawy, 2011). DCT has been criticised for including an explicit purpose (for example, reacting to rapid change) that leads to conceptual and propositional paradoxes (Barreto, 2010). Nevertheless, a number of scholars see merit in DCT modelling (for example, Pavlou and El Sawy, 2011). Indeed, for Schweizer et al. (2015) DCT provides a clearer view of strategic change than other theories.

While ST, IT and RBT are used by many scholars when studying different elements of change management, DCT is by far the better match to my research. ST deals with the fulfilment of stakeholders' needs and recognising their perspectives; however, this is not an integral part of my research focus. Therefore, this theory is not the best match to my work.

Institutional theory looks at the organisation's structure, which is formed by institutionalised contexts. This theory provides organisations with a better understanding of the current market; therefore, organisations can achieve better integration with external institutional contexts. My research is not examining institutionalised contexts. Therefore, this theory is not the best match to my work.

RBT focuses on tangible and intangible resources. In order for these resources to create a competitive advantage, four distinct features are required: Valuable, Rare, Inimitability and Non-substitutable. This theory clarifies the relationship between resources and profit. Using resources to increase profitability is an important element in the survival of an organisation, but it is not specifically addressed in this thesis. Therefore, this theory is not the best match to my work.

My research focuses on how knowledge evolves in order to have the knowledge necessary to complete tasks carried out by staff members within a business process undergoing planned/radical change. Dynamic capabilities represent an organisation's capacity to create and integrate knowledge via the ability to review and improve competencies, and recognise the strategic management knowledge needed for restructuring competences. These capabilities provide organisations with the opportunity to change and transform in line with external environmental changes, and so survive. Scholars use DCT to explain relationships between knowledge as a resource and creating dynamic capabilities within an organisation from differing perspectives, including knowledge creation, sharing, learning, and integration. In addition, DCT has been applied to understand planned/radical change; however, knowledge was not included in these investigations. Knowledge evolution as an important resource for creating dynamic capabilities within an organisation requires further study. This thesis deploys DCT to provide a lens through which to understand the stages of knowledge evolution.

2.4 Knowledge Management

2.4.1 Knowledge Management Systematic Literature Review

A systematic review of relevant knowledge management research was carried using three scholarly databases: EBSCO, Emerald and ProQuest (see Table 2.3). The key words/terms "knowledge and management and empirical research" were used in initial searches. The criteria of the search were limited to full texts in peer-reviewed, English language, scholarly journals. The systematic search covered published academic articles in the EBSCO, ProQuest, and Scopus databases over a fifteen-year period: from 2000 to 2015. This was an initial research activity and further searches were made using other terms and key words throughout the period of conducting this research, including papers published before 2000 and from 2015 to 2017.

Database	Keywords	Search Criteria
EBSCO	Knowledge AND Management AND Empirical Research	Timeframe: 15 years (2000-2015), English, scholarly journals, articles, full text, peer-reviewed
Emerald		
PROQUEST		

Table 2.3: Knowledge Management Systematic Search Results (Source: thesis author).

Knowledge Management is a process that contains a number of different activities and tools. Scholars differ in their definitions of and approaches to Knowledge Management. Dahiyat (2016) defines KM as the generation and attainment of new knowledge that is mixed with existing organisational knowledge for dissemination in ways that enhance organisational performance. Interzari et al. (2017) describe KM as the management of a mix of processes such as retrieving, measuring, gathering, recording, classifying, appraising, categorising, generating, disseminating, and deploying knowledge. Chang and Lin (2015) see KM as a collection of activities rooted in actions of individuals and groups within specific contexts.

Salojärvi et al. (2005) study SME sustainable sales growth with a focus on leadership and knowledge management actions in ten Finnish enterprises. Salojärvi et al. (2005) define KM as adding value and maximising intangible assets, and see KM as a way to view management activities within an organisation. These intangible assets are identified as human capital, external capital, and organisational capital. The qualitative data for this study were collected via standardised questionnaires and semi-structured interviews. This

data was focused on tools and processes SMEs employ to knowledge management and the management of intangible assets. The paper argues that to be effective KM activities should be implemented in a strategic manner. Salojärvi et al. (2005) recommend that future research should include identifying the most productive KM activities; SMEs capitalise on KM within their business processes; what benefits can be gained; and ways policy makers encourage SME growth via KM.

Knowledge Management has been defined in different ways by scholars. For example, Davis (2002) emphasises KM as an efficient system allowing the gathering, deployment and reuse of knowledge within organisations. A further definition of KM states that it is a formal procedure identifying internal information, which is provided to members of the organisation when needed (Roy, 2002). While this is a useful starting point for understanding KM, knowledge is far more than mere information. Indeed, Van Beveren (2002) sees KM as a way of finding relevant information to convert into vital knowledge for decision making.

Rastogi (2000) defines knowledge management as a process of managing an organisation's actions, obtaining, producing, recording, transferring, evolving, and using knowledge, by staff members to achieve strategic objectives. Bounfour's (2003) paper focuses on knowledge creation, sharing and adding value to information and knowledge within an organisation. Durst and Edvardsson (2012) describe the central elements of KM as creating, storing and transferring knowledge that supports staff members. Another viewpoint shows that KM is an efficient vehicle for attaining, recording, sharing and deploying tacit and explicit knowledge in order to enhance the achievement of organisational objectives (Darroch, 2003; Secundo et al., 2015, following Magnier-Watanabe and Senoo, 2008).

Knowledge management theories recognise that using and developing knowledge is an important asset for an organisation to carry out its objectives (Metaxiotis et al., 2005; Robinson et al., 2005). KM allows the delivery of the proper knowledge to the right staff member at the relevant time, supporting members of the organisation to deploy knowledge for accomplishing and maintaining competitiveness (Lindblom and Tikkanen, 2010). Ambos and Schlegelmilch (2009) argue that the full potential of knowledge management, as a system, cannot be achieved unless members of an organisation are willing to accept changes and new modes of thought.

There are different viewpoints regarding KM, but scholars tend to share common ground about the importance of having a coherent and effective approach to the management of knowledge that enhances an organisation's performance (Nonaka and Takeuchi, 1995; Martin, 2000). Hsu and Shen (2005) and Ooi et al. (2009), describe KM as a structural approach that supports an organisation in making decisions to improve the ability to formulate strategy. It is important for an organisation's staff members to continue developing their knowledge to react to and implement changes necessary for the organisation to maintain core competencies needed to survive in its sector.

Kraaijenbrink (2012) reviews knowledge management processes regarding small firm product development projects. Kraaijenbrink (2012) shows that integration of knowledge and its management is a significant factor for projects of this sort. In addition, the relationship between knowledge and business processes via increased interactions affects performance. Moffett et al., (2003 and 2010) focus on interrelationships between technical and human elements of KM. Zack et al. (2009) present a KM framework for decision making using the integration of new knowledge and technology, whereas Oltra (2005) examines factors contributing to KM effectiveness and offers a conceptual and practical framework built on knowledge and human resource management relationships. Yang et al. (2013) investigate Taiwanese research and development (R&D) projects with a focus on the connections between IT, KM and team processes within R&D. Meier et al. (2010) show that IT is valuable to knowledge combination and that it is organisational creativity that improves performance in the main. Finnegan and Willcocks (2006) use process analysis of CRM implementation from a KM viewpoint in a study of UK local government, focusing on how implementation is affected by cooperation between groups within organisations and how tacit knowledge is identified and shared.

Yahya and Goh (2002) explore connections between KM and human resource management, while Björk (2012) investigates how individual ideation performance is affected by bridging numerous knowledge domains. Björk (2012) states that cooperation between individuals increases innovation, particularly if these individuals operate across knowledge domains. Björk (2012) recommends, therefore, that managers recognise the importance of this bridging and encourage staff members to engage in such activities. These two articles emphasise the importance of knowledge for enhancing individual performance.

Jaw et al. (2006) examine knowledge flows and subsidiaries' performance from the viewpoint of human capital. Using discriminant analysis, Gottschalk and Khandelwal (2003) state that IT personnel have an important role to play in knowledge management technology projects within organisations. Takahashi and Vandenbrink (2004) carried out a case study on Honda that demonstrates an effective fusion of Japanese-style (human mediation and tacit knowledge) and Western KM (IT and explicit knowledge) for a new approach to KM. Heisig (2009) analyses KM frameworks from research and practice examining central elements to detect similarities and differences. Heisig (2009) identifies standard concepts and terminology to align international KM for greater understanding. Handzic (2011) examines the legitimacy of an integrated socio-technical KM model to consider the importance of social and technical initiatives within organisational KM.

Heffner and Sharif (2008) offer an integrative KM framework for creating new knowledge and technological innovations used by managers in decision-making processes. Their framework shows individual and group knowledge is combined to create innovation via continuous learning, deployment of knowledge, and performance monitoring. The KM literature has so far overlooked knowledge evolution from pre- to post-change knowledge, focusing instead on ways in which individual and group knowledge is combined in a technological context. Thompson and Walsham (2004) consider the shift from representational methods of KM to a more practice-based approach regarding knowledge and its management. Štorga et al. (2010) examine design ontology as a possible approach to increasing product development efficiency.

Levin et al. (2002) examine connections between knowledge sources, types of knowledge, trust and individuals seeking knowledge. Mohamed et al. (2009) use an empirical approach to examine the role played by KM in sustainable development by considering critical success factors and the use of technology. Darroch (2003) provides a scale for measuring KM activities to develop KM theory. Sandhawalia and Dalcher (2011) argue that a systematic approach to KM is required for developing competences to aid knowledge evolution within organisations. Andries and Wastyn (2012) offer an empirical study of KM adding value to organisations. This value may be financial due to enhanced performance brought about by innovation. Andries and Wastyn (2012) conclude that while KM activities require investment, the longer-term benefits outweigh initial costs.

Zarraga and García-Falcón (2003) discuss the increased attention on KM by businesses and the creation of organisational knowledge from individual knowledge. Sun (2010) consider the impact of day-to-day organisational activities on the acquisition, development, deployment and transfer of knowledge. Tian et al. (2009) ask why and how KM is used to develop knowledge in higher education and research settings. Leseure and Brookes (2004) discuss knowledge transfer between different project teams, and Nesheim et al. (2011) analyse the links between communities, organisational management and employees when engaging with KM activities. The paper focuses on management effects upon staff members willingness to take part in knowledge creation and sharing. Communication and feedback are considered to be key factors to reach KM-related objectives, all of which increases staff members' ability to act autonomously.

Zhang and Jasimuddin (2012) examine methods for transferring knowledge within organisations via a marketplace approach to KM. Massingham (2010) states that the use of KM in managerial contexts is a measure of KM's worth. This, Massingham (2010) argues, is particularly the case when added to knowledge risk management, which applies KM tools and techniques to the management of organisational risk. Lang (2001) investigates why uncodified knowledge and contexts lead to gaps in organisational knowledge by examining restrictions, settings and results. An et al., (2013) present a study regarding methods to improve the effectiveness of KM activities. Andreeva and Kianto (2012) observe the connections between KM, organisational competitiveness and economic performance. Pérez-López and Alegre (2012) consider the impact of IT capabilities on performance within KM processes. Malhotra (2005) demonstrates the importance of knowledge management strategies being combined with technology to enhance performance within business processes.

Palacios et al. (2006) study relationships between KM, innovation, and organisational performance. Palacios et al. (2006) show that growth, sharing and securing of knowledge positively affects performance, as does ongoing organisational learning. Ferraresi et al. (2012) argue strategic direction and increased innovation are influenced by KM that assists in improving business processes. Cantner et al. (2009) focus on organisations implementing KM, and show that KM leads to greater collaboration and innovation. Performance improvement via knowledge creation and management is studied by Mangiarotti (2012), who presents a KM factor model for this purpose. Another model of this type, regarding organisational performance in Iranian manufacturing, is presented by

Noruzy et al. (2012). Salem (2014) examines KM in the Egyptian hospitality industry and its impact on performance and innovation.

Darroch and McNaughton (2002) use empirical data from organisations in New Zealand to investigate how KM leads to innovation. Xu et al. (2010) offer a method via which organisations use KM for ongoing performance improvement. Hasan and Al-hawari (2003) consider the impact of KM styles on organisational performance via a conceptual model. Hasan and Al-hawari (2003) state that there are a number of viewpoints regarding KM's effects on performance within an organisation. This paper concludes that KM has positive effects when staff members have correct knowledge and deploy it. Hasan and Al-hawari (2003) state that KM and performance are influenced by management style, availability of knowledge, and an awareness of using this knowledge effectively within the organisation. Hasan and Al-hawari (2003) note that the factors they identify require further development.

Wei (2007) explores perceptions versus actual value regarding success factors, KM strategies, and KM processes within the context of performance in the Malaysian telecommunications industry. Mills and Smith (2011) examine KM resources and their influence upon the performance of organisations. Danskin et al. (2005) study KM in the textile industry, considering connections between KMS, strategy and performance. Danskin et al. (2005) investigate links between internal and external resources in the form of knowledge to increase competitive advantage. Effective KMS assists knowledge across the organisation. External KMS builds stronger networks and adds value to both internal and external knowledge.

Khalifa et al. (2008) present research on ways that KMS affects performance in organisations. Khalifa et al. (2008) note that flexibility and innovation enhances KMS outcomes during change, and that KMS is linked directly to increased performance. Crawford (2005) shows that a transformational management style, the organisation's place in the market, and KM can be combined in an effective manner. Donate and Guadamillas (2011) examine leadership as a factor that impacts on knowledge management and innovation. Managers who effectively deploy knowledge to encourage innovation enhance organisational performance. Singh (2008) focuses on management styles affecting innovation and the creation of competitive advantage in his study of KM in an Indian technology company. Leadership in knowledge-intensive organisations and its relationship to knowledge management is examined by Merat and Bo (2013), who

emphasise that knowledge is not an organisational resource unless it is identified and deployed by managers and staff members to deliver organisational outcomes and achieve objectives.

Mehta (2008) explores effective KM in global software organisations. Fink and Ploder (2009) investigate SMEs challenges to develop KMS and the role that software plays in this process. Loke et al. (2011) advance a TQM and KM model of supply chain learning and test it using data from the manufacturing and service sectors. Knowledge assets and contingency are examined by Birkinshaw et al. (2002). Thompson and Walsham (2004) consider knowledge creation within strategic alliances. Bagnoli and Vedovato (2012) study how KM and strategy coherence affect innovation and performance using a quantitative analysis of Italian manufacturing SMEs. Bagnoli and Vedovato (2012) conclude that this type of coherence positively influences organisational performance and that managers need to be aware of the importance of linking KM with strategy. Ju et al. (2006) offer a strategic contingency model to classify knowledge characteristics and integration, KM strategies, capabilities, organisational learning, and innovation. Donate and Canales (2011) explore new ways to think about knowledge strategy. They demonstrate organisations outperform competitors by setting objectives identified via KM. In addition, they consider tools and contexts that support implementation.

Dufour and Steane (2007) focus on KM practitioners' approaches to KM strategy and practice. Maier and Remus (2003) argue that effective organisational processes should be based on KM strategies. Maier and Remus (2003) recommend that KM plans should be piloted in a business process before being applied across the organisation's other processes. Organisational participants need to identify tasks and resources needed, including knowledge, to enhance task completion within a business process. Yang et al. (2013), studying Chinese manufacturing, explore the attainment and distribution of knowledge via the moderated regression analytical system. Lakshman (2011) offers a knowledge-based theoretical approach to cultural integration regarding this topic. Duchek (2015) provides a practice-based, empirical investigation into absorptive capacity and the practice of knowledge absorption. Chen and Liu (2012) consider network position and knowledge diversity, whereas Morrison and Rabellotti (2009) examine knowledge and information networks in the Italian wine industry. Peña (2002) provides an empirical study into the creation of knowledge networks within organisations.

Ngulube (2015) provides a content analysis of 303 articles published in the *Journal of Knowledge Management* between 2009 and 2013 via a review of research methods. Ngulube's paper finds that scholars tend to use quantitative methods when researching knowledge management and that few qualitative studies are seen in the literature. Ngulube (2015) concludes that more qualitative studies should be carried out to examine the various facets of KM.

A summary table of the relevant articles referring to knowledge management is contained in Appendix 3. The existing literature demonstrates that although many scholars discuss the interrelation of KM and topics such as growth, innovation, developing strategies and enhancing performance — elements needed for an organisation to change — the integration of knowledge management and change implementation is not the core focus of the literature. There is a need for further study to integrate change management and knowledge management focusing on the evolution of knowledge during the implementation of change. This will provide a richer understanding of the stages of knowledge evolution from pre- to post-change knowledge required to complete tasks carried out by staff members. By having this increased awareness, staff members will be able to identify and deploy post-change knowledge that enhances task completion. Arguably, this will have positive effects on the implementation of change.

2.4.2 Knowledge Definition

Knowledge is defined in many different ways. Some definitions emphasise knowledge as an organisation's ability to enhance productivity and competitiveness (Rivera-Vazquez et al., 2009). For other scholars, knowledge is informational patterns that are understood within an organisation (Bierly et al., 2000). However, the term knowledge should be recognised as being more complex and referring to an individual's interpretation of experience, information and context when carrying out tasks and activities. Utilising the right knowledge is essential for developing business processes and enhancing performance outcomes (Kluge et al., 2001). Knowledge embedded in the organisation is more than that held in documentation: it exists in the organisation's systems, processes and everyday activities. This knowledge is a mix of an individual's experience, values and expertise within a specific context that allows the incorporation of new knowledge consisting of new information and experience (Davenport and Prusak, 2000; Tsoukas and Vladimirou, 2001; Rai, 2011; Stenius et al., 2015). Knowledge includes a wide-ranging

mix of elements, both codified and uncodified. The word "knowledge" should be considered as a complex rather than a simple term (Stenius et al., 2015; Secundo et al., 2015).

Knowledge is static unless a trigger sets it in motion making it dynamic (Nonaka and Takeuchi, 1995). Developing knowledge enables it to flow in a valuable way within organisations leading to longer-term benefits (Fahey and Prusak, 1998; Lee et al., 2013). For Jong and Ferguson-Hessler (1986), elements of knowledge are classified as actions required to complete tasks. Tsoukas and Vladimirou (2001) see knowledge as linked to an individual's actions. Secundo et al. (2015) posit that knowledge is explained as an individual's interpretation of information and experience used to address problems and other needs. This interpretation comes from an individual's understanding based on his or her personal experience and prior knowledge (Lee et al., 2013).

Using the definitions above, knowledge is identified as a wide range of elements that are intellectual, experiential, personal and tangible. Furthermore, it is a combination of systems, skills and expertise, forming a type of capital wherein knowledge is recognised as an asset that assists performance enhancement for an organisation's development and survival. Knowledge is the integration of information and skills forming the experience needed to carry out tasks. Knowledge is an essential element for performing tasks within business processes.

2.4.3 Types of Knowledge

Scholars classify knowledge in a variety of ways. Two labels often used are tacit and explicit. Nonaka and Konno (1998) state that tacit knowledge is rooted in activities, practice, beliefs, ethics, and feelings. This kind of knowledge is known as "sticky knowledge" in that it is based in experience and is both intuitive and technical (Rai, 2011, following Polanyi, 1966, p.781). The term sticky knowledge was coined by Szulanski to convey that the sharing of such knowledge is problematic (Jensen and Szulanski, 2004). Words associated with tacit knowledge include ''skill,'' ''know-how,'' ''working knowledge,'' and ''expertise,'' which show an individual's ability to perform tasks (McAdam et al., 2007, p.45). Tacit knowledge tends to be implied rather than codified (Wei Choo, 2000) and less easily shared (Zack, 1999).

Explicit knowledge, sometimes referred to as "leaky" knowledge, is a form of recorded knowledge including guidelines, procedures, documents and reports (Rai, 2011,

following Nonaka and Konno, 1998, p.781). Explicit knowledge is tangible and distributed with ease due to its formal documentation (Siadat et al., 2012). This form of knowledge is clear and codified (Nonaka and Konno, 1998; Wei Choo, 2000; Herschel et al., 2001), identified and measured (Nonaka and Konno, 1998; Harlow 2008). Explicit knowledge is important for an individual when carrying out specific tasks. Both tacit and explicit knowledge are needed to enable individuals to complete job activities and tasks within an organisation (Rai, 2011). Knowledge is also considered as declarative, procedural and heuristic.

- **Declarative Knowledge**

Declarative knowledge (DK) describes what we know we know and communicate to others (Anderson et al., 1997; Nunan, 1999; Pasternak and Bailey; 2004). According to Farnham-Diggory (1994), DK is exchanged via written and verbal communication. Studies examining DK have focused on understanding meaning as a vital part of knowledge transfer (Ebbinghaus, 1964; Underwood, 1982; van Dijk and Kintsch, 1983; Bucciarelli, 2007). For Camerer and Hogarth (1999), DK represent facts regarding situational or general realities, as opposed to skills and strategies — examined in the discussion of procedural knowledge below. Camerer and Hogarth (1999) state that DK is necessary for individuals to recognise that decisions affect performance. Scholars argue that DK is static and factual, concerned with tangible objects, purposes, people and relationships (Robillard,1999; Gorzelsky, 2013). Taatgen and Lee (2003) state that, in the thinking stage, the knowledge needed to perform tasks is DK and this requires interpretation by the individual or group. Scholars have demonstrated that DK facts are identified as different elements of a specific task providing the necessary knowledge to interpret the task (Weitz et al., 1986; Khoumsi and Gonzalez-Rubio, 2006).

A number of researchers show that when an individual gains new DK, he or she increases his or her expertise and focuses on the information within the immediate environment (Taylor and Wier, 1980; Fiske et al., 1983; Fiske and Taylor, 1984). Chiaburu and Tekleab (2005) see declarative knowledge as moving from a beginner stage to mastery as DK is developed into expertise. This view is shared by other scholars (for example, Anderson, 1982 and 1985; Gagne, 1984) who agree that this development is measurable.

Declarative knowledge, which is, by definition, explicit, is declared/communicated because the holders of the DK recognise the knowledge and share it (Sánchez et al.,

2010). DK allows variations to occur, meaning that elements are introduced to adapt the knowledge for the task (Macpherson, 2003).

All knowledge that exists as groupings of facts is DK and needs time for interpretation before any action is taken based on this knowledge (Busari and Arnold, 2009). This is because DK is a result of instructions, which can be assessed (Martocchio and Dulebohn, 1994; Chiaburu and Tekleab, 2005). Anderson, in particular, has shown that DK may be adapted into procedural steps for use in problem-solving activities (Anderson, 1987). This facilitates problem solving even before the acquisition of the skills found in procedural knowledge (discussed further below) and allows a degree of modelling to occur before a task begins (Neves and Anderson, 1981; Anderson et al., 1997; Taatgen and Anderson, 2002). This is useful because modelling of this kind provides opportunities for trial and error (Chandler and Sweller, 1991; Paas, 1992; Sweller et al., 1998). Individuals have the chance to use DK to prepare for active engagement with a task and the ability to adapt procedures where necessary (Singley and Anderson 1989; Hiebert and Wearne, 1996; Capon and Kuhn, 2004).

The effective use of DK relies on capturing it in the form that is used to solve problems (Jain and Jain, 2011). This understanding of DK in a structured form provides conceptual understanding, which, in turn, focuses attention on the main elements of a problem. As a result, the DK is not only enhanced but allows the improvement of procedures (Rittle-Johnson et al., 2001; Richey and Nokes-Malach, 2015).

For the purposes of this research study, declarative knowledge is defined as a set of facts and rules describing a domain of knowledge. It is a structure of knowledge providing an explicit explanation for the domain of knowledge. It is knowledge that describes specific actions to perform a certain task (Vasconcelos et al., 2000; Gottlieb, 2014).

- **Procedural Knowledge**

While the conceptual DK deals with the interconnectedness of different elements of knowledge (Hiebert and Lefevre, 1986), Anderson et al. (1997) explain that procedural knowledge (PK) forms part of behaviour but is unconscious. In short, PK represents the specifics of how DK is deployed in problem-solving activities. PK is the knowledge needed to put the DK into action: the information related to processes and strategy for performing tasks (Hiebert and Lefevre, 1986; Kraiger et al., 1993; Camerer and Hogarth, 1999; Sitzman and Leners, 2006). PK takes form as a set of actions and is knowledge that

is demonstrable in skills or procedures and enhanced via actions of practice (Jong and Ferguson-Hessler, 1986; Farnham-Diggory, 1994; Groth and Bergner, 2006; Jackson, 2007), manifesting as clear steps for completing tasks (Hiebert and Lefevre, 1986). As stated by McCormick (1997), PK is less complicated to define than the more conceptual DK. However, PK does involve considering diverse types of procedural activity (Hiebert and Lefevre, 1986).

PK, containing defined actions, allows individuals and groups to carry out dynamic problem-solving steps within a specific operational domain (Jong and Ferguson-Hessler, 1986; Lefevre et al., 1993; Haapasalo, 2003; Baroody et al., 2007). PK is the knowledge needed to follow consecutive steps to complete tasks (Jong and Ferguson-Hessler, 1986; Rittle-Johnson et al., 2001; Kolloffel et al., 2011). This is because PK informs individuals and groups how to perform tasks (Benjamin and O'Reilly, 2011).

PK is applying knowledge into action and is what knowledge to apply and when to apply it (King et al., 2007). King et al. note three important points regarding individuals and groups that are skilled in deploying PK: first, their ability to manage the context of the task to enhance change; second, the ability to work on short- to long-term goals in parallel; third, the flexible and creative use of specific strategies for the completion of tasks (2007). Tollin and Jones (2009) are concerned with PK used as a task development tool that facilitates increased managerial efficiency when implementing responses to problems. Williams (2007 and 2008) argues that this ability to deploy PK well has become a valuable asset in the Knowledge Economy.

For this research study, procedural knowledge is defined as the enacting of declarative knowledge into use and employing that knowledge in a series of combined steps and stages in a particular order. Procedural knowledge is a relationship of sequential steps. The type of relationship and connection between the steps form the quality of the procedural knowledge. The description of the action for the steps answers the question "How to?" (Vasconcelos et al., 2000; Holcomb et al., 2009; Gottlieb, 2014).

DK and PK are different forms of knowledge: DK is about why things happen, while PK focuses on how (Ryle, 1949; Benjamin and O'Reilly, 2011; Ross et al., 2015). However, there is a lack of research focusing on relationships between DK and PK. As noted above, there is a corresponding relationship between DK and PK in that DK assists in directing actions carried out and enhances PK via practice (Radakovič et al., 2012; Holmes, 2012; de Freitas Chagas Junior and de Abreu Campanário, 2014). Mills (2016)

argues that DK is a requirement but not an assurance of understanding, adding that being aware of facts creates a basis of understanding but should be coupled with PK. Some scholars insist that instructing individuals to complete tasks leads to individuals acting without thinking (Borgatti and Cross, 2003; Veil, 2011). In such instances, interrelationships between DK and PK do not lead to improvements in either knowledge type.

- **Heuristic Knowledge**

Heuristic knowledge (HK) is less formal knowledge, built on reflection as a result of the activities of individuals or groups. According to Tsoukas and Valdimirou (2001), knowledge management is a dynamic process assisting understanding and creating heuristic knowledge. Other scholars have shown that this deployment of DK and PK leads to more effective completion of tasks (Collins, 1990; Orlikowski, 1996; Weick, 1998).

It is possible to transform HK into organisational knowledge by recording and disseminating it accurately (Batet et al., 2013). HK is a result of individual interpretation and organisational communication (Gadamer, 1989). HK is recorded but not managed during its creation (Trevelyan, 2011) because HK comes from the perception, motivation and experience of individuals and groups within a specific context (Rizun and Taranenko, 2014). To create an environment where HK is fostered, managers encourage improvisation and initiative (Tsoukas and Valdimirou, 1998). A supportive, community-minded work environment assists in managing organisational knowledge gained (Kreiner, 1999).

HK is referred to as expertise (Mizoguchi et al., 1995) and as the common-sense approach to problem solving (Dion, 2011). Individuals understand the general and then link knowledge to a specific situation. Interpretation by individuals is required while carrying out tasks (Tandon et al., 2014). When knowledge has been put into practice and seen to affect performance in positive ways it is recorded and disseminated as organisational knowledge for good practice (Tsoukas and Valdimirou, 2001). HK assists in navigating a period of change, allowing individuals within the organisation to be proactive in enhancing organisational knowledge that improves task completion (Grasso, 2010; Hulme et al., 2011; Petherick, 2012; Preston et al., 2015). HK requires a

collaborative environment to form this kind of reflexive, looped, learning that guides organisational decision making (Flood and Romm, 1996; Groot and Maarleveld, 2000; Leeuwis and Pyburn, 2002; Yuen et al., 2012; Preston et al., 2015). Heuristic knowledge is developed and evaluated while performing tasks (Tsoukas and Viladimirou, 2001).

This thesis defines heuristic knowledge as the link between declarative and procedural knowledge, gained through incremental experience. It involves individuals taking decisions and making judgements to deploy DK and PK. Heuristic knowledge is the judgments people make about options they have in uncertain conditions. These individual judgments result in decisions via searching for explanations to make sense of, and create value from, a situation in order to choose the best options for the individual reacting to current and future events that require changes to be made (Vasconcelos et al., 2000; Holcomb et al., 2009; Dion, 2011; Preston et al., 2015). Two important elements of HK are sense-making, referring to judgments of individuals to explain and create value from a situation; and decision making, where individuals search for explanations and then choose the best option for reacting to current or future events.

- **Sense-making**

Weick (1995) and Sonenshein (2010) define sense-making as staff members using experience and forward thinking to understand a situation and possible outcomes. Weick (1995) and Sonenshein (2010) show that this allows decision making during periods of uncertainty based on plans and desired outcomes. Both Mills (2003) and Weick (2005) see sense-making as the construction of a personal interpretation of a situation. Lysova et al. (2015) argue sense-making begins with the ideas of individuals, which are developed via interactions with others. Ivanova-Gongne (2015) notes that empirical identification of these cognitive processes is problematic. For Weick et al. (2005) and Colville and Pye (2010), sense-making is based on understanding meaning contained in actions of others, in parallel with assumptions made about existing knowledge.

An organisation's staff members should have the knowledge needed to complete tasks; otherwise, making sense of problems is difficult. Organisations that manage and disseminate knowledge effectively are able to leverage knowledge in ways that allow a flexible approach to innovative thinking and activities. This requires using knowledge that is understood by staff members and connecting it with unknown or lesser understood knowledge (O'Connor and Fiol, 2002; Kirkman, 2016). This creates challenges for organisations that only disseminate knowledge to particular areas of operations as

limiting knowledge to specific roles or departments restricts innovation and communication (Dougherty, 2001; Kirkman, 2016). Individuals identify environmental changes and generate new knowledge appropriate for dealing with the new situation; understanding this allows organisations to use social structures, allowing teams to increase awareness, build new knowledge and learn via trial and error (Kirkman, 2016).

Understanding change and planning for the future requires new knowledge and comprehension of the change event. However, this leads to individuals creating their own meaning within the situation. This potential for misinterpretation influences whether tasks necessary within a period of change are completed as desired (Balogun and Johnson, 2005; Ren and Guo, 2011; Shin et al., 2012; Conroy and O'Leary-Kelly, 2013; Steigenberger, 2015). Team problem-solving activities are important to avoid subjective errors of interpretation by creating structures within which trial and error leads to new understanding that can then be disseminated (Gioia and Chittipeddi, 1991; Weick, 1995; Dougherty 2003; Voronov, 2008; Maitlis and Christianson, 2014; Steigenberger, 2015).

Subjective responses and sense-making are key to change management. Positive responses by members of an organisation lead to positive implementation of change. This is due to increased awareness, communication and commitment to the change (Shin et al., 2012; Sonenshein and Dholakia, 2012; Vuori and Virtaharju, 2012; Maitlis et al., 2013; Steigenberger, 2015).

Sense-making should be rooted in colleague interactions and effective communication (Gawlik, 2015) that allows individuals within a group to make sense of both information and their current situational experience (Hilde and Mills, 2015). It is imperative that sense-making is seen in these terms for it to be effective for implementing change (Dreyfus and Rabinow, 1982; Foucault, 1997; Fox, 2000; Clegg et al., 2006; Mørk et al., 2010; Filstad, 2014).

Effective knowledge management via sense-making allows staff members to understand the stages required for change, which in turn facilitates effective action (Thomas et al., 1993; Weick, 1995; Gioia and Thomas, 1996; Baker and Schaltegger, 2015). This is sometimes referred to as sense-giving: the influencing of sense-making by management (Gioia and Chittipeddi, 1991; Rouleau, 2005; Tallon and Kraemer, 2007; Baker and Schaltegger, 2015). This is not just a top-down process as stakeholders at any level in an organisation have the ability to be sense-givers and influence managers (Morsing and Schultz, 2006; Tallon, 2014; Baker and Schaltegger, 2015). In order to facilitate effective

sense-making, organisations should listen to all individual stakeholders. Without an open, team-based approach to knowledge exchange and development it is difficult to evolve knowledge (Weick et al., 2005; Kyoon Yoo, 2014).

The attainment of new knowledge needed to enact change requires sense-making to evolve regardless of challenges, disappointments, fear, doubt and uncertainty (French, 2001; Saxena, 2015). The comprehension of knowledge and the ability to disperse it is not uniform within an organisation. Indeed, sense-making for decision making, planning and implementing necessary change relies upon the ability of members of an organisation to identify, consider, understand, learn and transfer knowledge into activities (Cepeda-Carrion et al., 2012; Saxena, 2015). This ability is affected by the intricacy of the tacit and explicit knowledge required and that is shared and acted upon (Saxena, 2015). Weick (1993) notes problems arise where individuals are bound to existing, outmoded knowledge and decide to deploy this irrelevant knowledge into tasks. Providing too much knowledge to individuals leads to misinterpretation when knowledge is not managed effectively. Weick (1993) and Saxena (2015) agree that misinterpretation slows or prevents knowledge transfer.

Ickis et al. (2014) note sense-making is a non-linear process requiring continual reconsideration and developing of understanding (Hartt and Jones, 2013). Sense-making requires individuals within organisations to remain open to different perspectives and problem-solving possibilities (Cederlund, 2014; de Man and Luvison, 2014). For Jalonen (2014) sense-making relies on activities wherein these various stages and activities for increasing awareness and understanding are used, allowing individuals to both accept and deploy new knowledge. The new knowledge needed for change is often intrinsic, contextual knowledge based on situational evidence that leads to the restructuring of knowledge. Recognition of these signals in a social context motivates individuals to take effective action (Kyoon Yoo, 2014).

- **Decision Making**

Organisational and group decision making is an awareness of the options available to reach objectives in a particular context (Mayfield and Mayfield, 2015:), carried out by those responsible for directing specific courses of action (Robbins and Judge, 2011; Muñoz-Porcar et al., 2015). Decision makers define problems, identify objectives and assess risks to proposed changes (Hammond et al., 1999). Decision making of this kind

involves strategy, structure, market positioning, product development and selection, human resources, performance and administrative processes and procedures in organisations (Poole et al., 1985; Pashiardis, 1993; Schmidt et al., 2001; Wilson, 2009; Mayfield and Mayfield, 2009 and 2015). Individual decision making tends to involve the requirements of specific work tasks (existing and new), process effectiveness, and role-specific goals (Murnighan and Mowen, 2001; Schmidt et al., 2001; Kedia et al., 2002; Balleine, 2007; Aguinis and Kraiger, 2009; Mayfield and Mayfield, 2015). Within contemporary business processes, decision making is a regular activity and often has to be achieved in short timeframes (Rausch, 1999; Murnighan and Mowen, 2001; Kedia et al., 2002; Erakovich and Anderson, 2013; Mayfield and Mayfield, 2015).

Decision-making management is an important aspect of organisational growth and development, and research has shown that shared decision making within business processes leads to employee empowerment, motivation and innovation (Ford and Fottler, 1995; Goetsch and Davis, 2010; Mayfield and Mayfield, 2015; Muñoz-Porcar et al., 2015). As a result of these findings and rapidly changing business environments, scholars note that organisations are increasingly giving staff members greater responsibility for decision making (Rausch, 1999; Huisman, 2001; Murnighan and Mowen, 2001; Duncan et al., 2003; Mayfield and Mayfield, 2015).

Kocher and Sutter (2005) note that it is difficult to tell whether individuals or groups are more effective at making decisions within organisations. Indeed, numerous studies show both individuals and groups are prone to making a variety of mistakes during such processes due to a lack of knowledge that affects understanding (Ungson et al., 1981; Cannon and Edmondson, 2001; Cunningham et al., 2002; Walter et al., 2010; Frese and Keith, 2015; Amankwah-Amoah, 2015; Henderson and Smith-King, 2015; Vershinina et al., 2017). The capture and dissemination of knowledge should be managed so that information is provided to staff members in a timely manner (Bourgeois and Eisenhardt, 1988; Eisenhardt, 1989 and 1999; Intindola et al., 2016; Cristofaro, 2017). Decision making is a complex procedure that requires a clear methodology or organisations risk ongoing indecisiveness (Cervone, 2015). Regardless of time-pressures and complexities, managers and staff members need time to reflect on alternative scenarios and responses (Walger et al., 2016).

2.4.4 Knowledge Evolution and Redundant Knowledge

- **Knowledge Evolution**

A systematic search was made to review research, within the field of knowledge management, that specifically investigates knowledge evolution or changes to knowledge. This search used the following key words: "knowledge and change," "knowledge change," "knowledge change over time," "does knowledge change," "evolving knowledge," "evolution of knowledge," "evolving knowledge base," "modes of knowledge change," and "how does knowledge change." These key words were entered into the most relevant databases for this field of study during the initial search: Emerald, EBSCO, and ProQuest. The use of the word "change" within these searches was intended to find references to the study of how knowledge changes. Further searches were made throughout the period of conducting this research to identify other relevant literature.

In an article examining scientific knowledge, Bouissac (1992) draws attention to scholarly questioning of empirical research approaches. This study considers the consequences of the viewpoint that knowledge is created rather than illuminated in many research papers. Bouissac (1992) sees this as scepticism and links this widely-held belief to a reduction in 1980's scientific funding. Lundvall (1998) presents a taxonomy of knowledge comprising knowledge about context, skills and abilities, and knowledge about performing specific tasks. The article uses this combination to classify innovation styles. The study's exploration of learning considers timeframes and trust, with a focus on the links between trade specialisms and specialist knowledge within an organisation. Lundvall concludes that a combination of these factors influence organisations' innovative abilities.

Shariq (1999) presents a framework to increase awareness of knowledge transfer processes. Shariq shows that these processes occur between individuals via dynamic interactions. The study concludes that this central element of thought should be emphasised when considering interactions that facilitate knowledge sharing. Antonelli (1999) examines the market for knowledge. The article considers the difference between information, abilities and knowledge. Antonelli (1999) identifies an increasing focus on knowledge in service sectors and how the blending of knowledge assists in creating organisational competencies utilising technology. Dixon (1999) offers a qualitative study of knowledge-sharing systems in which Ford, British Petroleum and Lockheed-

Martin are examined to demonstrate a shift in thinking regarding who holds knowledge in organisations. Dixon (1999) offers the distributed model to show that organisational knowledge is extensive and considers knowledge sharing practices developed to facilitate knowledge transfer, rather than working on the hypothesis that experts hold the most valuable knowledge. Dixon (1999) shows that quality knowledge is dispersed across organisations. The article concludes that this understanding assists problem-solving activities.

Laszlo and Laszlo (2002) study ways in which KM assists sustainability in organisations. The article uses an evolutionary-systems viewpoint and qualitative methodology. The research model is based on practical knowledge and Laszlo and Laszlo (2002) conclude that the evolutionary learning community offers a heuristic strategy creating knowledge for evolutionary development. Schulz (2003) explores knowledge flows between subunits of multinational corporations in an empirical study of the factors that impact this flow. The article concludes that relevant knowledge needed to complete tasks is formed from relationships between prior knowledge and new knowledge. Schulz (2003) emphasises that it is important to understand knowledge evolution because organisations rely on knowledge and this understanding allows better knowledge management, flow and control. The article states that knowledge relevance is an important factor for the management and flow of knowledge between subunits. Schulz's work examines important aspects of knowledge flow.

Balogun and Jenkins (2003) argue that change is a knowledge creation process. Drawing on a wide-range of theories regarding organisational knowledge, Balogun and Jenkins (2003) consider different ways in which change is managed. The article focuses on culture and strategic change, examining collective expectations and views that represent tacit knowledge. This knowledge should be identified and evolved during periods of strategic change. Balogun and Jenkins (2003) offer recommendations for practice based on the conclusion that individuals need evolved tacit knowledge regarding organisational interactions, as well as ways to organise tasks when implementing change.

Chen et al. (2010) offer a model for considering knowledge ecology in organisational KM. The model consists of the knowledge population — including planning, finance, information systems, manufacturing, marketing, quality assurance etc.; the knowledge community: interaction, competition, evolution, and distribution; organisational resources: staff, processes, culture; and the external environment.
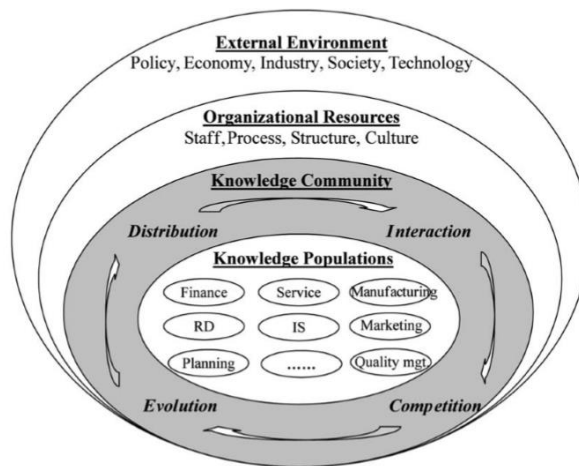
Figure 2.2: Conceptual Illustration of the Knowledge Ecology in an Organisation (Source: Chen et al., 2010)

Knowledge evolution is seen by Chen et al. (2010) as a strategy for staff members to deal with uncertainty during a period of change. Their paper focuses on the integration of internal and external resources to develop knowledge within a group of staff members.
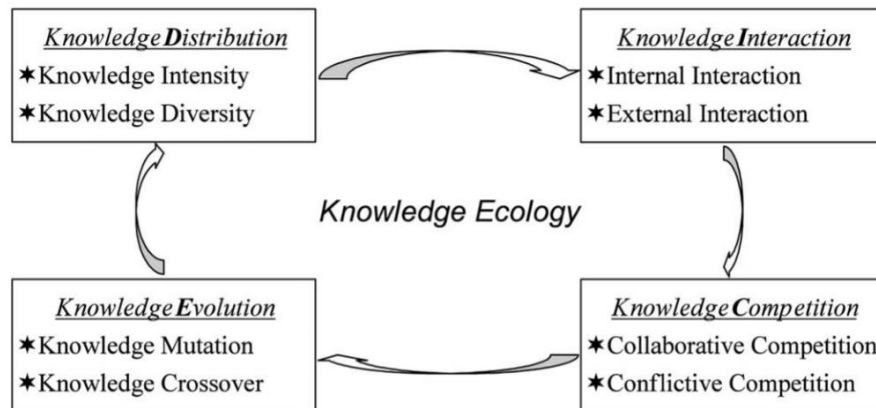
Figure 2.3: Major activities in the DICE Model (Source: Chen et al., 2010)

This evolution of knowledge assists organisational dynamic capability utilising both internal and external resources. Chen et al. (2010) investigate the development of knowledge as an outcome rather than the way knowledge evolves.

Zollo and Winter (2002) offer a knowledge evolution cycle model. This model links learning techniques and dynamic capabilities. For Zollo and Winter (2002) learning consists of "experience accumulation," "knowledge articulation," and "knowledge codification" (p.340). These elements of learning lead to improved dynamic capabilities

such as R&D and restructuring. Their research shows how links between learning and dynamic capabilities assist in the evolution of daily operational practices. Zollo and Winter (2002) consider knowledge evolution as the growth of knowledge. Zollo and Winter's stages of the knowledge evolution cycle demonstrates that individuals or groups create ideas to develop new ways to solve old problems. These ideas are formed by modelling the integration of internal and external knowledge. Lin (2007) presents a model of KM evolution consisting of three stages. The first stage is "initiating": organisational recognition of the value of KM and preparation of KM initiatives (p.648). The second stage is "development": investment in KM structures and encouraging KM practices (p.648). The third stage is labelled "mature": KM is being enacted and shared internally with staff members and externally with organisational stakeholders (p.648). Lin (2007) concludes that KM strengthens an organisation's capabilities.
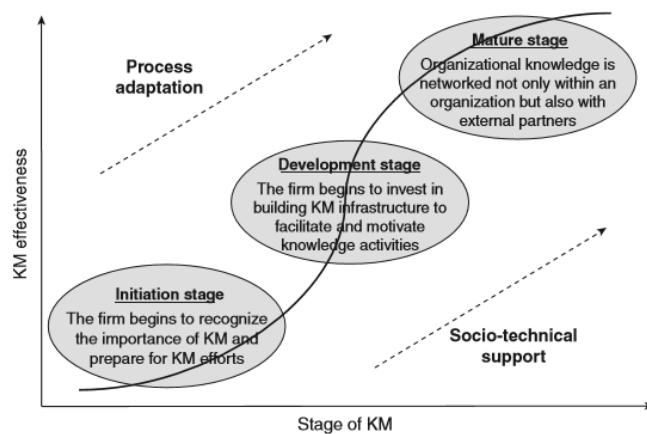
Figure 2.4: Knowledge Management Stages (Source: Lin, 2007)

Lin (2011) provides a model for examining KM evolution with a focus on the effects on individuals, organisations and IT, involving the stages of KM initiation, implementation, and institutionalisation.
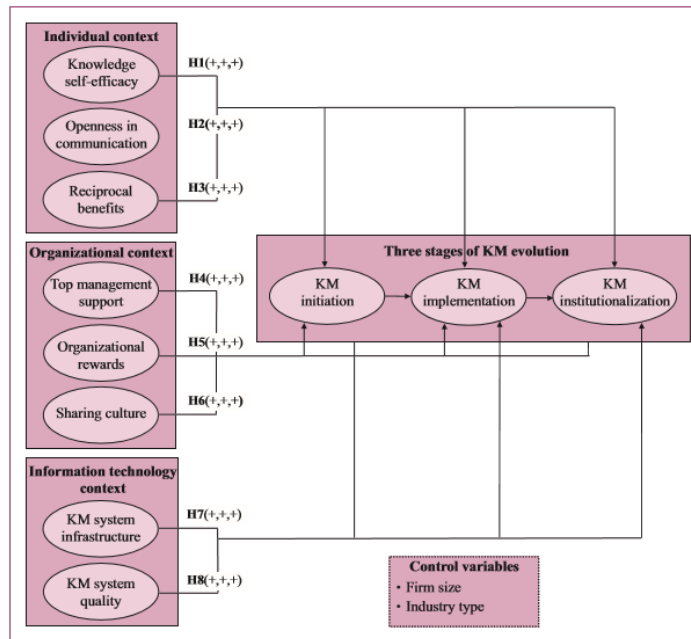
Figure 2.5: Three Stages of Knowledge Management Evolution (Source: Lin, 2011)

Lin (2011) concludes that different organisational situations have differing effects on KM. Knowledge evolution stages are affected by staff members' competencies, supportive management, and effective knowledge management. Zollo and Winter (2002) and Lin (2007, 2011) investigate the evolution of knowledge management as creating and developing practices of knowledge management. Scholars tend to consider knowledge management as a process of knowledge acquisition, adaptation and securing knowledge.

Sandhawalia and Dalcher (2011) consider the necessity of methodical approaches to KM and offer a model for facilitating standardised guidelines. Sandhawalia and Dalcher (2011) argue that using such an approach allows organisations to increase the speed of knowledge evolution. The study demonstrates that knowledge generation, storage, transfer and usage is a key tool in competitive performance. This is achieved via effective integration strategies and the eradication of many obstacles found in learning processes. Increasing organisational capability in this way makes knowledge evolution faster and provides knowledge that becomes a valuable resource. The research uses a case study involving an international organisation and its software and project management processes. The case study lasted over two years and focused on KM activities, infrastructure change and knowledge transfer capabilities. The article concludes that organisations should encourage communication and feedback to allow knowledge to

flow, and to facilitate knowledge transfer through relationship building. This is achieved by the creation of communities of practice, building trust and confidence, and rewarding behaviour that leads to positive implementation of change. Sandhawalia and Dalcher (2011) emphasise that overt organisational commitment to a culture of knowledge, along with clear communication throughout the organisation, increase KM effectiveness. Sandhawalia and Dalcher (2011) consider knowledge evolution as the growth of knowledge within an organisation.

Easterby-Smith and Lyles (2011) examine the literature of organisational learning in order to identify common elements in the knowledge evolution cycle consisting of "generative variation, internal selection, replication, and retention" (p.165). This qualitative study shows that learning affects an organisation's performance but is rarely consistent. This work is of limited use because variables that impact the effectiveness of organisational learning and performance are not defined. The article calls for further research that separates learning from knowledge, and considers the effects of networks, communities and structures on learning and knowledge. Storga et al. (2013) consider knowledge evolution processes by investigating links between data and information from varied organisational knowledge settings. This qualitative and quantitative study investigates organisational knowledge evolution structures examining knowledge accumulation and transfer across an email network.

Wilson (2016) investigates the effects of knowledge bases on library management and considers alternative uses. The article focuses on the evolution of knowledge bases and examines aspects of contribution, integration and structure. Wilson (2016) investigates ways in which evolution of knowledge bases allows innovation. Tsai (2016) examines knowledge heterogeneity made up of individual and group specialist knowledge and how knowledge evolves for individuals and groups. Tsai (2016) concludes that people develop sets of knowledge from learning opportunities, knowledge accumulation, experience, communication, and innovation. Furthermore, these knowledge sets increase professional competency and the ability to complete tasks during periods of innovation.

Al-Omari et al. (2014) offer a model of organisational knowledge growth as a resource wherein such growth enhances organisational practices. Al-Omari et al. (2014) use quantitative methods, first reviewing KM and knowledge growth literature before assessing tools for measuring knowledge outcomes. The model uses a software tool containing a simple formula for the identification of knowledge for problem solving.

Again, Al-Omari et al. (2014) consider knowledge evolution as the growth of knowledge, from internal and external sources, for enhancing organisational practices. They and other researchers overlook the study of declarative, procedural and heuristic knowledge from pre- to post-change knowledge.

Author(s)	Knowledge evolution
Al-Omari et al. (2014); Sandhawalia and Dalcher (2011); Storga et al. (2013)	Growth of knowledge
Easterby-Smith and Lyles (2011); Storga et al. (2013)	Structure for managing knowledge in specific contexts
Zollo and Winter (2002); Lin (2007); Lin (2011)	Evolution of knowledge management as a system
Chen et al. (2010)	Strategy to deal with uncertainty during change

Table 2.4: Different Perspectives on Knowledge Evolution (Source: thesis author).

Table 2.4 shows that scholars have studied knowledge evolution from differing perspectives. They have developed knowledge evolution models with a focus on systems of knowledge management rather than knowledge itself. The existing literature ignores knowledge evolution during the implementation of planned/radical change. Furthermore, current studies assume that the accumulation, development and growth of knowledge are always relevant to the organisational situation. Scholars pay little heed to knowledge that continues to be used after planned/radical change and knowledge that is not required after the implementation of change, which is, therefore, redundant. Al-Omari et al. (2014) consider redundant knowledge as part of the knowledge gained from internal and external resources, which is filtered before being deployed. For the purposes of this thesis knowledge evolution is defined as the progression of staff members from pre-change knowledge to post-change knowledge. Table 2.5 below summarises the knowledge evolution elements examined in the extant literature. It can be seen that scholars have focused on a number of knowledge evolution elements but, unlike this thesis, they do not consider the stages of knowledge of evolution from pre- to post-change knowledge.

Year	Author(s)	Knowledge Evolution Elements
1992	Bouissac	Knowledge creation
1998	Lundvall	Specialist knowledge and innovation
1999	Shariq	Dynamic interactions in knowledge sharing
1999	Antonelli	Enhancing organisational competencies by blending knowledge and utilising technology
1999	Dixon	Knowledge sharing and transfer
2002	Laszlo and Laszlo	Knowledge creation and sustainability
2002	Zollo and Winter	Integration of internal and external knowledge
2003	Schulz	Knowledge management, flow and control
2003	Balogun and Jenkins	Organisational knowledge, culture and strategic change
2007	Lin	Knowledge evolution model with three stages: initiating, development and mature
2010	Chen et al.	Knowledge ecology model: knowledge population, knowledge community, organisational resources, external environment
2011	Lin	Knowledge evolution model with three stages: KM initiation, implementation, and institutionalisation
2011	Sandhawalia and Dalcher	Knowledge generation, storage, transfer and usage as a key tool in competitive performance
2011	Easterby-Smith and Lyles	Knowledge evolution cycle: generative variation, internal selection, replication, and retention
2013	Storga et al.	Knowledge accumulation and transfer across an email network
2014	Al-Omari et al.	A software tool containing a simple formula for the identification of knowledge for problem solving
2016	Wilson	Evolution of knowledge bases: contribution, integration and structure
2016	Tsai	Learning opportunities, knowledge accumulation, experience, communication, and innovation

Table 2.5: Knowledge Evolution Elements (Source: thesis author)

- **Redundant Knowledge**

A search for literature relating to redundant knowledge was carried out using the EBSCO, Emerald and ProQuest databases. The search criteria English language, scholarly journals, articles, full text, and peer-reviewed were used. The key words used in these searches were "redundant knowledge" and "irrelevant knowledge" and "unneeded knowledge."

Crowther and Carter (2002) explore knowledge transfer processes within higher education business schools, stating that course content should be student-centred and relevant. Crowther and Carter (2002) state this is a problem created by increasing specialisation, rather than meeting requirements for generalisation sought by customers. The paper concludes that academics in business and management schools are in danger of becoming irrelevant by ignoring the needs of their students. This article's focus is the need to exclude irrelevant knowledge from teaching materials that does not serve the student customer. Crowther and Carter (2002) argue that there is a need to review and filter existing knowledge content in order to provide relevant courses for students. This thesis recognises the need to review and select relevant

pre-change knowledge, with a focus upon business processes undergoing planned/radical change, and models the knowledge evolution stages that assist with the identification of redundant knowledge in pre-change knowledge as it evolves into post-change knowledge.

Garzarelli et al. (2008) focus on open source software (OSS) noting that it is a collaborative enterprise. This open sharing creates knowledge generation and flow to a greater degree than in-house software development projects; knowledge becomes more valuable given the potential number of individuals interacting. This quantitative study analyses costs and benefits of open source software in comparison to proprietary software developed by traditional organisations. The paper concludes that as OSS allows all contributions, regardless of an individual's specialism, outputs increase proportionately. The knowledge generation of OSS development is a far faster process than in traditional frameworks via a division of labour referred to as "redundant economies" by Garzarelli et al. (2008, p.17). Corredoira and Rosenkopf (2010) examine the transfer of knowledge and knowledge flows connected to human and social capital. The paper concludes that social capital is important in knowledge transfer and creates knowledge flows between organisations. Corredoira and Rosenkopf (2010) use the term "redundant knowledge channels" (p.159), meaning that employees moving from one job to another transfer irrelevant knowledge to their new organisation. Garzarelli et al. (2008) and Corredoira and Rosenkopf (2010) use the principle of redundancy; however, the papers do not consider redundant knowledge. Instead, the focus is on effective working practices and knowledge transfer. The extant literature neglects the emergence of redundant knowledge during planned/radical change.

Al-Omari et al. (2014) create a model to consider knowledge growth and organisational knowledge capital. The model contains a formula for coding knowledge objects that assists with categorising and measuring organisational knowledge growth. Al-Omari et al. (2014) use their model to investigate knowledge growth stages; knowledge evolution as learning; individuals' experience of knowledge growth; and how knowledge becomes knowledge capital. Al-Omari et al. (2014) state that the measurement of knowledge growth requires analysis of processes and peoples' learning within organisations. This individual knowledge needs to be captured and documented for use in business processes and decision making. The use of feedback channels to increase knowledge growth is recommended. Al-Omari et al. (2014) claim that the formula's coding elements enable identification and eradication of redundant knowledge — regarding non-work-related

knowledge in their case study — as knowledge evolves during the process of knowledge capital enhancement. They show the importance of having and recognising redundant knowledge and removing this during the knowledge evolution process. This study is limited and could have gone further by investigating the stages at which redundant DK, PK and HK is identified.

Redundant knowledge is used as a term by those working with technical systems. Dong and Li (2013) propose a method for substation fault diagnosis wherein redundant knowledge is identified. Dong and Li (2013) state that by using this method redundant knowledge is removed from the system, improving fault diagnosis. Lauffs and Holzapfel (2016) offer a platform that allows modelling development, performance and safety assessment of actuators. Lauffs and Holzapfel (2016) state that the platform offers benefits to those developing prototypes due to it being flexible and cost effective compared to previous platforms. These two papers are technical in nature and avoid dealing with human knowledge. However, the work of Lauffs and Holzapfel (2016) does show that data, information, or knowledge redundancy is an important element of creating and developing efficient systems and processes.

Zhang et al. (2014) investigate knowledge flows in networks centred on Chinese ICT companies. Zhang et al. (2014) state that the literature has not studied this particular type of network, nor the structures that affect the flow of knowledge. The quantitative study examined patent filing data covering 6 million patents to 2011. Zhang et al. (2014) conclude that "in networks centered by prolific inventors, useful knowledge outweighs redundant knowledge" (p.1107). The networks studied provide increased knowledge dissemination allowing members to benefit from the useful knowledge of the most prolific experienced inventors. Zhang et al. (2014) emphasise that redundant knowledge is a product of a lack of innovation and communication. Redundant knowledge was identified and reduced in networks where innovative individuals were working within the group. Shiri et al. (2015) study network diversity and innovation. The qualitative study collected data from food SMEs in European countries to investigate the effects of networks on innovation. Shiri et al. (2015) state that bridge ties create more innovation in organisations. Furthermore, a wide variety of partners connected in effective networks is beneficial to process innovation. Karamanos (2015) states that while it is accepted that organisations create alliances to implement change and promote innovation, scholarly literature has not investigated these alliances. Karamanos (2015) use a case study carried out in the biotechnology sector considering organisations experiencing a period of

uncertainty that needed to operate within a supportive network. The findings recommend that managers of innovation responsible for forming these alliances should use them to discover matching knowledge across new networks. This leads to greater consistency of knowledge. Furthermore, directed searches via networks allow non-redundant knowledge to flow and be combined with other knowledge. The conclusion is that partners in the alliance learn from each other by monitoring these non-redundant knowledge flows. These three articles show networks support innovation by allowing the flow of non-redundant knowledge that enhances innovation. Zhang et al. (2014), Shiri et al. (2015) and Karamanos (2015) all discuss the importance of identifying the non-redundant knowledge because redundant knowledge does not assist innovation.

Watts Perotti et al. (2010) discuss potential new challenges for knowledge workers as knowledge economies mature. Their research is based on an ethnographic study involving workers employing smart technology. The main findings are that workers in the knowledge economy are likely to have to filter increasing amounts of information as digital accessibility grows. Watts Perotti et al. (2010) recommend that systems are created that are context aware, as well as suggesting that user control should involve awareness of the need for information filters. The main problem that increasing amounts of unfiltered irrelevant knowledge poses is overwhelm.

It is clear from the literature that redundant knowledge is discussed in different ways regarding a variety of topics. This range of scholarly interventions means that different definitions of redundant knowledge exist for different types of study. For the purposes of this thesis redundant knowledge is identified as the subset of pre-change declarative, procedural and heuristic knowledge that is no longer required to complete tasks within business processes after planned/radical change has been implemented.

2.5 Factors Affecting Knowledge Management

There is general recognition among academics that knowledge management is a cross-functional and multifaceted discipline (Lee and Choi, 2003). Three factors for managing knowledge are identified: enablers, processes and organisational performance (Beckman, 1999). These factors stimulate knowledge creation, protect knowledge and facilitate knowledge sharing in organisations (Stonehouse and Pemberton, 1999). Knowledge processes include activities for managing knowledge effectively such as creation, sharing, storage and usage (Gold et al., 2001; Alavi and Leidner, 2001) and represent basic operations of knowledge (Van der Spek and Spijkervet, 1997).

According to Bell DeTienne et al. (2004) and Mehta (2008), factors that contribute to effective KM are either human or technical. Bollinger and Smith (2001) propose that human behaviour is the key to the effectiveness of KM activities, as KM involves an emphasis on organisational culture, teamwork, promotion of learning and sharing of skills and experience. From this viewpoint, three supporting human-related elements are considered: culture, leadership and HR practices. Hence, organisations promote a series of values that influence people's behaviours and willingness to share knowledge (Sveiby and Simons, 2002; Leidner et al., 2006). Elliott and O'Dell (1999) consider culture, technology, infrastructure, and measurement as four key factors influencing KM. Culture promotes collaboration and sharing of knowledge; technology speeds up knowledge transfer but creates information overload; infrastructure includes organisation structure, technology, processes; and people networks to ensure knowledge flow and measurement.

Mathi (2004) identifies factors for implementing KM in organisations as culture, KM organisation, strategy, systems and IT infrastructure, effective and systematic processes and measures. Hariharan (2005), on the other hand, proposes seven factors for effective KM, which are termed strategic focus, alignment with objectives, KM organisation and roles, standard KM processes, culture and people engagement, content under scrutiny and technology enablement. Lee and Choi (2003) identify seven different factors, which are collaboration, trust, learning, centralisation, formalisation, skills, IT and support. Of these, trust is part of an organisation's culture and is translated into activities such as increased collaboration and communication. Trust is considered as a significant factor, for in its absence, knowledge sharing will not take place and organisations will refrain from sharing vital information across the enterprise (Robbins, 2005).

Chong and Choi (2005) identify 11 main KM critical success factors, which are employee training; employee involvement; team working; employee empowerment; top management leadership and commitment; information systems infrastructure; performance measurement; knowledge-friendly culture; benchmarking; knowledge structure; and elimination of organisational constraints. Ward and Aurum (2004) agree with these elements but add organisational culture as a factor influencing KM.

There is a significant relationship between independent variables of team learning, embedded systems, and provision of leadership, and the dependent variable of knowledge performance (Chourides et al., 2003; Jennex and Olfman, 2004; Kumar and Idris, 2006). Increased communication, with the aid of standard processes and technology

infrastructure, enhances collaboration (Anantatmula and Kanungo, 2010). Gold et al. (2001) propose that technology, structure, and organisational culture drive infrastructure capabilities stating that an information-sharing culture is vital for effective KM. Yu et al. (2004) show that KM drivers such as learning orientation, knowledge-sharing intention, knowledge management system quality, reward, and knowledge management team activity are significantly related to organisational knowledge management performance (i.e. knowledge quality and knowledge-user satisfaction).

Information technology as a factor of effective KM enables the acquisition of greater amounts of information, thereby providing greater amounts of data related to organisational processes, providing an opportunity for creating and expanding knowledge, a necessary characteristic of KM (Alavi and Leidner, 2001; Anantatmula and Kanungo, 2010). Arora (2002) states that IT is useful to an organisation in KM implementation, but has to be backed by a corresponding change in organisational culture. Most of the IT tools for KM are developed for explicit knowledge, and Koh et al. (2005) identify three critical factors: strategic alignment and focus, system and data integration, and security and privacy policies.

Akhavan et al. (2006) categorise KM factors under the headings Knowledge Strategy, Training Programmes, CEO Support and Commitment, and Business Process Reengineering. A clear and well-planned knowledge strategy, as part of organisational strategy, develops the organisation's capability for utilising resources to achieve strategic objectives. Training programmes are important to provide staff members with the knowledge of concepts required for completing job activities. CEO support and commitment affect KM because planning and implementation requires strong and consistent leadership. Business process reengineering involves reviewing processes in order to consider changes needed for implementing KM effectively.

Donate and Guadamillas (2011) focus on influential factors for overcoming human barriers associated with knowledge generation, codification, sharing and application. These factors are oriented towards the development of an internal environment for boosting KM initiatives, since they allow interactions among organisational members to be increased via the sharing of ideas, experimentation and willingness to codify, transfer and apply knowledge for innovation (Bierly and Daly, 2002; Bell DeTienne et al., 2004; Jansen et al., 2006; Singh, 2008). KM requires a culture in which people are respected, based on the knowledge they have and the way they put it to use for the organisation

(Akhavan et al., 2006). Since knowledge management is viewed as a collaborative activity, management scholars recognise the context-dependent nature of knowledge management activities to innovation (Argote and Ingram, 2000; Kostova and Roth, 2002; Chen et al., 2010).

Author(s)	Date	Factors Affecting KM
Elliott and O'Dell	1999	culture, technology, infrastructure, and measurement
Beckman	1999	enablers, processes and organisational performance
Gold et al.	2001	technology, structure, and organisational culture
Bollinger and Smith	2001	human behaviour, organisational culture, teamwork, promotion of learning and sharing of skills and experience. culture, leadership and HR practices
Arora	2002	IT and organisational culture
Sveiby and Simons Leidner et al.	2002 2006	behaviours and the willingness to share knowledge
Bierly and Daly Bell DeTienne et al. Jansen et al. Singh	2002 2004 2006 2008	sharing of ideas, experimentation and willingness to codify, transfer and apply knowledge for innovation
Chourides et al. Jennex and Olfman Kumar and Idris	2003 2004 2006	team learning, embedded systems, and provision of leadership, and the dependent variable of knowledge performance
Lee and Choi	2003	collaboration, trust, learning, centralisation, formalisation, skills, IT and support
Bell DeTienne et al. Mehta	2004 2008	human or technical
Mathi	2004	culture, KM organisation, strategy, systems and IT infrastructure, effective and systematic processes and measures
Yu et al.	2004	learning orientation, knowledge-sharing intention, knowledge management system quality, reward, and knowledge management team activity are significantly related to organisational knowledge management performance (i.e. knowledge quality and user knowledge satisfaction)
Hariharan	2005	strategic focus, alignment with objectives, KM organisation and roles, standard KM processes, culture and people engagement, content under scrutiny and technology enablement
Koh et al.	2005	strategic alignment and focus, system and data integration, and security and privacy policies

Robbins	2005	trust
Chong and Choi *Ward and Aurum	2005 2004	employee training; employee involvement; team working; employee empowerment; top management leadership and commitment; information systems infrastructure; performance measurement; knowledge-friendly culture; benchmarking; knowledge structure; and elimination of organisational constraints *plus organisational culture
Akhavan et al.	2006	knowledge strategy, training programmes, CEO support and commitment, and business process reengineering, organisation culture
Anantatmula and Kanungo	2010	communication and IT
Alavi and Leidner Anantatmula and Kanungo	2001 2010	IT
Argote and Ingram Kostova and Roth Chen et al.	2000 2002 2010	context-dependent nature of knowledge management activities to innovation
Donate and Guadamillas	2011	human, knowledge generation, codification, sharing and application

Table 2.6: Factors Affecting KM Literature Summary (Source: thesis author).

Table 2.6 shows that these factors affect knowledge management in organisations. Scholars have identified and listed numerous factors examined in a variety of organisational contexts and in differing circumstances. The existing literature shows there is very little agreement between scholars regarding a definitive set of factors influencing knowledge management. However, there are common factors within these different viewpoints, such as processes, human behaviour, organisational culture, IT infrastructure, management and HR practices. Recognising and understanding factors that affect knowledge management enhances implementation of knowledge management within organisations. It is important to include and define these factors in an investigation into knowledge needed to complete tasks that evolve during a period of planned/radical change, and how these factors affect the knowledge evolution stages. The existing literature does not consider KM factors with regard to knowledge evolution.

2.6 Business Processes

In organisations, a business process is "a lateral or horizontal organizational form, that encapsulates the interdependence of tasks, roles, people, departments and functions required to provide a customer with a product or service" (Earl, 1994, p.13). A business

process is a set of logically related activities arranged in a coherent sequence. These processes are core business assets. Modelling and managing business processes is important for operational management in an organisation (Harrington and Lomax, 2000; Harmon, 2007; Polpinij et al., 2015). A business process contains interrelated tasks, or activities, for transforming inputs and outputs (Anttila and Jussila, 2013) to satisfy the requirements of various organisational stakeholders (Palmberg, 2009; Roeser and Kern, 2015).

Business processes may be modelled to identify tasks and procedures (Polpinij et al., 2015; Tbaishat, 2017), which allows the flow of knowledge needed to complete the tasks (Mendling et al., 2012; Anastassiu et al., 2016). According to Kettinger et al. (1997), business process projects typically include attempts to transform the organisational subsystems of management (style, values, measures), people (jobs, skills, culture), information technology, and organisational structures, including team and coordination mechanisms. Changes to these subsystems are viewed through the analytic lens of the business process (intra-functional, cross-functional, inter-organisational). The goal of process transformation is improved processes, products and services measured in terms of cost, quality, customer satisfaction, or shareholder value.

Business process re-engineering (BPR) requires business processes to be restructured and designed to increase organisational performance in order to implement radical change. BPR enhances organisational performance by combining tasks across the organisation to eradicate unnecessary expenditure, duplication of work, and ineffective practices (Davenport and Stoddard, 1994; Jung and Lee, 2016). Hakim et al. (2016, p.1119), following O'Neill and Sohal (1999), present key definitions of BPR by other scholars including "analysis and design of processes within and between organizations" (Davenport and Short, 1990), and "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement" by Hammer and Champy (1993).

An important element of BPR in implementing radical change is the use of technology to enhance change (Goel and Chen, 2008, following Hammer, 1990). BPR involves simplifying and automating business processes for enhanced performance. This requires effective change management to reduce the risk of negative outcomes created by staff member resistance or uncompleted tasks. Streamlining via BPR reduces organisational operating costs (Goel and Chen, 2008). Re-engineering business processes consists of evaluating the existing situation, identifying what is working in current processes,

considering ways of improving processes, creating alternative approaches to task completion, and redesigning and modelling processes to meet the needs of the target situation via radical change (Grau et al., 2008).

Kueng (2000) highlights the importance of information to business processes — for example, human resources information systems, and management information systems. Information management should be monitored to prevent leaders, process managers and employees experiencing information overload. Relevant information within a business process needs to be provided to staff members according to the process goals and needs. Sanchez et al. (2010) believe that measures are applied to two aspects of a business process model (BPM): the business process design, and the results that it produces when executed. Business Process Management consists of numerous systemic elements. These include strategic alignment; effective feedback systems; integrating activities and identifying interrelationships; goal-orientated performance indicators used as control mechanisms; and a global view of the system (Pádua and Jabbour, 2015). Design measures deal with the static properties of business processes and are defined by the business process model at the time of its design. Trkman (2010) argues that BPM assists with the alignment of organisational strategy and business processes. Zellner (2011) advocates Business Performance Improvement (BPI) as an approach to increase the effectiveness and efficiency of business processes that provide output to internal and external customers. Improving business processes is routinely cited as a high priority for organisations (Zellner, 2013).

To attain greater efficiency in a business process, Trkman (2010) argues that potential problems should be addressed, including duplication of functional expertise and increased operational complexity, which results in an escalation of costs, inconsistency in the execution of functional decisions between processes, and a general erosion of efficiency. Organisations align their strategy and structure with the competitive environment to perform effectively (Rogers et al., 1999). The optimal organisational style depends upon various internal and external constraints and there is no universal or best way to manage processes (Livari, 1992).

Research indicates that there is a positive correlation between process management and business prosperity (McCormack and Johnson, 2001; Skerlavaj et al., 2007; McCormack et al., 2009). Business processes tend to name a higher proportion of process managers at both a senior executive and supervisory level (Pritchard and Armistead, 1999). Process

owners should have permanent roles with responsibility for, and authority over, designing the process, measuring its performance, and training staff members who perform it (Hammer and Stanton, 1999). These process owners are in charge of assuring dynamic improvements of the capabilities of business processes (Leite et al., 2016). Furthermore, the appointment of process owners increases the inclusion and commitment of middle management to the business process. Resistance from middle management is a reason for the failure of business process projects (Terziovski et al., 2003). Active support from middle management is vital for continuous improvement. These managers need the freedom to select new strategic initiatives (Burgelman and Grove, 2007). Kujansivu and Lönnqvist (2008) emphasise that process management improves business process fluidity and identifies tasks that do not add value. When management and staff members are empowered to take decisions, it results in smoother operations with lower throughput times (Jennings et al., 2000; Reijers and Mansar, 2005; Trkman and McCormack, 2010).

2.6.1 Tasks within a Business Process

Business processes consist of tasks. The identification of tasks necessary for process management has emerged in response to the competitive nature of private and public organisations constantly striving for ways to increase productivity, maximise returns and attain excellence in their markets (Grover and Kettinger, 2000; Burlton, 2001; Paim, 2002). External influences on organisations require internal responses. These responses come via process-oriented design or redesign, by managing business processes function, and recording and monitoring historical process performance to improve overall organisational performance (Paim et al., 2008).

Harmon (2003) argues that managers need to plan business process implementation, allocate resources to tasks, supervise progress and control results, which is summarised as checking that tasks have been completed by staff members. These tasks include implementing or putting into practice new processes, seeing that processes take place properly, monitoring process execution, controlling process execution, and making short-term changes.

Internal communication is important for business process management (Davenport, 1993). Scholars stress the importance of increasing awareness of processes; international competition; global frames of reference for performance; greater supply of information

and technology; consolidation of IT tools to support process management; and local and global provisions to increase control, maturity, and capability for accomplishing strategic goals (Davenport, 1993; Hammer and Champy, 1993; van der Aalst et al., 2003; Grover and Kettinger, 2000; Burlton, 2001; Harmon, 2003; Smith and Fingar, 2003; BPM Group, 2005; Poirier and Walker, 2005; Davenport, 2005; Spanyi, 2006). These internal communication activities include promoting staff members' understanding of the internal and external environment; setting strategy, goals and approaches to change; understanding, selecting and prioritising processes; understanding, selecting and prioritising modelling tools; forming process groups and teams; understanding and modelling processes in the current situation; defining and prioritising current problems; and defining and prioritising solutions for current problems (Bowersox and Closs, 1996; Hammer, 2001; Ballou, 2003; Grieger, 2004; Poirier and Walker, 2005; Margherita, 2014). Internal communication is one of the components for completing tasks within business processes.

Managing business processes involves coordinating tasks needed to ensure that desired outcomes are delivered. In order to complete tasks within business processes, resources are needed. These resources include information, materials, equipment, capital, staff members, ideas and knowledge, which are integrated and coordinated by business process managers to achieve the objectives of the process (Bowersox and Closs, 1996; Hammer, 2001; Ballou, 2003; Grieger, 2004; Poirier and Walker, 2005).

Hagen and Alonso (2000) state that business processes are characterised as sequences of steps and data exchanges. In order to build realistic systems, it is important to deploy mechanisms that allow the system to continue processing even when failures occur. This is the role of specific planned tasks. To allow the continuation of a process in spite of a failure, it is necessary to have an extended process specification that includes failure-handling tasks.

2.6.2 The Role of Knowledge in Task Completion

Cane et al. (2012) examine domains affecting task completion and how knowledge is required for the completion of tasks. Khatri et al. (2006) state that knowledge is important for understanding tasks in both familiar and unfamiliar areas, and that the effect of applying knowledge depends on the tasks.

Strategies are required to complete tasks, which are general processes that operate across different contexts of knowledge. A certain amount of domain knowledge is necessary for

the efficient and effective utilisation of strategic knowledge (Alexander and Judy, 1988; Vakkari et al., 2003; Sahib et al., 2012; Park, 2015; Saastamoinen and Järvelin, 2016). Regarding task completion, Schoenfeld (1987) argues that knowledge individuals bring to tasks counts more than the content or strategy they employ. Reagans et al. (2005) show that individual experience provides an opportunity to become proficient in performing tasks, routines and practices. An individual's experiences are shaped by knowledge gained through practice. Reagans et al. (2005) emphasise studies undertaken by Newell and Rosenbloom (1981) and Delaney et al. (1998), which show that time individuals take to complete tasks and errors they make decrease as they gain experience with tasks. In a team context or where individuals are working collectively, they gain knowledge from colleagues to improve the knowledge available in the organisation, which in turn, affects task completion.

Employees are intrinsically as well as externally motivated. Self-motivation is important when tacit knowledge in and between teams needs to be transferred (Osterloh and Frey, 2000). Self-motivation assists overcoming problems of task completion (Holmstrom and Milgrom, 1991; Gibbons, 1998; Prendergast, 1999; Haerem and Rau, 2007). Livingston (2003) argues that knowledge use depends on human beings' abilities to learn and process information, as well as individual knowledge of one's own learning processes and task-specific elements. Knowledge of task-specific elements includes knowing about the nature of tasks as well as the type of processing demands placed upon individuals. In the case of explicit knowledge, process managers observe staff members, with individual knowledge, performing their tasks. In the case of tacit knowledge, however, it is more difficult to observe transfers of knowledge within and between teams.

Park (2015) suggests knowledge is the most important element in new tasks and perceptions of tasks in the context of an individual's awareness enhances problem-solving ability. Wildemuth et al. (2014) note that while talking about tasks takes time, staff members adapt by combining different kinds of knowledge. Pesch and Bouncken (2017) examine the relationship between task discourse and trust. Saastamoinen and Järvelin (2016) link different types of knowledge, experience and attitude to task difficulty of staff members, and state that task complexity is, as a result of these variables, a matter of perception.

In summary, business processes consist of tasks, or activities, that staff members should carry out. These tasks require knowledge (information and experience) to achieve

specific process outcomes (Kueng, 2000; Berente et al., 2009). Knowledge and skills are necessary for proper completion of known tasks, regardless of complexity (Solymossy and Gross, 2015; Park, 2015; Saastamoinen and Järvelin, 2016). Knowledge work in the form of tasks represents the building blocks of individual job activities (Byström and Hansen, 2005; Sahib et al., 2012; Wildemuth et al., 2014).

2.7 The Research Gap

There is an ongoing debate regarding good practice for implementing and managing planned/radical change in organisations. The extent of this debate is seen from the qualitative studies emerging in the literature, and it is clear that studying planned/radical change is important. Knowledge is a central aspect for the implementation of planned/radical change. In the knowledge management and change management literatures there are extensive studies investigating knowledge and change within the two disciplines, yet only limited attention is given to the integration of knowledge and change and the stages of knowledge evolution from pre-change knowledge to post-change knowledge. The identification of redundant knowledge is barely considered in relation to knowledge evolution. The importance of knowledge as an organisational resource that needs to be deployed during a period of change implementation is recognised. Knowledge is a necessary resource for implementing planned/radical change. Once planned/radical change is implemented within a business process the process moves from an existing state to a target state and tasks change accordingly. As knowledge is also required to complete tasks, it needs to change to allow completion of tasks after the change. The various elements of KM are well studied, as is clear from the literature reviewed in this chapter. Having said that, within the knowledge literature, while some articles discuss knowledge evolution these papers consider the evolution of knowledge as accumulation and growth of knowledge. There is a need to study how knowledge evolves from pre- to post-change knowledge. For the purposes of this thesis, the following terms will be used: pre-change knowledge is the knowledge required to complete tasks before planned/radical change is implemented in the business process. Post-change knowledge is the knowledge necessary to complete new tasks after planned/radical change implementation. Redundant knowledge is a subset of pre-change knowledge no longer needed to complete new tasks within business processes that have implemented planned/radical change.

Not all pre-change knowledge is necessary to complete new tasks. Analysing pre-change knowledge and identifying relevant post-change knowledge is important. Redundant knowledge needs to be recognised and separated from the relevant parts of pre-change knowledge necessary to complete the post-change tasks. This is part of knowledge evolution. Recognising redundant knowledge is vital to having the appropriate post-change knowledge. Redundant knowledge that is not identified will be carried forward into tasks following the change and adversely affect task completion. An analysis of existing literature regarding redundant knowledge shows that little attention is given to ensure it leaves the organisation.

Furthermore, the knowledge management literature shows a large number of factors affect knowledge management implementation within organisations. Scholars have examined a variety of organisational contexts in differing circumstances. Recognising and understanding factors that affect knowledge management enhances organisational performance. It is important to include and define the factors that affect pre-change knowledge evolution to post-change knowledge during periods of planned/radical change.

2.8 Theoretical Background and Research Focus

For an organisation to survive, it needs to respond to rapid external changes. The organisation should be changing and transforming according to the external speed of change. Due to rapid global, social, technological, political and environmental changes, the importance of studying change has grown (Mabey, 2013; O'Doherty et al., 2013). Organisational change is the capacity to adapt to and keep pace with external change (Graetz and Smith, 2010; du Gay and Vikkelsø, 2012). Organisations implementing change management need to examine and maintain their position within the market by aligning external business environmental factors with internal factors (Ben-Menahem et al., 2013). Change should be managed to enhance performance within an organisation (Meaney and Pung, 2008). Change management is important in all processes and not only affects performance but also the potential survival of organisations (Kempster et al., 2014; Sghari, 2016).

This thesis uses tasks carried out by staff members within business processes undergoing planned/radical change as a unit of analysis for studying knowledge evolution. It is important for the organisation to manage and develop business processes (Polpinij et al., 2015). Business processes are modelled to identify tasks (Tbaishat, 2017). Changes in

business processes transform organisational subsystems of management, people, information technology, and organisational structures. A business process contains interrelated tasks or activities for transforming inputs and outputs (Anttila and Jussila, 2013; Roeser and Kern, 2015). Changing business processes includes managing the tasks needed to meet outcomes. To complete these tasks resources are required, including information, ideas and knowledge, materials, equipment, capital, and people, which need to be integrated and managed in order to achieve the organisation's objectives (Grieger, 2004; Poirier and Walker, 2005; Margherita, 2014).

Conducting change in business processes requires information and skills, which allow the flow of knowledge needed to complete tasks (Mendling et al., 2012; Anastassiu et al., 2016). Skills can be developed via relevant training. Change management is the process of assisting people in an organisation to understand the need for adopting new skills to enable organisations to thrive (Kotter, 2008).

This thesis investigates the evolution of knowledge from pre- to post-change knowledge necessary to complete tasks carried out by staff members. This section brings together the three scholarly domains of this research: change management, knowledge management, and tasks within business processes. These three areas are synthesised to identify the research focus of the thesis. The nexus of the thesis is where these three domains overlap. In other words, business processes undergoing planned/radical change for which pre-change knowledge is different to post-change knowledge. This study examines knowledge evolution: the progression of staff members from pre-change knowledge to post-change knowledge. This research yields insights into redundant knowledge and ways in which it is identified. In addition, the thesis identifies and defines factors affecting progression of staff members through the knowledge evolution stages.

2.9 Research Questions

The following questions have been formulated for this research study drawing on the literature:

- How does knowledge evolve from pre-change knowledge to post-change knowledge within business processes that undergo planned/radical change?

- How is redundant knowledge identified during knowledge evolution?

2.10 Research Conceptual Model

Knowledge Evolution Conceptual Model

* Pre-change DK, PK, HK

Event Occurrence

The stages of knowledge evolution from pre- to post-change knowledge investigated in this thesis.

** Post-change DK, PK, HK

K: Knowledge
DK: Declarative Knowledge
PK: Procedural Knowledge
HK: Heuristic Knowledge
* Knowledge required to complete the task before the event occurred
** Evolved knowledge required to complete the new task

Figure 2.6: Knowledge Evolution Conceptual Model (Source: thesis author).

Business processes undergoing planned/radical change shift from a current state to a desired target state (Kempster et al., 2014). This shift changes tasks included in processes from existing tasks to new tasks. Knowledge is important for completing tasks. Pre-change knowledge is present prior to the event occurrence, which in this study is the announcement to staff members by senior management that the implementation of

planned/radical change is beginning in a business process. Following the event occurrence in the business process, tasks change and the knowledge should be changed accordingly.

This research considers how change in knowledge happens as it evolves from pre-change knowledge to post-change knowledge. The conceptual model in this section presents the pre-change knowledge and the event occurrence. Pre-change knowledge is required to complete tasks prior to the change. For knowledge to evolve within business processes, there should be existing tasks and pre-change knowledge before the event occurrence. The evolution of knowledge is staff members' progression from pre-change knowledge, prior to the event occurrence, to the post-change knowledge. The space in the model between the event occurrence and the evolved knowledge will be investigated empirically throughout two case studies. These case studies use semi-structured interviews to collect the necessary data, along with a review of relevant documentation related to changes in business processes. This data will be analysed to develop stages needed for knowledge evolution. The expanded version of the conceptual model can be found in Appendix 4.

2.11 Chapter Summary

This chapter reviewed and analysed the change management literature to identify the focus of the research: planned/radical change. An examination of theories used to investigate change management was undertaken. This was followed by a study of the knowledge management literature, including knowledge evolution, factors affecting knowledge management, and redundant knowledge, with a focus upon declarative, procedural and heuristic knowledge. Based on this appraisal, a gap in the literature was identified and a theoretical framework and conceptual model were constructed.

Chapter Three presents the research methodology of this thesis. It explains the underpinning philosophy that determines the empirical methods deployed. The chapter includes a case study protocol, results from a pilot study testing this protocol, as well as the adapted version of the case study design.

Chapter 3: Research Methodology

3.1 Introduction

The previous chapter reviewed the literature and established the research questions for this study. This chapter sets out the research methodology to address the research questions and is structured under the headings: Research Approach and Philosophy; Qualitative Research; Data Validity, Reliability and Triangulation; Research Strategy and Methodology; Case Study Protocol.

3.2 Research Approach and Philosophy

Research philosophy underpins the overarching methodological choices and strategies that researchers adopt. Different research philosophies have varying underlying assumptions about the social world and, consequently, influence theories that can be developed to describe organisations (Burrell and Morgan, 1979; Easterby-Smith et al., 2012). Burrell and Morgan (1979) argue that recognising the researcher's frame of reference is vital for effective analysis and theory building. This is because all viewpoints contain assumptions that restrict or colour perspectives and play to biases. Considering other viewpoints, or paradigms assists researchers to frame their study. Burrell and Morgan (1979) focus on the study of organisational activities to explore assumptions held within fields of study. This involves defining and differentiating between theoretical approaches, and considering ontological and epistemological issues associated with various viewpoints that explain the deeper workings of society and organisations.

Burrell and Morgan (1979) present four paradigms to provide insights into social structures. These paradigms are *functionalist*, wherein structures are purposeful and require human action. The *interpretive* paradigm posits that structures are created by human beings and are socially constructed from peoples' thoughts. *Radical structuralism* sees human action and social change as a result of socio-political and economic pressures. *Radical humanism* considers social and individual thinking as a product of ideological influences and that change occurs when this is recognised and people find the freedom to develop new ideas.

Burrell and Morgan (1979) note that researchers make assumptions of an ontological and epistemological nature. Ontologically, researchers consider whether reality is external or created from human consciousness. Realism considers reality as external to individual

cognition, made up of names, concepts, labels, and hard-structured concepts. On the other hand, nominalism understands reality to be part of the individual, describing it with names as a tool to explain and make sense of the external world (Burrell and Morgan, 1979). This research follows the nominalist view considering reality as subjective experiences (Burrell and Morgan, 1979).

Epistemologically, Burrell and Morgan (1979) suggest that researchers consider how they grasp knowledge and share this understanding with others. Furthermore, researchers need to recognise and agree upon one objective tangible truth or accept that truth as knowledge is subjective. Understanding the nature of knowledge is approached in two ways. The first, positivism, is based on traditional approaches that dominate the natural sciences. Positivism attempts to describe and predict occurrences in the social world by examining regularities and casual relationships between its elements. While the social world from the anti-positivist viewpoint is that the social world is best examined from the perspective of individuals who have lived through the experience under investigation (Burrell and Morgan, 1979). This research is anti-positivist in nature.

Thus, this study takes a nominalist and anti-positivist perspective to the study of knowledge evolution in business processes that have implemented planned/radical change.

3.3 Qualitative Research

Qualitative research is interpretative and uses a collection of wide-ranging data reflecting a specific situation over a period of time (Strauss and Corbin, 1998; Gay and Airasian, 2000). This is opposed to the statistical, predictive approaches of quantitative methods, which rely upon statistical methods and countable data (Hakim, 2000). The four important elements of qualitative research are ethnographic; contextual; experiential; and case-analytic (Cibangu, 2013). Qualitative research provides understanding and information regarding viewpoints, contexts, backgrounds and methods (Kozleski, 2017). Researchers following qualitative approaches study phenomena based on experiences of individuals (Kornbluh, 2015; Demuth and Terkildsen, 2015).

Qualitative methods lead to creative and flexible research that presents vivid and revealing findings from in-depth studies carried out in real contexts (Hyde, 2000; Snape and Spencer, 2003; Guercini, 2014). In qualitative studies reality or information are recognised as being communally and mentally created (Demuth and Terkildsen, 2015).

Data collected via qualitative methods garners emotional experiences providing researchers with deeper understanding (Christenson and Gutierrez, 2016). Qualitative researchers investigate day-to-day settings to observe routine behaviours (Jervis and Drake, 2014) collecting first-order data for coding to present themes and make conceptual connections (Christenson and Gutierrez, 2016).

Dixon-Woods et al. (2004) list 12 qualitative approaches to research synthesis: narrative synthesis; grounded theory — constant comparison; meta-ethnography; meta-synthesis; meta-study; logical analysis; data analysis techniques; metaphorical analysis; domain analysis; hermeneutical analysis; discourse analysis; and analytic induction. Langley and Abdallah (2011) argue that, unlike quantitative methods, qualitative data have the ability to provide in-depth insights into situations, events and experiences as they occur. Gopaldas (2016) sees qualitative research as valuable due to the numerous types of data included in the research.

Nevertheless, qualitative research poses problems for researchers regarding validity of findings and convincing readers (Chandra and Shang, 2017). This is particularly the case as researchers' code and interpret data gathered from participants, meaning that results are filtered through the researcher's subjective readings and opinions, which leads to inaccurate findings or bias (Cornford and Smithson, 2006). Indeed, it is useful to remember that in this kind of research data are produced and so are of the researcher's making (Gummesson, 2005). It has been suggested that qualitative research is prone to speculation and bias, but this has been said about quantitative methods as statistical analysis requires interpretation by the researcher (Kapoulas and Mitic 2012, following Morgan and Smircich, 1980). Qualitative methods are time consuming (Thorpe, 2003) and often require adjustment throughout the research process (Irvine and Gaffikin, 2006). However, reliability of qualitative studies can be enhanced via knowledge of relevant theory and literature as well as recording steps taken to allow replication (Kapoulas and Mitic, 2012).

Afzal (2006) argues that qualitative research provides insights into specific situations from which to build theory. Garcia and Gluesing (2013) argue that qualitative methods are extremely useful for investigating the planning and implementation of change within organisations. This thesis investigates knowledge evolution during the implementation of planned/radical change; therefore, qualitative research methods assist the investigation into the stages through which knowledge evolves and to better understand redundant

knowledge, as well as identifying and defining factors affecting progression of staff members through knowledge evolution stages. The research questions developed in the previous chapter are better addressed by gaining first-hand accounts of the thoughts and actions of staff members directly involved with the daily tasks carried out in a business process. The most appropriate method is the use of semi-structured interview-based case studies.

Qualitative methods are spontaneous and inventive and show a variety of viewpoints (Tuohy et al., 2014). Using a qualitative approach assists the researcher to provide empirical data regarding the enhancement of strategy and procedures (Denyer and Tranfield, 2006; Kozleski, 2017). In qualitative studies, the stress is on examining a particular issue within a specific situation (Guercini, 2014). Qualitative methods are effective for analysing business processes and the accounts of individuals participating in these processes (Galloway et al., 2015). This type of research identifies forces inherent to change that act upon an organisation (Garcia and Gluesing, 2013). Furthermore, qualitative research brings management theory and practice into closer alignment (Guercini, 2014).

This research studies business processes undergoing planned/radical change, focusing on the tasks and the evolution of pre- to post-change knowledge. It is important to understand the situation before and after planned/radical change in order to identify the stages required for the knowledge to evolve from pre-change knowledge to post-change knowledge. The qualitative approach increases understanding about redundant knowledge, specifically, its identification during these stages of evolution, and the factors affecting progression of staff members through the knowledge evolution stages.

3.4 Research Strategy and Methodology

3.4.1 Case Studies

This research uses case studies for data collection, focusing upon the phenomenon of knowledge evolution within business processes during the implementation of planned/radical change. The attention is upon the experiences and perspectives of individuals within the organisational context. This form of data collection examines real life for in-depth investigations or comparative studies. Case studies involve the analysis of processes and development regarding individuals, groups and events to address

specific research questions (Eisenhardt, 1989; Stake, 1995; Gerring, 2006; Baxter and Jack, 2008; Thomas, 2011; Yin, 2013; Cope, 2015). Tellis (1997) adds that a unit of analysis is required for carrying out valuable case studies and it is usually procedure based rather than human based. The unit of analysis for this thesis is tasks carried out by staff members within business processes undergoing planned/radical change. This unit of analysis fits with the focus of the study of pre-change to post-change knowledge evolution.

There are different types of case studies: exploratory, descriptive, explanatory (Yin, 2003), intrinsic, instrumental, and collective (Stake, 1995). There is also a distinction between single and multiple case studies. Scholars are divided on how many studies should be carried out and there is no agreement on the optimum number of cases required (Eisenhardt, 1989). However, single case studies are effective for focused investigations used to test theory or to examine typicality or uniqueness (Rowley, 2002; Yin, 2003). Case studies ask "how" and "why" questions and study the associated details via thorough contextual analysis (Yin, 2003; Stake, 2005; Boblin et al., 2013).

This qualitative method has been criticised for a lack of rigour (Donnelly and Wiechula, 2012; Yin, 2012 and 2014; Taylor and Thomas-Gregory, 2015). Case studies are often critiqued regarding the way researchers select cases, conduct data collection, analyse the data, and report findings (Miles and Huberman, 1994; Yin, 1994; Patton, 2003; Henry and Foss, 2015). This is because many scholars want to see case studies designed and used in line with traditional criteria used in the physical sciences. However, Yin (2003) argues case studies are qualitative not quantitative and should be considered and judged in different ways regarding design, implementation, analysis and reporting.

Statistically-minded positivists demand construct, internal and external validity, and reliability based on a realist viewpoint. They agree that findings from case studies can only be generalised to a narrow population, if at all. Furthermore, positivists raise concerns regarding researcher subjectivity and bias. Proponents of quantitative methods suggest using numerous data points, and that a focus on ease of replication assists in addressing these concerns (Donmoyer, 1990; Al Rubaie, 2002; Gerring, 2007; Yin, 2009; Mariotto et al., 2014; Tsang, 2014; Cronin, 2014). Case studies are effective for analysing decision making, policies and organisations, which are objects examined for the purpose of explanation (Thomas, 2013).

Case studies require that specific research questions are identified and defined. Once the question or questions are refined, the case is selected. It is extremely important that the case study's objective is defined clearly and early in the research process (Bergen and While, 2000, following Yin, 1994). Choices are then made regarding data collection and data analysis. Having collected the data, researchers carry out analysis and report their findings (Sofaer, 1999; Rowley, 2002; Ghauri and Grønhaug, 2005; Siggelkow, 2007; Cope, 2015; Rule and John, 2015). In order to carry out a case study effectively the selection of individuals, groups, event or organisation to be studied is paramount, as is early confirmation of accessibility, timeframes, ethical considerations and associated documentation. Yin (2009) recommends researchers build a formal framework and that research propositions are assessed during data collection and analysis, which generate new ideas. Stake (1995) agrees this is an option for researchers to map the research; however, he states this is not imperative.

Despite the limitations mentioned above, many scholars, like Flyvbjerg (2006), state that case studies are required and are appropriate research methods. Researchers gather detailed data regarding the thoughts, activities, actions, motivations, beliefs, knowledge, experience, and values of individuals in the context of their environment (Yin, 2009; Thomas, 2013). Case studies provide in-depth information with multiple, contextualised, insights related to the phenomena under study (Yin and Davis, 2007). With this is mind, two case studies generated sufficient empirical data to examine knowledge evolution in different business processes and to develop an empirically underpinned conceptual model.

3.4.2 Data Collection: Interviews

Interviews are a popular way for researchers to gather data (Sin, 2004; Rowley, 2012). There are a number of ways interviews can be carried out, including in person, by telephone, via email, and using video-conferencing software. Interviews can be one-to-one or involve groups (Hussey and Hussey, 1997; Sin, 2004) and create understanding via a dynamic interplay between individuals (van der Zouwen, 2001; Sin, 2003 and 2004). Interviews are focused on specifics, exploring and recording intricacies of individual and organisational realities (Rhodes, 1994). Interviews are useful for understanding practices, views, motivations, behaviour, beliefs, ethics, knowledge, procedures, and for capturing a holistic view of an organisation and how individuals work and interact within it (Hannabuss, 1996; Trautrims et al., 2012; Rowley, 2012;

Starr, 2015). Interviews held within organisations allow direct observation of staff members interacting within their work environment. Researchers gain valuable insights into everyday activities, technical elements, atmospheres, cooperation and motivation, and other aspects of organisational culture (Hannabuss, 1996; Starr, 2015). When interviewing for research purposes it is important to remember that these interactions rely on a willingness to share information, as well as requiring clarity of expression and understanding from both parties (Stanley and Wise, 1990; Undurraga, 2012).

The participants identified to take part in case study interviews represent a variety of organisational levels, job specifications, and experiences to provide a range of perspectives that add to the value of data collected (Rowley, 2012). The first communication should introduce the researcher, list credentials, explain the purposes of the research, inform prospective participants of the length of the interview, gain permission for recording interviews, emphasise confidentiality, provide contact details, and enquire about issues of convenience and availability. It is also useful to ask for recommendations regarding other potential participants. Furthermore, interview questions, where possible, should be tested in a pilot study (Rowley, 2012). Interview preparations include provision of an appropriate, comfortable environment; a clear explanation of the project's aims; an ice-breaker opening to begin the session, to relax interviewees, build trust, emphasise anonymity, and set a conversational tone; coherent instructions; and questions using everyday language rather than jargon that interviewees may not understand (Elliot, 2005; Bourne-Day and Lee-Treweek, 2008; Rowley, 2012).

When using interviews to collect data, researchers should be aware that problems of bias and inaccuracy can occur where questions are constructed poorly. There is also the issue of response bias to consider, wherein interviewees misremember details of an event or provide answers based on what he or she thinks the interviewer wants to hear, or wilfully misleads the interviewer to hide something (Hannabuss, 1996; Jervis and Drake, 2014). Recording interviews electronically, with the express permission of interviewees, assists the researcher to transcribe and catalogue data (Starr, 2015). However, participants should be given the opportunity to speak without being recorded where they feel more comfortable doing so at any point (Hannabuss, 1996).

One drawback of interviews is they are time-consuming to conduct, for the researcher and interviewees. Flexibility, on the part of the researcher, is important as people are giving their time. Adapting to late arrivals or interruptions is part of an interviewer's

skillset. Time constraints limit the number of interviews it is possible to conduct and restricts the time available for each interview. Furthermore, data collected should be analysed so decisions need to be made about the number of interviews included in the study. Interview data is collected until saturation is reached. This is when no new information emerges from the interviewees and the data becomes repetitive (Rowley, 2012; Reinecke et al., 2016).

Interviewees are individuals and not merely data sources, so rapport building is needed to create value from interviews (Undurraga, 2012). This is also a key interviewer skill as the building of rapport needs to take place while the interviewer is also actively engaging in the discussion and carrying out accurate data collection (Hannabuss, 1996). It is also important to consider that the wording of interview questions can have different connotations in different languages (Zhang and Guttormsen, 2016). Interviewees should be able to clarify the questions, and the researcher should not assume that interviewees understand the question asked (Tateo, 2015).

Researchers choose to conduct structured, unstructured or semi-structured interviews. Structured interviews are based on prearranged questions asked in a uniform manner to ensure standardisation. Unstructured interviews are more conversational and are directed by interviewees more than by set questions. Semi-structured interviews use predetermined questions but maintain flexibility to tailor the interview based on responses of interviewees (Dunn, 2005). Semi-structured interviews use prepared open and closed questions (Prowse and Camfield, 2013) to allow comparison between data collected in different interviews (Starr, 2015). Therefore, semi-structured interviews are the most appropriate form of data collection for this thesis.

The semi-structured interview design for the case studies detailed in Chapter 4 and 5 of this thesis consists of three main parts. The first part includes questions about changes that happened in the business process. The second part is a discussion of the tasks that were performed before planned/radical change started, pre-change knowledge, and whether this knowledge is still relevant and needed to carry out post-change tasks. This assisted in identifying redundant knowledge. The third part is a discussion of post-change knowledge. This section of the interview addresses how staff members gained post-change knowledge.

3.4.3 Data Validity, Reliability and Triangulation

The problems for researchers using qualitative approaches stem from not only the need for accurate recording and analysis of data but also how to present persuasive, validated explanations in the findings (Lincoln and Guba, 1985; Patton, 2001; Golafshani, 2003; Yin, 2013). Researchers overcome these challenges by studying and documenting the case in its context rather than at a distance (Miles and Huberman, 1994; Maxwell, 2004 and 2012; Erickson, 2012; Yin, 2013). One way of testing findings, particularly during the early part of research, is to compare empirical data collected with expected outcomes posited during the research's planning and design phase (Yin, 2013). The data collected for this study was gathered in the context of business processes and tasks of the Institutes studied. The interviews were recorded electronically, transcribed, reviewed, and analysed thematically following recommendations for providing validity.

Validity refers to value, accuracy and scrupulousness (Golafshani, 2003) of the research to ensure the findings are "plausible, credible, trustworthy, and, therefore, defensible" (Burke, 1997, p. 282). Validity is an important component when presenting qualitative studies as quality research. There are several ways to demonstrate validity. Descriptive validity refers to accurate recording and presentation of facts in reported descriptions regarding events, observations etc., which can be improved via the use of several observers in a technique known as investigator triangulation. Interpretive validity is concerned with researcher interpretations of how individuals, who are part of the case being studied, see and experience an event or situation. This can be assisted via feedback on research interpretations from these individuals, known as member checking, offering participants the opportunity to clarify or challenge findings. Theoretical validity is achieved by a thorough systematic review of relevant literature in the field of study (Burke, 1997). Internal validity requires researchers to demonstrate that findings are linked to observed causes (Cook and Campbell, 1979; Burke, 1997). These methods were employed during the data collection, analysis and reporting stages of this research study. Descriptive validity was attained by presenting data from recorded interviews that were accurately transcribed and reviewed. Interpretative validity was increased by using member checking, allowing participants to clarify and challenge the data. Theoretical validity was improved via the systematic review of literature contained in Chapter 2. Internal validity was achieved by seeking confirmation from interviewees that the findings were in line with their lived experiences.

This thesis uses qualitative methods as this type of investigative approach is highly effective in examining activities and processes through studying cause and effect (Cook and Campbell, 1979; LeCompte and Preissle, 1993; Johnson, 1994; Strauss, 1995; Burke, 1997). External validity assists with generalising findings from qualitative studies. Statistical generalisation relies on random samples from a predetermined population; whereas, qualitative methods tend to rely on using specific, targeted cases (Burke, 1997). Studying larger samples, individuals with different roles and backgrounds, and carrying out more than one case study, adds validity and increases the generality of the findings for future application. This is known as replication logic (Cook and Campbell, 1979; Yin, 1994; Burke, 1997). Two elements of this thesis could be replicated by other researchers. One, the case study protocol (Appendix 5) offers criteria for selecting appropriate cases and interview participants when studying business processes undergoing planned/radical change. Two, the model developed from the empirical data can be applied by researchers seeking to understand the stages of knowledge evolution, and ways to identify redundant knowledge, in different contexts such as planned/incremental, emergent/radical, and emergent/incremental change.

Case study methodologies have been consistently improved and updated since their introduction as research tools (Tellis, 1997). A triangulated research strategy requires protocols to provide validity and accuracy, and to allow scope for new ideas and interpretations to emerge during studies (Yin, 1994; Stake, 1995). The elements required are reliability, construct validity, and internal and external validity (Yin, 1989). The identification of the unit of analysis provides internal validity and informs data collection and analysis methods. Furthermore, external validity can be found in theoretical connections leading to recommendations for general application (Yin, 1994). Creating a case study protocol delivers reliability and maintains researcher focus on the procedural nature of this qualitative approach (Tellis, 1997).

Data triangulation offers multiple perspectives that increase validity. Bennett and McWhorter (2016) state that triangulation provides trustworthy data via internal and external validity. Triangulation assists with building rigour and trustworthiness into a study by regulating bias (Golafshani, 2003). This involves cross verifying data to provide more credibility, achieved by drawing empirical evidence from multiple sources such as observations, documents and interviews. Triangulation occurs when research is carried out in different places with different groups of people. Triangulation provides more in-depth insights, confirms findings, strengthens conclusions with comprehensive empirical

evidence, and alerts researchers to inaccuracies, misinterpretations, and misconceptions (Golafshani, 2003). This thesis includes two case studies carried out in two different Institutes. Within each case study, participants from three levels — senior management, middle management, and staff members — relevant to selected processes were interviewed to capture a variety of perspectives on implementing the changes to business processes. All participants were selected because they had first-hand experience of the planned/radical change and worked in the Institute for at least one year before the changes began in the business processes under investigation. The data was cross-checked via member checking, comparing responses with written evidence from the change documentation held by the Institutes, checking the consistency of interviewees' responses to specific questions, and by comparing the perspectives of senior managers, middle managers and staff members. Furthermore, relevant documentation regarding the planned/radical implementation at both Institutes were examined for comparison with the responses from the interviewees. This documentation supported the data analysis.

3.4.4 Data Analysis

During the data collection period, themes arise that allow researchers to create an analytical framework to categorise data. This framework should remain flexible to avoid missing new ideas and connections as they arise. In turn, this ensures that research questions are considered from as many angles as possible (Srivastava and Thompson, 2009). Thematic analysis identifies broad topics and subjects that enable researchers to describe patterns in the data during analysis and reporting. Although researchers should remain flexible when considering themes in data, it is also important to maintain a consistent approach and engage in active and repetitive reading of the data when developing themes and relationships between them (Braun and Clarke, 2008).

The transcribed interview data in this study has been indexed numerically and placed within tables — see a sample table in Appendix 5. This shows the interviewee index number and the case referred to, following suggestions by Ritchie and Spencer (1994). This allowed the researcher to interpret the data, develop definitions and explanations about the phenomena being studied. Building a thematic framework assists with pursuing a systematic handling of data. The data was added to where new sources were found or there was a need to clarify points made by interviewees. The availability of the

transcribed data increases validity and allows triangulation (Srivastava and Thompson, 2009).

Six steps suggested by Braun and Clarke (2008) for thematic analysis of qualitative data were followed: become acquainted with the data via transcription, reading and re-reading; create a coding system; identify themes; review the data and themes; describe and label the themes; and report the findings. Once researchers are familiar with the data, and have created a coding system, it is possible to begin coding via numbering, highlighting, and annotating to identify possible thematic relationships. Researchers then group data under various codes for further analysis. This enables researchers to begin to define and explain themes that emerge, and to consider interrelationships identified between data and themes. Reviewing the data and themes requires two stages. The first is to re-examine the data gathered to check for patterns. The second stage is to review the entire data set and all themes (Braun and Clarke, 2008).

The next part of the analysis involves reconsidering data to link these to an overarching narrative that the research is presenting via analysis of the data. Researchers should continually consider relationships between data and themes, as well as whether or not the analysis addresses the study's research questions. This includes checking for other themes that illuminate issues or correlations. The reporting stage of this process involves creating a persuasive narrative that substantiates the findings. These stages of thematic analysis add validity and strengthen the findings of qualitative research by showing coherent connections, presenting data for ease of inspection, and creating a narrative description that clarifies elements of the research subject (Braun and Clarke, 2008).

3.5 Case Study Protocol

The case study protocol (see Appendix 5) for this thesis consists of three main phases. The first phase is designing the outline for the case study and contains three steps. First, the research focus, questions and problem are identified. Second, the research objectives are set. Third, a fieldwork outline was constructed. Phase Two, is conducting the research, and consists of two steps. First, developing and testing the methodology, including criteria for selecting cases and interviewees, and designing the interview questions; second, carrying out fieldwork data collection. Phase Three is the data analysis phase. The following section describes the implementation of the case study protocol.

Phase One: Designing

The first step in this phase established the scholarly domains of this research consisted of: change management, knowledge management, and business processes. These three areas of study are synthesised to identify the research focus and develop the research questions. The two research questions are:

- How does knowledge evolve from pre-change knowledge to post-change knowledge within business processes that undergo planned/radical change?

- How is redundant knowledge identified during the knowledge evolution stages?

The following empirical questions assist in addressing these two research questions and were used in the development of semi-structured interviews for the collection of data in the two case studies. These questions help to focus on knowledge evolution during a period of planned/radical change and to identify redundant knowledge.

- What tasks were performed before change took place?
- What was the pre-change knowledge?
- Is this knowledge still needed after the change took place?
- Is this knowledge still relevant after the change took place?
- What are the current tasks performed after change?
- What is the post-change knowledge?
- How did you acquire the post-change knowledge?

The second step was to identify research objectives, which are as follows:

- To review the change management literature and develop a matrix to classify the extant literature.

- To review the literature in the area of knowledge management with a focus on declarative, procedural and heuristic knowledge.

- To develop a knowledge evolution model that explains the stages needed for knowledge to evolve, and identify the redundant knowledge throughout these stages within a business process undergoing planned/radical change.

- To identify the factors affecting knowledge evolution within a business process implementing planned/radical change.

The third step in Phase One was to create a case study fieldwork outline, including the development of criteria for selecting Institutes for case studies, criteria for selecting interview participants; and developing initial interview questions for senior management to ensure the qualifying criteria were met: first, the Institute had to have implemented planned/radical change within one or more of its business processes. This change had to be large-scale and initiated and approved by senior management; the change needed to have a documented plan, specific objectives and targets of change; and had to be implemented and completed before this case study fieldwork was undertaken.

The selection of interviewees requires the identification of individuals who are able to provide relevant and informed perspectives regarding the object of study (Rowley, 2012). Interviews were to be carried out at the selected Institutes commencing with two members of senior management who had responsibility for the planned/radical change to the business processes to ensure that the qualifying criteria were met. Middle managers were then to be interviewed to gain an understanding of the process they manage and to identify key tasks within the process. The remaining interviewees would be relevant staff members involved in the process that had been radically changed. Clarification would be obtained regarding the use of pre- and post-change knowledge, as well as the identification of redundant knowledge. Table 3.1 shows the information sought from interview participants in the two case studies conducted for this research.

Interviewee	Data Type for Case Studies 1 and 2					
	Criteria of the case study	Determine and choose processes that changed	Determine the key tasks in each of the chosen processes	Tasks before the planned/radical change and the pre-change knowledge	Tasks after the planned/radical change and the post-change knowledge	How staff members acquired the post-change knowledge
Senior management	4	4				
Mid-manager			4	4	4	4
Staff member				16	16	16
Total	4	4	4	20	20	20

Table 3.1: Interview Participants of Case Studies 1 and 2 and Data Required (Source: thesis author).

Case study interview questions were developed and an ethical form was submitted for approval by Brunel University London (see Appendix 5). The interview questions were formed using everyday language rather than technical terms such as declarative knowledge or planned/radical change.

Phase Two: Conducting

Phase Two consisted of two steps. The first step was a pilot study at a higher education institute in the United Kingdom. The first stage of the pilot involved explaining the purposes of this research to selected members of Institute Z, including the type of data required and questions to be asked. Next, interviews were scheduled with three participants at this Institute. Selection was based on participants having managed processes that had undergone planned/radical change. The average duration of the interviews was an hour. At this stage, the interview questions were not organised in sections or themes.

Following the interviews and subsequent analysis, it was clear that the interview questions were too long and not sufficiently focused. The analytical framework needed to be developed, by creating sections containing themes, in order to address the research questions and objectives. This was done before moving to the second stage of the pilot. This involved interviewing three different participants at Institute Z who had also managed processes that had undergone planned/radical change. As before, the purposes of this research and the questions to be asked were made clear to the participants before scheduling the interviews. These interviews lasted an hour on average and were recorded.

The interviews were structured using three sections. The first section focused on the situation before the change, the tasks and the knowledge needed by staff members to complete these tasks. The second section addressed changes in business processes and within the tasks, roles and responsibilities, as well as how these changes took place. The third section considered the business process situation after the implementation of change, the new tasks, the knowledge required to complete these tasks, and whether the knowledge was entirely new or contained part of the knowledge required before the implementation of change. These three sections were applied to develop the themes for use as a framework for data analysis. The interviews were transcribed, and the paragraphs were numbered and annotated in relation to the thematic framework. The coded evidence was then grouped under each theme, with each participant allocated a unique alpha-numeric identifier.

During the pilot and research case studies steps for carrying out thematic analysis recommended by Braun and Clarke (2008) were followed to ensure effective analysis of data and valid reporting of findings. Following the pilot, the research questions and

thematic framework were deemed to be the final version and ready for use in the full case studies.

In the second step of Phase Two, four higher education institutions in Kuwait were identified as being potentially suitable for this research study. Initially, senior managers at each institute were contacted by telephone to identify which institutes met the criteria for the planned case studies. Two of the four institutes met the selection criteria for this research: the implemented change within the business processes was strategic and planned in advance; changes were initiated and approved by senior managers with a specific start and end date; and changes had been completed within the business processes.

As a result, interviews were scheduled with two senior managers at each institute. These two interviews were carried out to ensure that all research criteria were satisfied and then to select relevant business processes for study. The senior managers provided support in scheduling interviews with middle managers and staff members involved in the selected business processes. These interviews each lasted approximately one hour. All interviews were recorded and transcribed for data analysis purposes. Initially, it was decided to use software to analyse the data; however, due to the continual system crashing of qualitative data analysis software, the data collected was analysed manually. The interview transcript paragraphs were numbered and annotated using the three sections of the thematic framework developed during the pilot study. The evidence identified under each theme in all the transcripts was then brought together to develop a narrative for each case study wherein the evidence was referenced using the interviewee's identifier.

Both Institutions are recognised as meeting international standards of higher education. The first, Institute X, follows the American higher education model and is accredited by the Association to Advance Collegiate Schools of Business (AACSB). The second, Institute Y, is an extended campus of an international institute. Graduates of Institute Y receive an international degree in addition to the locally-awarded degree. Furthermore, both of these institutions use English language throughout all operations, from administration to academia. Therefore, all case study interviews could be carried out in English, without the need for translation and cross-language interpretation.

It was then necessary to make contact with the senior managers of Institutes X and Y to arrange initial interviews. During these interviews, the case study criteria checklist was followed with interviewees to ensure that the Institute qualified for inclusion in this

study. Once the Institutes met the criteria, the interviewees assisted in the selection of business processes suitable for study, and arrangements were made for interviews involving middle managers and staff members. Interviews were then held with these middle managers regarding change implementation and the identification of relevant staff members. These staff members were contacted to seek their cooperation in the study. The interviews with staff members were conducted to complete data collection for the case studies. At the beginning of all interviews the ethical form was discussed, questions regarding the study and data being collected were answered, and participants were asked to sign the participant sheet (see Appendix 5). In addition to carrying out interviews, documentation relevant to the change implementation was reviewed (see Appendix 6 and Appendix 7).

Phase Three: Data Analysis

At this stage, the themes developed in Phase Two were deployed to structure the data analysis report. First, the thematic framework was used to annotate and code all transcripts to identify relevant data. This data, in the form of statements and paragraphs, were grouped together under each code. The narrative reports were then structured based on these themes. This approach follows the steps suggested by Braun and Clarke (2008) that allow researchers to add validity and reliability to qualitative research studies. The thematic structure assisted in identifying the implementation of planned/radical change within the processes: the situation before and after the implementation of change, focusing on tasks, the steps required, and pre- and post-change knowledge.

3.6 Chapter Summary

This chapter presented the research methodology of the thesis, describing and explaining approaches taken including the underpinning research approach and philosophy. As stated, this research follows the nominalist view considering reality as subjective experience and uses an anti-positivist perspective to study knowledge evolution in business processes that have implemented planned/radical change.

The chapter set out the qualitative research methods used in this thesis, providing a rationale for using these methods in an investigation into the stages of knowledge evolution within business processes undergoing planned/radical change. These methods provide perspectives regarding redundant knowledge and the factors affecting

knowledge evolution. It has been demonstrated here that the appropriate method for this type of study is the use of semi-structured interview-based case studies.

The chapter addressed issues of validity and reliability showing how interpretative validity was increased by using member checking; theoretical validity via the systematic review of literature; and internal validity by seeking confirmation from interviewees that the findings were in line with their lived experiences.

The chapter demonstrated that the identification of the unit of analysis enhances internal validity and informs data collection and analysis methods, and that external validity can be found in theoretical connections leading to recommendations for general application. In addition, a case study protocol was presented to deliver reliability and maintain researcher focus on the procedural nature of these research methods.

Data was cross-checked and relevant documentation regarding the implementation of planned/radical change at both Institutes were examined for comparison with responses from interviewees. This documentation supported the data analysis and can be found in Appendix 6 and Appendix 7 of this thesis.

The next chapter contains the narrative report of the first case study conducted at Institute X. Chapter Five contains the second case study conducted in Institute Y.

Chapter 4: Case Study 1 — Institute X

4.1 Introduction

The previous chapter presented the research methodology and design. In addition, a case study protocol was developed and tested through a pilot study. This chapter discusses the first case study carried out at Institute X. The case study focuses on two processes that implemented planned/radical change and analyses the tasks completed by staff members included in these processes, as well as the pre- and post-change knowledge. The first process is the Registration and Admission Office process. This process deals with all student issues from initial application to graduation and receiving a degree. The second process studied is the Faculty Self-Evaluation process. This process determines the academic excellence within the Institute by ensuring that faculty meet expected quality benchmarks for teaching, research and scholarship, and services.

The chapter is structured as follows: Criteria for Choosing Institute X, Background of Institute X, Critical Analysis of Institute X – Change in the Processes, Process 1: Registration, Admissions Office, Process 2: Faculty Self-Evaluation Process, Chapter Summary.

4.2 Criteria for Choosing Institute X

This case study investigates changes implemented within two business processes of Institute X. Specifically, the study examined tasks in both processes to ascertain stages of knowledge evolution between pre-change and post-change knowledge. The case study's empirical data provides deeper insights into knowledge evolution to develop the conceptual model based upon empirical evidence.

Two members of the senior management team were interviewed to ensure that Institute X met the selection criteria. These two participants were instrumental in understanding the overall change that happened in the business processes of Institute X.

In 2013, Institute X launched a strategic plan to be implemented from 2013 to 2017. This plan was entitled Institute X 17 Strategy, the objective of which was to transform radically the business processes of the university, both academic and administrative, from manual to digital. The detailed strategic plan, initiated by the President and Board Members, was prepared and documented following a review of the business processes that involved several stages of evaluation and redesign to ensure that re-engineering of

the processes would meet the planned objectives. The processes underwent radical change due to the amount of documentation required prior to the change and the amount of new knowledge required by staff members as a result of the change.

Institute X has completed the implementation of change within the business processes selected for study. Table 4.1, below, presents the selection criteria developed in the case study protocol, and shows how Institute X satisfies these criteria.

Criteria	Institute X
Specific objectives and targets of change	New strategic plan and objectives
Describe process change	The purpose of the change was to apply the strategic plan to meet the objective of being a fully digital, paperless Institute
Processes that radically changed	The registration and admissions, and faculty self-evaluation processes within Institute X have moved from manual to digital
Initiated by whom?	President and Board Members
Started when?	2013
Completed when?	The planned/radical change implementation for the studied processes was completed September 2015
Was the change planned in advance?	Yes, it was planned and documented
Processes radically changed	The studied processes changed from manual to digital

Table 4.1: Selection Criteria for Institute X (Source: thesis author — developed from the first two interviews with senior management).

4.3 Background of Institute X

In recognition of the new global technological era, discussions involving specialists from Kuwait University began in the mid-1990s regarding the establishment of private higher education institutes. One of these, Institute X, according to its website, provides tuition in contemporary science and technology to meet present and future demand for an educated, international population, qualified to add value to the community and the country as a whole.

The vision became a reality when, in partnership with an international university, Institute X opened its doors for its first student intake. The close relationship with this international partner ensures that students of Institute X attain internationally accredited qualifications. Institute X started with 400 students. In 2016, 4000 students graduated at degree level and a further 350 achieved Master's level. The foundations of Institute X are based on core values of integrity, quality, accountability, creativity, innovation and professionalism. These values continue to be at the heart of the Institution's corporate aims.

Institute X continues to develop its connections with international higher education partners across the globe, including institutes in America and Europe. Institute X is extending its international reach with further partnership arrangements planned with UK institutes. These connections provide faculty and students with the opportunity to interact, study and learn as part of the global community. Equally important, Institute X provides students with opportunities to engage with the business community in Kuwait. These activities include careers exhibitions. In addition, Institute X offers its students support for entrepreneurs/start-ups and subsidised resources, as well as discounted training for professional qualifications, for example, accountancy and marketing.

The Department of Institutional Effectiveness (IE) at Institute X has a team of five people responsible for quality assurance in relation to planning and performance. This department translates the Institute's strategic objectives into more focused divisional and departmental objectives, which are then measured using key performance indicators (KPIs). Performance levels are measured during periodical follow ups based on the KPIs, which allows the team to feedback on progress to the top management. The Department of Institutional Effectiveness is tasked with and responsible for the implementation of the strategic plan and ongoing follow ups (B/127).

4.4 Critical Analysis of Institute X – Changes in the Processes

Following the initial interviews with members of the senior management, the next interviews involved middle managers where the processes carried out in the departments were examined in greater detail regarding the situation before and after the implementation of change. Finally, staff members within the selected business processes were interviewed, with the focus upon investigating details of job tasks and the changes that occurred regarding these tasks and the pre- and post-change knowledge. Applying the terms of the confidentiality agreement, the data collection interviews were coded with

letters and paragraph numbers (for example, A/1 refers to Interviewee A, paragraph 1). In addition to the semi-structured interviews, a review of relevant institutional documentation regarding the change was also carried out. Table 4.2 sets out the roles and numbers of interview participants at Institute X, along with the data required from each interview. As can be seen, two senior managers were interviewed to ensure the case study criteria were met and to select business processes relevant to this study. Next, middle managers were interviewed to identify key tasks in the business processes and particular staff members — those working within the business process for at least a year before the changes — to interview. Finally, these staff members were interviewed to discuss their experiences of the planned/radical change and the knowledge required to complete tasks before and after implementation of the changes.

| Interviewee | Data Type for Case Study 1 | | | | | |
	Criteria of the case study	Determine and choose processes that changed	Determine the key tasks in each of the chosen processes	Tasks before the planned/radical change and the pre-change knowledge	Tasks after the planned/radical change and the post-change knowledge	How staff members acquired the post-change knowledge
Senior management	2	2				
Mid-manager			2	2	2	2
Staff member				8	8	8
Total	2	2	2	10	10	10

Table 4.2: Interview Participants of Case Study 1 and Data Required (Source: thesis author).

Institute X has a planned, written and accountable plan (X 17 Strategy) for creating "*an attractive environment*" (A/1) to enable learning, research, and the achievement of academic excellence. At the developmental stage of the X 17 strategy, senior managers recognised that planning was imperative to meet the strategic objectives. With the objectives identified, senior managers determined the initiatives necessary to enhance the processes identified: *"based on this strategy,* [senior management] *have identified initiatives, how to enhance the environment. And then we created, like, similar initiatives based on the objectives related to the enhancement"* (A/17). The initiatives were codified into a plan for changing from manual and paper-based processes to digital and paperless processes. According to interviewee A, the processes were radically changed based on strategic objectives developed in advance. This transformation changed the way that tasks were completed in academic and non-academic processes: *"after doing the optimisation process, we went into automation process"* (A/2). Interviewee A also stated

that the progressive development path created by implementing the strategy has been invaluable for "*engineering of the processes in terms of the cost and the time and the resources*" (A/2). The research unit of analysis of this thesis is business processes. This case study focuses on two processes: Registration and Admission, and Faculty Self-Evaluation. The changes to these processes were completed, tested and operational in September 2015.

Institute X 17 Strategy was based on three main strategic objectives: excellence in education, excellence in research, and the provision of an attractive environment for faculty, staff and students. Institute X's structures consist of two types of processes, academic and non-academic: "*[t]he processes, as you know, in university, you can categorise our processes into two main types: the first one is the academic processes, the second one is the conventional business processes*" (A/3).

The following section explains the two processes selected for study — Registration and Admission Process, and the Faculty Self-Evaluation Process — and shows the tasks and the knowledge necessary to complete these tasks (identified as the pre-change knowledge in this thesis). This is followed by analysis of changes implemented by studying new tasks and knowledge necessary to complete these tasks.

4.4.1 Registration and Admission Process Prior to the Planned/Radical Change

The Registration and Admissions Office is responsible for many tasks, all of which require direct contact and communication with students, within processes that cut across different functional lines within the Institute. Admission to Institute X is the first process that students experience. The office registers courses chosen by students each semester, ensuring that choices of courses satisfy graduation requirements. The final task for this office is to agree graduation requirements when the qualifying students have completed their academic programme.

Tasks and Pre-change Knowledge

This section discusses the tasks carried out in the Registration and Admissions process, including steps required to complete tasks and necessary knowledge.

Admission Task

Students hoping to attend Institute X apply through the admissions process administered by the Registration and Admissions Office. Before the implementation of the change, the process was paper-based with application forms completed manually and subsequent

steps carried out in paper format. This had been a relatively slow-moving task in the past: *"we had to wait until the information was passed from the students' information system to us on paper forms"* (D/7).

Steps in the Admission Task

Applicants attend the Registration and Admissions Office in person, and by prior appointment. Applicants complete the Admissions Application Form manually, with the Administration Officer supervising completion to ensure applicants meet all entry requirements: *"student[s] would normally, fill out an application and originally it was a paper-based application"* (C/1). Applicants' documents and photographs would be attached to application forms and a complete paper package would be sent, by post, to the Admissions Department where a manual assessment of the application would take place. This assessment consisted of two elements: first, the Admissions Office checked manually that applicants fulfilled the admission requirements and, second, applicants would be instructed to take a placement test, dependent upon proficiency in Mathematics and English (as evidenced by supporting hard copy documents). If the applicant was required to sit a placement test, he or she would be directed to the Test Centre where a date for sitting the examination would be arranged.

Results of the placement test were sent to the Admissions Officer and the applicant in paper form. On receipt of the test results, applicants would be advised by the Admissions Officer whether he or she would need to follow Institute X's foundation programme or was eligible to begin the academic programme without this requirement: *"the results on paper would be validated by the foundation programme that will recommend which course to take, they will send it to registration, and they would be enrolling the student"* (C/7). The Admissions Officer would make this decision by using a manual checklist regarding marks attained in the placement test and documentary evidence of prior achievement. The Admissions Officer would then submit completed documents to the Registration Office, where the applicant's information would be entered manually into the system. Enrolment into Institute X would then be confirmed unless the intake was full, in which case applicant would be admitted to a following intake.

Pre-Change Knowledge for the Admission Task

To carry out the admission task before implementation of planned/radical change, an Admissions Officer had to understand the steps of the admission process. He or she needed to be aware of the aim of the Admission Application Form, and had to be able to

complete the form to give guidance to applicants during its completion. In addition, Admissions Officers needed to know the requirements for the types of supporting documents to accompany the application form, for example identity papers and high school qualifications. It was also important for Admissions Officers to know Institute X admissions rules, together with which decisions would need to be taken throughout the steps of the process for applicants to be admitted to Institute X. The necessary knowledge to complete tasks included the placement test requirements, procedures to be followed should a placement test be necessary, and, upon release of placement test results, criteria used to decide whether applicants should be entered into the foundation programme or the academic programme. How to enrol applicants into relevant programmes was also necessary knowledge to complete the task.

Registration

The second task performed by the Registration and Admissions Office is the registration and enrolment of students who have been assessed, approved and accepted by the Admissions Officer. The aim of registration and enrolment is to ensure students are listed on their chosen courses. This task, before the implementation of the change, was carried out manually using two platforms that were not linked to each other. The first part of the task required students to select courses they wanted to follow for the semester ahead and to register this selection online, using the digital system. The second part required the Registrars to input the student choice into the learning management system, Moodle. This manual procedure resulted in the Registrars having to update the entries when courses were added or dropped, and correct errors in the data recorded; it was necessary for the Registrars to do this on a daily basis.

Steps in the Registration Task

The first step needed for the registration task before the implementation of the change was for the Registrars to review the details loaded onto the Moodle system. This action would result from an email sent to the Registrars from the Admissions Officer confirming enrolment of an applicant. The Registrars would login to the online registration system. After successful login, the Registrars would receive an online text-file referring to the student and available courses, displaying the options to "add" or "delete." It was the Registrars' responsibility to cross-check with the student's official documents to ensure that entries were recorded accurately or to ascertain why any student details were incorrect or missing. Any errors were corrected manually. The updated

entries would then be re-run through the platform manually as the system did not do this automatically.

The second step in the registration task required the Registrars to ensure that course titles were correct. Manual checking was carried out in case course titles were omitted from the system because it would be impossible for students to register for those courses. Where course titles were omitted, the Registrars would apply to the IT Department, by email, for the relevant course code, which would then be added to the system menu. Student registration and enrolment could then be completed. The third part of the task for registration was dealing with general enquiries from teachers and students.

Pre-Change Knowledge for the Registration Task

To carry out the registration task before the implementation of the change, it was essential for staff members responsible for registration to know the relevant personnel in the IT Department, in order to maximise system support. The Registrars needed to know the fields the text-file offered and that the fields available were correct. Knowledge to complete the task was gained by cooperation with the IT Department. Furthermore, the Registrars needed to know how to run the script on the Moodle system — a process called "cloning," which would be carried out on Moodle's website. The ability to recognise cloning indicators and signage on Moodle's system was also required knowledge, as it was from these "flags" that errors and omissions were identified and addressed. In order that the Registrars could input details under correct headings, they needed to know the roles of each individual. Faculty, students, teachers and teaching assistants had to be differentiated on Moodle's platform. Moreover, the Registrars needed to know how each individual would view the Moodle system so as to deal with enquiries and queries raised by different parties by directing them to appropriate sectors of the system. Registrars needed to know the structure and objectives of Institute X. The Registrars also needed to know the job titles and names of faculty and staff members to allocate authority levels in Moodle.

Graduation Task

The third task is the graduation task where documents relating to students who have completed their courses are collated, reviewed and forwarded to the Ministry of Education. Before the implementation of change, documents were dealt with manually (for example, the Clearance Form — see Appendix 6), by staff members who were responsible for reviewing the Major Sheets and transcripts, then preparing and packaging

documents and, finally, verifying the documents to be sent to the Ministry of Higher Education. These tasks were labour-intensive as all papers needed to be photocopied and any exceptional considerations delivered by hard copy, often by the students themselves, who would need to attend in person, sometimes daily.

Steps in the Graduation Task

The steps in the graduation task involved a methodical checking procedure, performed manually, to ensure each individual student had complied with the rules and requirements of both Institute X and the Ministry of Higher Education. In the first instance, students would arrange an appointment with the Registration Office so that graduation procedures could be carried out. In any one academic year, it was possible to have in excess of 200 students graduating, all of whom would have to be dealt with individually, and entered on the system manually. The first step would be to check the student's passport for validity. The transcripts and the Major Sheets, for every student, were then printed for reviewing. These documents were checked manually. The courses that students had taken had to be recorded accurately on the Major Sheet. If there was a discrepancy, the Major Sheet would be updated or amended by hand: *"with the help of the transcript we have to cross-check each and everything and then we fix up the Major Sheet for the students"* (G/20). Also at this point, an assessment would be carried out by Graduation Officers to ensure students had completed the courses necessary to graduate. In cases where manual amendments were necessary these had to be added to the system by Graduation Officers. Once hard copy papers had been prepared, data would be entered manually on to the system by Graduation Officers: *"we have to fix it manually – it takes a lot of time, because in a semester we have over 200 students graduating"* (G/23).

Pre-Change Knowledge for the Graduation Task

To carry out the graduation task before the implementation of change, Graduation Officers had to know the requirements for graduation to ensure the courses and grades listed on a student's Major Sheet complied with the rules. Necessary knowledge to complete the task included whether any course for which the required grade had not been attained might be repeated. Familiarity with the record system was required knowledge to ensure necessary amendments were accurately inputted, whether in the transcript or Major Sheet. Likewise, knowledge of the archiving system was essential so that student documents were organised efficiently. It was necessary to keep up to date with changing requirements of the Ministry of Higher Education so that the correct documents were

enclosed in the package submitted to the Ministry for graduation approval and recording: *"when we are doing this task we have to be really well known with the Major Sheet, the Majors, all the courses required, what are the satisfactory credits that the student needs - because we have certain grades in our university which are not able to repeat the courses"* (G/34).

4.4.2 Faculty Self-Evaluation Process Prior to the Planned/Radical Change

The Faculty Self-Evaluation Process is designed to evaluate the performance of faculty members each academic year. This section discusses the steps required to complete the task, and existing knowledge in the paper-based process before implementation of the change.

Steps in the Faculty Self-Evaluation Task

The first step in the process before the change was for the HR Director to issue instructions by email to all faculty members to complete a self-evaluation form, called the Annual Report. This email would be sent towards the end of the academic year. The Annual Report was designed to elicit a summary of activities performed by faculty during the preceding academic year and was available, hard copy, to be collected from the HR Director's office. It was the duty of the faculty member to complete the form manually, disclosing details of his or her service, research and teaching: *"we have to do it manually, not by computer"* (M/23). Each faculty member completed the form in his or her own style using paper-based forms, as no guidance criteria were available (Old Faculty-Evaluation Report — see Appendix 6): *"we had to write manually what we did during that year of service, service research and teaching"* (L/1). This made the review of the evaluation slow and labour-intensive. The lack of criteria allowed inaccuracies, omissions, irrelevancies and discrepancies to be submitted without challenge or amendment. While faculty members had no guidance, neither did the evaluators; the Dean, Acting Dean and Heads of Departments (HoD) based the evaluation results on individually completed forms and what they believed about the individual's performance.

Once faculty members had completed an evaluation form, the form was submitted, hard copy, to the HoD through departmental administrators. It was the administrators' responsibility to ensure that evaluation forms were photocopied for the Dean, Acting Dean and HoDs to have a copy to assess prior to evaluation meetings — when the decision would be taken on how to rate the particular faculty member.

When studying completed evaluation papers, the Dean, Acting Dean and HoDs reviewed the evidence submitted to support faculty members' claims. Each adjudicator would benchmark the employee evaluation based on their own criteria from which they then subjectively judged whether the faculty member either "meets" or "exceeds" expectations. The papers would be "signed off" by the evaluators as evidence of consent and approval. The final step required the Acting Dean to notify the faculty member of the evaluation result, after which the papers would be lodged in the relevant HR file: *"after the end of the semester, we would get our evaluation"* (M/23).

Pre-Change Knowledge for the Self-Evaluation Task

The necessary knowledge for carrying out the self-evaluation task applied to faculty members and Dean, the Acting Dean and HoDs. For the teaching staff being evaluated, necessary knowledge comprised primarily of academic knowledge and administration steps. A faculty member required personal skills, as well as other general managerial skills, depending on his or her position within the faculty. In order to evaluate their own performance, it was necessary for them to have experience and knowledge of their current skills.

For HoDs, rules and regulations applying to higher education were part of the knowledge necessary to complete the task. In addition, HoDs required knowledge concerning the teaching approach (the methodology) being adopted in Institute X in order to judge the service element of the evaluation process. As the paper-based system relied on judgement rather than satisfying pre-determined criteria, it was essential to have required knowledge gained by experience within and outside Institute X.

4.4.3 Planned/Radical Change within the Two Processes

The X 17 Strategy identified that processes needed to be optimised to ensure effectiveness in terms of time, efficiency and cost. The existing paper-based system resulted in a range of performance standards with no requirement to achieve completion of tasks within a specific timeframe: *"it was all done, done paper-based — there were no specific timeframes because people tend to take their time and they are different in performance and capabilities"* (B/59). Additionally, staff performance could not be assessed with transparency and fairness as their level of outcome achievement and efficiency was largely dependent on subjective views of their manager or supervisor.

There was also a need to demonstrate to students of Institute X that this is an institute competing on the world stage. The X 17 Strategy recognised that students were, and

would become more, technologically literate, experienced in global travel, and expecting international standards of institutes at home: *"because, like, our* [students] *and staff today they are smart. They have the mobile and they have much more knowledge than us as professors"* (A/47). The use of technology was to be maximised as tool with which changes in the processes would be affected. The strategic objective, in short, was to convert all administrative paper-based processes to digital: *"the process transformation that happened from taking the process from the peoples' hand to be online is the difficult part because we had to have* [a] *vigorous process of creating the documentation and reviewing that document, and then approving it, and then testing it, and then re-evaluating and re-engineering that process, and re-inventing it again until we reach an area where we stabilise it. In certain occasions, we have to run two processes in parallel, the manual and electronic, while we test the stability and efficiency of each one of them"* (B16-18).

These processes were re-engineered so that efficient task completion would not be dependent on individual performance, thus standardising performance and utilising time and resources efficiently, by moving from manual to digital: *"I have witnessed a dramatic change* […] *we have had drastic changes in many processes"* (B/6). It was accepted that digital step-by-step processes would eliminate manipulation by users and support accuracy of process outcomes: *"the process starts online and ends online"* (B/14).

As a consequence of the process changes, it was seen that the staff members executing tasks could be more fairly evaluated for performance, as the online system would provide accurate information for objective assessment. As was noted above, most processes carried out by Institute X are now dealt with online, from registration of students to HR procedures for the staff. One interviewee stated that *"processes re-engineering and automation is the strongest witness and indicator of our aim to change"* (B/3). The processes are now digital except for some hardcopy files *"because* [of] *the regulator and governmental environment that still requires* [Institute X] *to have archives and paper-based"* (B/57).

All levels of Institute X were involved with the change implementation. The Vice Presidents and members of the Board of Trustees initially approved change proposals that were submitted by departmental heads and managers: *"making the initiative was from a department but approving it and raising the bar and demanding high standards*

comes from senior management" (B/35). As the proposed changes were dramatic and affected the Institute strategically, they needed to be approved by senior management. The Board of Trustees were then responsible for ensuring that these changes would be of strategic importance to Institute X and would adhere to quality standards demanded of the Institute, both domestically and internationally.

The X 17 Strategy laid out clear steps for the implementation of changes to business processes. The first of these steps fell to managers, who were tasked with developing a vision to change the process under his or her supervision and from which the strategic objectives would be addressed: *"so we* [process managers] *start with a vision, and then we start with the tools"* (B/45). Upon confirmation of approval from the Dean and the responsible Vice Dean, managers compiled a detailed action plan that included resources needed to implement approved changes, the timeframe and quality control points, and human resource requirements: *"we start listing* […] *all types of resources, technical resources, people and the amount of change required"* (B/44).

It was a priority for senior management to ensure that the required knowledge to complete tasks was available and accessible to faculty, staff and students, to maintain their morale, confidence and commitment. Both faculty and other staff members needed to understand their roles during and after the implementation of the change. An important part of this role development was an appreciation of the objectives. Institute X sought the involvement of end-users, the staff members, in both the planning and the implementing of the changes. It was recognised by the senior management that the project would not achieve favourable outcomes unless staff members bought into the implementation and objectives: *"we get the end-user or the people to buy-in"* (B/52).

The first step to achieving buy-in was an awareness campaign, set up before the changes commenced: *"awareness campaigns always are important for this"* (A/25). Faculty and other staff members were expected to participate; to make themselves fully conversant with the changes; to know how the implementation of the changes would happen; and, importantly, how they would contribute to and be affected by the changes. Feedback from Institute staff members was encouraged by senior managers. Institute X made it clear that they valued the cooperation of staff members and wanted them to be active participants in the changes. The awareness campaign was initially communicated to faculty, staff and students using media with which all parties were familiar and comfortable, for example email and SMS messaging: *"we publish this first through*

emails and […] *a shared point portal where we publish all the documentation"* (B/53). As participants already had access to and employed online communication through Institute X's intranet and cell phones, it followed that all staff members could be expected to be reached through these media: *"our role is to make this knowledge available to our stakeholders and, by stakeholders, we are talking the students and staff"* (A/37). Additionally, handbooks, both hard copy and electronic, were compiled in two separate editions (one for faculty and another for staff members), outlining all policies, rules and procedures appropriate to each participant: *"the handbook contains all the policies and the procedures, and the bye-laws related to the work environment"* (A/32-33). In support of online communication and handbooks, Bulletin X was launched online. This was designed to be a first point of reference for faculty and staff members providing information and problem-solving advice. While the handbooks provided a fixed, over-arching reference, Bulletin X was a communication forum containing frequent updates and additions as the implementation of the changes progressed. One interviewee reported that as Bulletin X *"can be found online […] the students and staff can find information"* (A/34).

In parallel with the actions detailed above, faculty and other staff members attended training sessions in preparation for the implementation of changes. To minimise the stress that the changes might cause, Institute X continued to run paper-based process systems in *"parallel"* (B/73-74) with the early implementation of the changes to maintain the confidence of staff members tasked with using the electronic system. How long the two systems ran in parallel was dependent on the complexity and size of each individual process. An interviewee stated that *"we have to run two processes in parallel, the manual and electronic, while we test the stability and efficiency"* (B/18). This period was to ensure that new online systems within the process were stable and performing as planned. This allowed staff members to become comfortable using the new digital system during the transition away from manual processes.

Institute X indicated that one of the challenges to overcome in changing manual processes to electronic was the human element: *"the technology part, it's fun. It's easy to manage, it's easy to monitor, to extract data from the human is the difficult part"* (B/20). A workforce, as a body and individuals, tends to resist change and this resistance appears in a number of ways: *"it's always a way that is filled with the challenges, with rejections, with objections with even doubts sometimes, specifically when you try to create something that nobody else has created before"* (B/21). Merely eliciting data and

information from some staff members presented a challenge, with rejection, objection and doubt being commonplace.

An interviewee went so far as to state that *"some employees are complainers. They talk, and they speak and some have influence. Some of them don't have that kind of noise or voice to reach up to these levels"* (B/62). Managers tend to pay more attention to those with the loudest voice among staff members. This may result in staff members not being treated equally or their efforts going unnoticed; however, the new digital process allows performance monitoring and an "*objective and transparent*" appraisal system (B/65): "*the managers can now easily track every employee of the staff performance which is recorded online: who did what and when*" (B/62).

From the outset, Institute X discovered that negativity from participants could not simply be attributed to age, gender or nationality. Many of the senior staff (senior in age, not necessarily in rank) viewed progress positively and were enthusiastic to learn, to acquire necessary knowledge and to adapt. Likewise, with a staff cohort of 49 different nationalities, Institute X encountered no resistance that could be identified on the grounds of nationality alone. It was concluded that negativity resulted from individual attitudes. Indeed, one interviewee noted that *"attitude is the main concern and the main challenge that we face"* (B/89).

Institute X was prepared for countering resistant attitudes, adopting an understanding approach through communication and encouragement, and (during the period of implementation of the change) demonstrating that changes would have positive outcomes for end users: *"escalating and leveraging the challenge* [we are able to] *lower the resistance* [...] *we always try to publicise and mention what are the benefits. We try to get the buy-in, so even if they don't buy it, they don't fight it* [.] *So, we lower the resistance"* (B/94-96). Staff members of Institute X were involved in promoting a positive message. For example, some staff members, who had yet to commence, and therefore experience, the implementation of change within the business process, were so encouraged by what they witnessed in other departments that they were driven to request early commencement for their processes. Institute X, while making sure that the communication and training methods to provide the necessary knowledge were efficient, recognised that support for faculty and staff members would be required throughout the implementation period to ensure necessary knowledge was acquired by the participants: *"knowledge is provided by many ways: training is one of them"* (B/70). As a result,

there were only a few instances where staff members initially rejected the support and guidance offered for implementing the change: *"It's always a way that is filled with the challenges, with rejections, with objections with even doubts sometimes [...] specifically when you try to create something that nobody else has created before"* (B/21).

As mentioned above, Institute X prepared and published procedural manuals for staff members, faculty and students to access when needed, for example: *"we have like, you know, Faculty Member Handbook. The Handbook it contains all the policies and the procedures, and the by-laws related to the work"* (A/33). Additionally, the content of initial training sessions, attended by staff members (including senior management), was reinforced by interdepartmental one-to-one training sessions. Staff members were encouraged to discuss any issues or problems they may have encountered during any stage of the period of implementation of the change. Experts from the IT Department were available to address any concerns and to assure participants that ongoing support could be accessed. A helpdesk was also established to assist with staff queries: *"plus the support, the helpdesk we have established for each process or for each change that we implement. And then we start launching"* (B/73).

Institute X utilised technology and e-communication channels to embed the policies, rules and regulations already existing in the higher education sector in Kuwait. Online information and guidance was made accessible with online prompts and pop-ups to ensure each step was completed fully and in the correct order. The final provision for the acquisition of the necessary knowledge involved the use of social media channels. Bespoke accounts were created as communication vehicles where discussion and questions were encouraged and where advice and solutions were offered by qualified personnel. The technology and e-communication were deployed in conjunction with face-to-face communication and training: *"Also in terms of IT services we are going from being only supporting emails to bringing e-learning systems online to even virtual classes and stuff like that and even virtual and interactive trainings"* (B/5).

Following the first round of implementing changes to digital processes, users attended feedback sessions where performance was rated, and implementation outcomes were evaluated. One of the main aims of these feedback sessions was to ensure that participants had acquired, or were acquiring, the necessary knowledge. Institute X allowed existing paper-based systems and new online digital systems to operate in parallel while users acquired the necessary knowledge and gained confidence in their

changing roles. However, it was recognised by senior managers that users might come to rely on the dual system and this could affect the implementation outcomes and possibly impact the changes.

Indeed, as the period of implementation of change progressed, the performance of any task using hard copy was discouraged to the point where steps would not be deemed completed should they be presented on paper for sign-off. A task so rejected could only be resubmitted using the digital, online process. This practice identified weaknesses in user skills and, via further training and support of these staff members, advanced the acquisition of the necessary knowledge. Institute X monitored the operation of the digital system by participants and reinforced its use, ensuring that staff members did not default to the previous system.

4.4.4 Tasks and Post-Change Knowledge for the Registration and Admissions Process

This section discusses the tasks in the Registration and Admissions process after the implementation of change. The steps are detailed in this section together with the necessary knowledge required to carry out the tasks in the Registration and Admissions process.

Admission

This process, following the implementation of the change, is now completely electronic/online (except for regulatory requirements for some hard copy materials demanded by the Ministry of Higher Education) with minimal input from admissions staff whose duties are limited to cross-checking and reviewing.

Steps in the Admissions Task

Following implementation of the change, the steps required to carry out the admissions task are completely automated. In the first instance, applicants must complete the admissions application online. The system prompts the applicant to ensure accurate completion and requires them to upload and attach relevant documents into the electronic system: *"the applicant would online upload all the information that's required"* (C/3). When information or documents have been entered incorrectly or omitted, the system, an "intelligent" programme, flags the error and prompts applicants to correct their submission. The applicant's ID number is a mandatory field and has to be entered correctly, as the system has the facility to cross-check entries to either verify or reject it.

The next step requires Admissions Officers to review online applications, to cross-check information entered and to ensure relevant documents have been successfully entered and uploaded. During this step, applicants are informed by the system if they need to sit a placement test for English and/or mathematics proficiency. When a placement test is required to enable applicants to enrol, they are allocated a time and date from the Test Centre for sitting the test. If the appointment is not convenient the system allows applicants to request an alternative appointment. The online system carries this out automatically.

Applicants must submit the original documents requested. The Admissions Officers package these originals and send them for archiving to fulfil Ministry of Higher Education requirements. The Admissions Officers direct applicants to the online enrolment system where their application is completed. If the applicant has attended a placement test, the Admissions Officers are able to access results online and offer guidance to the applicant concerning courses for which the applicant is eligible. Results of the placement test determine whether the applicant needs to enter the foundation or academic programme. The applicant then enrols on the relevant courses using the online system: *"we made the system more user-friendly for the students"* (G/5).

Post-Change Knowledge for the Admission Task

The Admissions Officer needs to understand the online application system, digital forms, as well as the information essential to a successful application; for example, Institute X's admission rules and regulations. This knowledge is needed to assist applicants in completing the documentation and to resolve any problems that may occur during this step. The online system requires a student ID to be entered accurately, and transcripts from the applicant's previous school to be available and uploaded. The Admissions Officers must have knowledge of the system, which includes requirements of the placement test and how to apply to sit the test via the system. In addition, the Admissions Officer must know the placement test results to indicate whether applicants are required to enrol on the foundation course or qualify for the academic programme. Finally, the Admissions Officer must know how to implement the steps regarding completion of digital forms on the enrolment system.

Registration Task

Following the implementation of the change, enrolment on the Moodle learning management system is completed digitally. The responsibility of the Registrars is only to

review the input to ensure that the student has made the appropriate course selection. Files are uploaded automatically daily. The change to automation has eliminated many errors, saved time and reduced staff workload. However, Moodle does have some technical issues that are being dealt with: *"we can have more benefits of Moodle and we can enhance the learning management system or the virtual learning environment for Faculties and students. So, this is what we are trying to do right now"* (D/56).

Steps in the Registration Task

The Registrars have the task of monitoring the online system to ensure that students are being enrolled accurately and that their details are accessible: *"we added the [digital] archiving system so all documents that we receive from the student can be immediately archived"* (C/49). The first step following implementation of change, is for the Registrars to login to the system daily to ensure cloning has been completed automatically. The system updates new courses and these updates can be viewed daily. The Registrars are responsible for responding to and dealing with general queries from both teaching staff and the students. For security purposes, the digital system has a backup process where all the data is stored: *"we now have a better* [digital] *backup process"* (D/3).

Post-Change Knowledge for the Registration Task

The post-change knowledge needed by the Registrars includes understanding the online system. It is essential to know how the system is accessed and viewed by different users, such as teachers and students, so that their queries can be addressed and resolved. The text fields in the system must be completed correctly, so the structure must be known in order that the Registrars can recognise whether the entry is correct or incorrect. Knowledge of how to run files through the system, and check their accuracy after the run, is required together with knowledge to enrol students using the manual system if the online system is not accepting online student enrolment. The manual system is employed to deal with extraordinary exceptions. The Registrars use online sources, such as Moodle forums, to in order to be able to address technical queries regarding completing the task.

Graduation Task

Following the implementation of the changes, the task is now online. The steps are tracked either by email or by uploading to the platform. Most errors and omissions have now been eliminated. All the requirements to complete this task are carried out in one electronic system, making it easier for both students and staff members. Moreover, exceptional considerations are now dealt with online so the Dean of Institute X sends an

electronic notification and the graduation team can deal with it immediately. The new system is important as it allows reports to be sent to the Ministry of Higher Education with ease. Should the Ministry require graduate details, or any additional information, this is easy to access and provide as all documents and reports are held on the electronic system. The Ministry requires hard copy documents and the system allows for papers to be printed and provided to the Ministry as required.

Steps in the Graduation Task

The first step for the graduation task after the implementation of the change is to obtain a report for each graduating student from the system: *"the automated process in the graduation office"* (H/1). The information on the report is checked by the Graduation Officers to ensure accuracy. This is done manually: *"then we manually check all the transcripts, and then whatever changes have to be made, this have to be made in the system"* (H/37). This step is necessary because the system is not always up to date. The Graduation Officers, in consultation with the student, ensure that any amendments are recorded and that the courses necessary for graduation have been completed. Once documents are accurately prepared, an officer locks the Major Sheet on the system, after which no further changes can be processed and the student will no longer be able to access his or her completed Major Sheet. Degrees are awarded as a semester batch, not individually, online, with the system recognising which students should graduate by linking the Degree Award function with the locked Major Sheets: *"then we send an email to the student that yes, the degree is awarded"* (H/47). The locked Major Sheets are approved online and the students graduate: *"after the Degree is awarded, then we have the final list in, then we have the graduates* [who are] *moved into* [our] *alumni academy"* (G/82).

The final step is that the system compiles a semester batch list of graduates and it is this list, together with the package of hard copy documents, which is sent to the Ministry of Higher Education for certification. It should be noted that the Ministry of Higher Education demand all papers in hard copy, so the graduation procedure must reflect this. The student must complete an online form to carry out the clearance step: *"we send the students an email and the students come to the graduation clearance form online"* (H/49).

Post-Change Knowledge for the Graduation Task

The necessary knowledge to carry out the Graduation task is to know what software applies to each step and how the interaction of the software functions assists the daily tasks: *"we need to know under what category we have to go, or under what tab we have to go and do the necessary changes, whether it is under the Major Sheet or under the transcript"* (G/41). The new archiving software — a completely new system — must be understood so that staff members can access files and records and use these documents in other areas to complete tasks: *"we need to know where we can go and fetch the information and how we can link that particular document to the software"* (G/87). The necessary knowledge includes access to documents required by the Ministry of Higher Education and how to present them to the Ministry to ensure degrees awarded are certified.

4.4.5 Task and Post-Change Knowledge for Faculty Self-Evaluation

Institute X reviewed the process of faculty self-evaluation following a change in management personnel. The HoDs decided that existing paper-based processes were time-consuming, inaccurate and subjective; nor did it demonstrate Institute X's mission to promote science and technology. A new system was introduced comprising three main changes: first, the process is online throughout, second, it is the responsibility of the faculty member to support their evaluation with necessary and relevant evidence and, third, the evaluation is based on predefined criteria, applicable to all.

The change carried out for the self-evaluation task changed the process from a paper-based exercise to technology-based: *"we felt that, in order to be fair to all faculty, faculty must know exactly the criteria in detail which they are being evaluated against"* (L/21).

This section discusses steps carried out in the Faculty Self-Evaluation Process that were required to complete the task and the necessary knowledge. The new process is more comprehensive and rigorous while simultaneously saving time for faculty as the online process is faster than the paper-based process it replaced: *"it was all done paper-based – there were no specific timeframes because people tend to take their time and they are different in performance and capabilities especially non-senior positions but always too busy to do the paperwork"* (B/59). The system is organised so that it is user-friendly. Entries are trackable, and the process is seen to be more transparent. As the system is based on predefined criteria, evaluations are objective, eliminating most of the subjective input and decisions of faculty and HoDs. This has resulted in fewer challenges to, and

disputes over, the evaluation decision itself and the evidence required for the decision to be made: *"It was […] mostly subjective […] and easily manipulated because with this paper you can pull up paper any time, you can change it and the small people were not heard properly. Also, you can't miss the document because the system has digitally archived"* (B/60). This saves time for staff members – *"it's really time-saving for a teacher"* (M/7) – and managers: *"as HoD, I receive that all online then I check what* [and] *how Faculty evaluated themselves to make sure that's valid or not"* (L/15).

Steps in the Faculty Self-Evaluation Task

Towards the end of the academic year, faculty members are sent an email by the HoD requiring them to fill in the Annual Report but instead of it being a manual, paper-based exercise, the members are directed to the online platform: *"you start by sending an email to all Faculty members"* (L/64). Faculty are prompted to complete the online form (for example screenshots of the online Faculty Self-evaluation form see Appendix 6), which is divided into three main criteria: teaching, research and scholarship, and service. It is the decision of the faculty member which of these three criteria is given the greatest weighting, according to the member's work and achievements throughout the previous academic year: *"now once the system opens for the Faculty members, Faculty members will find a box where they would have to first define the weights"* (L/66). For example, the online system allows faculty members to click on criteria listed in Level One and proceed to Level Two, under the teaching criteria, to indicate their engagement with those particular criteria. Faculty are expected to address some of the items listed under Level Two to meet the expectations of their role. If a faculty member is able to confirm the fulfilment of all Level Two criteria, then it is possible that he or she will exceed expectations: *"even they can be outstanding which is higher than expectations in terms of the teaching"* (L/7).

Similar options are available for the other two criteria (research and scholarship, and service): *"now once he clicks teaching, he will start evaluating himself based on the teaching. Now each category, whether it is teaching, service or research, has two levels of evaluation"* (L/69). These predefined criteria indicate the evidence that will be required to support their self-evaluation. For example, under the research section, the faculty member must attach published journal articles relevant to his or her research: *"now everything is being online. So, it's like a technology-based system for self-evaluation"* (L/3).

The next step, after completion of the forms and attachment of documents, is that the whole package is sent electronically to the HoD. The HoD assesses and reviews the report and the supporting evidence against clear criteria. The HoD carries out a detailed appraisal of all three criteria completed by the faculty member at both Level One and Level Two: *"I* [the HoD] *will look at the file that he provides for evidence. Now, it will either fully agree with the Faculty that, yes, that is correct and this file provide evidence, ok, and give the grade"* (L/80). If the HoD is not satisfied with any of the items, he or she has the authority to remove that item as being completed unsatisfactorily and this can be done on the electronic system. When all the items have been appraised the HoD gives an overall score: *"*[the] *overall evaluation may change. It can either stay the same or sometimes, it can go upwards"* (L/82). The HoD has three options after assessment: the report may be accepted in full and the score confirmed; the report may be returned for further evidence to be submitted; or the report may be awarded a lower score than the faculty member awarded themselves. The HoD *"cannot take what they wrote for granted, so he checks it against the criteria, so he either accepts it or changes the score the Faculty member awards himself"* (L/15).

Once the assessment step is completed, the full package, with the score recommendations, is forwarded electronically to the Dean. It is not the Dean's role to duplicate the effort of the HoD; the Dean takes an overview of each electronic package and grants approval.

The final step after the Dean's appraisal is that the evaluation result is forwarded to the faculty so that the faculty member is advised accordingly. The result is available to view on the online system: *"once* [the Dean] *gives his overall approval, it will now go to the Faculty, the Faculty can now view it again on the system to see the overall evaluation"* (L/88).

Post-Change Knowledge

Faculty members still need to know the rules and regulations of the evaluation process and its three criteria. Within the new process and the new tasks, faculty members need to know how the new online evaluation system works, and how to access the new digital evaluation form. This requires a username and password, used via a login link sent by HR in an email also containing guidelines for completing the form. Once logged in, faculty need to complete this digital form correctly using the guidelines. Faculty also need to know how to access helpdesk support. Other necessary knowledge includes

knowing the predefined criteria developed for the self-evaluation under all three evaluation headings in order to present effective benchmarking evidence: *"It's a points system, ok. If I achieve 60% in teaching, I'll get 'meet', 40% I need improvement, 30% 'other status' so now he knows in advance his evaluation based on what, how he performed"* (L/61). This knowledge is required for faculty to not only evaluate their current performance but also assists them with professional development as they know the specific criteria via which they are assessed, and how to meet these criteria. In addition, they need to know how and where to upload supporting documentary evidence, and the kinds of evidence appropriate to meet the teaching, research and scholarship, and service criteria. Furthermore, faculty members need to understand error flags raised by the system — for example, not saving the form or missing a required field — in order to progress through the evaluation process. They need to know how to verify submission of the completed form online, how to follow this up, and how to access the feedback.

4.5 Chapter Summary

This chapter has discussed Case Study 1, which was carried out at Institute X. By analysing the semi-structured interviews conducted with task facilitators and management, in addition to reviewing the institutional documentation regarding the change, the pre- and post-change knowledge has been identified. This was achieved by focusing on the steps that the staff members took to complete the tasks before the change and comparing these steps with the new steps required by the change. It is by focusing on these steps that knowledge evolution throughout the change implementation period could be followed and recognised from pre-change to post-change knowledge. The following chapter presents Case Study 2, which investigates the change in knowledge within the business processes of Institute Y during a period of implementation of planned/radical change.

Chapter 5: Case Study 2 — Institute Y

5.1 Introduction

The previous chapter discussed the changes at Institute X and analysed the tasks carried out by staff members included in two processes, as well as the knowledge necessary to complete these tasks before and after the implementation of the change.

This chapter is the second of two case studies and it investigates the changes implemented within one business process in Institute Y. Understanding this change in knowledge allows the stages of knowledge evolution to be developed for the purpose of updating the research model from conceptual to empirical.

The chapter is structured as follows: Criteria for Choosing Institute Y, Background of Institute Y, Critical Analysis of Institute Y – Change in the Advising Process, Chapter Summary.

5.2 Criteria for including Institute Y

This case study investigates the changes implemented within the Institute Y Advising Process. The study examined the tasks in this process to determine the stages of knowledge evolution between the pre-change and post-change knowledge.

To establish whether or not Institute Y met the criteria of the study, two members of the senior management team were interviewed. These two participants were instrumental in understanding the overall change that happened in the Advising Process.

In 2012, a new senior management team took charge at Institute Y. They launched a comprehensive restructuring programme of business operations based on a strategic plan for change. The over-arching aim was to transform all the business processes of the Institute, both academic and administrative, in ways that would enable the new management team to manage the Institute and achieve their strategic objectives. The business processes themselves — with particular regard to student registration for courses each semester, advising on course choice, faculty evaluation and recruitment — were reviewed, and new tasks implemented to furnish the student community with a professional, efficient service, and faculty with an equitable and streamlined performance assessment. Therefore, this constitutes planned/radical change.

The detailed strategic plan was prepared after consultation with all stakeholders, from senior managers to staff members. The President and the Board of Trustees of Institute Y were proactive in overseeing the plan and authorising its implementation. Additionally, the Executive acted as a monitoring body throughout the implementation to ensure adherence to the wider aims and objectives of Institute Y. Table 5.1, below, presents the selection criteria developed in the case study protocol (Chapter 3), and shows how Institute Y satisfies these criteria.

Criteria	Institute Y
Specific objectives and targets of change	New strategic plan and institute restructuring
Describe process change	The purpose of the change was to apply the strategic plan to restructure the Institute and to redesign processes to achieve the strategic objectives
Processes that radically changed	Advising process for registration and progression
Initiated by whom?	President and senior management
Started when?	2013
Completed when?	The planned/radical change implementation for the studied processes was completed September 2015
Was the change planned in advance?	Yes, it was planned and documented
Processes radically changed	The studied process was redesigned and moved from manual to online

Table 5.1: Selection Criteria for Institute Y (Source: thesis author — developed from the first two interviews with senior management).

5.3 Background of Institute Y

Institute Y has grown to be one of the leading educational establishments in Kuwait, receiving institutional accreditation in 2010 from the Private Universities Council (PUC), the body that monitors and assesses the performance of private institutions on behalf of the Kuwait Ministry of Higher Education. Institute Y operates as an extended campus of an international institute, so not only are the qualifications offered by Institute Y internationally recognised and accredited, but students also have opportunities to participate in overseas studies with affiliated institutes. Students graduating from

Institute Y have the opportunity for further study abroad should they satisfy the entrance requirements. To ensure course relevance, faculty coordinate with both public and private sector employers to understand and provide academic training that meets the demands of the commercial world. Institute Y states that its aim is to provide support from the start of the application process, which is continued throughout the student's diploma/degree. It is also an aim of Institute Y that each student should be treated as an individual (Institute Y website).

Institute Y has two faculties: the Department of Business Studies, and the Department of Applied Arts and Design. Business Studies embraces elements of commerce from accounting to marketing to management, taught in classes using various methods from group discussion to practical and theoretical work. Graduates from this faculty often go on to work in local employment in either the public or private sectors, or may continue their further studies locally or internationally (Institute Y website). Institute Y recognises that the field of Art and Design is competitive, and training must remain relevant for the future. Courses offered by the Art and Design Department are not staffed only by academics but also by practitioners in the field of web design, interior design and graphic art. Students graduating from this department go on to set up their own businesses, work as freelancers, or join established operations (Institute Y website). Institute Y also offers a Foundation Studies Department where students can become proficient in the English language so as to enable them to join the faculty of their choice.

5.4 Critical Analysis of Institute Y – Changes in the Advising Process

Following the initial interviews with members of the senior management, the next interviews involved middle managers overseeing the Advising Process carried out in the departments. These interviews examined in greater detail the situation before and after the implementation of change. Finally, staff members within the Advising Process were interviewed, with the focus upon investigating details of job tasks, the changes that occurred regarding these tasks, and the pre- and post-change knowledge. Applying the terms of the confidentiality agreement, the data collection interviews were coded with letters and paragraph numbers (for example, A/1 refers to Interviewee A, paragraph 1). In addition to the semi-structured interviews, a review of relevant institutional documentation regarding the change was also carried out, including the initial change proposal document and the presentation slides used to introduce and explain the change to faculty and staff members (see Appendix 7). Details of the interview participants at

Institute Y, and the data required, are presented in Table 5.2. The table shows that two senior managers were interviewed first. This enabled confirmation that the Institute met the case study selection criteria, as well as the identification of business processes that were relevant to the research. The next set of interviews shown in the table were with middle managers who identified tasks for study and the staff members engaged in these tasks before — a minimum of one year — and after the implementation of change. The final interviews were held with these staff members to gain insights into their experience of the change and to distinguish between the pre- and post-change knowledge required to complete tasks before and after the implementation of planned/radical change.

Interviewee	Data Type for Case Study 2					
	Criteria of the case study	Determine and choose processes that changed	Determine the key tasks in each of the chosen processes	Tasks before the planned/radical change and the pre-change knowledge	Tasks after the planned/radical change and the post-change knowledge	How staff members acquired the post-change knowledge
Senior management	2	2				
Mid-manager			2	2	2	2
Staff member				8	8	8
Total	2	2	2	10	10	10

Table 5.2: Interview Participants of Case Study 2 and Data Required (Source: thesis author).

The Advising Process is an extensive operation involving the Student Affairs Division, Academic Division and Non-Academic Division. The Registration Department is part of the Student Affairs Division, the IT Department is situated in the Non-Academic Division, and faculty members work within the Academic Division. Faculty members are tasked with advising prospective and existing students concerning courses they may take and paths they must follow to achieve qualification. The adviser must take into account the student's existing qualifications; the pre-requisite qualifications needed to participate in any given course; and the courses needed for progression.

5.4.1 Advising Process Prior to the Planned/Radical Change

Before the change, the manual system for this process was labour-intensive, time-consuming, often inaccurate and inefficient. Students had to attend Institute Y in person to participate in the advising process: "*everything was manual* […] *you come into college and you start doing everything manually, including manual forms, hard copies*" (B/12). Furthermore, the location and supervision of classes, the availability of appropriate

courses, and timetabling were manually controlled (B/4-5). Selection of courses was based on faculty opinions regarding a student's academic record to date, rather than assessing the best options for students to achieve their objectives. Institute Y identified this activity as being a *"very tense* [experience] *for teachers … they would be asked questions they don't know the answers, they would be stuck at a table for about three or four hours"* (C/45). This was because a lack of knowledge on behalf of faculty dealing with students. The lack of inter-faculty coordination and consultation throughout the Advising Process resulted in a prolonged period of adjustment and reallocation of students to courses during the first few weeks of the academic year, all of which was carried out by advisers/teachers acting independently of one another — duplicating effort and, in some instances, creating more problems. To address the shortcomings of the Advising Process, meetings were held to identify issues in the process: "*And so that we make the result will come out as we want it to come out as. So, we looked at those glitches, one by one, or gaps, one by one, and we found a solution for each one. This was documented and then a plan was set to follow up, a plan of the new advising system was set and then it was proposed to the Director of Student Affairs … who had some changes or some recommendations – they were looked at, they were changed. So, the process went into modification once or twice until it finalised at the end and presented to the President"* (C/48-49).

Prior to the implementation of the change, staff members were invited to offer feedback regarding how the process could be improved and what challenges were predicted. With an objective to offer — *"the best professional service"* (B/33) — the change was to be the trigger for *"continuous improvement"* (B/34). Institute Y experienced minimal resistance to changes to the Advising Process because staff members had *"the knowledge* [and] *provide*[d] *the feedback"* required for effective change (B/45). Moreover, staff members appreciated that the situation after change implementation would make their roles easier: *"previous* [to the change] *it was 90%* [error rate], *it dropped to 53%, so it's like nearly half the students because they followed correct advice from the beginning"* (C/66). Resistance to the change among the staff body was further reduced when the results of the new advisory process were seen and experienced: "*So all these things, you know, successful results made all these teachers, who were reluctant in the beginning to follow the system, to be happy to do it now*" (C/67).

Task and Pre-Change Knowledge

Before the implementation of the change, the Advising Process required students to go to Institute Y for a timetable to be compiled, course registration to be completed, and documentation (all hard copy) to be accredited. All documents were required to be manually uploaded to the system. To gain an understanding of the evolution of knowledge during the change, the following section details the steps in the advising task before the implementation of change.

Steps in the Advising Task

The first step to be carried out in the Advising Process was to check the student's Major Sheet, which is a record of existing qualifications, to ensure students held the appropriate pre-requisites. Then an adviser would choose the courses to be studied, based on his or her Major Sheet, and registers these for the student. An interviewee described the complexity of this task in the following manner: *"first of all we used to get the documents regarding every student and then we used to go through all the document alone, check against the Major Sheet and the rules and the GPA and everything, and then accordingly, we choose their courses. Then after we are done with this, we send it to the scheduling dept. and they used to give the […] they provide the schedule and the teacher, and they plan for this too"* (F/29-31).

This procedure was carried out at a meeting with the student. An interviewee at Institute Y explains: *"I had to sit with every student ... to revise the Major Sheet and the courses manually … explain to them what courses they could sit"* (H/10). Another interviewee said *"it was set schedules. We, as an adviser, we couldn't suggest much or show some flexibility"* (E/13). Yet another respondent described the difficulties faced due to the fixed timetables: *"Even the students, they were tied in regard to timetables and the timings of the classes and even the courses that they should take in each stage or in each semester"* (E/14). This step in the process was time-consuming as some advisers were scheduled to deal with upwards of 60 students during the advising week, all of whom had to be accredited and whose papers had to be manually uploaded. This reduced the quality of support provided: *"I just basically highlight whatever courses they need to take in order to graduate, maybe four or five or even six, depending on students and their GPA, and a schedule will be made and will be given to the students"* (G/22). The advisers were guiding the students from extensive course lists and corresponding class schedules, all hard copy. The task was difficult, complicated, open to mistakes and inefficiencies.

The registration of courses would result in a timetable being produced for students. As the system of manual input was not efficient, the timetables were produced without cross-referencing. These timetables had to be manually checked for clashes in class timings, over-allocation of students per course, and inconvenient schedule timings due to student circumstances — for example, regular medical appointments — and so many problems were neither recognised nor resolved. The rewriting of the timetables was a problem sometimes taking up to three weeks to resolve. An interviewee noted how this could cause a range of issues: *"they don't have the timetable, they didn't show up […] they want to change classes […] this was time-consuming."* (H/24). Such was the intensity of this step that some staff members devoted their entire time to this administrative exercise: *"I just re-confirm the timetables […] it wasn't much contribution to the real advising as the real name of advising"* (E/48). The quality of advice and support was reduced due to inefficient working: *"when students came in at the beginning of the semester, they were given a schedule, and that was called advising basically, it was us telling them you are taking this, this, this subjects at this time, with this teacher. So, we weren't really advising them in anything, we were just telling them, we were just telling them this is it"* (G/16-17).

The Advising Process for existing students, rather than new entrants, required the adviser to check the student's progress and monitor their GPA scores. The Major Sheet was studied, the study plan considered against the GPA, and a decision made as to whether the student could progress to some courses or drop others. This too took time to calculate: *"We check if her GPA is lower than 2.0; in this case she is not allowed to take more than four courses"* (E/51). Timetable clashes and incorrect courses were dealt with. This was yet another time-consuming activity: *"We were giving the options and approve the transfer […] change the course […] re-register. We have to be aware of the policy and procedures and the availability of classes"* (C/35-37). This further cross-checking was carried out by the adviser and the Registration Department working closely together to resolve issues: *"[there is an] open and straightforward channel of communication between us […] we promptly try to respond and make sure it is rectified"* (H/61-62). Colleagues would attempt to make the process less inefficient by spending more time overcoming these inherent problems.

It was during this step that timetables were produced for students who did not attend meetings arranged with an adviser. In such instances, courses were registered for the student in absentia. At the start of the semester these students had to collect their

timetables and any issues were then addressed. After registration and timetable approval, the timetables had to be signed by the student and it was from this point that *"students [were] not allowed to change their courses"* (E/57). While the majority of students eventually received a workable, approved timetable, there are some occasions when their situation must be referred to the Head of Department (HoD) for consideration and resolution. For example, if a student's Major Sheet indicates that she has received a third warning letter, or that an acceptable grade has not been achieved for a course, which precludes the student from taking a further course or from being able to choose the course she would like to follow, then this is a decision for the HoD. The rules and regulations were not clear regarding such exceptional circumstances: *"if there is a major problem* […] *any issue* […] *we refer it to the HoD"* (E/63). Sometimes the adviser, predicting these difficulties, would send the hard copy file to the HoD in advance of the student raising the issues, and the problems were addressed and resolved: *"I have already contacted the HoD and then they do the change"* (H/85).

Pre-Change Knowledge

The staff members were required to have literacy and numeracy skills: *"simple skills. Because basically the skills that I need is to check, some numeracy skills, checking her GPA, checking the stages making sure that she is taking the pre-requisite courses"* (E/72). The advisers needed to be able to elicit and record basic identification information (for example, ID number, full name) together with information specific to the student's study career: *"which stage is she in, Stage One, Stage Two?* […] *which diploma, management, banking, marketing?"* (E/73). Advisers had to check manually a range of information sources: *"so before the technological changes happened we need[ed] to know the student grades, the attendance, the number of courses, minimum number of courses required, the way these courses were scheduled"* (I/20). Additionally, communication skills were recognised as being essential for advisers.

The advisers needed to know the course content outline to be able to offer advice to the student and to discuss suitability for individual student study: *"first of all, we had to be informed about the prerequisite courses, what courses are to be taken before being taken into another course, so that if the student comes along and says oh I don't want colour, I'm talking about graphic design, I want 'x' course, then we would say* […] *you cannot do this course unless you've got a course done from stage one"* (J/26-27).

Furthermore, the advisers needed to know the policies, regulations and curricula of Institute Y, as well as how to apply this knowledge to the Advising Process and for completing registration. Each semester, students are required to select new courses, the advisers needed to know the minimum GPA necessary for students to register a certain number of courses and the pre-requisites for course registration. In addition, an updated version of the student's Major Sheet containing a list of courses to progress to graduation was needed. During the Advising Process, the adviser had to be aware of class schedules to avoid timetable clashes: *"the way the classes are scheduled […] what classes are offered for this semester based on projections"* (H/30). If any of the advisers did not have the knowledge necessary to complete the steps of the advising task, then the Director of the Student Affairs Division, acting as an advising process supervisor, was responsible for ensuring the advisers were informed about *"the rules, the pre-requisites, the advising steps"* (C/22). In order to be able to support both students and the advising team effectively, advisors had to have this knowledge.

5.4.2 Planned/Radical Change within the Advising Process

Institute Y is governed by a Board of Trustees, which confers day-to-day responsibility for delivery of its mission to senior executives in various roles. The objective of Institute Y is to produce qualified, educated graduates who have received a rounded educational experience from their time at the Institute. In pursuance of this mission, the Board of Trustees tasked the senior management to compile a strategic plan, to be implemented over a five-year period: *"we adopt an approach of management which is based on strategic planning"* (A/1). Prior to the academic year 2011-2012, Institute Y operated without a written strategy for its aims and objectives.

All stakeholders and parties responsible for contributing to Institute Y's mission were invited to offer suggestions and recommendations for the strategic plan. Senior management developed the plan utilising the feedback relevant to achieving the strategic objectives: *"we develop a strategic plan. We basically get feedback from all stakeholders and based upon the feedback of all stakeholders we decide on a number of strategic goals and objectives"* (A/2-4). Furthermore, the executives were briefed to consider the previous performance of Institute Y and evaluate achievement of the previous, informal objectives.

After the Board of Trustees approved the strategic plan, the President of Institute Y publicised the plan and its objectives via a presentation to staff members (see Appendix 7 for a sample of the presentation slides). It was made clear that the management changes would affect processes carried out within each department. During the presentation, the President explained the restructuring in detail together with the contribution each department could make to achieve the strategic objectives. To ensure the strategic plan was progressing, the Board of Trustees regularly monitored its implementation and approved progress reports: *"the decision, ok, to recruit a number of people, it was in light of the realisation by the Board that we should be going in a different approach in relation to how we manage this College"* (A/36).

It was emphasised that the strategic plan's objectives would be the driver for Institute Y's activities and the changes would be in accordance with the plan. The strategic plan called for major restructuring of the Institute: *"We re-structured the College in such a way that we have […] the upper management and then we have three major divisions"* (A/13). The Institute's first action was to restructure to add the tier of Academic, Student Affairs, and Administrative divisions. Once this was done, middle managers, to head the divisions, were recruited: *"There was new leadership, some key people had to go, some people were brought into the College. So, obviously, yeh, you're talking about a long way of, basically, a new strategic management. You had a new structure and you had, actually, some new faces in the College"* (A/27).

The strategic plan focused on three main operational areas of Institute Y: academic, management, and research. Each of these areas was to be controlled by a director responsible for the departments under his or her supervision, delegating to HoDs, who was answerable to the President of Institute Y for the development of the strategic plan: *"These three directors report all to the President of the College"* (A/20). Moreover, to assist the plan's efficient implementation, the senior and middle management were to operate an open-door policy, to encourage staff members to provide feedback on progress, foster ideas and suggestions, enhance progress, overcome problems, and to develop the departments and processes carried out therein. There were a number of external obstacles to be overcome during the period: *"occasionally you have things that you did not* [originally] *account for. Ok. Keep in mind that in the context of the higher education market in Kuwait so many of things are not really decided or, let's say, the market/the making within the College we have a number of things which are imposed upon us by the regulating body which is actually the Prime Security Council so it's an*

evolving thing all the time and as a result and that basically facing some, you know, bottlenecks here and there" (A/46).

Ideas for changes that would contribute to satisfying the objectives of the strategic plan were not only the domain of senior management. Staff members were invited to make relevant proposals to their HoDs, who would make representations to the Director of Department and ultimately to the President of Institute Y: *"the approval comes from the top management and you then receive it as the middle management"* (C/12). One interviewee stated: *"We made the proposal* [...] *we looked at the gaps. We filled them in with proper solutions and then we had this proposal presented to the President of the College who was very supportive and enthusiastic"* (C/34). If these ideas were approved, a committee was formed of relevant staff members to develop a plan for the implementation of the change and a formal email detailing the membership and responsibilities of this committee was issued by the President: *"the formal decision came from the President"* (C/37).

It was recognised that staff members who would be carrying out tasks in the Advising Process would need to be prepared and aware of the changes to complete the new tasks. The senior management and committee members made the necessary knowledge to complete the new tasks available before and during the implementation of change in various ways. First, details of the changes and the committee members responsible for the implementation of the changes were published for staff members. By informing the staff members in advance of the implementation, it was thought that the committee would be better supported in their aims. Moreover, by continuous publication of updates on progress, the staff members would have a sense of inclusion in the change.

Second, meetings were conducted at department level chaired by Division Directors. The purpose of such meetings was to discuss tactics of the change implementation, in particular how a new task would be carried out and the knowledge needed to complete the new task. As a result of these meetings, information guides were produced and made available in advance of the change implementation to all staff members who were involved in the completion of the new tasks (for an example from the guide, see Appendix 7). The guides were initially published in hard copy.

To ensure that staff members understood how to complete new tasks, training sessions were conducted by experts in the field at Institute Y. These internal experts held *"workshop*[s] *and a pilot advising session"* (C/28). Furthermore, staff members were

encouraged to ask questions of the experts so that any problems occurring during the completion of the tasks could be highlighted and resolved. In addition, experts were in attendance to give hands-on assistance when new tasks were being carried out. In order to check knowledge, staff members were provided with training including simulations and role-play, wherein the trainers *"gave the staff some imaginary situations and imaginary questions to see if their answers* […] *if they have studied the advising or not"* (C/29).

Throughout the implementation, HoDs at Institute Y conducted meetings with staff members to discuss tasks, seek their opinions and suggestions for overcoming problems within the tasks and processes, and announce progress updates regarding the change implementation: *"we had several meetings at the beginning of the academic year, in the mid academic year and before the advising period itself"* (C/26).

Following the implementation of the first five-year strategic plan it has become a goal of Institute Y to continue this strategy of formal plans, and create another five-year project. As a mission-driven operation, Institute Y will set out its future strategic goals after consultation with stakeholders. This will be followed by an analysis of key performance indicators of the current strategic plan. These goals will indicate the objectives, initiatives and programmes that will be detailed and finalised for the new plan. With appropriate staff members in place, the guiding methodology will be implemented and revised if necessary.

The Planned/Radical Change within the Advising Process

Institute Y's strategic plan encompassed every department, not least the non-academic departments — which were restructured and reorganised from the top down. A review of the hierarchical structure resulted in the appointment of a Director of Non-Academic Departments, who was tasked with overseeing all non-academic processes. HoDs were appointed, who were responsible for departmental processes, and answerable to the Director. The Non-Academic Division is responsible for the Human Resources, Finance, Marketing, and IT departments.

The Student Affairs Division is responsible for all issues regarding students, including administering student registrations and student advising. Here, there is a relationship with the Academic Department insofar as the faculty members (who fall under the control of the Academic Department) are directly affected by student registration, which, as

previously discussed, is administered by the Student Affairs Division that, in turn, is controlled by the Non-Academic Division.

The tasks within the non-academic and student affairs divisions have been developed, redesigned or changed totally: *"the new system fills all the gaps that were there in the old system"* (C/12). These changes affected not only the Advising Process in isolation, and the division within which the process was carried out, but also other processes within other divisions. For example, the Advising Process involves all faculty members as advisers, the IT Department and the Registrar Department. The changes were made across divisions and departments. Staff members from different divisions and departments shared the implementation of the changes and the execution of the tasks within the processes.

5.4.3 Task and Post-Change Knowledge for the Advising Process

Institute Y implemented change to the advising process under its strategic plan. The change not only switched the process from manual to digital but also restructured the process itself. The change required the involvement of advisers from the Faculty of Business Management and the Department of Applied Arts and Design, together with technology experts from the IT Department. The goal of the Institute was to redesign the process, and capture the steps for completing the task, to bring all the parts together in an orderly fashion using digital tools. The aim was not to move to a paperless system as some hardcopy documentation was still required following the change.

The change implemented in the advising process not only addressed the way in which the task was carried out — digital rather than manual — but also how the task within that process was changed in relation to other processes within the Student Affairs Division. Following the change each academic department appoints their own advisers, making the advising process *"more specialised, more specific and more accurate"* (B/21). There is no longer a necessity for the student to attend Institute Y in person for registering courses because students now register online using the Moodle platform. This tool guides and controls the registration process, which allows the student to know *"they are going to study the following course, in the following manner, with the following timetable"* (B/21-25). The students, however, have face-to-face meetings with advisers to discuss their course choices for the next semester before registering online.

Steps in the Advising Task

To gain an understanding of the evolution of knowledge during the change, the following section details the steps in the advising process after the implementation of the change.

The new task starts with the adviser receiving a folder containing file papers for a number of students for which the adviser is responsible. It is at this stage that the adviser allocates a ten-minute meeting to each student. This represents a significant departure from the process before change where students were expected to attend Institute Y and wait until an adviser was available to assist them: *"it did improve the performance level [, it had] a positive impact for everybody"* (B/54-55).

Within the folder, important student details are produced on a single page per student. This informs the adviser of the student's ID number, GPA, name and current stage, the courses completed and the courses that should be taken in order for the student to achieve qualification: *"first of all we receive a folder with a student's ID, GPA...Yes, a folder with a number of students – each student it's one page for a student ID, GPA, her name and her current situation* [...] *the courses that have been taken and the future courses that should be taken for this student"* (E/122-123). Student pages are produced in duplicate — one for the adviser and one for the student. The adviser is in possession of accredited information regarding the student: *"The Major Sheets, I advise them they are accurate* (H/113). Another adviser stated that they and the student would make *"decision*[s] *to select the courses"* (E/128). The GPA details indicate whether the student complies with the requirements for progression to a certain number of courses. The adviser is acting upon information required by the rules and guidelines of the Moodle platform, which is programmed to control and direct the choices the student may make: *"We are not just telling them what classes to register for, we are telling depending on their GPA, whether they need* [...] *more effort, whether they will lose their scholarship* [...] *maybe not graduate"* (D/34).

Based upon accurate information, advisers are able to recommend courses to students that are most appropriate to their requirements: *"we advise whether to take minimum or maximum number of courses"* (E/120). Another interviewee further explains: *"once I receive it, that's the new change — once I receive the form I try, based on my judgement, I recommend some courses she should take"* (E/123). This option was not available before the change as there was little flexibility built into the schedules. Now the meetings are more of a dialogue than before: *"we discuss with my students the courses that she*

should take" (E/127). This recommendation step concentrates on student progress — which courses need to be passed before other courses can be taken. This is supportive and adds to the student experience: *"by advising way in advance we can keep a check on the student progress, to see if the student is fit enough, to look at those courses that the student selected, or we can motivate the student and support the student and help the student move in the direction that the student wants to move in"* (I/3).

Furthermore, the increased time available to advisors, along with the new streamlined system, allows for more contact than the 10-minute slots available before the change: *"then we set a new date for students to come to us, ok, and we do the real advising. Where students, she comes to me, I show her sheet – we call it transcript – and she/we discuss now,* [I] *discuss with my students"* (E/125-126). This, in turn, increases both adviser motivation and student confidence: *"It makes it much more* […] *professional than the old system"* (B/16). One interviewee described the impact of this: *"We are speaking to them* […] *listening to their feedback* […] *what are their preferences?* […] *we interact* […] *we are involved* […] *after all, they are the ones taking the courses"* (D/19-22).

It is important for the adviser and student to understand the requirements: *"to make sure* [the students] *don't register something else against the adviser's advice"* (C/5-7). Based on the advice given, students are able to select courses they wish to follow for the following semester, fully briefed with the required information: *"once the change was made, we actually sitting and advising and telling them ok, now you have a choice, I recommend this, I recommend this, you need to finish these courses if they are prerequisite to other courses, and then the registration happened which they can do online, on their own"* (G/18).

It is at this point that advisers give guidance on how the students register their course choices online, using the Moodle platform: *"I show her online how to do it, she watches the screen, I show her the website* […] *a simulated registration"* (E/129). Another staff member stated that *"as an advisor now after implementing the system I am constantly reminding the students, where they are, where their progress is, and that they can finally go and register, on their own, for all the new courses that they* [if they get the] *grades and the attendance they can register on their own, select the options that they really want to select"* (I/27).

Online registration can be carried out by the student off-campus, offering greater flexibility: *"an even easier process for the students and now they know they can actually just do it whenever, wherever they are. They can do it from home, they can do it from school, if they need help — they were actually taught how to do it and it's been easier for them"* (G/7). This flexibility extends to the Institute Y departments, which can access student registration details online in a controlled and coherent way: *"it is easier for our department to follow up with students' registration"* (E/16-17). Students are encouraged by advisers to register online promptly as courses are not available indefinitely: *"You have only one week to register before these courses, for the Summer courses"* (E/132). As one interviewee notes, students have time to do this using the new system: *"after we agree on online (we set it up online), they can do it anytime – it functions 24/7. Students can go (online) and select the courses. Later, of course, we can respond to them one-by-one"* (K/22-23). The advisers have the authority to register on behalf of the students without first obtaining their permission if the student misses the deadline: *"I would take the responsibility to register her courses […] based on my recommendation"* (E/135).

Staff members in the IT Department at Institute Y are available should students have any queries concerning the Moodle system, so online registration tends to run smoothly. The Moodle system offers quick, straightforward registration and provides the student with timetabling options: *"if there is a class at 10 and a class at 8, they register early so they can get into the 10 o'clock class"* (D/11). When a student has completed the online registration, the system confirms their registration and produces a timetable. The student has access to the timetable immediately and it is also available for the Administration Department.

Post-Change Knowledge

There was agreement among the advisers regarding the necessary knowledge. First, the advisers stated that they must know the rules and regulations of Institute Y, as without this knowledge they could not advise correctly. Advisers felt that they should know the course codes, as this knowledge contributes to the understanding of the Major Sheets and the registration document produced by Moodle for the students.

The interviewees placed emphasis on the need to know about student progress throughout the semester: *"the things I need to know are what they're doing well in class or not, and what subjects they still need to take for me to tell them and help them when it comes to picking subjects"* (G/48). It is also necessary for advisers to be aware of the

pre-requisites for a course, as well as the course detail: *"it's my role as an adviser to discuss or to inform the students about the topic, or the course they are taking next semester"* (E/87). Another interviewee stated: *"the current task of advising, you would need to know the prerequisites, you would need to study the student's major sheet and understand their GPA, and you know, what, how they performed the previous semester, which again is provided to the advisor, and you will just need to know the knowledge of the programme of study, like what is these courses for students to take, going forward"* (D/44-45). The need to understand the rules and carefully negotiate the steps was emphasised by this interviewee: *"I make sure that I study the rules, the pre-requisites, the advising steps, carefully, to be able to advise the students and advisers at the same time. Because I do get questions, the whole time with the advising period, from advisers not knowing some certain steps or some certain information. So, I have to be acquainted 100% with every single type of the information"* (C/21-23).

The advisers explained it was preferable for students to ask for information from the adviser. Interviewees also stressed the importance of how future courses impact students' final qualifications and the flexibility within courses: *"accumulated knowledge of the students and their choices and the decision-making process […] is easy […] all information is available to complete their diploma according to plan"* (H/105).

Contained within the regulations of Institute Y are the rules concerning attendance. The advisers were sure that knowledge of these rules is needed after the implementation of the change: *"so, I think, yes, it's important to […] we still need this kind of knowledge. Also, the attendance policy and regulations for the College"* (E/91). Students are still expected to attend to sign their timetables, for example, and to be present for orientation day. Should a student miss more than ten classes, *"they will have a warning letter, they will miss the chance to attend the final exam"* (E/80). It was agreed that advisers should have this knowledge, even though the regulations are set out in the student handbook, so that they can fully advise the students on possible consequences for non-attendance.

While it is apparent that the new automated system elicits the information required from student applicants, the interviewees agreed that the necessary knowledge still included what should be identified as required initial information; for example, without the student ID, name, year of study and diploma being studied, it would be impossible for the student to progress through the registration system. It is necessary for advisers to be able to identify any missing information in order to address problems with registration and

timetable production: *"well without the knowledge of the procedures or the knowledge of the programme of study, or the knowledge of the process or the GPA guidelines and prerequisite guidelines, it's nearly impossible to undertake the tasks we're supposed to do for the advising so I would say role of knowledge, plays a great role. Knowledge plays a great role"* (D/59).

Effective communication was identified as essential to completing the new tasks after the implementation of the change. Advisers need to be able to communicate with students and with their colleagues: *"the students are going and doing them online. So maybe there is* [a] *knowledge for the student to apply but, as advisers, the only change and the knowledge needed is how to communicate with the student and advising them face-to-face"* (F/79). In some instances, the adviser may not have the detail required to satisfy student enquiries so *"would refer the student to* [a] *colleague* [who] *has more knowledge about that course"* (E/78). Communication among the advising team provides the necessary knowledge within the group: *"we have the chance to share knowledge* […] *communicate person-to-person"* (E/82).

Moreover, advisers are provided with the knowledge they need for the coming registration process at the beginning of a semester, as meetings are held *"before the advisement period"* (E/81). The process task and the necessary knowledge are now reviewed annually by divisional directors and HoDs with staff members who are involved with the process, to ensure all the necessary knowledge to complete the task is available to those who need it for quality assurance purposes. In addition, these meetings allow staff to seek clarification regarding the steps and knowledge necessary to complete the task. The guides are issued to staff members by email. This ensures that the advisers are prepared to carry out the advising accurately and knowledgeably. Advisers are in possession of the necessary documentation from the beginning of the advising process. Files are available for the full academic year and may be accessed at any time to deal with student enquiries. The files include *"Major Sheet, schedule, Student Handbook, Code of Conduct, PUC rules"* (C/15-17) from which the adviser is able to answer student queries in an informed way. The adviser needs to know how to access the files and utilise the information appropriately.

The advisers agreed that they needed to know how to operate the online Moodle platform, in order to progress through the advising steps to registration. Although the student is responsible for the online application, advisers confirmed that they were

deferred to by the student with regard to the online procedure. Knowing how the system works, what information is required and what the student will see on-screen was considered important knowledge for the adviser: "*if I don't have this knowledge, I won't be able to share this knowledge with my students*" (E/152).

5.5 Chapter Summary

This chapter discussed the second of two cases, where the implementation of planned/radical change restructured the Advising Process from manual to digital. By analysing the semi-structured interviews conducted with task facilitators and management, as well as institutional documentation relevant to the change implementation, the pre- and post-change knowledge has been identified. This was accomplished by concentrating on the steps that the staff members took to complete the tasks before the change and comparing these steps with the new steps required by the change. It is by focusing on these steps that the knowledge progression throughout the change implementation period could be recognised and followed from pre-change knowledge to post-change knowledge. The next chapter discusses the findings derived from the two case studies.

Chapter 6: Discussion and Synthesis

6.1 Chapter Introduction

The previous two chapters presented an analysis and discussion of two cases studies — Institute X and Institute Y. This chapter discusses the findings from these two cases studies. The findings are structured in the following sections: Conceptual Framework; Change in Knowledge within a Business Process Undergoing Planned/Radical Change; Knowledge Evolution; Redundant Knowledge; and the Factors Affecting Knowledge Evolution. The contents of this chapter led to the revision of the initial knowledge evolution conceptual framework outlined in Chapter 2. This chapter presents an explanation of the change in knowledge as it evolves within a business process that implemented planned/radical change. Knowledge evolution is the progression of staff members from pre- to post-change knowledge.

6.2 Conceptual Framework

This research investigates how knowledge evolves in business processes that implemented planned/radical change. Planned/radical changes take place during a specific period of time, which shifts the process from a current to a target state (Armenakis and Harris, 2009). Planned change refers to the way organisations manage change (Bryant and Stensaker, 2011). Radical change is a type of change where essential assumptions and organising logic of organisations are taken apart and reconfigured (Lamberg et al., 2009). Planned/radical change is defined as large-scale changes that are organised in advance and approved by the senior management of an organisation. Stensaker and Falkenberg (2007) posit that corporate change initiatives are characterised as business process reengineering (BPR) initiatives. Changes include new information technology systems that enable a number of changes to the organisational structure, work processes, new management roles, new governance principles, and organising work groups within integrated and empowered teams. This thesis addresses how knowledge that is redundant for completing tasks, after implementation of planned/radical change, is identified during knowledge evolution. Knowledge is an important component to complete the required tasks within a business process.

Business processes consist of tasks that staff members should carry out. These tasks require knowledge to achieve specific process outcomes (Kueng, 2000; Berente et al.,

2009). Solymossy and Gross (2015) explain that knowledge and skills are necessary for completing known tasks, regardless of their complexity. Knowledge work in the form of tasks represents the building blocks of individual job activities (Byström and Hansen, 2005). These strands of research suggest that, implementing change in business processes changes the tasks within these processes and, consequently, changes the knowledge required to complete the tasks. In order to address the research questions presented in section 2.9, a conceptual model is developed to investigate the stages of knowledge evolution from pre-change knowledge to the post-change knowledge necessary to complete tasks carried out by staff members after planned/radical change implementation.

An organisation must change, advance and progress in order to survive and compete in its sector, which may be local or global (Kodama, 2001). According to Puustjärvi (2010), a business process is a series of tasks. Weske (2007) defines a business process as a collection of related, structured tasks that realise a specific objective. Dave (2017) defines business processes as any sequence of structured or semi-structured tasks performed in series or parallel by two or more individuals to reach a common goal. The tasks change as a consequence of planned/radical change within business processes: from existing tasks to new tasks required to achieve the change objectives (Braganza and Korac-Kakabadse, 2000). It follows that as business processes change so do the tasks within the processes.

The Knowledge Evolution Conceptual Model, shown in Figure 2.6, is designed to represent the evolution of declarative, procedural and heuristic knowledge, as defined in section 1.6, necessary to complete tasks within business processes that implemented planned/radical change. As shown in section 2.4.4, knowledge evolution is discussed in the existing literature as an accumulation and growth of knowledge. Scholars do not address knowledge evolution during planned/radical change, nor do they consider knowledge evolution in terms of declarative, procedural and heuristic knowledge necessary to complete tasks. In addition, redundant knowledge is discussed in various ways in the literature — for instance, Corredoira and Rosenkopf (2010) consider this type of knowledge with regards to human and social capital, while Dong and Li (2013) examine the concept in technical systems — but scholars rarely examine redundant knowledge in relation to the evolution of knowledge.

The Knowledge Evolution Conceptual Model presented in this thesis was developed to address how knowledge evolves within a business process undergoing planned/radical change. The case studies for this research focused upon two Institutes that met the criteria for study. As the literature explains, there needs to be an existing task in order for change to occur that results in a new task. Where tasks are created for the first time, there will be no pre-existing task-related knowledge in the business process. Sections 4.2 and 5.2 establish that the Institutes met these criteria as the selected processes had moved from manual to digital, thus undergoing planned/radical change. Tables 4.1 and 5.1 show that the processes move from an existing situation to a targeted situation during the implementation of planned/radical change.

The Knowledge Evolution Conceptual Model provides an explanation of business processes undergoing planned/radical change. The existing knowledge required to complete the task before the change —a manual task in Case Studies 1 and 2 — is the first element in this model, which refers to DK, PK and HK required to complete existing tasks prior to the change. As Cane et al. (2012) demonstrate, knowledge is an important element for task completion. The conceptual model recognises an event occurrence: the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process.

The evolution of knowledge is the progression of staff members through the knowledge evolution stages from Stage 1, pre-change knowledge, to Stage 6, post-change knowledge. The event occurrence, which is the announcement of the beginning of planned/radical change, is important for the knowledge to evolve. As Nonaka and Takeuchi (1995) argue, knowledge is static and only becomes dynamic if a trigger sets it in motion. As Park (2015) states, knowledge is a vital element required for the completion of new tasks.

To summarise, the Knowledge Evolution Conceptual Model (Figure 2.6) includes Stage 1 that identifies the pre-change knowledge. For knowledge to evolve within a business process, there should be existing tasks and the necessary knowledge to complete these tasks. Stage 2 is the event occurrence. The evolution of knowledge begins with pre-change knowledge and evolves to post-change knowledge, which is the last stage of the model. The stages between Stage 2 and the last stage have been investigated empirically in this thesis via two case studies.

The three forms of knowledge required to complete tasks are defined in various ways in the existing literature; however, the following definitions are most pertinent to this research:

Declarative knowledge is a set of facts and rules describing a domain of knowledge. It is a structure of knowledge providing an explicit explanation for the domain of knowledge. It is knowledge that serves to describe a specific action to perform a certain task. In addition, it is knowledge that is consciously and intentionally recollected (Vasconcelos et al., 2000; Gottlieb, 2014).

Procedural knowledge is enacting the declarative knowledge into use and employing that knowledge in a series of combined steps and stages in a particular order. Procedural knowledge is a relationship of sequential steps; each step is connected to the other. The type of relationship and connection between the steps form the quality of procedural knowledge. The description of the action for the steps answers the question "How to?" (Vasconcelos et al., 2000; Holcomb et al., 2009; Gottlieb, 2014).

Heuristic knowledge is the bridge between declarative and procedural knowledge, gained through incremental experience (Dion, 2011; Preston et al., 2015). It also involves individuals making decisions and judgements regarding how to deploy DK and PK. Heuristic knowledge is the judgments people make about options they have in uncertain conditions. This individual judgment results in a decision via searching for an explanation to make sense of, and create value from, a situation in order to simplify it. It affects the ability to choose the best options for the individual reacting to current and future events that require changes to be made (Vasconcelos et al., 2000; Holcomb et al., 2009).

6.3 Findings from the Data Analysis and Discussion

The findings from the analysis of the data presented in Chapters 4 and 5 — Change in Knowledge within a Business Process Undergoing Planned/Radical Change; Knowledge Evolution; Redundant Knowledge; Factors Affecting Knowledge Evolution — are discussed in this section.

6.3.1 Change in Knowledge within a Business Process Undergoing Planned/Radical Change

As has been examined in Chapters 4 and 5, both Institutes implemented planned/radical change in their business processes. These changes were planned and approved by senior

management. The business processes in both case studies rely upon and utilise three types of knowledge: DK, PK and HK. Although this was not explicitly identified by the managers or staff members interviewed (see Table 6.1: Interview Evidence for the Change in Knowledge within a Business Process Undergoing Planned/Radical Change for Case Studies 1 and 2, below).

In both cases, knowledge was considered intuitively during planning and implementation of the changes. The senior managers knew that staff members needed to have the knowledge necessary to complete new tasks. They worked to provide this necessary knowledge, but senior managers, middle managers and staff members were unable to differentiate the three types of knowledge: DK, PK, and HK. As the literature shows, DK is important for completing tasks (Khoumsi and Gonzalez-Rubio, 2006). This is also the case for PK (Wu et al., 2013). Having the DK and PK necessary for completing the new tasks positively affects the development of the HK necessary to complete new tasks (Benjamin and O'Reilly, 2011).

Recognition of different types of knowledge is important because it makes knowledge more valuable at the outset of a period of change. This research assists in clarifying the evolution of knowledge necessary to complete new tasks carried out by staff members during periods of implementing planned/radical change. During the implementation of planned/radical change in the two case studies, knowledge evolution starts with the pre-change knowledge. In other words, prior knowledge staff members have to complete existing tasks before the implementation of planned/radical change. Examining the pre-change knowledge begins with the staff members understanding the planned/radical change: first, understanding the new situation after the implementation of change; second, understanding their roles, responsibilities and tasks assigned to them. Based on this, they start to develop new HK that is added to the pre-change HK.

Next, pre-change knowledge is evaluated by staff members. This evaluation, in regard to new tasks assigned to them and the knowledge necessary to complete these tasks, is based on their perception of the planned/radical change and the new tasks. Staff members reassess their pre-change knowledge in light of the new tasks. Based on this assessment, pre-change knowledge is divided into two parts: relevant knowledge and redundant knowledge. The quotes contained in columns 1 and 2 of Table 6.1 demonstrate this. Column 1 shows that interviewees confirm part of the pre-change knowledge is relevant to complete new tasks after implementation of planned/radical change. This involves

reassessment of both pre-change declarative and procedural knowledge, using pre- and post-change heuristic knowledge.

Another result of this assessment of the pre-change knowledge is that the remainder — after DK and PK relevant to completing the new tasks is identified — is redundant knowledge. Column 2 in Table 6.1 contains responses confirming that the remaining pre-change knowledge is superfluous to complete new tasks. This remaining pre-change knowledge is irrelevant for completing new tasks and is redundant knowledge. The redundant knowledge identified via this assessment is only declarative and procedural knowledge.

When planning the radical change, senior managers considered post-change knowledge required by staff members and ways to communicate this knowledge. During the implementation of planned/radical change, new DK necessary for completing new tasks was provided by senior managers explaining and defining the restructuring using rules, regulations and so on. New procedural knowledge, necessary to complete new tasks, was provided by internal experts training staff members to carry out new tasks. A helpdesk team provided hands-on training and support. Column 3 in Table 6.1 contains quotes showing the new knowledge added that staff members need to complete the new tasks.

Staff members are aware of the importance of having post-change DK necessary to complete new tasks. Staff members add new DK and PK to relevant pre-change DK and PK to evolve towards post-change DK and PK. The evolving post-change DK and PK are deployed to complete new tasks in the business process. Senior management monitor results of this evolution by observing and supporting staff members in their new tasks in the business process. At the beginning of this deployment, staff members use their pre- and new HK. By completing the tasks and deploying the evolving post-change DK and PK necessary for these tasks, staff members assess their pre-change HK, identifying the relevant and redundant parts. Staff members add the new HK to the relevant pre-change HK, which evolves into post-change HK. The evolving post-change HK is used to complete new tasks.

The Institutes were unaware of these subtleties because managers had not been exposed to knowledge theory. This would have assisted them to differentiate forms of knowledge and gain the associated advantages. For example, awareness of knowledge definitions and the contribution of DK, PK and HK to task completion allows managers to guide staff members to a better understanding of declarative and procedural knowledge

necessary to complete the new tasks. The ability of staff members to develop heuristic knowledge enhances the completion of new tasks. The implementation of planned/radical change is improved (Zhao et al., 2013).

Declarative, procedural and heuristic redundant knowledge represents the irrelevant parts of the pre-change knowledge. Where this redundant knowledge remains due to a lack of awareness, it may be used in the completion of the new tasks, resulting in the deployment of unnecessary knowledge that may affect task completion. In order to facilitate the ability of staff members to identify redundant DK, PK and HK, the post-change DK and PK has to be provided to staff members to enable them to develop post-change HK.

The quotes contained in Table 6.1 are evidence of the change in knowledge within the business processes of Institutes X and Y that implemented planned/radical change.

Knowledge still needed	Knowledge not needed	New knowledge we need to add
Institute Y		
1- "Part of it (knowledge) yes, it is still needed, like the procedures, the policies, the rules regarding the PUC, the Major Sheet of each student and each Major" (F/50)	5 - "but other than that there is stuff that we really don't need anymore. Like, for example, using Google Documents, and the shared files, and the scheduling in sections and looking for the timetable and all this stuff, we don't need them anymore" (F/51)	10 - "I need to do some more training on looking at what students would see" (H/92)
2 - "I am using part of the knowledge except the process is more efficient" (H/66)	6 - "Now part of that knowledge is not needed because it is thrown on the student" (F/78)	11 - "but, as advisers, the only change and the knowledge needed is how to communicate with the student and advising them face-to-face" (F/79)
3 - "Part of the knowledge is still needed and still need to be reinforced because from one semester to another you can forget" (H/67)	7 - "I am using part of the knowledge except the process is more efficient" (H/66) 8 - "Part of the knowledge is still needed and still need to be reinforced because from one semester to another you can forget" (H/67)	12 - "As an advisor, technologically, we learnt a new process of helping students" (I/6)
4 - "Knowledge-wise, as I said,	9 - (Except for the online	13 - "we need technology,

you still need the same knowledge but then, again, the knowledge are more organised and more written down, like, the instructions" (H/69)	system that was new), "other knowledge was pretty-much the same" (E/159)	understanding of technology, for the new system" (I/31)
Institute X		
14 - "It's the same knowledge, like at the end of the day, if the enrolment doesn't work, we have to have that manual, manual knowledge" (E/80)	18 - "Yes, I agree, it's sometimes, sometimes, again it's to some extent, some things (knowledge) are irrelevant" (M/46)	22 - [Regarding working on Moodle/online system] "yeah, self-learning" (F/84)
15 - "Yes. You need to have the (same as before the change) knowledge. You'll have to have all this knowledge. These are like the basic knowledge which you have to have" (G/46)	19 - "Yes. You need to have the (same as before the change) knowledge" (G/46)	23 - "…So by doing that, I had to study the major sheet and the transcripts of the students […] So all those things I have studied myself" (H/52-56)
16 - "the knowledge that, that I have was basically from my teaching experience" (M/33) 17 - "Some things (knowledge) are relevant, so when it's objective it's relevant, when it's subjective, because it includes emotions" (M/44)	20 - "Some things [knowledge] are relevant" (M/44)	24 - "Now, you need to be fully aware of the rules and regulations of higher education in the country that you are working in" (L/48) 25 - "as well, you would need to be, you need to have special skills of the system now" (L/89)
18 - "So these were important …I would say they are still very important now but I wouldn't say they're now no longer, they are still very important but at least now you can use them in a more organised way now" (L/50-52)	21 - "These are still needed for the new system as well but they were needed more in the old system" (L/46-47)	26 - "we had to learn by myself and we google the solution. And this was something that you need to do self-study" (D/58-59)

Table 6.1: Interview Evidence for the Change in Knowledge from Case Study 1 and 2 (Source: thesis author — adapted from interview transcripts).

6.3.2 Knowledge Evolution

Knowledge evolution is defined as the stages needed for declarative, procedural and heuristic knowledge to evolve from pre-change knowledge to post-change knowledge.

During knowledge evolution, some existing knowledge is found to be no longer relevant or needed to complete new tasks. This knowledge is termed redundant.

The definition developed in Chapter 2 of this thesis states that knowledge evolution is staff members' progression from pre-change to post-change knowledge. As Chen and Liang (2011) state, knowledge changes with a trigger. The event occurrence in and of itself is not the only contributor to start knowledge evolution, nor does pre-change knowledge allow knowledge evolution should it remain static. First, staff members need to understand changes that are to take place within the business process. Second, staff members need to understand their roles and responsibilities within the process: the tasks they are to complete, along with the ways tasks are to be completed.

In the analysis of this aspect of staff members' comprehension, one finding is that as a result of the senior management providing clear explanations of the new tasks staff members were encouraged to evaluate and assess pre-change knowledge and compare it with post-change knowledge. This contributes to the progression of knowledge evolution. Similarly, a lack of understanding of the new task negatively affects knowledge evolution because staff members will not be able to fully evaluate and assess pre-change knowledge.

Staff members use their pre-change HK to complete tasks prior to the change to develop their new HK. The post-change HK, necessary to complete the new tasks, is developed by assessing pre-change DK and PK, and adding new DK and PK to evolve towards post-change DK and PK necessary to complete new tasks. This evolving post-change DK and PK is then deployed by staff members. The staff members make decisions using their pre-change HK and new HK, which they consider in conjunction with the availability of new DK and PK provided by senior managers and experts in the process.

In both case studies, new DK was made available by managers to staff members in the form of new guidelines, rules and the task's structure in various formats, including hard copy, online and meetings. Staff members identified relevant pre-change DK adding this to new DK to make sense of the post-change declarative knowledge. Staff members had declarative knowledge necessary to complete new tasks. Senior managers, middle managers and experts provided staff members with new PK through hands-on training sessions that explained the actions needed to deploy DK to complete new tasks. Staff members deployed the relevant part of pre-change PK and the new PK, which evolved into post-change PK necessary to complete new tasks after planned/radical change. Staff

members were able to identify knowledge relevant to new tasks and, therefore, remaining knowledge became redundant.

The identification by staff members of relevant pre-change, post-change, and redundant DK and PK allowed them to apply the post-change DK and PK to the new tasks in the business process. The deployment of post-change DK and PK allowed staff members to identify relevant pre-change, post-change and redundant HK. The use of knowledge to complete the new tasks resulted in a feedback loop. Where tasks could not be completed, staff members sought or created DK, PK or HK to fill their knowledge gaps.

There is little consideration given in the existing literature of knowledge evolution during the implementation of planned/radical change, nor the stages through which staff members need to progress in order to evolve their knowledge, required to complete new tasks, from pre-change knowledge to post-change knowledge. Scholars have studied knowledge evolution from different perspectives and have developed knowledge evolution models with a focus on systems of knowledge management rather than knowledge itself. For example, Sandhawalia and Dalcher (2011), Storga et al. (2013), and Al-Omari et al. (2014) see knowledge evolution as the growth of knowledge. Easterby-Smith and Lyles (2011) and Storga et al. (2013) examine knowledge evolution as a structure for managing knowledge in specific contexts. Zollo and Winter (2002), Lin (2007) and Lin (2011) investigate the evolution of knowledge management as a system, while Chen et al. (2010) understand knowledge evolution as a strategy to deal with uncertainty during change. Current studies assume that the accumulation, development and growth of knowledge are always relevant to the organisational situation.

In contrast to the existing literature, this thesis focuses on understanding how knowledge required to complete tasks evolves during the implementation of planned/radical change in business processes. Attainment of understanding and comprehension of the new tasks within the business process enhances knowledge evolution. Staff members progress from pre-change DK, PK and HK to post-change DK, PK and HK. How redundant knowledge is identified during this progression is discussed next.

6.3.3 Redundant Knowledge

The management of redundant knowledge enhances business process performance (Sivakumar and Subroto, 2004). Within the literature redundant knowledge is studied

using various perspectives; however, as there seems to be no agreed definition of redundant knowledge, it is necessary to form a definition here.

The extant literature neglects redundant knowledge during planned/radical change. Al-Omari et al. (2014) show the importance of recognising redundant knowledge and removing this during the knowledge evolution process. The study by Al-Omari et al. (2014) is limited and could have gone further by investigating the stages at which redundant DK, PK and HK is identified. Dong and Li (2013) and Lauffs and Holzapfel (2016) avoid dealing with human knowledge. However, the work of Lauffs and Holzapfel (2016) does show that data, information, or knowledge redundancy is an important element of creating and developing efficient systems and processes. Zhang et al. (2014), Shiri et al. (2015) and Karamanos (2015) show networks support innovation by allowing the flow of, and access to, non-redundant knowledge that enhances innovation, and all discuss the importance of identifying the non-redundant knowledge because redundant knowledge does not assist innovation. Watts Perotti et al. (2010) argue that redundant knowledge poses a risk of overwhelming individuals and causing confusion. The existing literature offers a number of definitions of redundant knowledge due to the variety of research foci. In the interests of clarity, following an analysis of the extant literature, this thesis contributes to advancing understanding of redundant knowledge as the subset of pre-change declarative, procedural and heuristic knowledge that is no longer required to complete tasks within business processes after planned/radical change has been implemented. A further contribution of this thesis is, unlike the existing literature, the identification of redundant knowledge within the stages of knowledge evolution. Redundant knowledge is separated from pre-change DK and PK when this is considered in conjunction with post-change DK and PK. Identification of redundant DK and PK is the result of staff members' perceptions of events that have caused the changes and the new tasks to be carried out.

6.3.4 Knowledge Evolution Model

Based on the findings from the case study data, the conceptual model (Figure 2.6) has been revised and developed as the Knowledge Evolution Model. The conceptual model shows the existence of pre-change knowledge, the event occurrence, and the post-change knowledge. The space in the model between event occurrence and evolved knowledge was empirically investigated via two case studies. The analysis of data from these case

studies enabled modelling of the stages of knowledge evolution from pre-change knowledge to post-change knowledge. The data demonstrated that feedback loops exist within these stages, as well as the importance of factors affecting the progression of staff members through the knowledge evolution stages. The Knowledge Evolution Model consists of six stages and is shown in Figure 6.1.

Stage 1 of the model recognises the steady state that organisations are in where there is alignment between existing DK, PK and HK and the tasks that staff members have to carry out. Stage 2 is the starting point for knowledge evolution, namely, when an event occurs. For the purposes of the model, the event is the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process. This creates a new situation that staff members have to face and address. Staff members become aware that new tasks will be introduced within business processes. The following three stages inhabit the knowledge evolution domain. These stages are when staff members evolve their pre-change knowledge into post-change knowledge. There is a feedback loop in the progression of knowledge evolution stages that returns staff members to Stage 3. Here, staff members seek better comprehension of the planned/radical change and the new tasks. This feedback loop could be repeated several times, as staff members acquire a better understanding of the change and new tasks, until the staff members reach Stage 6: where they have the evolved post-change DK, PK and HK. Progression through the stages is affected by several factors. These factors are discussed in further detail in section 6.3.5 below.

Knowledge Evolution Model

Radically Changed Business Process

1- * Pre-change DK, PK, HK

2- Event Occurrence

F → **Leaving the Radically Changed Business Process**

F

Knowledge evolution domain

3- Comprehension of planned/radical change

4- Diagnosis of Knowledge

Existing & New HK

Redundant DK, PK

Relevant Existing DK, PK

New DK, PK

5- Deploy Knowledge

Redundant HK

Relevant Existing & New HK

Feedback

6- ** Post-change DK, PK, HK
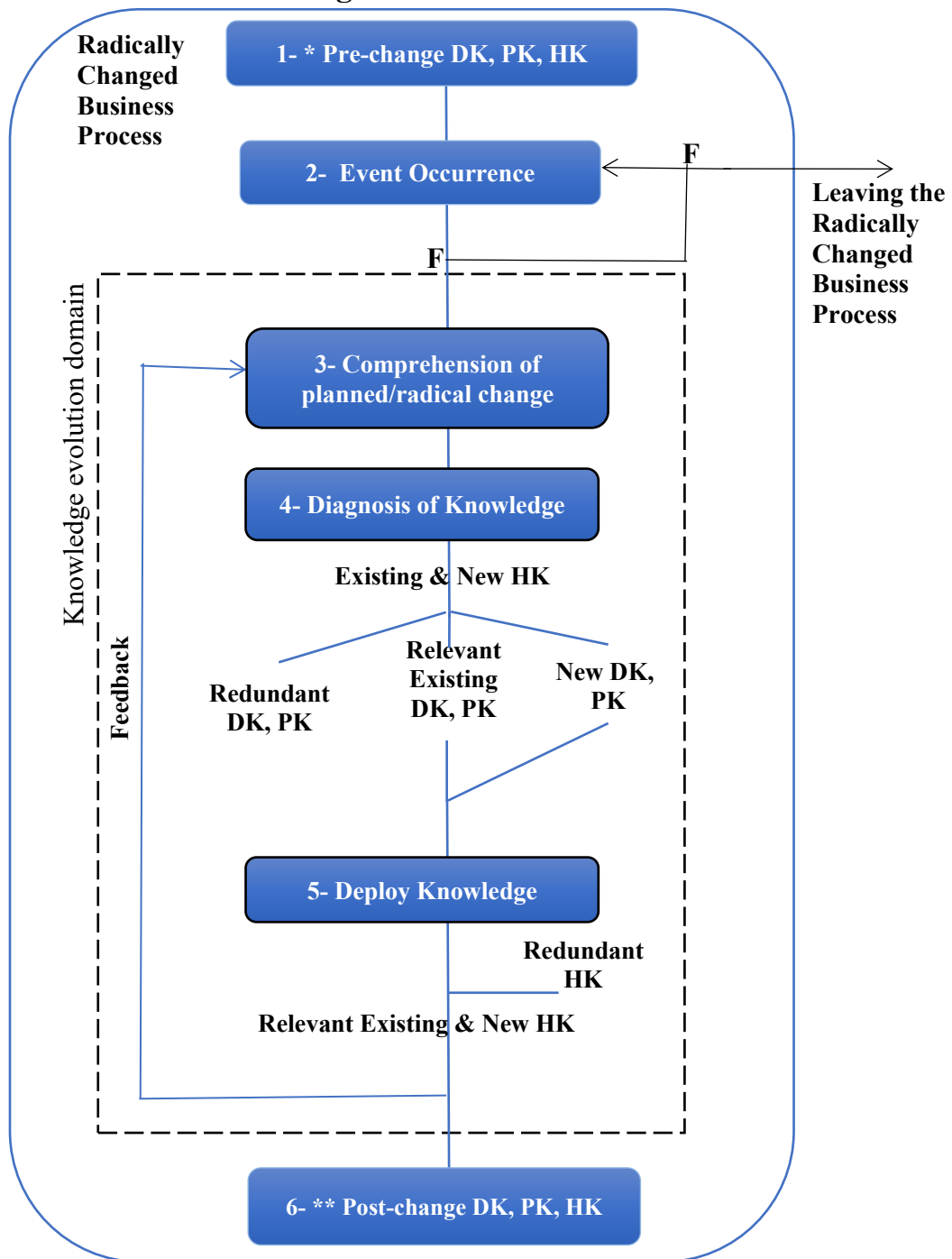
K: Knowledge
DK: Declarative Knowledge
PK: Procedural Knowledge
HK: Heuristic Knowledge
F: Factors Affecting Knowledge Evolution
* Knowledge required to complete the task before the event occurred
** Evolved knowledge required to complete the new task

Figure 6.1: Knowledge Evolution Model (Source: thesis author).

6.3.5 Factors Affecting Knowledge Evolution

The factors affecting knowledge evolution presented here emerged from the analysis of the two case studies. Before examining the factors affecting knowledge evolution specifically, it will be useful to provide an overview of literature that discusses factors that affect knowledge management. Chong and Choi (2006) posit that there are eleven factors to knowledge management implementation: employee training; employee involvement; team working; employee empowerment; senior management leadership and commitment; information systems infrastructure; performance measurement; knowledge-friendly culture; benchmarking; knowledge structures; and elimination of organisational constraints.

Numerous scholars have developed a range of other factors that include leadership, investing in people, and developing supporting organisational conditions — for example, technical infrastructure and secured knowledge structures (Chourides et al., 2003; Jennex and Olfman, 2004). Anantatmula and Kanungo (2010) mention IT as an enabler of knowledge management. Akhavan et al. (2006) state the following as being among the critical success factors for knowledge management: knowledge strategy, training programmes, CEO support and commitment, and business process reengineering. Mathi (2004) identifies key success factors in implementing knowledge management within organisations as: culture, knowledge management organisation, strategy, systems and IT infrastructure, effective and systematic processes and measures.

According to Bell DeTienne et al. (2004) and Mehta (2008), the key factors that contribute in general terms to effective knowledge management are human and technical. Bollinger and Smith (2001) propose that human behaviour is the key to success or failure of knowledge management activities, as knowledge management involves an emphasis on organisational culture, teamwork, the promotion of learning, and the sharing of skills and experience.

The factors identified in the literature are discussed from a knowledge management perspective. However, some of these factors affecting the success of knowledge management implementation are similar to the factors that affect knowledge evolution, set out below, and have an impact upon progression through the knowledge evolution stages.

No	Factor	Quote (e.g. A/5)
Institute X		
1	Attitudes of staff members towards change	The common denominator between people and resistance and acceptance is the attitude (B/82) All the updates are very good (H/76)
2	The advantage to the staff members of the planned/radical change that takes place	It's easier for us now (E/61) We found that it's…very convenient and it is much more better authentic, so we started doing this (H/18)
3	The complexity of the new tasks for the staff members	The process starts online and ends online. So, we have a clear track record of every step of the process (B/14) A simple task, so they have their checklist, ok, in the application, and they need to complete it (C/27)
4	The support provided to staff members within the business process	Encouraged our employees to feel confidence (B/29). We even give grace period for people to shift and to change (B/55) We always have virtual helpdesk for them (B/7) So, we have to tackle the IT and receive some support on a continuous basis for the first year until all those were resolved (L/96)
5	The availability of DK needed to complete the new tasks	We have a determined policy in our Faculty Handbook explaining how to evaluate this A/10, The Handbook it contains all the policies and the procedures and the by-laws related to the work environment (A/33) Wanting to have everyone knowing the other tasks so in peak times they will be helping others (C/66)
6	The availability of PK needed to complete the new tasks	In every level we give them training. Sometimes one-on-one, sometimes on individual, on group sessions on department level and we always have virtual helpdesk for them (B/70) That is "How To": how to do things like how to apply for your vacation, so step-by-steps you have to go online to this address then you have to select the process and you are initiated (A/2) Then there will be a help session. So, we give them the knowledge on the spot (A/42)
7	The commitment and determination of the management	So, we start with a vision, and then we start with the tools (B/45). Whenever they bring a paper and they bring a signed paper to our offices, that doesn't work anymore (B/107) [Deans] without their support, um, we could not have won these fights with other departments (B/36)
8	The recognition of the HK needed to complete the new tasks	So, everybody was collectively involved and everybody knew about what was happening (D/44) Start telling people and getting their feedbacks on it, because people are the key element of making this change successful (B/50)
Institute Y		
1	Attitudes of staff members towards change	They love the system (K/34). Everyone they do a good job and it was a proven system (K/46) And this is natural…when they see the result, they will stand by you (C/89)

2	The advantage to the staff members of the planned/radical change that takes place	They try to make it easy to understand… and after this everything good (K/34)
		The benefits here first of all it reduces the workload on us as an adviser (E/138). It reduces also the human errors factor (B/8)
3	The complexity of the new tasks for the staff members	Try to keep trying to clarify any hitting points or any big issues to settle (K/33)
		Through explanation and clarification of things, then it was easier to implement and the knowledge was easier disseminated (D/57)
4	The support provided to staff members within the business process	The IT team were with them all the steps (K/47)
		We have met with the President of the College (E/25)…with our HOD, Head of the Department (E/26)
		We have been monitoring and supporting them (H/5). There was a whole support system, we were all helping each other and the academic, the registration department was there, helping us to set it up (H/43)
5	The availability of DK needed to complete the new tasks	We compose manuals with all the details taking from all sides (K/25). We printed some manuals (K/36). To make the manual for the adviser to keep improvement and for continuance learning (K/40)
		We came out with a clear guidelines…whereas we looked at all the course requirements (D/38)
6	The availability of PK needed to complete the new tasks	We had proper sessions, training sessions, which there were discussions and we were trained, to understand the system (H/34)
		… workshop on the system to use, we gave them a workshop on the prerequisites (C/46). They had a mandatory workshop for staff and faculty to inform them of this (C/47)
7	The commitment and determination of the management	Once you are determined and you know that you are doing the best for everybody it works well (B/41)
		The President and the Directors of the College provided the training at the beginning (H/36)
		(HoD) very knowledgeable, very knowledgeable and supportive...all the information that you could ask is available (J/138)
		Director of Student Affairs and the HoD's were available at the whole time (C/81)
8	The recognition of the HK needed to complete the new tasks	We started to discuss having brainstorming sessions with the team members (E/24)
		We had several meetings at the beginning of the academic year, in the mid of the academic year and before the advising period itself (C/26)

Table 6.2: Interview Evidence for the Existence of Factors Affecting Knowledge Evolutions (Source: thesis author — adapted from interview transcripts).

Table 6.2 shows a sample of evidence from the data collected in the two case studies. One finding is that staff members recognise that there are certain elements that affect their ability to complete new tasks after the change. These elements are developed in this thesis as factors affecting progression through the knowledge evolution stages. Achieving the post-change knowledge — the DK, PK, HK necessary to complete the

new tasks — is reliant on these factors assisting, rather than delaying, staff members. These factors are as follows:

- Attitude of staff members towards change

The attitude of staff members is important as it affects the progression through the knowledge evolution stages. Staff members who accept the changes take a more positive approach and adapt to these changes. This encourages them to move forward, overcome obstacles and challenges, and assists them to cope with problems and difficulties they may encounter. Preparing individuals for the coming changes affects their attitude and increases acceptance, leading to a positive view of the change (Vakola, 2014). Greater understanding of the changes results in a positive enhancement of attitude among the staff members (Alas et al., 2009). With a positive attitude, staff members are likely to be self-motivated and willing to put more effort into acquiring the post-change DK, PK and HK necessary to complete new tasks.

A negative attitude from staff members impedes progression through the knowledge evolution stages. They might not be motivated enough to overcome obstacles and challenges. This impacts upon staff members evolving the post-change knowledge and this might affect the completion of these tasks.

- Advantages to staff members of planned/radical change

Staff members who realise and appreciate the advantages and benefits they accrue following the change in the business process perform more positively (Bjorkman, 2009). This encourages and motivates them to participate, move forward, apply more effort, solve problems, and to seek post-change knowledge. This would help their progression through the knowledge evolution stages. Therefore, knowledge evolution is achieved in a more effective manner, which enhances the completion of planned/radical change.

Staff members who perceive fewer advantages to them, may not accept their roles and responsibilities in the new business process. They may not be motivated to move forward and progress through the knowledge evolution stages. The progress of staff members through the knowledge evolution stages may either be slow, or they may not reach the post-change knowledge stage. This may prevent completion of the planned/radical change.

- Support provided to staff members within the business process

The extent to which support is provided to staff members, by senior managers and supervisors, during the period of implementing planned/radical change is important (Alas et al., 2009). This occurs in different ways: hands-on, continuous support; steps laid out to clarify new tasks; effective communication, cooperation and assistance among colleagues; and approval from middle management to confirm that staff members are carrying out new tasks correctly.

Support for staff members affects their progression through the knowledge evolution stages, as it identifies difficulties and challenges that staff members are facing. The difficulties and challenges are addressed by senior managers and supervisors to enable staff members to reach the post-change knowledge stage. This support for staff members allows them to retrace their steps. They might need to do this to improve their comprehension of the implementation of planned/radical change in order to overcome challenges and difficulties, and fill gaps identified during progression through the knowledge evolution stages.

In business processes where support for staff members is not provided or support is inadequate, progression of staff members through the knowledge evolution stages could be adversely affected. Staff members can become stuck at any stage. They reach the post-change knowledge stage later than projected by managers or supervisors. This affects gaining the post-change knowledge and the completion of new tasks.

- The availability of DK and PK necessary to complete new tasks

The availability of post-change DK and PK necessary to complete new tasks affects progression of staff members through the knowledge evolution stages. When post-change DK and PK are available in a clear and timely manner, staff members' ability to complete new tasks is improved.

DK describes an explanation to understand and be able to perform a particular task (Vasconcelos et al., 2000; Gottlieb, 2014). The post-change DK needed to complete new tasks is important as it enables staff members to define the new task's structure, and to be aware of new rules and regulations. Pasternak and Bailey (2004) argue that our knowledge about something is DK. It follows that in situations where DK is absent, either as a whole or in part, staff members are unable to complete new tasks efficiently.

PK is the application of DK in a series of actions to complete new tasks. PK is knowing, step by step, how to compete the task (Baroody et al., 2007). If the post-change PK needed to complete new tasks is not made available to staff members, they will be unable

to complete new tasks. This is because the absence, complete or partial, of the post-change PK necessary to complete new tasks leads to staff members using pre-change PK, complete or partial, that is not suited or applicable to the completion of new tasks. Therefore, new tasks may not be completed in the correct way.

- The complexity of new tasks for staff members

Tasks within business processes differ in their complexity and this remains the case during the implementation of planned/radical change. The complexity of new tasks within the business process should be managed to provide effective understanding (Osburn et al., 2015), to enable staff members to diagnose and deploy knowledge. This facilitates progression through the knowledge evolution stages to the evolved post-change knowledge. In situations where new tasks are complex and unclear, staff members may not comprehend the changes and the new tasks included within the business process. Their ability to diagnose and deploy the post-change knowledge is hampered. In turn, progression through the knowledge evolution stages is slower.

- The commitment and determination of management

During the period of implementing planned/radical change within a business process, management commitment and determination has a significant impact upon the completion of new tasks (Osburn et al., 2015) and also the knowledge evolution progression of staff members. Management commitment and determination assists staff members to achieve post-change knowledge. It is important that management actively follow up and provide feedback on progression through the knowledge evolution stages and ensure that staff members within the business process engage with these stages, rather than getting stuck at a point in the evolution. The post-change knowledge is better achieved, and the new task completion enhanced.

Where this commitment and determination is not pursued, the follow up system might not be effective. The progression of staff members through the knowledge evolution stages might be affected in a negative manner. The evolved post-change knowledge may not be achieved, and the completion of the new tasks may be negatively affected.

- The recognition of HK needed to complete new tasks

The post-change HK needed to complete the new tasks is reached by progression of staff members through the knowledge evolution stages. It is important that managers recognise and value staff members' HK within business processes (Liu et al., 2013;

Wildemuth et al., 2013). Recognition of this HK encourages staff members to apply more effort towards developing the post-change HK needed to complete new tasks. Non-recognition of HK discourages staff members from applying effort towards developing the post-change HK necessary to complete new tasks. This may have a negative effect on achieving evolved post-change HK and so the task completion will be adversely affected.

The Knowledge Evolution Model illustrates that these factors represent decision points where the factors influence staff members and affect their progression through the knowledge evolution stages. The completion of new tasks is dependent upon the interrelations between these factors.

6.4 Chapter Summary

This chapter discussed the analysis of the case studies under the headings: The Conceptual Framework; Change in Knowledge within a Business Process Undergoing Planned/Radical Change; Knowledge Evolution; Redundant Knowledge; and the Factors Affecting Knowledge Evolution. The research included here led to the revision of the knowledge evolution conceptual framework developed in Chapter 2, and facilitated the creation of an empirical model: the Knowledge Evolution Model. This chapter also provided an explanation of the change in knowledge, necessary for staff members to complete tasks, as it evolves within a business process undergoing planned/radical change. This evolution is the progression of staff members from pre-change knowledge to post-change knowledge.

Having illustrated the elements of this thesis based on the case study analyses in this chapter, the following chapter presents the contribution to the literature of knowledge management and change management. Chapter 7 discusses the contribution to these scholarly fields regarding gaps in the literature, theory, and practice.

Chapter 7: Contributions

7.1 Introduction

This chapter explains the contributions made by this thesis, namely the Knowledge Evolution Model, an exposition of redundant knowledge and explicates factors that affect knowledge evolution. The theoretical framework of dynamic capabilities underpins these contributions. The implications of knowledge evolution to practice are set out. This research addresses the gap between the knowledge management and change management bodies of literature. It provides a foundation from which to gain deeper insights into the effects of knowledge upon the implementation of planned/radical changes to business processes within organisations.

7.2 Contribution to Theory

This section explains the contribution to theory by exploring: the Knowledge Evolution Model and its stages; identifying redundant knowledge during these stages; explaining the factors affecting knowledge evolution; the utilisation of post-change knowledge within a business process to create a dynamic capability for the organisation.

7.2.1 Contribution to the Literature

The declarative, procedural and heuristic knowledge necessary to complete tasks within business processes has received scant scholarly attention. Consequently, the literature lacks definitions regarding knowledge in the context of business process management. Scholars recognise the importance of having correct knowledge, as this enables staff members to complete tasks in an efficient manner (Willett et al., 2014; Park, 2015; Saastamoinen and Järvelin, 2016; Pesch and Bouncken, 2017). There has been a noteworthy increase in research papers addressing planned/radical change. However, few of these papers explore connections between planned/radical change and knowledge, and, specifically, the knowledge necessary to complete tasks carried out by staff members within business processes during periods of planned/radical change. The literature discussing radical change focuses on simultaneous organisation-wide change but not on the steps required to implement changes (Dominguez CC et al., 2015). Radical change brings new structures, regulations and tasks to business processes, requiring staff members to adapt their knowledge to implement changes effectively (Zhao et al., 2013;

Feng et al., 2016). This thesis examines the declarative, procedural and heuristic knowledge necessary to complete tasks within business processes. This study suggests that knowledge acts as a constraint on the implementation of planned/radical change. Where knowledge evolves from pre-change to post-change knowledge, the implementation of planned/radical change proceeds more smoothly. On the contrary, where knowledge evolution is hampered, for instance when employees continue to use redundant knowledge, the implementation of planned/radical change is disrupted.

Knowledge evolution is discussed in the literature from different viewpoints. Some scholars consider knowledge evolution to be a knowledge management system, while others consider it to be a process of knowledge growth and accumulation (Zollo and Winter, 2002). The existing literature barely examines the changes that happen to knowledge during the implementation of planned/radical change. Extant research studies assume that most, if not all, pre-change knowledge should be preserved and overlook redundant knowledge.

The identification of redundant knowledge, which occurs during knowledge evolution, is scarcely recognised by scholars investigating redundant knowledge. Redundant knowledge is examined from various perspectives within the literature. As a result, different definitions of redundant knowledge exist depending on the focus of the particular study. For example, Molina-Morales and Expósito-Langa (2013) define redundant knowledge as surplus knowledge that is often duplicated. This thesis defines redundant knowledge as a subset of pre-change knowledge no longer needed to complete new tasks within business processes that have implemented planned/radical change. Redundant knowledge needs to be distinguished from pre-change knowledge that remains useful after the changes are implemented.

The factors affecting knowledge evolution have been discussed in the literature from different viewpoints. There are similarities between those factors examined in the knowledge management literature and factors presented in this thesis. However, previous discussions focus on factors influencing knowledge management practices. Scholars have shown that numerous factors improve implementation of knowledge management. This thesis extends current thinking by explicating the effects the factors have on knowledge evolution during periods of planned/radical change. The gaps in the literature regarding the interrelationships between knowledge and change are addressed below.

Implementing and managing planned/radical change in organisations continues to be a matter of scholarly interest. In the knowledge management and change management literature there has been a great deal of work done regarding knowledge and change as separate topics. Scholars rarely examine the integration of knowledge and change, and the knowledge necessary to complete tasks in a business process undergoing planned/radical change. The value of information, skills and experience as resources within a period of change implementation is recognised (Willett et al., 2014; Solymossy and Gross, 2015; Park, 2015; Saastamoinen and Järvelin, 2016; Pesch and Bouncken, 2017). This study argues that knowledge is a vital resource for implementing planned/radical change (Lucas, 2010). Analysing pre-change knowledge and evolving post-change knowledge enhances task completion and, therefore, change implementation. This knowledge evolution includes recognising redundant knowledge to prevent this being carried forward into new tasks. The literature studying redundant knowledge considers the importance of identifying this kind of knowledge from different perspectives; however, existing literature investigating redundant knowledge gives scant attention to identifying and ensuring this knowledge is not carried forward into new tasks. In addition, the existing literature does not discuss redundant knowledge in relation to the progression of staff members through the knowledge evolution stages. This study sets out the knowledge evolution stages in which redundant knowledge becomes apparent and, moreover, establishes the interplay of redundant knowledge and knowledge evolution.

Knowledge management scholars have identified a number of factors affecting knowledge management implementation, which are studied in numerous contexts that are discussed below. The factors that affect knowledge management have been shown to affect the efficacy of knowledge management within an organisation. This thesis adds to the literature by defining the affects these factors have on the progression of staff members through the knowledge evolution stages during planned/radical changes.

Knowledge Evolution Model

The Knowledge Evolution Model, depicted in Figure 6.1, consists of six stages. These stages set out conceptual paths that staff members traverse to evolve their knowledge to perform their tasks within business processes. During the implementation of planned/radical change these tasks are transformed from current tasks to redesigned tasks necessary for the change to be achieved. Knowledge is an important element to complete

these tasks properly. Consequently, in cases where tasks change the knowledge necessary to complete the tasks will change accordingly (Cane et al., 2012; Willett et al., 2014; Park, 2015; Saastamoinen and Järvelin, 2016; Pesch and Bouncken, 2017). DK, PK and HK are important to complete tasks. The completion of tasks relies on staff members having the knowledge necessary to complete the tasks (Macpherson, 2003; Radakovĭc et al., 2012). Planned/radical change to business processes produces innovative results via new tasks (Ritala and Hurmelinna-Laukkanen, 2013). In cases where staff members do not have the necessary post-change knowledge, tasks may not be completed properly (Zhao et al., 2013; Kirkman, 2016; Vershinina et al., 2017). DK provides facts about tasks, while PK covers the steps to carry out tasks (Ross et al., 2015). HK refers to expertise and common sense (Dion, 2011). HK assists staff members in being proactive in enhancing knowledge that improves task completion (Grasso, 2010; Hulme et al., 2011; Petherick, 2012; Preston et al., 2015). Therefore, an understanding of knowledge evolution is essential to the implementation of planned/radical change.

Staff members who lack the requisite post-change knowledge will use their existing knowledge, not all of which will be relevant to the new tasks and redesigned processes. Therefore, redundant knowledge is used to complete new tasks and, as a consequence, new tasks may not be completed properly. Staff members revert to carrying out tasks in the way they did prior to the change because the tasks match their knowledge. Staff members should have the post-change knowledge as planned/radical change in a business process changes the tasks and requires knowledge to evolve from pre- to post-change knowledge. As Steigenberger (2015) states, new knowledge and understanding the change is necessary for its implementation. Staff members who lack post-change knowledge tend to resist change. A reliance on pre-change knowledge leads staff members to fill their knowledge gaps from sources that are not relevant to completing the new tasks. When staff members understand tasks, and have the necessary knowledge to complete tasks, this enhances task completion (Khatri et al., 2006; Cane et al., 2012).

The literature discussing knowledge evolution tends to consider single stage changes and does not examine the progression from pre-change knowledge to post-change knowledge. While some scholars discuss knowledge evolution they tend to see the evolution of knowledge as accumulation and growth of knowledge. The Knowledge Evolution Model contributes to the literature by providing a set of stages for achieving knowledge evolution in a business process undergoing planned/radical change.

This thesis presents a model of stages of knowledge evolution for moving from existing tasks to new tasks within a business process undergoing planned/radical change. This model demonstrates the importance of staff members working to understand the event and begin to diagnose knowledge, thus developing a more valuable resource for use in implementing changes to business processes undergoing planned/radical change.

Each of the Knowledge Evolution Model stages is outlined here and then expanded upon below. Stage 1 represents existing knowledge — DK, PK and HK — needed to complete tasks (Park, 2015) prior to an event occurrence. Stage 2 is an event, specifically the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process. Stage 3 is where staff members understand the planned/radical change (Liu et al., 2013; Willett et al., 2013). Stage 4 is the diagnosis by staff members of pre-change DK, PK and HK in relation to post-change DK, PK and HK. Stage 5 is the deployment of the knowledge into the new tasks. Feedback and feedforward loops occur during Stages 3, 4 and 5, which resolve and overcome challenges and difficulties. These loops repeat several times, depending on the complexity of the new tasks (Jackson, 2007; Yuen et al., 2012; Preston et al., 2015). Once issues arising in Stages 3, 4 and 5 are resolved, staff members progress to Stage 6, which is evolved post-change knowledge — DK, PK and HK — necessary to complete new tasks. The stages included in the Knowledge Evolution Model are as follows:

- Stage 1: Pre-change Knowledge

Evolution is a process of change from one state to a more efficient state, keeping that which is working well for development (Cambridge Dictionary). A business process consists of existing tasks with pre-change knowledge prior to a planned/radical change. This pre-change knowledge is the starting point for knowledge evolution in this model. Knowledge evolution is the progression of staff members from pre-change knowledge to post-change knowledge following an event occurrence. As Chen and Liang (2011) state, knowledge does not change without a trigger.

Stage 1 includes pre-change declarative, procedural and heuristic knowledge that already exists and is necessary to complete tasks in processes prior to planned/radical change. Where tasks are created for the first time, there will be no pre-existing task-related knowledge in the business process.

- Stage 2: Event Occurrence

The announcement to staff members by senior management that the implementation of planned/radical change is beginning in a process acts as a trigger for knowledge evolution to begin. In cases where the event does not occur, existing tasks in the process continue as before because knowledge necessary to complete the tasks already exists.

- Stage 3: Comprehension of the Planned/Radical Change

The existing literature shows that providing clarity to staff members about their roles and responsibilities is important for change implementation (Feng et al., 2016). This thesis demonstrates that this is essential for the evolution of knowledge necessary to complete tasks carried out by staff members in a business process undergoing planned/radical change. The progression of knowledge evolution is maintained by providing staff members with an explanation of the proposed changes in various forms: an overview, documented guidance in the form of hard copies or digital materials, clarifying staff members' roles and responsibilities in new tasks that they have to complete. During Stage 3 staff members need to know how they are to complete new tasks following the implementation of change. Staff members need to make sense of the planned/radical changes or they may not be able to evaluate and identify the post-change knowledge, thus affecting knowledge evolution progression. The way in which planned/radical change is understood by staff members is dependent upon the factors discussed below. Stage 3 is part of the knowledge evolution domain as this is the first time we can identify knowledge as evolving.

- Stage 4: Diagnosis of the Knowledge

There is a need for staff members to evaluate the pre-change DK and PK in relation to the post-change DK and PK. They do so by diagnosing new tasks being developed and making decisions concerning pre- and post-change knowledge and redundant knowledge. At this stage, staff members use existing pre-change HK and consider pre-change DK and PK. During this period of discussion and planning regarding new tasks, staff members identify pre-change DK and PK — which also allows them to recognise redundant knowledge. This allows for the development of new HK, which is added to the pre-change HK. Staff members begin to identify pre-change DK and PK that is relevant to post-change tasks, and to consider pre-change DK and PK that will be redundant in the

post-change environment. This allows staff members to evolve pre-change DK and PK to the post-change DK and PK necessary to complete new tasks.

According to the Knowledge Evolution Model, the knowledge being diagnosed comprises the DK and the PK, which are linked and considered using the HK. As Preston et al., (2015) state HK assists the enhancement of organisational knowledge that improves task completion. As the case studies show, staff members understand the general situation regarding planned/radical change within a business process and link the knowledge to a specific task. HK assists in meeting challenges faced during periods of change, allowing staff members within the organisation to be proactive in enhancing organisational knowledge that improves task completion. Staff members identify changes and deal with challenges, which assists them to build new knowledge via trial and error. Kirkman (2016) notes that effective knowledge management allows staff members to link existing knowledge with new knowledge.

Mayfield and Mayfield (2015) state that staff members' decision making tends to involve the requirements of specific existing and new work tasks, process effectiveness, and role-specific goals. Staff members can make mistakes during tasks where they do not have the knowledge necessary to complete the tasks (Frese and Keith, 2015; Amankwah-Amoah, 2015; Henderson and Smith-King, 2015; Intindola et al., 2016; Cristofaro, 2017; Vershinina et al., 2017).

- Stage 5: Deploy Knowledge

Stage 5 is where relevant pre-change DK and PK is added to new DK and PK which evolves into post-change DK and PK necessary to complete new tasks in the process. Furthermore, active deployment of evolving post-change DK and PK requires staff members to decide which parts of the pre-change HK are relevant to complete new tasks while identifying redundant HK. Tsoukas and Viladimirou (2001) show that staff members develop their HK through practice and by performing tasks.

There is an opportunity for feedback following deployment of evolving post-change knowledge, identifying task mistakes, difficulties in completing new tasks, and addressing challenges. Feedback loops occur in the progression through knowledge evolution stages that return staff members to earlier stages. Kirkman (2016) argues that staff members need new knowledge to implement change. A lack of the necessary knowledge means that staff members have to rely on trial and error when completing new tasks. Staff members seek to make sense of planned/radical changes and new tasks

(Weick, 2005), which occurs at this stage in the model. This enables them to continue progressing through later stages of the Knowledge Evolution Model. A feedback loop could be repeated several times, depending on the factors affecting knowledge evolution, until staff members progress to Stage 6: evolved post-change knowledge.

- Stage 6: Evolved post-change DK, PK and HK

At Stage 6, staff members have the evolved post-change DK, PK and HK to complete new tasks. This stage represents the completion of staff members' progression through the knowledge evolution stages, including identification of redundant DK, PK and HK.

The recognition of these stages and their impact on the completion of new tasks after implementation of planned/radical change represents a central element of this research's contribution to the fields of knowledge management and change management. Table 2.5 summarised the knowledge evolution elements within the extant literature, while Table 7.1 updates Table 2.5 to demonstrate this research's contribution to the literature.

Year	Author(s)	Knowledge Evolution Elements
2017	Alyaseen	Knowledge evolution stages from pre- to post-change knowledge

Table 7.1: Knowledge Evolution Elements Update (Source: thesis author)

Redundant Knowledge

Redundant knowledge has been studied from different perspectives within the literature. This thesis defines redundant knowledge — DK, PK and HK — as a subset of pre-change knowledge no longer needed to complete new tasks within business processes that have implemented planned/radical change. This thesis provides a different perspective from the extant literature regarding redundant knowledge and demonstrates a way of identifying such knowledge. This contribution adds to the literature by showing how knowledge which is no longer necessary to complete tasks is identified during the staff members' progression through the knowledge evolution stages. It is useful for researchers to recognise the importance of the existence of redundant knowledge and the impact of this redundant knowledge on task completion.

Redundant knowledge is identified within the knowledge evolution domain by staff members as they progress through the stages of the Knowledge Evolution Model. Staff members diagnose pre-change DK and PK in relation to post-change DK and PK. Staff members progressing through Stage 4 identify the irrelevant part of their pre-change DK and PK that is no longer needed to complete new tasks. This is redundant knowledge.

This identification of redundant DK and PK is a result of: staff members' comprehension of the new tasks; their ability to diagnose knowledge; and availability of new DK and PK necessary to complete new tasks within the business process.

Staff members need to identify redundant DK and PK so that they can deploy evolving post-change DK and PK to carry out new tasks — Knowledge Evolution Model Stage 5. They are then able to identify redundant HK, which is the part of their experience that is no longer needed to complete new tasks. HK is evaluated through practice. Staff members move beyond the knowledge evolution domain and progress to Stage 6, evolved post-change knowledge.

These activities of identifying redundant knowledge, which take place during staff members' progression through the knowledge evolution stages, are influenced by factors discussed in greater detail below.

Factors Affecting Knowledge Evolution

The presentation of these factors, as part of the research findings, adds to the literature by linking them to knowledge evolution. Some of the factors affecting knowledge management implementation are similar to the factors that affect knowledge evolution (DeTienne et al., 2004; Yu et al., 2004; Jennex and Olfman, 2004; Ward and Aurum, 2004; DeTienne et al., 2004; Mathi, 2004; Hariharan, 2005; Robbins, 2005; Koh et al., 2005; Chong and Choi, 2005; Leidner et al., 2006; Kumar and Idris, 2006; Akhavan et al., 2006; Jansen et al., 2006; Akhavan et al., 2006; Mehta, 2008; Singh, 2008; Anantatmula and Kanungo, 2010; Chen et al., 2010; Donate and Guadamillas, 2011). It is useful for scholars to recognise these factors and to understand the impact they have on knowledge evolution in business processes undergoing planned/radical change. This is because these factors affect the progression of staff members through the knowledge evolution stages, and will be present in varying degrees depending on the circumstances of a business process within an organisation; for example, the support provided to staff members. The attitude of staff members is important as it affects progression through knowledge evolution stages. A negative attitude affects progression through the knowledge evolution stages in a negative way. Their progression could be slowed because they might not be motivated enough to overcome challenges, which affect task completion. The completion of tasks is enhanced when staff members appreciate the advantages and benefits they will experience following the implementation of

planned/radical change in the business process. A lack of recognition of change-related benefits slows the progress of staff members through the knowledge evolution stages and may prevent completion of new tasks.

Managerial support for staff members affects their progression through the knowledge evolution stages, as managerial support helps identify and address difficulties and challenges that staff members face. Where this support is not provided, or support is inadequate, the progression of staff members through the knowledge evolution stages could be adversely affected with knock on consequences for task completion.

Knowledge is important to tasks within a business process. DK is needed to understand and define new task structures, roles and regulations. PK is important for deploying DK into a series of steps to complete tasks. For staff members to be able to progress through the stages, post-change DK and PK are needed to complete new tasks, and this influences their progression through the stages. Missing or incomplete post-change DK and PK negatively influences the progress of staff members through the stages and affects reaching Stage 6: evolved post-change knowledge.

The degree of clarity and complexity of new tasks affects the progression of staff members through the knowledge evolution stages (Kuhlthau, 1993; Vakkari, 2001; Haerem and Rau, 2007; Saastamoinen and Järvelin, 2016). Therefore, staff members need to receive clear explanations of tasks to be completed. They should be aware of and comprehend the planned/radical changes taking place in order to be able to continue progressing through the stages of the Knowledge Evolution Model. Furthermore, non-recognition of HK discourages staff members from applying effort towards developing their HK needed to complete the new tasks (Kreiner, 1999).

7.2.2 Contribution to Dynamic Capability Theory

Dynamic capability theory explains an organisation's capability of managing, integrating, building and reinforcing internal and external competencies to address rapidly changing environments (Teece et. al., 1997). Teece states that this theory refers to the organisation's ability to generate knowledge, and the sustained capacity of the organisation to create dynamic competitive advantage (1997). An understanding of knowledge evolution assists staff members to adapt to planned/radical change within business processes. Knowledge evolution is a dynamic capability that can be used to

restructure and strengthen an organisation's competences, and so enhance performance and the organisation's ability to survive (Cheng and Liang, 2011).

As this theory describes the ability of the organisation to manage knowledge as an intangible resource, this research contributes to DCT by improving the capability of an organisation through understanding how pre-change knowledge evolves into post-change knowledge within business processes. When staff members have post-change knowledge, this enhances completion of new tasks and implementation of planned/radical change. Implementing planned/radical change within business processes enables organisations to respond to rapid developments in the external environment and so enhances organisational performance (Lucas, 2010). The interplay between DCT and post-change knowledge represents a central element of this research's contribution to the fields of knowledge management and change management.

7.3 Implications for Practice

For managers to enhance the implementation of planned/radical change within a business process it is vital for them to understand the importance of the knowledge necessary to complete the tasks in its three forms: DK, PK (Khoumsi and Gonzalez-Rubio, 2006; Mills, 2016) and HK (Melo et al., 2014). Once this has been understood, managers develop action plans that ensure availability of knowledge necessary for staff members to complete tasks (Cane et al., 2012). As knowledge is an important aspect for task completion, staff members with the necessary knowledge can improve task performance and completion.

The Knowledge Evolution Model stages provide a framework for managers to support staff members in understanding how pre-change knowledge evolves to post-change knowledge. Managers should make post-change DK and PK available to staff members and support them in developing their post-change HK. They should be encouraging and facilitate staff members' recognition of post-change DK and PK for the following reasons: first, staff members need to understand task structures and be given guidance with clearly defined objectives (Khatri et al., 2006). Staff members need clarity in their assigned tasks and it is this clarity that allows staff members to utilise post-change DK to complete new tasks (Richey and Nokes-Malach, 2015). Second, staff members should be provided with post-change PK by managers (Feng et al., 2016) so that they are able to apply the post-change DK in a series of actions in a specific order appropriate to completing new tasks. Staff members need the support offered by training that allows

them to evolve pre-change knowledge to post-change knowledge. Third, scholars note that managers should involve staff members in the planning and preparation for radical change (Bhasin, 2012; Al-Abbrow and Abrishamkar, 2013; Feng et al., 2016; Sghari, 2016). This is particularly important in order for staff members to develop their appreciation of new tasks and engage with evolving post-change DK and PK. This form of managerial practice will enhance the completion of new tasks (Battilana et al., 2010). Fourth, managers should recognise and acknowledge pre-change HK of staff members as a means to enhance performance (Tsoukas and Valdimirou, 1998) and support them to develop new HK, identifying redundant HK, in order for them to have the evolved HK.

In addition, managers and staff members should be aware of redundant knowledge and its impact on progression through the knowledge evolution stages. Managers and staff members should understand the stages and actions needed to identify redundant DK, PK and HK to enhance new task completion.

Managers should assist staff members with understanding new tasks within the business process (Osburn et al., 2015), in order that staff members are able to diagnose and deploy the post-change knowledge. This support is important for enhancing the implementation of planned/radical change (Alas et al., 2009) and has a significant impact upon the knowledge evolution progression of staff members.

The Knowledge Evolution Model shows that the effects of the factors affecting staff members' progression through the knowledge evolution domain begin after the announcement to staff members by senior management that the implementation of planned/radical change is beginning in a business process. These factors' effects can be seen in the following scenarios.

In the first scenario, managers encourage and support staff members to progress through the knowledge evolution stages so evolved post-change knowledge is achieved and the completion of new tasks is enhanced.

In the second scenario, staff members are not motivated and decide not to progress through the knowledge evolution stages, and the other factors work together effectively towards achieving the evolved post-change knowledge, then staff members may leave the process.

A third scenario could be that staff members are not motivated and decide not to progress through the knowledge evolution stages, for any reason, and the other factors are not present, staff members may stay at the event occurrence stage and not progress through

the other stages. Staff members continue to use their pre-change knowledge to attempt to complete new tasks. This affects the completion of new tasks because the evolved post-change knowledge will not have been achieved.

Managers' awareness, within a business process, of factors affecting progression through knowledge evolution stages, enables them to address these factors in ways that support staff members progressing through the stages to achieve post-change knowledge.

7.4 Chapter Summary

This thesis contributes to the literature by providing a conceptual model — the Knowledge Evolution Model — consisting of six stages, which explains how staff members progress through the knowledge evolution stages within a business process undergoing planned/radical change. The model is derived from empirical sources. During these stages, redundant knowledge for completing new tasks is identified. The factors affecting progression of staff members through these stages are discussed as part of this contribution to the literature. This thesis contributes to dynamic capability theory by expanding it to include knowledge evolution within business processes undergoing planned/radical change. As discussed in the last section of this chapter, this thesis has implications for practice via the recognition of the importance of post-change knowledge. This contribution enhances practices for completing the implementation of planned/radical change.

The next chapter concludes the thesis with a discussion of the issues studied, a statement of findings based on the evidence presented, research limitations, and recommendations for future studies.

8. Thesis Conclusion

8.1 Introduction

This chapter concludes the thesis by presenting a research overview, discussion of findings and contribution based on the evidence presented, research limitations, and recommendations for future studies.

8.2 Research Overview and Findings

This thesis investigates changes in knowledge required to complete tasks within a business process implementing planned/radical change. The research is based on the synthesis of three theoretical frameworks: change management, knowledge management, and tasks within business processes.

Responding to rapid external changes allows organisations to survive. Organisational change should match the external pace of change in the market. Due to the speed of global, social, technological, political and environmental changes, the importance of studying change continues to grow (Mabey, 2013; O'Doherty et al., 2013). Organisational change is the capacity to maintain alignment with external change (Graetz and Smith, 2010; du Gay and Vikkelso, 2012). Organisations implementing change management need to align external business environmental factors with internal factors (Ben-Menahem et al., 2012).

This thesis uses tasks carried out by staff members within business processes to study knowledge evolution. Therefore, it is important for organisations to manage and develop business processes and to recognise them as significant assets (Polpinij et al., 2015). Business processes can be modelled to categorise tasks and actions (Tbaishat, 2017). Changes in business processes can be radical, altering organisational subsystems and structures. The aim of this type of change is to improve processes, performance, and add value to organisational outcomes by transforming inputs and outputs (Anttila and Jussila, 2013; Roeser and Kern, 2013).

The implementation of planned/radical change in business processes requires careful preparation to develop competitive advantage (Kempster et al., 2014; Sghari, 2016). Planned/radical change assists in enhancing organisational performance and staff members' abilities. This type of change requires staff-development activities to provide post-change knowledge required to complete new tasks (Al-Abbrow and Abrishamkar,

2013). Effective planned/radical change assists with increasing motivation and morale of staff members (Halpin and Daugbjerg, 2016; Feng et al., 2016).

For organisations to achieve strategic goals, there needs to be awareness of tasks contained within business processes (Spanyi, 2006). Managing these tasks is part of planned/radical changes to business processes necessary to achieve desired outcomes. To complete these tasks included in business processes requires the integration and management of intangible and tangible resources (Grieger, 2004; Poirier and Walker, 2005; Martin et al., 2013; Margherita, 2014).

Implementing planned/radical change in business processes entails the use of information and skills, allowing knowledge to be deployed in completing tasks (Mendling et al., 2012; Anastassiu et al., 2016). Planned/radical change implementation is the process of supporting staff members to recognise the need for developing new skills to increase organisational performance in order for the organisation to survive (Kotter, 2008). Knowledge is an important element to complete tasks within business processes undergoing planned/radical change. Knowledge should be managed with a view to enhancing change implementation, and the relevant knowledge necessary to complete tasks (Kueng, 2000). The tasks completed by staff members within a business process require the integration of knowledge (Berente et al., 2009; Willett et al., 2014; Solymossy and Gross, 2015; Park, 2015; Saastamoinen and Järvelin, 2016). Recognising the importance of declarative, procedural and heuristic knowledge necessary to complete new tasks within business processes enhances task completion and thereby implementation of planned/radical change.

The interrelationship of knowledge and change, and the stages of knowledge evolution from pre-change knowledge to post-change knowledge during periods of planned/radical change within business processes has received little attention in the existing literature. Scholars such as Sandhawalia and Dalcher (2011), Storga et al. (2013) and Al-Omari et al. (2014) see knowledge evolution as the accumulation, development and growth of knowledge that is always relevant to the organisational situation. Scholars appear to ignore knowledge that is not required after the implementation of change, namely, redundant knowledge. Only one article links knowledge evolution and redundant knowledge. Al-Omari et al. (2014) consider redundant knowledge as part of the knowledge gained from internal and external resources, but do not distinguish between

declarative, procedural and heuristic knowledge — nor do they investigate the stages of knowledge evolution.

Similarly, the importance of identifying redundant knowledge receives scant attention in the literature in relation to knowledge evolution. Redundant knowledge is studied in different ways from various perspectives. The number of scholarly interventions contained in the literature has led to many definitions of redundant knowledge. For example, scholars like Molina-Morales and Expósito-Langa (2013) see redundant knowledge as merely surplus knowledge. However, this thesis shows that redundant knowledge is the subset of pre-change declarative, procedural and heuristic knowledge that is no longer required to complete tasks within business processes after the implementation of planned/radical change. Redundant knowledge needs to be recognised to have the appropriate post-change knowledge. If the redundant knowledge is not identified, it will be carried forward into new tasks and affect post-change knowledge and task completion.

The importance of information, skills, and experience as organisational resources that need to be deployed during periods of change implementation is recognised in the literature. However, greater understanding of knowledge as a significant resource for completing new tasks carried out by staff members within business processes is needed. The various elements of knowledge management have received extensive attention in the literature, but most scholars consider the evolution of knowledge as accumulation and growth of knowledge.

This thesis offers an empirical model of the stages of pre-change declarative, procedural and heuristic knowledge evolution within a business process undergoing planned/radical change to post-change knowledge. This study also examines how the redundant parts of pre-change knowledge are identified during the knowledge evolution stages. A number of factors affecting the staff members' progression through the knowledge evolution stages during a period of implementing planned/radical change in a business process are defined. The recognition of these factors enhances the progression of staff members through the knowledge evolution stages. Further understanding of the role of knowledge to complete tasks as a vital resource for implementing planned/radical change is required. This study addresses the gap in the existing literature between theory and practice in the areas of change management and knowledge management by demonstrating the

importance of understanding the stages of knowledge evolution in business processes undergoing planned/radical change.

8.3 Research Limitations

This thesis investigates knowledge evolution stages in the context of a business process undergoing planned/radical change and provides a conceptual model developed from empirical data to understand these. The Knowledge Evolution Model is limited to explaining the progression of staff members through the knowledge evolution stages, and does not include middle and senior managers. In addition, the model is limited to studies of business processes undergoing planned/radical change. The identification of redundant knowledge during the stages of knowledge evolution studied in this work is also limited to the context of business processes undergoing planned/radical change. The factors affecting knowledge evolution that have been identified and defined here are limited to the context of the progression of staff members through the knowledge evolution stages within a business process undergoing planned/radical change. Furthermore, the study of redundant knowledge in the context of planned/radical change within a business process is limited to the recognition of this knowledge during the stages of knowledge evolution. This thesis does not attempt to develop ways in which to manage this redundant knowledge. The factors affecting knowledge evolution are similarly limited in that they are identified but the degree of effect is not measured. The empirical data collected for analysis in this thesis are limited to two case studies carried out in higher education institutes, X and Y, in Kuwait. The interviews conducted during the case studies were limited to 24 participants in total due to data saturation being reached.

8.4 Statement of Contribution

In order to contribute to the literature, this thesis addresses the relationship between knowledge management and planned/radical change and offers a model of the stages of declarative, procedural and heuristic knowledge evolution within a business process undergoing planned/radical change. This research investigates the evolution of pre-change knowledge to post-change knowledge necessary to complete tasks in business processes. This thesis studied redundant parts of pre-change knowledge and the way this is recognised during knowledge evolution stages. In addition, this research identifies and defines factors affecting knowledge evolution during a period of implementing planned/radical change in a business process. Recognising and understanding the factors

affecting knowledge evolution enhances the progression of staff members through evolution stages.

8.5 Recommendations

It is recommended that managers, seeking to enhance the implementation of planned/radical change within a business process, understand the importance of knowledge necessary to complete tasks in three forms: DK, PK and HK. This allows managers to create action plans to provide the necessary knowledge for staff members to complete tasks.

The Knowledge Evolution Model stages offers a framework for managers to demonstrate to staff members the evolution of pre-change knowledge to post-change knowledge, to enhance the completion of tasks. Managers (from board members down) and staff should recognise and acknowledge pre-change HK of staff members, identifying redundant HK, in order for them to have the evolved HK required following the change.

Managers and staff members should be able to comprehend and enact the stages and actions required to identify redundant DK, PK and HK to enhance new task completion. Managers should assist staff members with understanding new tasks within the business process, in order that staff members are able to diagnose and deploy post-change knowledge. Managers' awareness of factors influencing progression through the knowledge evolution stages equips them with the ability to better support staff members towards achieving post-change knowledge. This in turn enhances task completion and thus the implementation of planned/radical change within business processes.

8.6 Further Studies

The Knowledge Evolution Model presented in this thesis can be tested and further developed using action research methodology within a business process before, during and after planned/radical changes. This will allow researchers to observe the stages in detail, including the pre-change situation, the event occurrence, and individuals' progression through the remaining knowledge evolution stages to the evolved post-change knowledge. It will enable insights from both management and staff members to be captured during every stage of knowledge evolution within a business process undergoing planned/radical change.

Given the importance of knowledge to the implementation of planned/radical change further action research into this phenomenon could be useful in other contexts. Therefore, it is recommended that the knowledge evolution stages, identification of redundant knowledge, and factors affecting knowledge evolution presented in this thesis be examined in contexts other than planned/radical change; for example, planned/incremental, radical/emergent, and radical/incremental change.

Further research is needed into the management of redundant knowledge following its identification during the implementation of planned/radical change and other contexts. The findings of this thesis show that non-recognition of redundant knowledge has a negative effect on task completion. Further research is required to develop ways to deal with redundant knowledge once it has been recognised.

Methods to better understand the degree of influence each of the factors has on knowledge evolution forms a further avenue of potential research. This would assist senior managers to prioritise activities and practices that have been shown to enhance the completion of tasks. More investigation is also required regarding the progression of managers, rather than only staff members, through the stages of knowledge evolution during a period of implementing change within business processes and organisations.

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Appendices

Appendix 1: Classification Matrix for Change Management Literature

- **Incremental change**

Incremental change is the study of changes organisations implement in daily business activities. Incremental changes are improvements that an organisation experiences after some time in its development stages (Ashurst and Hodges, 2010). Weick and Quinn (1999) state that incremental change are first order and continuous change that involves individuals' constant adaptation and editing of ideas obtained from different sources. These constant adjustments, carried out across departments, result in substantial change (Alfes et al., 2010). Incremental change aids in the clarification of an organisation's evolution and future development while relating to its long-term goals. Amira Sghari (2016) emphasises that incremental change is a dynamic process based on trial and error and adjustment.

Incremental change is a change that an organisation experiences while it exploits its capabilities to increase its competitive advantage in the market. This increase is achieved due to various elements, including the workforce's attitude, and increased available capital to meet the organisation's financial objectives (Constantinides, 2004). Abrahamson (2000) cautions that organisations should ensure that the steps for implementation are planned within stages allowing for continual reflection and modification of activities in order to prevent the necessity of further unnecessary changes.

Moreover, this type of change requires teamwork that enables the organisation's staff to work towards achieving common goals. Incremental change enhances coordination, which leads to desired levels of performance (Friedl and Biloslavo, 2009). Incremental change is preferred by managers who avoid higher levels of risk that come with radical change. Incremental changes are step-by-step adjustments that take time to put into effect. Within incremental change, organisational variations are defined as empirical changes in the quality, shape, or state of an entity over time, following the deliberate introduction of new courses of action, ways of thinking and operating (Kodama, 2001). Incremental changes are defined along continua, moving from evolutionary to strategic

reforms. Managers view incremental changes as small changes that alter narrow, specific aspects of an organisation in search of improvement of its present situation, while maintaining the general working framework.

Research by Al-Abrrow and Abrishamkar (2013) indicates that few organisations decide unilaterally to adopt a continuous change approach. Nevertheless, these firms capitalise on the many principles of incremental change through engendering the ability and flexibility to experiment and accommodate day-to-day contingencies, opportunities, exceptions and the unintended repercussions punctuating organisational life. The process aspect of change aims to proceed from the current state of the organisation to the desired future via implementing and managing change (Bhasin, 2012).

Dominguez CC et al. (2015) note that organisations make incremental changes in structure and strategy to meet challenges of non-radical change in their environments. Dominguez CC et al. (2015) use a model to examine organisational evolution via incremental change. Feng (2016) adds that incremental change provides more stability and is often easier to implement than radical change, particularly as employees may not be aware of gradual change.

In short, incremental change takes some time to put into effect and involves altering small, specific aspects of daily business activities via trial and error in a continual organisational evolution towards longer-term goals.

- **Radical change**

Radical change occurs when the organising logic and fundamental assumptions of organisations are dismantled and reconfigured (Lukka and Partanen, 2014; Feng et al., 2016). Liguori (2012) notes that radical change involves organisations reinterpreting themselves. Feng et al. (2016) state that radical change is quick, extreme, extensive, and wide-ranging and is used when faced with an uncertainty. Organisations experience significant upheaval and uncertainty during periods of radical change because there is a shift in strategy, structure and control (Lichtenstein, 2000). For Morgan and Zeffane (2003), radical change defines the type of change resulting from actions by management that are spontaneous and intuitive. Friedl and Biloslavo (2009) state that radical change is the preferred course of action by managers who believe in fast reforms, innovation, and taking risks. This type of change is large-scale organisational change and is driven by institutional logic (Al-Abrrow and Abrishamkar, 2013). Sonpar et al. (2009) suggest that trust drives this form of change. Levels of trust determine the smoothness and

effectiveness of radical change implementation that is achieved through empowerment and consultation (Morgan and Zeffane, 2003).

When scholars such as Feng et al. (2016) and Friedl and Biloslavo (2009) argue that radical change occurs quickly are not considering the variety of contexts and circumstances of organisations implementing this type of change. The speed of radical change will be different for each organisation because of the difference between sectors and organisational capabilities. An organisation moving from one way of performing process to another undergoes radical change (Greenwood and Hinings, 1996). Sumo et al. (2016) argue that radical change requires new knowledge and some organisations can develop knowledge resources in this way quicker than others. All organisations need to explore the necessary knowledge to complete tasks in business processes undergoing radical change. Radical cannot be fully implemented without the required knowledge. This kind of change is complex and often takes places during periods of uncertainty; therefore, an organisation that effectively manages knowledge required to move from an existing situation to a target situation will enhance change implementation (Sumo et al., 2016).

Radical change brings new ways of thinking to replace existing conceptions (Brunsson and Sahlin-Andersson, 2000; Lukka and Partanen, 2014). Radical change is revolutionary and challenging, demanding innovation and the re-engineering of business processes (Feng et al., 2016), causing changes in structure across many parts of an organisation (Dominguez CC et al., 2015).

Launching radical change effectively is important since it helps establish perceptions of change by employees. This is important because this stage may bring the challenge of resistance to change among the workforce. Radical change is referred to as transformational or fundamental change since it often transforms the organisation from a traditional hierarchical culture to a structure containing a large number of innovative self-directing teams and builds trust (Morgan and Zeffane, 2003; Yang and Konrad, 2011; Evans, 2014; Jonsen et al., 2013; Halpin and Daugbjerg, 2016; Feng et al., 2016). For the purposes of this thesis, radical change is large-scale organisational change that demands the re-engineering of business processes, causing changes in structure across many parts of an organisation (Al-Abrrow and Abrishamkar, 2013; Dominguez CC et al., 2015; Feng et al., 2016).

- **Emergent change**

Emergent change takes place organically, without an overall top-down organisational plan. The consequences of this change cannot be determined as emergent change occurs in uncertain situations (Ford and Greer, 2005; Bhasin, 2012; van der Voet et al., 2014). Inappropriate decisions made by an organisation experiencing emergent change may affect performance (Ford and Greer, 2005).

Emergent change is defined as the unanticipated changes that occur in cycles and have temporary effects on organisational employees and their activities (Meyer and Peng, 2005). These changes disturb the efficiency of the factors of production in an organisation, which force the organisation to adapt or perish. Lee and Rhee (2007) see emergent change as change that occurs in the external environment of an organisation, as a result of macroeconomic changes. However, Ford and Greer (2005) and Bhasin (2012) state that the circumstances may be either internal or external. Emergent change impacts members of an organisation, as well as changing organisational processes and relationships in areas of operations (Maimone and Sinclair, 2014).

Although this type of change is not planned, it is perceived before its results are seen (Bate et al., 2000). Organisations see cultural changes occurring but cannot predict the future consequences of these changes in the sales of products, which is either positive or negative. Kempster et al. (2014) emphasise that strategic alignment, communication and the validation of change is deployed in a carefully prepared manner, setting out objectives and goals for members of the organisation. This requires cooperation during such planning as members of the organisation offer valuable perceptions and ideas throughout the change implementation. Alblas and Wortmann (2012) argue that emergent change is incremental or radical.

- **Planned change**

Planned change requires preparation in advance, with direction and commitment from senior managers (Doyle et al., 2000; Bryant and Stensaker, 2011). Bamford and Forrester (2003) state that planned change has led theory and practice since Kurt Lewin's work was first introduced in 1951. Lewin proposed change as a process and argued that organisations progress from one stage to another. Planned change is one of the most well-known types of change that has been redefined by various scholars with the aim of simplifying this concept for ease of understanding. The definitions remain varied (Battilana et al., 2010; Kempster et al., 2014; Sghari, 2016).

Planned change is defined as the process whereby an organisation decides on matters affecting its operations by involving organisational members at all levels (Morgan and Zeffane, 2003). Planned change involves the general agreement, and the establishment of trust, between the top management and employees (Sonpar et al., 2009). Planned change is a process by which people in an organisation focus on common objectives that need to be achieved (Kempster et al., 2014). Bamford and Forrester (2003) state that planned change assumes that all participants will cooperate to achieving a shared goal; however, this cannot be guaranteed. Periods of uncertainty and change cause frictions between members of organisations that planning cannot prepare for (Guiette et al., 2014; Shari, 2016). Planned top-down change leave staff members unclear as to the effects of the change or post-change situations on them as individuals (Van der Voet et al., 2014; Bess, 2015). Other scholars argue that this type of change promotes unity and teamwork between management and employees (Levy, 1986; Kotter, 1995; Morgan and Zeffane, 2003; Eriksson and Sundgren, 2005; Battilana et al., 2010; Sghari, 2016).

Planned change occurs when organisations develop new strategies (Kodama, 2001). This shift may take place as a result of disturbances in the external or the internal environment (Muratbekova-Touron and Villechenon, 2013). This change adds value to an organisation via the development of existing strategies (Constantinides, 2004; Bhasin, 2012; Kempster et al., 2014; Sghari, 2016).

Ashurst and Hodges (2010) see planned change as the process wherein top management allocates resources available in the business within the period of change. Planned change is initiated and supervised by senior management that evaluate the availability of resources required to implement the change. Through this evaluation, the organisation has an advantage in terms of sourcing raw materials and finance, and utilising them under a planned change (Pettigrew et al., 2001). The senior management take the role of considering competition, required market standards, as well as identifying any market gaps to be filled. The consideration of these issues assists organisations with the proper allocation and usage of resources (Verity, 2005; Al-Abbrow and Abrishamkar, 2013).

Planned change is the process by which organisations restructure their operational activities to enhance their efficiency (Appelbaum et al., 1999). This type of change is where senior management are responsible for examining continuous changes that occur in competitor organisations. The management then come up with a plan that to address competitive challenges to ensure that the organisation survives and prospers (Kodama,

2001). Al-Abrrow and Abrishamkar (2013) describe planned change as the readiness of an organisation to shift from its current situation to become more proactive and efficient in the future. This requires organisation-wide communication, action and evaluation (Battilana et al., 2010; Sghari, 2016). Change makers need to understand the current situation, the desired target situation, and the circumstances in which transformation will occur (Kempster et al., 2014). It is clear from the existing literature that many scholars are proponents of planned change as an important driver for enhancing organisational performance. Others in the field of change management see this type of change as creating uncertainty, particularly for staff members. However, senior managers reduce resistance to change by addressing issues that cause concerns for staff members. For the purposes of this thesis, planned change is defined as change that requires preparation in advance initiated and supervised by senior managers (Doyle et al., 2000; Morgan and Zeffane, 2003; Bryant and Stensaker, 2011).

Appendix 2: Analysis of Classified Change Management Literature

Planned/Incremental Change Quadrant

The studies in this quadrant represent planned/incremental change. This quadrant includes empirical studies that explain changes which are planned and structured in advance and where the change is small-scale, evolutionary or minor in nature.

Senior management competencies are discussed in the literature as being a key factor in implementing planned/incremental change. Brown (2012) shows that the development of senior managers' meaning-making systems is a key determinant of senior-management effectiveness. This development includes being rational and objective when faced with difficulties while implementing change. Friedl and Biloslavo (2009) identify the influence of evolutionary change selection methods, and show that proper change-method selection improves business efficiency. Senior managers need to select the correct approach to change for their organisation. This process involves considering a number of factors including the scope of the change, associated risks, identifying tangible and intangible resources for use in implementing the change and enhancing performance. Baker et al. (2011) examine collaborative non-profit networks undergoing organisational change. This investigation finds that senior management at member sites is a significant factor influencing culture and performance. Ford and Greer (2005) study the role of management control systems in accomplishing planned change. Ford and Greer (2005) argue that senior managers should have the skills to complete change implementation in order to prevent change continuing beyond the targeted situation.

Lau et al. (2002) use institutional theory in a study into the effects of institutional forces on change schemas, and note that change schemas vary at different levels of an organisation. Lau et al. (2002) show that change plans should recognise the experience of change held by senior managers, middle managers and staff members. By recognising existing experience and allowing people freedom to act leads to less resistance and increased motivation during the implementation of the change. Muñiz Avila et al. (2012) develop a model to examine different elements of change management processes that encourage entrepreneurship in Mexico. Muñiz Avila et al. (2012) note that studies usually focus on organisational finances and show that understanding change management and the creation of support networks increases sustainability and growth for organisations and the Mexican economy. Zhou et al. (2006) consider the drivers and

consequences of organisational change. Examining the different impacts on organisational performance of technical and administrative change, Zhou et al. (2006) conclude that senior management competencies, including demonstrating an affable personality and a positive view of change, have a noticeable and positive influence on the implementation of change.

Another management competency studied is trust building. Mihail et al. (2013) investigate the links between work practices and corporate change. Mihail et al. (2013) examines trust building through effective communication, training, incentivisation, staff members' confidence in the organisation's future, and the development of relationships built on dialogue and respect, enhance performance and enable change. Smollan (2013) demonstrates that the more staff members trust senior and middle managers, the easier change implementation will be. Managers improve this competency by showing their capabilities, goodwill, and genuineness. By doing so, managers reduce resistance to change and motivate staff members to implement change effectively. Smollan (2013) notes that internal politics and frictions have negative effects on trust building, and that an aspect of this competency is to bear these potential obstacles in mind. Lindgreen et al. (2011) examine the impact of senior management competencies on change processes. Lindgreen et al. (2011) conclude that during organisational cultural changes leaders develop their skillsets in order to improve building trust and confidence, effective teamwork, mentoring, communication between managers and staff members, implementing change, and awareness of morale, motivation and relationships within the organisation.

The competencies based on skills, experience and meaning-making exhibited by senior management are shown in the literature to affect the implementation of planned/incremental change. Knowledge contained in these competencies is important when implementing change in an organisation, as knowledge is the integration of information, skills and experience (Foster, 2010) needed to carry out tasks; however, to enhance the implementation of change, it is necessary to understand that knowledge evolves during the implementation of change.

Other scholars discuss specific management practices regarding the implementation of this kind of change. Andrews et al. (2008) use organisational change theory in an examination of the usefulness of organisational change theory for management practice. Lindgreen et al. (2011) focus on the complexities of managing change in distinctive

organisational environments and cultures. The skills and knowledge that managers found to be most useful were based on practical methods that enabled them to make sense of and implement change. Pardo-del-Val et al. (2012) study the effect of participative management style on change. The paper shows the positive effect of this management style on the process of change. Pardo-del-Val et al. (2012) conclude that increasing group participation allows for clear communication, assists self-expression by staff members, reduces resistance, and improves implementation of change. Spicer (2011) uses cognitive mapping and personal construct theory in a study of managerial perspectives regarding changing organisational culture. Management often experience a gap between the planned outcomes and the actual outcomes due to a lack of structured implementation of change. Spicer (2011) recommends that cognitive mapping assists the implementation of organisational cultural change. The paper demonstrates that managers who follow explicit programs achieve successful culture change. Henderson and McAdam (2001) examine management decision-making processes in a fragmented network organisation undergoing change. The paper recommends that the evaluation should be responsive to the evolving information and decision-making needs. Managers need rapid access to knowledge and to evaluate it this for decision making that will enhance the level of change implementation.

Diefenbach (2007) investigates the effects of managerialist change management on corporate culture, arguing that personal perspectives and agendas affect the implementation of change, and showing that internal relationships, values and beliefs often negatively impact change processes that are considered to be cogent, unbiased, and tactical without self-interest or ideological motivation. By exploring the effects of managerial perspectives and communication styles, Diefenbach (2007) concludes that change implementation is negatively affected by top-down change management practices. Al-Abrrow and Abrishamkar (2013) examine management of employee motivation during periods of change, highlighting organisational preparation and commitment enhances implementation of change. Managers are responsible for encouraging a positive attitude to change in order to increase motivation of staff members and reduce resistance to change. For this to occur, effective preparation including communicating the nature and purpose of the change, and change-specific training should be carried out. Al-Abrrow and Abrishamkar (2013) show that effective preparation leads to enhanced change implementation, which assists the organisation to thrive and survive.

Jacobs et al. (2006) consider social behavioural issues that are present during change implementation, including commitment to and acceptance of the change. Staff members' behaviour in this respect is influenced to enhance the implementation of change through effective communication and discussion, and by the positive attitude and guidance of managers. Waistell (2006) suggests textual metaphors facilitate change, arguing that metaphors assist in communicating meaning by providing different contexts, allowing managers to clarify an organisation's vision of change for staff members. As a result, the ability of staff members to implement change is enhanced. Yilmaz and Kılıçoğlu (2013) explore change-process managerial methods to guide employees positively towards change. The most effective management approaches for implementing change are shown to include communicating the type and purpose of change to staff members, listening and responding to their feedback, and monitoring performance to maintain operational standards.

The focus on management methods and perspectives found in these papers is useful for guiding staff members during a period of planned/incremental change. While recognising the importance of management and communication, the role that peoples' knowledge plays during periods of change is neglected. Yet, the consideration of the evolution of pre-change knowledge to post-change knowledge needed to complete new tasks after the implementation of change would allow an examination into managerial, communication and organisational-resource issues to enhance change implementation.

Using inductive theory, Alfes et al. (2010) consider the role of HR during change processes. Alfes et al. (2010) recommend that HR departments use a change-driver approach; however, this is not always possible as HR personnel might be restricted by traditional views of their role within an organisation. The paper concludes that allowing HR personnel to take an active role in driving change enhances the implementation of change. Martinez-Sánchez et al. (2008) investigate HR practices and commitments to change that affect organisational performance. HR departments enhance change implementation by providing staff members with flexibility and benefits that increase performance. Martinez-Sánchez et al. (2008) examine relationships between HR practices and staff members' motivation and trust by considering policy transparency and awareness of staff members' perceptions. Shum et al. (2008) study the importance of employee commitment to customer relationship management induced change for successful CRM and positive outcomes for performance. Shum et al. (2008) demonstrate that change implementation is improved by providing staff members with training,

opportunities to gain experience, and by creating a culture that accepts necessary change. Kemp et al. (2010) use organisational change theory to examine strategic resource impact on change. The article demonstrates the use of discourse as a strategic resource to enable change by considering acceptance of and resistance to change within an organisation. The paper shows that wide-ranging debate allows a variety of ideas and beliefs to be put forward that are not immediately rejected. Kemp et al. (2010) argue that this inclusiveness via discourse adds to staff members' knowledge and creates shared meaning. Therefore, the change is enhanced by developing knowledge and cohesion of staff members working in teams. Del Val and Fuentes (2003) explain resistance to change and the most powerful source of resistance comes from deep-rooted values. Del Val and Fuentes (2003) emphasise that understanding resistance to change enhances change implementation. Regarding deep-rooted values, Del Val and Fuentes (2003) recommend that managers examine the post-change situation matches with existing organisational values. Furthermore, discussion opportunities reduce resistance to change. In addition, training increases communication and allows staff members to develop the ability to enact and embrace change. Scheeres and Rhodes (2006) examine what happens when staff members experience an organisation in a way that differs to the corporate cultural framework of values and mission that is presented. Scheeres and Rhodes (2006) show that corporate cultural change implementation is enhanced by reducing resistance to change via communication, training, inclusivity and teamwork. These activities should be directed and monitored by managers, experts and HR personnel during a period of change implementation. Becker (2010) identifies factors that facilitate unlearning when implementing new technology. The paper studies staff members' acceptance of change and capacity to unlearn existing ways of carrying out tasks. Becker (2010) shows that this process requires comprehension of the change and reasons for the change, specific change-related training and support, monitoring, positive communication, and an awareness of staff members' perspectives and needs.

Alfes et al. (2010), Sánchez et al. (2008), Shum et al. (2008), Kemp et al. (2010), Del Val and Fuentes (2003), Scheeres and Rhodes (2006) and Becker (2010) focus on HR performance and practice, staff development and training, feedback and inclusion for developing knowledge and communication strategies. An understanding of these elements enhances change implementation. Although Alfes et al. (2010), Sánchez et al. (2008), Shum et al. (2008), Kemp et al. (2010), Del Val and Fuentes (2003), Scheeres and Rhodes (2006) and Becker (2010) recognise the importance of knowledge as a mix

of information, skills and experience, they overlook the stages through which staff members progress to evolve their knowledge while experiencing the impact of change.

Emergent/Radical Change Quadrant

This quadrant represents studies that explain emergent/radical change. Emergent/radical change consists of unplanned actions to deal with unexpected situations. Emergent/radical change describes responses to unexpected situations within the organisation by one or more groups or organisational units. Romanelli and Tushman (1994), for example, apply punctuated equilibrium theory to study revolutionary transformation via incremental changes in organisational characteristics. Romanelli and Tushman (1994) show that most large transformations are made up of accumulated incremental changes that take place during a period of less than two years.

Bate et al. (2000) use mainstream theory to study change phases with a focus on those used to reframe culture-structure, noting that bringing together design and development, structure and culture blend the mix into a single cultural form. Bate et al. (2000) argue that the value of restructuring cultures in an organisation is greater than potential contingency factors that might be taken into account. Bridgman (2007) deploys discourse theory in a study of the articulation of enterprise within governmental policy on higher education. The paper shows that exploring organisational change across multiple levels, from language of policy to management practices and processes, is useful to discourse regarding the commodification of knowledge and institutional vision. Shaw et al. (2007) examine the knowledge of organisation members vital for building a strategy that improves business processes and communication in preparation to respond to a crisis. This paper emphasises the importance of knowledge management during organisational change. An important factor for change implementation is effectively communicating knowledge management initiatives and planned outcomes to staff members. As a result, feedback is used to overcome difficulties and disseminate best practice. A key conclusion is that prior knowledge is used to implement change within the current organisational culture.

Neves (2009) uses the lens of social learning theory to consider change impact on employee behaviour and turnover. Introducing individual change regarding efficiency and transforming employees into change agents helps them to participate in the institutionalisation phase. Szamosi and Duxbury (2002) identify the importance of

human factors to the ultimate success of organisational change. The focus of the study is upon supporting and empowering staff members by seeking feedback, sharing best practice, communicating the purpose of the change, as well as preparing for client feedback and other external factors. Küpers (2013) considers ways in which metaphors and narratives work together and contribute to transformation in organisations. Küpers (2013) argues that effective communication leads to effective change management.

The articles cited above discuss the importance of knowledge management to the implementation of emergent/radical change. From different perspectives, the articles examine how staff-centred approaches, effective communication and knowledge management initiatives improve change implementation. Supporting staff members, designing change implementation with the inclusion of staff members' perspectives, assists the level of change implementation. Although the importance of managing knowledge is identified by scholars examining this form of change, these papers do not differentiate between types of knowledge nor do they consider whether the knowledge held by or given to staff members is relevant to tasks required following the change. In these articles, knowledge is seen to exist prior to the change and no consideration is given to its evolution or how this occurs, even though emphasis is placed on communication, dissemination and transfer of knowledge, and cooperation. Staff members complete different tasks requiring different kinds of declarative, procedural and heuristic knowledge. This literature covering emergent/radical change shows little interest in investigating knowledge management and the importance of identifying declarative, procedural, heuristic and redundant knowledge within a period of emergent/radical change.

Emergent/Incremental Change Quadrant

This quadrant of the matrix describes small-scale change for which there is no formal plan. This type of change may be a result of an ongoing developmental process.

Staudenmayer et al. (2002) focus on the experience of time and events as a factor that facilitates organisational change. This paper recognises the need for an event to trigger change. Staudenmayer et al. (2002) claim that changing working patterns alters staff members' experience of time and this facilitates change, stating that this new temporal experience causes change, creates resources, and shows a need for change. Lee and Rhee (2007) deploy resource-based view and internationalisation theory in a study into change in corporate environmental strategy. The study demonstrates that organisations evolve

environmental practices in a nonlinear manner. Lee and Rhee (2007) emphasise the importance of senior management's views on environmental issues and the organisation's excess resources for implementing this type of change. An article by Gilmore and Gilson (2007) studies organisational ability to use radical external change to incrementally transform performance. Gilmore and Gilson (2007) argue that change of this kind allows for existing work patterns and processes to be carried out alongside new practices to enhance change implementation by maximising resources and strategic decision-making opportunities.

The literature reviewed focuses on the importance of recognising the need for emergent/incremental change, identifying and deploying resources necessary to implement change, and emphasises that the views of senior management and staff members affects change implementation. Knowledge necessary to complete tasks carried out by staff members during a period of emergent/incremental change is a valuable resource; however, the literature tends to underplay this aspect of change management.

Appendix 3: Summary Table of Knowledge Management Literature

Author/Year	Research Focus	Research Findings
Nonaka, I. and Takeuchi, H. (1995)	This book reveals how Japanese companies translate tacit to explicit knowledge and use it to produce new processes, products, and services.	Japanese firms are successful, the authors contend, because they are innovative, create new knowledge and use it to produce successful products and technologies.
Martin, B. (2000)	This paper argues for the importance of knowledge as a business resource and hence for the need to manage knowledge.	Difficulties arise over the intangible nature of knowledge and the inadequacy of existing management paradigms that are geared largely to the management of tangible resources.
Rastogi, P.N. (2000)	The nature and rationale of, and the preconditions and imperatives for, the effective practice of knowledge management (KM) are outlined.	Virtuous reality comprises an ethos of trust and co-operation, sincerity and goodwill, help and care, shared values and vision. The inner virtuous reality of an enterprise thence shapes the outer reality of its competitiveness.
Lang, J.C. (2001)	Lang investigates why uncodified knowledge and contexts lead to gaps in organisational knowledge by examining restrictions, settings and results.	Since there will always be uncodified or uncodifiable knowledge content and contexts – given the social nature of knowledge – several barriers to the creation and utilisation of knowledge exist. The task of knowledge management is to identify such barriers and to overcome them.
Davis, G.B. (2002)	This article focuses on concerns about productivity due to the emergence of anytime/anyplace computing.	Knowledge work productivity depends on good self-management. In unlimited access computing, a person has access at all times and all places to all information and communication resources.
Darroch, J. and McNaughton, R. (2002)	These authors use empirical data from organisations in New Zealand to investigate how KM leads to innovation.	The results of this research show that knowledge acquisition and responsiveness to knowledge are more important for innovation than knowledge dissemination.
van Beveren, J. (2002)	This paper presents a model of knowledge acquisition based on definitions of data, information and knowledge.	From a discussion of this model in the context of alternative viewpoints, it is concluded that the future focus for knowledge management should be toward human resource strategies that leverage human-intellectual capital within firms and for the dissemination and sharing of important information that promotes creativity and innovation within and between employees.
Yahya, S. and Goh, W.K. (2002)	This research explores connections between KM and human resource management.	The findings emphasise the importance of knowledge for enhancing individual performance.
Levin, D.Z. et al. (2002)	These authors examine connections between knowledge sources, types of knowledge, trust and individuals seeking knowledge.	The results of the survey—which were similar across the three companies—identified some action-oriented recommendations for companies looking to share knowledge across their organisations more effectively.
Birkinshaw, J. et al. (2002)	Knowledge assets and contingency are examined in this paper.	The consequences of management innovation are complex because so many different stakeholders are potentially affected.

Peña, I. (2002)	This empirical study examines the creation of knowledge networks within organisations.	The decision within a knowledge management (KM) framework to collaborate in knowledge sharing networks becomes a complicated issue, since such a decision needs to be made often under conditions of uncertainty and irreversibility.
Bounfour, A. (2003)	Intangibles are the nebulous but vital aspects of companies; for example, R&D, knowledge creation, corporate identity, and marketing and advertising expenditures, which are now considered to be the most important factors in the strategic positioning of organisations today.	This work offers an integrated and original approach to intangible resource management and an evaluation of their contribution to the establishment of competitive advantage in the market place.
Darroch, J. (2003)	This paper presents the first scale developed to measure knowledge management behaviours and practices.	Provides construct boundaries to assist the development of a theory of knowledge management.
Gottschalk, P. and Khandelwal, V.K. (2003)	This paper reports results from an empirical study of law firms in Australia.	The findings show that IT personnel have an important role to play in knowledge management technology projects within organisations.
Moffett, S. et al., (2003)	This paper focuses on interrelationships between technical and human elements of KM.	A strong relationship exists between KM and other organisational factors, namely organisational culture and internal technical culture. Further analysis of these elements revealed that factors internal to the organisation are impinged upon by macro-environmental elements.
Zarraga, C. and García-Falcón, M.J. (2003)	The article discusses the increased attention on KM by businesses and the creation of organisational knowledge from individual knowledge.	Based on a review of the literature and on the evidence provided by a quantitative empirical study, a list of factors favouring the process is presented in order of relative importance. The authors distinguish between those that more deeply favour the creation of individual knowledge and those most suitable for inducing the transfer and integration of that knowledge.
Hasan, H. and Al-hawari, M. (2003)	This research considers the impact of KM styles on organisational performance via a conceptual model.	KM has positive effects when staff members have the correct knowledge and deploy it. KM and performance are influenced by management style, availability of knowledge, and an awareness of using this knowledge effectively within the organisation.
Maier, R. and Remus, U. (2003)	These scholars argue that effective organisational processes should be based on KM strategies.	KM plans should be piloted in a business process before being applied across an organisation's other processes. Organisational participants need to identify tasks and resources needed, including knowledge, to enhance task completion within a business process.
Takahashi, T. and Vandenbrink, D. (2004)	These authors carried out a case study on Honda that demonstrates an effective fusion of Japanese-style (human mediation and tacit knowledge) and Western KM (IT and	Honda's achievement suggests that a new approach to knowledge management is possible, one that lies between Japanese style knowledge management centered on human mediation and tacit knowledge, and Western-

	explicit knowledge) for a new approach to KM.	style knowledge management based on information technology and explicit knowledge.
Leseure, M.J. and Brookes, N.J. (2004)	These authors discuss knowledge transfer between different project teams.	A key distinction is made between generic project knowledge (kernel knowledge) and specific project knowledge (ephemeral knowledge).
Thompson, M. and Walsham, G. (2004)	This research considers knowledge creation within strategic alliances.	The authors use their findings to suggest a way in which organisations may be able to derive more value from their investments in internal initiatives by increasing their ability to support knowing – and hence the generation of meaning – amongst their employees.
Salojärvi, S. et al. (2005)	This paper aims to make a contribution by examining the relationship between sustainable sales growth and knowledge management activities in 108 Finnish small and medium-sized enterprises (SMEs).	Fast-growing companies with high KM-maturity are applying KM-related activities in a comprehensive and balanced way, thereby raising question marks around the effectiveness of eclectic KM implementations.
Crawford, C.B. (2005)	This research report empirically explores the relationship between transformational leadership, organisational position, and knowledge management.	A transformational management style, the organisation's place in the market, and KM can be combined in an effective manner.
Metaxiotis, K. et al. (2005)	This paper explores the world of KM in a different way to review the current status quo and analyse the main agreements and disagreements among researchers and practitioners in order to highlight the key issues which need to be further researched.	Based on agreement among researchers and practitioners, and having in mind the remaining disagreements, the third KM generation should proceed to further investigation of several KM issues and to further research.
Robinson, H.S. et al. (2005)	This paper investigates how large UK construction organisations manage their knowledge assets. It then proposes STEPS, a mechanism for benchmarking an organisation's knowledge management maturity.	The paper concludes that construction organisations are likely to be successful in implementing KM if appropriate considerations are given to strategy formulation, implementation issues are addressed, and the link between KM and business strategy is strengthened.
Hsu, S.H. and Shen, H.P. (2005)	Based on Kanji's business excellence model, this paper compares the similarities and differences between KM and TQM.	The similarities include: results orientation, people-based management, teamwork, leadership and delighting the customer. The differences consist of continuous improvement and management by fact, because KM focuses more on building a culture to support knowledge generation and sharing.
Oltra, V. (2005)	Oltra examines factors contributing to KM effectiveness and offers a conceptual and practical framework built on knowledge and human resource management relationships.	Systematic patterns are presented regarding the impact of critical KM characteristics and KM-related HR practices on KM effectiveness. An induced framework, encompassing a number of specific variables and propositions is developed.
Malhotra, Y. (2005)	Malhotra demonstrates the importance of knowledge	Superiority of strategy-pull models over the traditional technology-push models is made

	management strategies being combined with technology to enhance performance within business processes.	feasible by new plug-and-play information and communication technologies.
Danskin, P. et al. (2005)	This research studies KM in the textile industry, considering connections between KMS, strategy and performance.	Effective KMS assists knowledge across the organisation. External KMS builds stronger networks and adds value to both internal and external knowledge.
Finnegan, D. and Willcocks, L. (2006)	These authors use process analysis of CRM implementation from a KM viewpoint in a study of UK local government, focusing on how implementation is affected by cooperation between groups within organisations and tacit knowledge is identified and shared.	A rich picture emerges of sub-cultural silos of knowledge linked with psychological contracts and power-based relationships influencing and inhibiting adoption and acceptance of the CRM system.
Palacios, M.D. et al. (2006)	This paper studies relationships between KM, innovation, and organisational performance.	Growth, sharing and securing of knowledge positively affects performance, as does ongoing organisational learning.
Jaw, B.S. et al. (2006)	This paper examines knowledge flows and subsidiaries' performance from the viewpoint of human capital.	Outflow of knowledge can enhance performance; however, the inflow of knowledge can facilitate performance only in the case of high investment of human capital in subsidiaries.
Ju, T.L. et al. (2006)	This article offers a strategic contingency model to classify knowledge characteristics and integration, KM strategies, capabilities, organisational learning, and innovation.	Knowledge characteristics with higher modularity and explicitness could enhance organisational learning and knowledge integration, levels of organisational learning, and knowledge integration, as KM capability has a significant impact on a firm's innovation.
Wei, C.C. et al. (2007)	These authors explore perceptions versus actual value regarding success factors, KM strategies, and KM processes within the context of performance in the Malaysian telecommunications industry.	The paired t-test results show significant differences among all the KM strategies in terms of their importance and actual implementation. Strategies such as technology, culture and leadership are moderately implemented, with measurement being the least implemented factor.
Dufour, Y. and Steane, P. (2007)	This research focuses on KM practitioners' approaches to KM strategy and practice.	The authors call for a radical change in the way of thinking and studying KM implementation, which incorporates configuration and contextual theories.
Magnier-Watanabe, R. and Senoo, D. (2008)	This paper examines how the organisation of a firm affects knowledge management.	Organisational characteristics, specifically – structure, membership, relationship, and strategy affect KM, namely – knowledge acquisition, storage, diffusion, and application respectively.
Khalifa, M. et al. (2008)	This paper presents research on ways that KMS affects performance in organisations.	Flexibility and innovation enhance KMS outcomes during change, and KMS is linked directly to increased performance.
Mehta, N. (2008)	Mehta explores effective KM in global software organisations.	Firms with successful KM programs typically develop three specific capabilities to address these issues. These capabilities, namely, Articulating the KM Strategic Intent, Facilitating Knowledge Flows to Enable Innovation, and Assessing KM Value, when

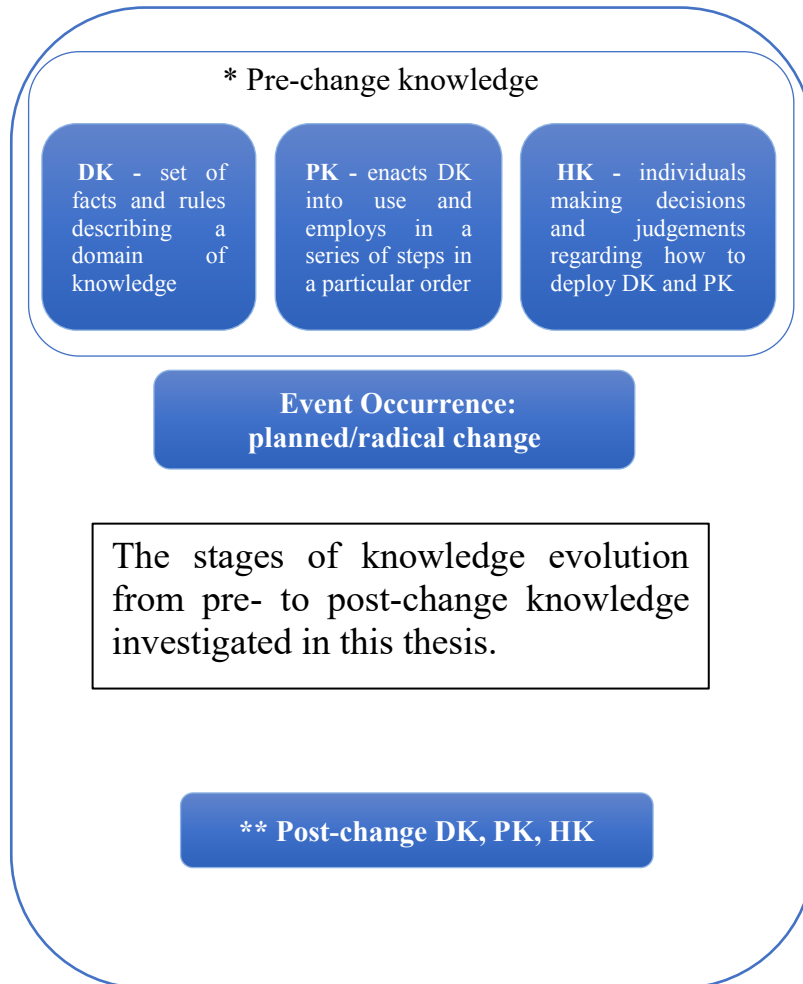|		developed simultaneously, help firms create KM-enabled value.
Singh, S.K. (2008)	Singh focuses on management styles affecting innovation and the creation of competitive advantage in his study of KM in an Indian technology company.	The findings indicate directive as well as supportive styles of leadership to be significantly and negatively associated with the art of knowledge management practices.
Heffner, M. and Sharif, N. (2008)	These authors offer an integrative KM framework for creating new knowledge and technological innovations used by managers in decision-making processes.	The framework shows individual and group knowledge is combined to create innovation via continuous learning, deployment of knowledge, and performance monitoring.
Ambos, T.C. and Schlegelmilch, B.B. (2009)	The paper investigates how knowledge management is really embedded in organisations and with which critical issues firms still struggle.	The promise of knowledge management can only be realised if people are open to changing business processes and adopt new ways of thinking.
Ooi, K.B. et al. (2009)	This paper seeks to close the gap on the existing literature, by giving guidance to the senior management of TQM companies that aspire to discover the competency of knowledge management.	By developing a deeper understanding of the relationship between TQM practices and knowledge management, senior management can focus their efforts on the practices that ensure a firm's ability to establish a competitive knowledge management capability.
Zack, M. et al. (2009)	These authors present a KM framework for decision making using the integration of new knowledge and technology.	A gap exists between the KM practices that firms believe to be important and those that were directly related to organisational performance.
Mohamed, M. et al. (2009)	This paper offers an empirical approach to examining the role played by KM in sustainable development by considering critical success factors and the use of technology.	Results show that KM is critical for innovation, prioritisation and efficient use of resources. A significant linear association between IICTs and KM across time and geography is detected.
Heisig, P. (2009)	Heisig analyses KM frameworks from research and practice examining central elements to detect similarities and differences.	The author identifies standard concepts and terminology to align international KM for greater understanding.
Tian, J. et al. (2009)	Tian asks why and how KM is used to develop knowledge in higher education and research settings.	The findings from the first survey show that the KM obstacles reflected on various aspects: technological support, the people involved in creation activities, laboratory cultural, and so on.
Cantner, U. et al. (2009)	These authors focus on organisations implementing KM, and show that KM leads to greater collaboration and innovation.	Innovation strategies targeted at consumers and continuous R&D activities are positively related to knowledge management usage by innovative German firms.
Fink, K. and Ploder, C. (2009)	This research investigates SME challenges to develop KMS and the role that software plays in this process.	A knowledge toolkit for SMEs that integrates knowledge processes and a software tool for decision making is provided.
Morrison, A. and Rabellotti, R. (2009)	These authors examine knowledge and information networks in the Italian wine industry.	Knowledge flows are restricted to a tightly connected community of local producers, differing in terms of knowledge assets, innovation behaviour and overall economic

		performance with respect to the rest of the firms in the cluster.
Lindblom, A. and Tikkanen, H. (2010)	This article aims to contribute to the study of knowledge creation and management in business format franchising by focusing on the question of how franchisors can convert the tacit knowledge held by franchisees (such as insights, ideas, and hunches) to explicit knowledge.	The findings emphasise that the conversion of franchisees' tacit knowledge to new explicit knowledge is one of the key knowledge management practices required for successful business format franchising.
Meier, H. et al. (2010)	Research areas cover new concepts and methods which enable machine producers to design potential services in an optimal way.	The findings show that IT is valuable to knowledge combination and that it is organisational creativity that improves performance in the main.
Štorga, M. et al. (2010)	These authors examine design ontology as a possible approach to increasing product development efficiency.	Design ontology was evaluated through test product examples and, based on this evaluation and proposed implementation framework, further research steps are proposed.
Sun, P. (2010)	Sun considers the impact of day-to-day organisational activities on the acquisition, development, deployment and transfer of knowledge.	The study elicited the organisational routines that influence the three knowledge management processes. These routines were then clustered into five key organisational themes: systemic knowledge; strategic engagement; social networking (external and internal); cultural context; process and structural context.
Massingham, P. (2010)	This paper examines whether the use of KM in managerial contexts is a measure of KM's worth.	This is particularly the case when added to knowledge risk management, which applies KM tools and techniques to the management of organisational risk.
Xu, J. et al. (2010)	These authors offer a method via which organisations can use KM for ongoing performance improvement	A networking process of continuous innovation based on KM is proposed by incorporating the phase of internalisation. Three sources of organisational knowledge assets in innovation are identified.
Handzic, M. (2011)	Handzic examines the legitimacy of an integrated socio-technical KM model to consider the importance of social and technical initiatives within organisational KM.	The findings provide a confirmatory test of the proposed model and reveal social factors to be of greater importance than technical factors in advancing organisational knowledge in the case of public administration organisations.
Sandhawalia, B.S. and Dalcher, D. (2011)	These authors argue that a systematic approach to KM is required for developing competences to aid knowledge evolution within organisations.	A four-stage framework is offered that helps to make sense of the development of capabilities during the implementation of KM initiatives.
Nesheim, T. et al. (2011)	This research analyses the links between communities, organisational management and employees when engaging with KM activities.	Communication and feedback are considered to be key factors to reach KM-related objectives, all of which increase staff members' ability to act autonomously.
Mills, A.M. and Smith, T.A. (2011)	These authors examine KM resources and their influence upon the performance of organisations.	The results show that some knowledge resources (e.g. organisational structure, knowledge application) are directly related to organisational performance; while others (e.g. technology, knowledge conversion), though

		important preconditions for knowledge management, are not directly related to organisational performance.
Donate, M.J. and Guadamillas, F. (2011)	This paper examines leadership as a factor that impacts on knowledge management and innovation.	Managers who effectively deploy knowledge to encourage innovation enhance organisational performance.
Donate, M.J. and Canales, J.I. (2011)	This article explores new ways to think about knowledge strategy.	Organisations outperform competitors by setting objectives identified via KM.
Loke, S.P. et al. (2011)	These authors advance a TQM and KM model of supply chain learning and test it using data from the manufacturing and service sectors.	While a greater level of TQM practices enhances the KM practices, the results reveal that both TQM and KM are significantly and positively related to supply chain learning.
Lakshman, C. (2011)	The model proposed in this article examines the nature and features of the integration process using a knowledge lens to view the cultural and organisational integration mechanism leading to integration effectiveness.	Drawing from advances in the acquisition, strategic HRM, knowledge management, and leadership literatures, the model identifies knowledge leadership, cultural knowledge integration, early involvement in integration process design, and variables related to causal ambiguity as key components of an effective set of practices for integration in these contexts.
Durst, S. and Edvardsson, I.R. (2012)	The aim of this paper is to review research on knowledge management in small- and medium-sized enterprises to identify gaps in the current body of knowledge, which justify future research directions.	Given the prevalence of small and medium-sized enterprises there is a strong need for more research on this important topic.
Kraaijenbrink, J. (2012)	Knowledge management processes are reviewed regarding small firm product development projects.	This author shows that integration of knowledge and its management is a significant factor for projects of this sort. In addition, the relationship between knowledge and business processes via increased interactions affects performance.
Andries, P. and Wastyn, A. (2012)	These authors offer an empirical study of KM adding value to organisations. This value may be financial due to enhanced performance brought about by innovation.	While KM activities require investment, the longer-term benefits outweigh initial costs.
Björk, J. (2012)	This paper investigates how individual ideation performance is affected by bridging numerous knowledge domains.	Cooperation between individuals increases innovation, particularly if these individuals operate across knowledge domains.
Zhang, Z. and Jasimuddin, S.M. (2012)	This research examines methods for transferring knowledge within organisations via a marketplace approach to KM.	The benefits of the market for knowledge transfer are illustrated from three aspects: transaction price as sharing reward; market as payment platform; and IT as transaction facilitator.
Andreeva, T. and Kianto, A. (2012)	The authors observe the connections between KM, organisational competitiveness and economic performance.	HRM and ICT practices for managing knowledge are quite strongly correlated and have a statistically significant influence on both financial performance and competitiveness of a firm.
Pérez-López, S.	This paper considers the impact of IT	Knowledge management processes mediate

and Alegre, J. (2012)	capabilities on performance within KM processes.	the relation between IT competency and market performance.
Ferraresi, A.A. et al. (2012)	These authors argue strategic direction and increased innovation are influenced by KM that assists in improving business processes.	Effective KM contributes positively to strategic orientation. Although there is no significant direct effect of KM on innovativeness, the relationship is significant when mediated by strategic orientation.
Mangiarotti, G. (2012)	This paper studies performance improvement via knowledge creation and management.	The implementation of internal KM practices precedes external knowledge acquisition. This indicates a positive association between KM intensity and strategy complexity in terms of knowledge sourcing.
Noruzy, A. et al. (2012)	This article presents a model regarding organisational performance in Iranian manufacturing.	Transformational leadership positively and indirectly influences organisational innovation through organisational learning and knowledge management. Knowledge management and organisational learning affect organisational performance. indirectly by organizational innovation
Chen, C.S. and Liu, C.H. (2012)	These authors consider network position and knowledge diversity.	Knowledge diversity positively moderates the association between centrality and the quality of the knowledge created, but negatively moderates the centrality-knowledge quantity relationship.
Bagnoli, C. and Vedovato. M. (2012)	This paper studies how KM and strategy coherence affect innovation and performance using a quantitative analysis of Italian manufacturing SMEs.	This type of coherence positively influences organisational performance and managers need to be aware of the importance of linking KM with strategy.
Yang, L.R. et al. (2013)	These authors investigate Taiwanese research and development (R&D) projects with a focus on the connections between IT, KM and team processes within R&D.	The findings suggest that TP may fully mediate the effects of KM on R&D project performance in terms of quality and development success and schedule and cost performance. The results also show that industry sector and team size have a moderating effect on the relationship between TP and R&D project performance.
An, X. et al. (2013)	These authors present a study regarding methods to improve the effectiveness of KM activities.	A reference model for the integrated adoption of existing KM methods is developed with respect to the characteristics of Chinese culture for improving the effectiveness of KM activities in the organisations.
Merat, A. and Bo, D. (2013)	This paper examines leadership in knowledge-intensive organisations and its relationship to knowledge management.	Knowledge is not an organisational resource unless it is identified and deployed by managers and staff members to deliver organisational outcomes and achieve objectives.
Salem, I.E.B. (2014)	Salem examines KM in the Egyptian hospitality industry and its impact on performance and innovation.	The findings reveal a strong and positive relationship between knowledge management and hotel performance. In addition, there is a strong and positive relationship between knowledge management and hotel innovation.
Secundo, G. et al. (2015)	Defines an integrated framework for entrepreneurial learning processes	The framework contributes to demonstrate how a "learning lens" can be applied to create

	happening in the context of technology intensive enterprise.	avenues for further research in entrepreneurship. Originality in the framework consists in the integration of entrepreneurship with the entrepreneurial learning area providing insights and implications for theory and practices.
Duchek, S. (2015)	Duchek provides a practice-based, empirical investigation into absorptive capacity and the practice of knowledge absorption.	Drawing on the case studies of two German high-tech firms, the paper shows how these practices were enacted.
Ngulube, P. (2015)	Ngulube provides a content analysis of 303 articles published in the *Journal of Knowledge Management* between 2009 and 2013 via a review of research methods.	Scholars tend to use quantitative methods when researching knowledge management and few qualitative studies are seen in the literature. More qualitative studies should be carried out to examine the various facets of KM.
Dahiyat, E.A.R. (2016)	This paper explores the main challenges for the future of online securities transactions via the Internet, and determines whether or not the current legal framework provides adequate protection to investors in an online environment.	Addresses the issue of what the law ought to be in order to enhance the trust and the predictability needed by the relevant parties involved in online brokerage service over the Internet.
Intezari, A. (2017)	This study aims to identify the main knowledge processes associated with organisational knowledge culture.	Although technology infrastructure is an important aspect of any KM initiative, the integration of knowledge into management decisions and practices relies on the extent to which the organisational culture supports or hinders knowledge processes.

Expanded Knowledge Evolution Conceptual Model

* Pre-change knowledge

DK - set of facts and rules describing a domain of knowledge

PK - enacts DK into use and employs in a series of steps in a particular order

HK - individuals making decisions and judgements regarding how to deploy DK and PK

Event Occurrence: planned/radical change

The stages of knowledge evolution from pre- to post-change knowledge investigated in this thesis.

** Post-change DK, PK, HK

K: Knowledge
DK: Declarative Knowledge
PK: Procedural Knowledge
HK: Heuristic Knowledge
* Knowledge required to complete the task before the event occurred
** Evolved knowledge required to complete the new task

Appendix 5: Data Collection and Analysis Documents

1- Case Study Protocol

Case Study Protocol

The case study protocol for this thesis consists of three main phases. The first phase is designing the outline for the case studies, the second phase is conducting the case studies, and the third phase is analysing the data collected during the case studies.

Phase One: Designing

• Step 1: Identify research questions and problem.

• Step 2: Set research objectives.

• Step 3: Construct fieldwork outline.

Phase Two: Conducting

• Step 1: Develop and test the methodology (pilot study).

• Step 2: Carry out fieldwork data collection.

Phase Three: Analyse data.

2- Ethical Letter Approval

Brunel University London

4 April 2016

LETTER OF APPROVAL

Applicant: Miss Nouf Alyaseen

Project Title: Nouf Ethical Form

Reference: 2268-LR-Apr/2016- 2795-4

Dear Miss Nouf Alyaseen

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.
- The correct Brunel logo (as above on this letter) should be included on the participant information sheet and any correspondence relating to the project.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor James Knowles

Chair

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London

3- Participant Information Sheet

	YES	NO
The participant should complete the whole of this sheet		
Please tick the appropriate box		
Have you read the Research Participant Information Sheet?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Have you received satisfactory answers to all your questions?	☐	☐
Who have you spoken to?		
Do you understand that you will not be referred to by name in any report concerning the study?	☐	☐
Do you understand that you are free to withdraw from the study:		
• **at any time?**	☐	☐
• **without having to give a reason for withdrawing?**	☐	☐
• **(where relevant, adapt if necessary) without affecting your future care?**	☐	☐
(Where relevant) I agree to my interview being recorded.	☐	☐
(Where relevant) I agree to the use of non-attributable direct quotes when the study is written up or published.	☐	☐
Do you agree to take part in this study?	☐	☐

Signature of Research Participant:
Date:
Name in capitals:
Witness statement
I am satisfied that the above-named has given informed consent.
Witnessed by:
Date:
Name in capitals:

Researcher name:	**Signature:**
Supervisor name:	**Signature:**

4- Senior Managers Interview

Date of the interview: The Interview Code:

Time:

Participant's Personal and Information

Participant's name...

Participant's occupation...

Length of experience in organization (years)....................................

E-mail..

Organization name...

Address..

Telephone................................., extension.....................................

Part A: The overall implementation of change

Key changes that were implemented within the organisation's processes

1. Can you tell me about the change that happened in your organisation/ Department (Business Process)?

2. How did this change take place?

Criteria	Institute X
Specific objectives and targets of change	
Describe process change	
Processes that radically changed	
Initiated by whom?	
Started when?	
Completed when?	
Was the change planned in advance?	
Processes radically changed	

Part B: Before the implementation of change

This concerns the job tasks before change took place, and the knowledge (data, information and experience) needed to perform the mentioned tasks

1. What tasks were included in the process (department) before change took place?

2. Discuss each of the mentioned tasks including the steps required to complete the tasks.

Part C: After the implementation of change

This concerns the job tasks after change took place, and the knowledge (data, information and experience) needed to perform the mentioned tasks

1. What are the tasks necessary in the process (department) after change implementation?

2. Discuss each of the mentioned tasks including the steps required to complete the tasks. (Describe each of the steps mentioned above).

3. How did you ensure that the new tasks would be understood and performed by employees? (what applicable procedures did you apply to ensure the proper performance)

4. How did you ensure that employees acquired the knowledge necessary for them to perform the new job tasks?

5- Staff Members Interview

Date of the interview: The Interview Code:

Time:

Participant's Personal and Information

Participant's name...

Participant's occupation..

Length of experience in organization (years).....................................

E-mail..

Organization name...

Address..

Telephone................................., extension.....................................

Part A: Overall implementing change situation

3. What were the changes that happened in your job?

4. How did the changes take place?

Part B: Before Implementing Change

About your job tasks before change took place, and knowledge (Data, information and experience) you need to perform the mentioned tasks

1. What tasks did you perform before the change took place?

2. What steps did you carry out to complete these tasks? (Identify 1 or 2 tasks)

3. Discuss the mentioned tasks and steps required to complete the tasks:

    *   Describe in brief each of the steps mentioned above.

    *   How did you do each step?

    *   What knowledge you were needed to do each of the mentioned tasks?

knowledge refers to:
*   **Information and skills you need to carry out your job tasks.**
*   **The action you need to use the required information and skills to carry out your job tasks.**
*   **Your decision to use this information and these skills in the way you use it to carry your job tasks.**
    *   Is this knowledge still needed? (Yes. Mention why? / No. Mention why?)

    *   Is this knowledge still relevant? (Yes. Mention why? / No. Mention why?)

Part C: After Implementing Change

About your job tasks after change took place, and knowledge (Data, information and experience) you need to perform the mentioned tasks

1. What are your current tasks you responsible to perform – after the change took place, and what steps you have to carry out in order to complete these tasks? (Identify 1 or 2 tasks)

2. Discuss each of the mentioned tasks and steps required to complete the tasks:

    • Describe each of the steps mentioned above.

    • How do you do each step?

    • What knowledge is needed to do each of the mentioned steps?

    • How did you acquire the knowledge necessary for you to perform the current tasks?

    • How do you obtain the new knowledge needed to carry out the steps needed to complete your current tasks?

6- Sample of Interview Analysis Table

Advising Process Before Change – Institute Y	

Interview Ref	Quote from interview
(C, 66-67)	So that is the *huge,* yes the *huge* successful result, that even the other teachers could not believe that their arms list is done, it's stable. Draw an ad. in the previous, it was 90%, it dropped to 50-something-%, 53%, so that's like nearly half of the student didn't have to draw up an ad. because they followed correct advising from the beginning. So all these things, you know, successful results made all these teachers, who were reluctant in the beginning to follow the system, to be happy to do it now. So that was the negative, basic negative point of view we had at the first meetings
(C, 68-69)	The positive one was that everything was documented and everything was, let's say, IT-wise. We entered technology in everything. Now, yes, technology might fail you at some point, but we made sure that we have a backup in everything. So if we are using a timetable, we have backup as a hardcopy; if we are using a plan system for the appointments we have backup as a hardcopy – just in case, you have to have backup technology anyhow. So, just in case to make sure you are on the right side and you are safe, you have to have a backup. But we did technologise, let's say, *everything*
(C, 74-75)	Well, I'm not going to hide it, but the first we had two advising period with the new system. Ok? The first one had also some gaps whereas teachers and Faculty were not *well*-informed with the information. We had them sent, er, sent as an email. We found out that you tell them to print it but they don't print it
(C, 76-81)	So, what we did in the *second* advising period to overcome those gaps, is print out everything, sit with them, adviser-by-adviser, group-by-group, meaning; the Business department, we had to sit with them alone; and the IDD (???) Department, we had to sit with them alone, and so on. So, we made sure that we sit with every adviser, with this list, to make sure that they comprehend the list and the steps they're supposed to follow. And what does the folder have for them to look for. So we made sure that every adviser, we don't have plenty of advisers, so that's a good thing for us, we have eight advisers in each department, each department. Sixteen is total. So that's not a big number to sit with individually, or like some are individual with two people at a time. We did not have problems with that. So we had to sit with them and make sure they get the steps, they get the advising list, … rules, and they get the procedure itself and what they are supposed to do. Now. Also, during the advising period, me, the Director of Student Affairs and the HoD's were available at the *whole* time
(C, 82-85)	Why? 1) to observe, 2) to make sure that everyone is doing what they're supposed to be doing – if they are not they will be reminded on the spot…3) we want to make sure that they're giving out the correct information, in case they have not read their folders or they have not read the steps correctly, we will be there to correct them and also make sure they are presenting the information correctly to students. These steps made it a lot easier and a lot successful, let's say, in the second advising period after the new system. We did not have any issues with the Faculty members, we did not have any issues with teacher. Human errors happen. We're human…So…this is acceptable. Other than that, there are no big deals, there are no big problems – all the big problems that we had before, we fixed them
(H, 43)	However, as an adviser, you need to advise them that this course might not be offered next semester due to the number…

(H, 105-107)	It was basically that we have, you know, a meeting at the beginning of the semester when we're back, before the advisement period and then in the meeting we are given the instruction or the instructions that we need for advisement. And it is organised, more organised, now say, we don't need too many questions, we have how to perform the tasks, we are ready to do them and plus our accumulated knowledge of the students and their choices and the decision-making process, it makes it easy for us as well as the fact that all the information is available to best advise them to complete their diploma according to the plan
(H, 135-137)	To conclude, I would say that it's more efficient. And it's more organised. Second we get more information because it's not only based on how much you know and if you ask, the information comes in a pack and via an email and a workshop so you can't miss the information. Plus the HoD is always available to ask to answer questions. And, you know. Always available during registration time
(B, 4, 5)	So before, everything was manual from the sense that you come into the College and you start doing everything manually, including manual forms, hard copies and you start doing all that. Once the hard copies are collected then it is entered into a system which is called Arms Application which actually gives you an idea of who is going where, and ultimately you do have to do the location of the classes and the supervision of classes, Courses, timetabling through a manual process of timetabling
(E, 48)	I used to receive the timetables which were designed by…*pause*…designed by the Administration office and I was just re-confirm the timetables. So, it wasn't much contribution to the advising as the real name of 'advising'.
(E, 50)	So the first step I receive a folder with a number of students …*pause*…approximately 40, 50 sometimes 60 students. Then I do the auditing, I check each students (sic.) if they are following the stages as I mentioned in the first part. If they are moving from one stage to another
(H, 10)	Yeah, for me I had to sit with every student, first before sorry uh, I had to revise the major sheet and the courses manually for the students, and then sit with them and explain to them what courses they could sit
(H, 11)	Of the courses based on their major sheet, and the time based on the availability and clash between classes
(H, 15-24)	Ok. So first, of course even when it was manual we went through different phases. So one phase we look at the Major Sheet, we register the courses for them based on their study plan. Then we send it to registration based on the timetable created. Later on, we hand it to the student and explain to them what course(s) they are taking. Eventually we had to do the registration and, while we are registering the student, we check that there's no clashes. Basically a long list of classes and all the courses and all the groups was created. So when we register the student and when we put the group number of the students we look at the clash, and if there's no clash, then basically the time and the group is selected for the student to best help them graduate according to the plan. The aftermath of the problem, of the issue, of the process was the *(not clear – could be 'sheet' or 'issue')*. Because afterward, I mean the first week of class, you know, the students like to change, they don't have the timetable, the people didn't show up and we had to fill their timetable to come to change. So it creates a lot of hassle. You are teaching, the students want to register, the students want to change classes, you need to see them and approve their application, then consult with other people, if the class – even if the class is not full. That was a little bit *(time)* consuming
(H, 17-24)	Eventually we had to do the registration and, while we are registering the student, we check that there are no clashes. Basically a long list of classes and all the courses and

	all the groups was created. So when we register the student and when we put the group number of the students we look at the clash, and if there's no clash, then basically the time and the group is selected for the student to best help them graduate according to the plan. Because afterward, I mean the first week of class, you know, the students like to change, they don't have the timetable, the students didn't show up and we had to fill their timetable to come to change. So it creates a lot of hassle. You are teaching, the students want to register, the students want to change classes, you need to see them and approve their application, then consult with other people, if the class – even if the class is not full. That was a little bit *(time)* consuming
(H, 79)	During that period we go and look again at the Major Sheet – we look at the study plan, the GPA and make a decision on whether they can move, drop courses or not
(E, 51)	according to the curriculum, yes. According to the curriculum, of course, we will receive the documents that we have in the advising is the curriculum of each student, her… *pause…*what it's called…GPA, her score. Also it's mentioned the courses she has taken previously and we try to check her progress. In this, also, we check if her GPA is lower than 2.0 in this case she is not allowed to take more than four courses.
(E, 49)	and later on the students will come in one day and I will submit and advising the timetable sheet to them and they will sign on it.
(E, 57)	we have like Open Day and we submit for each student her timetable. Now we have to note, take a note that students here, unless there is extreme…or…special case, students are not allowed to change their courses.
(H, 35, 36, 37)	it was basically through the period when I approve them, when we were giving the options and approve their transfer from one course to another, or change the course, we re-register the courses. We have to be aware of all this, plus the policy and procedures here, plus the availability of classes
(H, 43)	However, as an adviser, you need to advise them that this course might not be offered next semester due to the number…
(H 61, 62)	Like we have open and straightforward channel of communication between us, registration, between academic adviser and registration. So what we do is, whatever there is missing, a case, we promptly try to respond to it, solve it and make sure it is rectified,
(H, 123, 124)	What the steps is, basically, she didn't register, we register the courses for her. When the semester starts she comes and collects her timetable. If she has issues with the timetable she goes back to the, she goes to student affairs who direct her to us and we look at her request if, if her request is valid to change classes or to drop or add different courses, we will do that for her
(E, 59)	unless there is a major problem, for example, she is a graduate, she needs to take six courses instead of five courses; she has a third warning letter; she didn't, her GPA is not very well. In this case we have some exceptions and here we follow the rules and regulations
(E, 63)	Unless there is any issue individually we refer it to the HOD, the Head of the Department.

Appendix 6: Institute X Documents Sample

1- Change in registration task project

Page 1

From:	
To:	
Date:	5/4/2014 7:32:07 AM
Subject:	Fwd: [Ticket#2014050412000257] Automate generation of LMS Daily reports

Dear Hussain,

I've created a ticket with this project. Description below.

Regards,
Sara

---- Forwarded message from

From: "Sarah El-Ghandour"
To: IT Department
Subject: Automate generation of LMS Daily reports
Date: 2014-05-04 15:26:16

This project's main goal is to automate enrolling/deleting students from the LMS system based on the changes in SIS records. So far, an ETL process has been created to generate the students enrollments and courses reports and place them in a shared folder with the LMS test server. Also, Mr. Saleh has scheduled a process on the moodle test server to automatically read the students enrollments reports generated by the ETL process and run the corresponding moodle script to add/delete the students. For the courses offered however, it's not possible to automate reading the file. Therefore, the file will be first generated manually (once before the start of semester) , then changes (new courses) report will be generated automatically and placed in the shared folder, and manually handled by the LMS team.

Initial testing has taken place during the early registration period. Real-time testing will take place in the summer semester (on the LMS test server) while the old manual process continues on production server for sometime in order to be sure of the correctness of the automated process (because we need to test with the actual dates).

---- End forwarded message ---

6/19/2017

2- Manual change grade from before the change took place

Change Grade Form

2401

Date: ....

GUST ID: ....   Student Name: ....

Course ID ....   Course Title: .... Semester: ....

Previously Recorded Grade

New Grade

Date of submitting previous grade: ..../.............../...............
Date of changing grade: .... /.............../............... Text
* (not later than 48 hours from submitting grade)

Reason for changing grade:

	Instructor	Head of Department	Dean	Vice President
Name				
Signature				
Date				

Copy :
   1- Admission, Registration & Student Affairs
   2- Dean
   3- Student File
   4- Student
   5- SIS Help Desk

3- Manual student clearance form before the change took place

	Admission & Registration Dept.

STUDENTS CLEARANCE FORM

Date	06/15/2017	Majors	Marketing
Name Of Student	Abdulaziz A S S S A A Ali	G P A	2.28
GUST No.	0004996	M P A	2.53

IT Department		Alumni	
Date		Date	
Name		Name	
Signature		Signature	

Finance Department		Visit Alumni Office Website at https://alumni.gust.edu.kw/
Date		1-To fill the "Graduate Exit Survey"
Name		2-To create "Alumni Lifelong Email Account"
Signature		

Library	
Date	
Name	
Signature	

ID Unit	
Date	
Name	
Signature	

Admission, Registration & Student Affairs Dept.

4- Old faculty self-evaluation report before the change took place

|				
TO	:	**Dr.** Head, Department of H&SS	Date	: **July 1, 2014**
FROM	:	Dean, CAS	COPY TO	:
SUBJECT	:	**End of year assessment**	No. of PAGES	: **2**

Dear Dr

This letter contains our comments on your 2013-2014 Annual Report and our assessment of this year's performance. As you now know Annual Reports are used as a partial basis for determining the merit salary increase that will be recommended for the 2014-2015 academic year. The assessment also considers teaching evaluations and student comments, as well as the nature of your final exam, course assessments and your grade distribution. In the assessment of your performance, three descriptors will be used: **exceeds expectations, meets expectations and needs improvement.** The category, **meets expectations,** is to be considered as a positive evaluation. The evaluation in this letter applies only to the 2013-2014 academic year; it is a snapshot of the past year's performance.

In the remaining paragraphs, we will comment on your contributions to the three important areas of teaching, research/professional development and service at GUST.

Teaching:

Comments: Your teaching has been without complaints this year. The graph below shows your grade distributions (percentage of As, Bs, Cs, Ds & Fs) against the same figures for the entire H&SS department. Your grades are well distributed. The GPA for your classes is 2.56 compared to department average of 2.49. Your teaching evaluation (4.34) is higher than the college average (4.02), well done. Furthermore, student comments on your teaching are largely positive. You have used peoplesoft/moodle to report student progress. You have included your assessment of learning objectives in your course assessment form.

Assessment: Meets Expectations
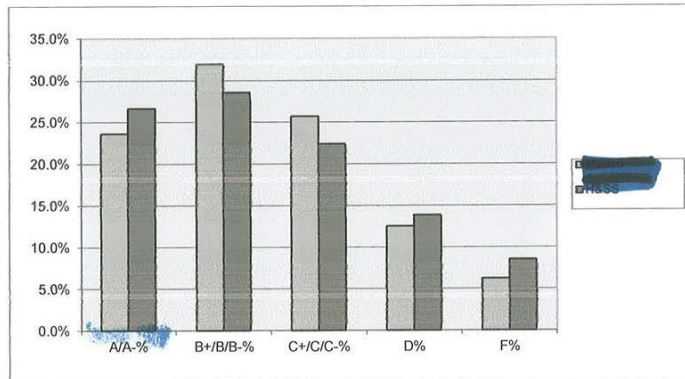
Research/Professional Development: Comments: You have managed to work on several projects which are nearing fruition and I hope these will count quite heavily in next year's assessment.

Assessment: Meets Expectations

Service: Comments: A busy and fruitful year, you managed to achieve a lot in just one year as HOD, several proposals and policy documents at different stages of completion. Trimming down the course list was a major task. You also made a very important connection with the Dar Al-Athar.

Assessment: Exceeds Expectations

Special Comments: This was your first year as HOD and although it can be difficult to adjust to the new position, you did very well. I am very pleased to be working with you and found you to be a professional that I can rely on. Thank you.

This assessment will go into your HR file. You are also entitled to respond to the assessment (deadline: July 8th, 2014). Your response will also be added to the file. The idea of the response is to create as much balance as is possible for your permanent file and not to re-do the merit analysis unless there is an egregious error.

Professor
Dean, College of Arts & Sciences

5- New online faculty self-evaluation form (screen shot)

MERIT

Faculty Evaluation

| 14/15 Evaluation | 15/16 Evaluation | 16/17 Evaluation |

Status

Request feedback

Evaluation Weights

This report will be sent to HR

a. Please enter a weight for each evaluation criteria from the following and make sure that total weight is equal to 100%.
b. Click on "Evaluate My Performance" to enter Self Evaluation values and comments along with needed supporting documents.
c. Make sure to Save your progress periodically throughout the evaluation
d. If you have general comments on each performance area you can write them in the general comments box.
e. When you have completed the evaluation please review it carefully before clicking submit to HOD, the submission is final.

Evaluation Area	Weight	Weight Range From	To
Teaching	70	50%	70%
Services	10	10%	20%
Scholarship	20	20%	40%
	100		

1/6

Nouf Alyaseen

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Performance Criteria Level I (Teaching)

	Performance Criteria	Max Points	Self	Comments	Upload Files	HOD Score	HOD Comments	HOD Upload	Dean Score	Dean Comments
1	Fulfilled teaching load as assigned and completed all reporting requirements by designated deadlines (syllabi, grades, Course assessment reports, i.e., course files)	10	10	yes, you can check your email	10	yes			10	
2	Course files are adequate and meet departmental/Accreditation standards	10	10	Hopefully yes	10	yes			10	
3	Demonstrated achievement of stated learning outcomes, and if needed, identified weakness and proposed corrective actions	10	10		10	yes			10	
4	Grades distributions are within acceptable range (based on department's criteria), Or justification provided by faculty and accepted by HoD	15	15		15	yes			15	
5	Attended all class sessions, or if absent, made arrangements for class meetings	10	10		10	yes			10	

Nouf Alyaseen   272

#	Performance Criteria	Self	Comments	Upload Files	MERIT	HOD Score	HOD Comments	HOD Upload	Dean Score	Dean Comments
6	Effectively used university resources (MYGUST, Library, SSC....etc) (New teaching methodology, development learning resources: evidence must be included in the dossier)	15	15	file_0	15	yes			15	
7	Was accessible to students electronically and in person (Advising & Office Hours)	10	10		10	yes			10	
8	Peer review visits, external evaluation	5	5		5	yes			5	
9	Was evaluated by students (5 point scale, normalized to 15 pts)	15	12	12	12	yes			12	
	Total Points		97.00		97.00		97.00			

The value will be coming automatically from survey system

Performance Criteria Level II (Teaching)
The below items require an evidence,Kindly upload a pdf file

Performance Criteria	Self	Comments	Upload Files	HOD Score	HOD Comments	HOD Upload Score	Dean Score	Dean Comments

Nouf Alyaseen   273

Appendix 7: Institute Y Documents Sample

1- Part of the proposal for change in the advising Process in Institute Y

Dear Dr XXXX,

……..

Currently students are being advised by their respective advisors during the allocated time in the semester. Then, once the semester ends, they now have the opportunity to choose their subjects of study online through the moodle platform. Once registration is completed, students come to Y during the "student orientation period" to collect their schedules. After which they get the opportunity to drop and add courses during the first week of teaching.

…….

Benefits to this proposal include:
- Alleviate the schedule pickup crowd
- Save Y the cost of paper that schedules are printed on
- Embrace technology and the ease that comes with it
- Avoid false schedule duplications

The proposed procedure is as follows:
1. Once the student registration period is completed schedules are now ready to be generated.
2. As soon as the schedules are ready, instead of printing them on paper, two options are suggested:
   a. Upload each individual schedule on the respective student's Moodle page.
   b. Email each student their schedule with the added benefit of checking whether the student received the email and read it.
3. The schedules should be in a format that the students would not be able tamper with.
4. Once the students receive their schedules, only those that would prefer to change their courses by dropping or adding are requested to pick up a printed copy from Y during the drop and add week.
5. The regular drop and add procedure should then go forward as normal with only the minimal amount of students requesting changes.

………

Regards,

XXXXX

Current Problems with Registration Process

- **Problems faced by students:**
  - Students are highly unsatisfied with the lack of input in regards to their class time.
  - Students are unhappy to have to come to register and be told which classes to take, with no time and no teacher signified.
  - Students are unhappy with the general procedure of registration in which they come to the college and are told to leave and come back in September for more information on class timing and instructors and to make changes.
  - Students are also unhappy to come and be told to leave and come again some other day as things were not prepared; especially as they arrived on the first day, only to find the grades were not even posted.
  - Students complained, at times on social media in regards to the above inconsistencies and lack of preparation.

Optimal Solution

- Each faculty member should be responsible for a specific group of students for advising throughout the students' tenure at Box Hill. i.e, Arezou will be assigned a batch of students based on their ID number.

- Prior to the registration period and advising, all interested parties should have a mandatory meeting whereby, everyone's roles and duties are clarified.

- Faculty member advisors should be available to students for a specific duration, in the current semester, ideally after the midterms as to advise them on how to use the new registration system and which courses are appropriate for their plan of study.

3- Sample of Guide for Staff Members - Institute Y