UNIVERSITY OF KWAZULU-NATAL

Examining Knowledge Management Challenges experienced during Enterprise Resource Planning Implementation at eThekwini Electricity

By

Yashveer Ramlakhan

205506486

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Supervisor: Professor Cecile Gerwel Proches

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ABSTRACT

eThekwini Electricity is an electric utility that distributes electricity to the eThekwini region. The organisation is a large organisation which has various software systems that are used to sustain its operation. One of the systems which is core to the organisations operation is their Enterprise Resource Planning (ERP) system. This study examined the knowledge management challenges which were experienced by eThekwini Electricity during the implementation on their Ellipse version eight ERP system which continue to have a negative impact on the organisation. Some of the negative effects include inefficiency and duplication of work as well as financial costs which are directly related to the ERP system. A qualitative research approach was used so that a deeper understanding about what these challenges were could be discovered. An interpretative approach for the study was deemed to be most suitable and fifteen participants formed the sample size of the study. Purposeful sampling was used to select the participants and semi-structured interviews were conducted to allow the participants to respond freely which provided a richer insight to the user's perceptions and views of the implementation of the ERP system. Interviews were transcribed and thematic analysis was performed on the data collected so that a detailed insight on common themes which emerged could be discovered. Salient findings which emerged was that the organisation experienced many knowledge management challenges which affected the implementation of their ERP system. A key finding was that the organisation did not have a knowledge management strategy in place, and everyone did as they saw fit to manage knowledge. There were elements of knowledge management practices which existed but nothing that followed a formal strategy. Recommendations such as creating a knowledge management strategy, addressing organisational culture, setting up a project management office, leveraging technology and taking suitable measures so that these challenges can be mitigated against, were put forward.

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CHAPTER ONE: OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Enterprise Resource Planning (ERP) systems are software-based systems which enable different functions of the business to integrate with one another such that the seamless exchange of information can take place (Acar *et al*., 2017; Maguire *et al*., 2010; Ramburn *et al., 2013a; Candra, 2014)*. The goal of any ERP system is to improve efficiency of the business by allowing different departments to share and consume the information generated by multiple systems (Candra, 2014; Acar *et al*., 2017). By being able to share information and integrate different processes across a business allows businesses to increase productivity and enable them to run a leaner organisation. ERP systems are not new and have been widely deployed in developed countries all over the world (Banaeianjahromi *et al*., 2016).

Over the year's ERP vendors and organisations have faced challenges relating to successful implementation, more so related to implementation in emerging economies (Ramburn *et al*., 2013a). There have been many implementations in South Africa and this dissertation focuses on the implementation of eThekwini Electricity's Ellipse ERP system. The dissertation presents the need to conduct research on the organisation and how the findings of this research is of benefit to the organisation to help tackle the knowledge management challenges identified in the research by providing recommendations. The information gathered by this research adds to the existing body of knowledge which exists in the domain of ERP implementations. Large organisations can utilise the findings from this research to improve the way in which they implement ERP systems and manage knowledge such that some of the challenges similar to eThekwini Electricity can be avoided saving the organisation time and money.

This chapter presents the background to the research as well as the reasons why there was a need to conduct this study at eThekwini Electricity. The research objectives and research questions are described and listed.

1.1.1 Study background

eThekwini electricity is an electric utility which belongs to the trading services cluster of eThekwini Municipality. The utility purchases and distributes electricity to more than seven hundred and forty thousand customers in the eThekwini Metropolitan area which spans over two thousand square kilometres (Electricity, 2018). Due to the magnitude of the operation of the organisation, the workforce and material management was too complex to be done using manual systems and the need for an ERP system culminated in the nineties (Watkins, 2011). The organisation deployed a Mincom system which later was acquired by ABB Australia and rebranded to the Ellipse ERP system. The system underwent various upgrades and changes including the current version which is version eight (ABB, 2007).

For the purposes of this research, the study focused on the implementation of the ERP system from version five to version eight which was a drastic change in the ERP system (Watkins, 2011). This upgrade skipped the other releases as by the time the organisation was ready to upgrade, the vendor had already released version eight of the ERP system. The organisation wanted to reap the benefits of the latest release of the ERP system. The implementation of version eight happened during the course of 2014 to the first half of 2015.

After the go live of the new system, the consultants which were involved in the implementation remained onsite for the next four years to support the system, do customisations which were retrofitted or to fix bugs which was causing the system to not operate correctly (Ventyx, 2012). The system has not been able to be supported by internal staff which probably indicates that comprehensive knowledge transfer has not occurred between the consultants and internal staff within the organisation. Users have also battled for a long time after the system went live to navigate and use the system which probably indicates that there was a lack of training on the new system.

1.2 MOTIVATION FOR THE STUDY

This section outlines the reasons which motivate the research undertaken for this dissertation. Firstly, there has been an increasing number of organisations within South Africa which have invested or are thinking of investing in ERP systems (Ramburn *et al*., 2013a). Secondly, there have been many ERP implementations in large organisations in

South Africa, but none of them have looked specifically into the knowledge management element within the utility sector. Thirdly, eThekwini Electricity has battled over the last two decades to fully implement their Ellipse ERP system and continuously requires the dedicated services of consultants to be onsite solving ERP issues.

Internal staff are unable to troubleshoot ERP database configurations and need to rely on the services of the consultants which leads to contractual delays and wasteful expenditure. This study could steer the organisation in a positive direction to help develop more effective knowledge management practices so that knowledge management challenges related to these practices can be avoided. Internal staff would benefit from the correct knowledge management practices and could support the ERP system on their own, thus not requiring the services of consultants. Lastly, there is a knowledge gap that exists in South Africa specifically in the domain of knowledge management and ERP implementations and this study aims to add to the existing body of knowledge such that other scholars and organisations can benefit (Acar *et al*., 2017; Ramburn *et al*., 2013a; Tsui *et al*., 2009).

1.3 FOCUS OF THE STUDY

The focus of this research was to identify the key challenges which was experienced by eThekwini Electricity and which is currently still being experienced with regards to the implementation of their ERP system. The research honed into the dimensions of knowledge management practices during the implementation phase of their Ellipse ERP system from version five to version eight. The research also analysed what knowledge management practices were exercised during the implementation of the ERP system and presents recommendations on how this can be improved. The research can also help other municipalities and developing countries who experience similar conditions, to overcome or address the challenges identified relating to knowledge management and knowledge management practices before these issues start affecting the implementation of their ERP systems.

1.4 RESEARCH PROBLEM

eThekwini Electricity has spent the last two decades implementing and tailoring their Ellipse ERP system to suit their needs so that the organisation could realise the benefits of a fully

functioning ERP system (Watkins, 2011). There have been numerous knowledge management challenges which continuously hinder the successful implementation of the ERP system, but none of these challenges have been formally identified, documented and acted upon. These have been tabled and communicated to the organisation on various platforms formally and informally such as the steering committee meetings and different workgroups. This has prevented the organisation from going out on a drive to solve these problems or to harness the full potential of their ERP system.

Currently, the organisation continuously needs to rely on the professional services of consultants to ensure that the system remains up and running and that specific functions are executed daily (Watkins, 2011). This has led to millions of Rands being wasted in consultancy fees, which could have easily been used to improve other parts of the business and to improve service delivery. These funds were spent through emergency orders and support contracts which were publicly advertised.

The Ellipse ERP system has been through multiple upgrades over the last twenty years and has not been able to function as a standalone system without the reliance on consultants to support the system (Watkins, 2011; Ventyx, 2012). This may be an indication that the ERP system has not yet been fully implemented, as a fully implemented system does not need to rely on external parties to support it on a day-to-day basis (Banaeianjahromi *et al*., 2016). Some elements of the current Ellipse ERP system work well, but there have been many failed attempts to get other features or elements implemented and adopted by the organisation. The organisation still performs many tasks manually which should have been automated by the current ERP system (Watkins, 2011). By automating these tasks, the business could operate more effectively and more efficiently (Jayawickrama, 2015).

This research delves deeper to gain an understanding of why the organisation has found it so difficult to implement and utilise their ERP system to its full capability. The research concentrates on the knowledge management challenges during the implementation of the version eight of the Ellipse ERP system and what knowledge management practices were undertaken during this period.

1.5 AIM OF THE STUDY

The study seeks to examine the knowledge management challenges which were experienced during the implementation phase of eThekwini Electricity's ERP system.

1.6 OBJECTIVES OF THE STUDY

a) To determine the knowledge management challenges experienced during ERP system implementation at eThekwini Electricity.
b) To identify the knowledge management practices which were executed during ERP implementation at eThekwini Electricity.
c) To provide recommendations to improve how knowledge is managed during ERP implementation at eThekwini Electricity.

1.7 RESEARCH QUESTIONS

a) What knowledge management challenges were experienced during ERP system implementation at eThekwini Electricity?
b) What knowledge management practices were exercised during ERP system implementation at eThekwini Electricity?
c) What recommendations can be made to improve how knowledge is managed during ERP implementation at eThekwini Electricity?

1.8 SIGNIFICANCE OF THE STUDY

The findings of this study would benefit eThekwini Electricity, utilities, large organisations and system implementors to identify knowledge management challenges related to ERP system implementation and its relationship to knowledge management practices during this phase. Kähkönen *et al.* (2017a) describe ERP system deployment as becoming a common practice in businesses today and the correct identification and mitigation of challenges experienced can be the deciding factor contributing to the success or failure of the ERP systems.

Through the findings of this research, eThekwini Electricity may address some of the knowledge management challenges of their ERP system implementation, which could aid

them in saving millions of Rands in consultancy fees which could be directed towards delivering better services to the public. For the researcher, this study will help uncover critical areas in knowledge management challenges during ERP implementation which other researchers were not able to explore extensively in the past specifically in a South African context.

1.9 LIMITATIONS OF THE STUDY

One of the limitations of the study was that some of the key members involved in the implementation of the Ellipse ERP system at eThekwini Electricity had resigned from the organisation so the researcher was unable to interview them. Another limitation of the study was that the study only focused on the internal staff members in the organisation as the external implementors were not interviewed, which could have added new perspectives to the findings from the study. Time was a major limitation as the interviewees were not always available to be interviewed or some of them could not stay away from their day-to-day activities for long periods of time. These were mitigated by scheduling appointments based on their availability and venues which were most convenient for them.

1.10 RESEARCH METHODOLOGY

This study represents an analysis within the interpretive paradigm and is based on a qualitative research approach. Qualitative studies are not about facts and figures but rather represent the why and how question and is thus more descriptive in nature (Creswell and Poth, 2017). Semi-structured interviews have been used to allow the participants to respond freely, which provided a richer insight into the user's perceptions and views of the implementation of the ERP system within the organisation (Saunders *et al*., 2012). This gave the researcher the ability to understand the subject from a wider range of perspectives.

The study uses an inductive approach to ensure that the findings have resulted from the raw data (Creswell and Poth, 2017). Thematic analysis has been used to analyse the data which was collected. Interpretive analysis of the data collected has allowed the researcher to understand and investigate the main research problems posed (Creswell and Poth, 2017). All interviews which were undertaken were recorded and transcribed which was used to identify, conceptualise and categorise the themes which emerged. Approval was obtained from the

University of KwaZulu-Natal's ethical clearance committee. The participants of the study were asked to sign a voluntary participant consent form in order for allowing interviews to be recorded and that the anonymity of the participants would be guaranteed.

1.11 OUTLINE OF THE DISSERTATION

This section briefly explains how the dissertation is structured. The dissertation comprises of six chapters excluding references and appendices.

Chapter One of this dissertation presents an introduction to the research topic, the motivation to undertake the study, the focus of the study, the problem which the research seeks to address, the aim, objectives, research questions and the significance of the study. It also briefly describes the research methodology utilised in the research.

Chapter Two discusses in detail the definitions of ERP systems as well as knowledge management from the perspectives of different scholars. Knowledge management during ERP implementation is discussed. The theoretical framework of the study is introduced, and its concepts explained in detail through different streams. It also addresses the gap in literature through the exploration of ERP systems, ERP implementations, knowledge management, and knowledge management challenges during ERP implementation.

Chapter Three examines the qualitative research strategy used to answer the research question and to achieve the research objectives of the study. The chapter clearly explains why a qualitative research approach was used for this study. The chapter then goes on to describe the method used to collect data, which was through conducting semi-structured interviews.

Chapter Four presents the data collected through conducting semi-structured interviews. The interviews were recorded and transcribed. Thematic analysis was then performed on these transcriptions and the key themes which emerged were highlighted with direct quotations from the participants of the study.

Chapter Five provides an analysis of the data presented in chapter 4 according to the objectives of the study. The literature review and theoretical framework is used to examine

whether there are similarities or differences observed when comparing the findings with that of past research.

Chapter Six brings the study to a close and makes recommendations for the organisation to implement to improve their knowledge management practices as the last objective, and it makes recommendations for further studies which can be undertaken.

1.12 CHAPTER SUMMARY

This chapter introduced the research topic, what an ERP system is and why ERP systems are important in any type of business in the world we live in today. A detailed motivation and focus for the study were also described outlining why there was a need to undertake this study. The research problem was then described along with three objectives and three research sub questions. The research methodology and the limitations of the research was presented. This chapter justified why it is so vital for ERP systems to be implemented successfully, and the importance this study has in contributing to the existing body of knowledge in the field of knowledge management and ERP implementations. Finally, it provided and overview of the entire dissertation.

The next chapter presents a detailed literature review of knowledge management and ERP systems. Knowledge management and its relationship with ERP implementations is then highlighted. The challenges during the ERP implementation phase is examined through different scholars and the theoretical framework is defined.

CHAPTER TWO: LITERATURE REVIEW IN RELATION TO ERP SYSTEMS AND KNOWLEDGE MANAGEMENT

2.1 INTRODUCTION

The literature review chapter of the dissertation examines relevant research and studies in the field of ERP systems and knowledge management. The chapter examines the existing information in the field of ERP systems in the South African context which was gathered from previous studies conducted. The definition of ERP systems is covered before moving onto knowledge management and knowledge management during the ERP implementation phase. The challenges surrounding knowledge management is discussed as well as the importance of knowledge management practices during the ERP implementation phase. This addresses the objectives which this study seeks to attain. Finally, the chapter highlights the gaps in the field of ERP implementation which the research aims to fill and contribute towards achieving a better understanding of knowledge management within this context.

2.2 ERP SYSTEMS OVERVIEW

ERP systems are one of the most popular, expensive and important software suites used by corporate organisations in the modern era in the information technology space (Pan *et al*., 2007; Banaeianjahromi *et al*., 2016; Jayawickrama *et al*., 2019). ERP systems cannot be discussed in detail without knowing where it originated from and how it evolved. Therefore, this section begins with a discussion of ERP systems by different scholars along with its evolution and implementation stages.

Before ERP systems existed, businesses were faced with the problem of the integration of their business processes. This need was later taken care of with the introduction of ERP systems and Newell *et al*. (2003) and Jayawickrama *et al*. (2019) describe that a competitive advantage for businesses can be created by correctly utilising an ERP system within an organisation. This is done by creating and organising crucial information so that the information can be shared with the rest of the organisation in an autonomous manner. The use of ERP systems creates better control, efficiency, quality and decision making within the business (Newell *et al*., 2003; Banaeianjahromi *et al*., 2016).

Businesses that successfully implement their ERP systems can streamline their operation to the extent that their processes become more efficient, more productive and much more competitive in the sectors they operate in (Ranjan *et al*., 2016).

2.2.1 ERP system history and definition

ERP systems were originally termed by the Gartner group to describe a group of applications which integrated multiple departments or business functions across or within a company (Wylie, 1990). Looking deeper into ERP systems, one finds that ERP systems are information systems which attempt to bring business functions closer together by integrating business processes which are seen to be core to the organisation or business. This enables these business processes to be automated as well as aid in replacing the previous monolithic legacy systems (Alshawi *et al*., 2004; Yusuf *et al*., 2004; Ranjan *et al*., 2016). Material Requirement Planning (MRP) was developed and used from the 1970s to 1980s and ERP systems are seen to be the successor of the previous MRP systems (Acar *et al*., 2017; Ebert, 2008).

ERP systems provide companies with intersystem linkages to support their supply chain management processes since there are constantly requests for data and information (Su and Yang, 2010). ERP systems are then further defined by Su and Yang (2010) as "an integrated enterprise computing system that is designed to automate the flow of material, information, and financial resources among all functions within an enterprise on a common database" (2010:458). Another definition by Lee and Lee (2000), describes ERP systems as an enterprise wide software suite which combines different parts of the business into a common database which could be accessed by all within the business.

ERP systems support the daily operations and decision-making processes within a business or organisation, automating them so that processes are more efficient and effective (Sedera *et al*., 2003; Ranjan *et al*., 2016; Madanhire and Mbohwa, 2016; Fernandez *et al*., 2018). ERP systems achieve this by providing different modules such as sales, finance, human resources and production (Elbanna and People, 2007; Fernandez *et al*., 2018). By interlinking these modules, the benefits of having an ERP system is realised by businesses

enabling them to exchange information and integrate business processes and functions (Fernandez *et al*., 2018).

ERP systems can either be purchased off the shelf or bespoke. Bespoke systems are built and modified to suit the organisation's operation. Large implementations often involve customizations to the software suite so that processes can be tailored to match the business processes of the organisation. This creates an environment where optimum business value can be achieved (Banaeianjahromi *et al*., 2016). There are many ERP solutions which exist today and some of them are more expensive than others. The more expensive packages offer a variety of modules which cater for special needs of businesses over and above operations such as accounting and production planning (Acar *et al*., 2017). Many ERP systems cannot be a simple drop-in largely because every organisation is different and therefore organisations need to undertake a selection process (Ranjan *et al*., 2016). This selection process factors into account all the business practices, strategies and goals of the organisation.

The implementation of ERP systems usually involves multiple departments across different spheres of the organisation which makes the implementation complex (Ranjan *et al*., 2016). These complexities often lead to several challenges which eventually can translate to high implementation costs, big budgets and extremely risky projects (Ramburn *et al*., 2013a; Ranjan *et al*., 2016). The implementation of ERP systems is challenging, and research indicates that ninety percent of ERP implementation go beyond the project completion date or go out of budget before it is complete (Ayağ and ÖzdemİR, 2007; Holland and Light, 1999; Ranjan *et al*., 2016). A study conducted by Acar *et al*. (2017) revealed that one third of all ERP implementations failed or had to be terminated before the deployment could be completed. The research also outlined the importance of sourcing the correct system for the organisation, as well as the importance of the manner in which the system is implemented.

2.3 ERP IMPLEMENTATION IN SOUTH AFRICA

Research conducted by Du Plessis and Mwalemba (2016) reveal that many organisations in South Africa have considered or are considering implementing ERP systems, but there are various issues which prevent this from happening. These include a lack of sufficient knowledge, skill shortages locally, security, costs as well as legislation. Another study

conducted by Hasheela-Mufeti and Smolander (2017) show that for ERP system to be implemented successfully in Southern Africa, that it is a requirement to have "sufficient and appropriate training" and "involved end users" for the ERP system being implemented.

Ramburn *et al*. (2013a) argued that the failure of an ERP implementation within a large organisation in South Africa, was due to challenges such as technical, process, and project knowledge. The same study also revealed that a critical success factor to achieve successful ERP implementations is knowledge management (Ramburn *et al*., 2013a).

2.4 ERP IMPLEMENTATION ISSUES AND CHALLENGES

The process during which technical, organisational and financial resources are configured as one to provide a functioning ERP system, is known as ERP implementation (Fleck, 1994; Ranjan *et al*., 2016; Ghosh, 2002). Although ERP systems have positive effects on business if implemented successfully, they can also cause many problems if incorrectly implemented (Ramburn *et al*., 2013a).

ERP systems can end up being a nightmare to managers and executives when they are not fully committed to the ERP implementation (Ranjan *et al*., 2016). One of the major issues which many businesses have encountered is keeping the system current and in line with the times and version (Acar *et al*., 2017). Maintenance of an ERP system is done by completing software and new hardware upgrades, which often requires the time of external consultants which can end up being very expensive and demanding on internal staff members (Ramburn *et al*., 2013a; Ranjan *et al*., 2016).

One of the other problems is the procurement of a system which is not compatible with the organisations existing processes, which instead of bringing the different departments within the business closer, leads to making them drift further apart (Zhang and Huang, 2012). Zhang and Huang (2012) report that organisations which exhibit higher levels of diversification between the departments within the organisation have the tendency to perform worse after ERP implementation.

Research conducted by Fernandez *et al*. (2018) reveal that the financial impact which an ERP implementation has on an organisation should be considered in great detail before

heavily investing in a product. Adverse financial impacts could be devastating to a business's finances which could have long term effects due to the high costs involved. These costs are a result of the additional money needed for human resources needed to ensure successful implementation (Fernandez *et al*., 2018).

System integration of an ERP system with other systems which are in operation within an organisation is one of the major challenges during any implementation (Fernandez *et al*., 2018; Banaeianjahromi *et al*., 2016). This process includes the integration of the ERP system with the existing operating systems within the business, the type of communication networks established throughout the organisation, as well as the hardware and the software management systems, so that the ERP system can suit the needs and limitations within the implementing organisation (Fernandez *et al*., 2018).

ERP systems are implemented using best practices, which as a result requires businesses to re-engineer and change the structure of their business processes which must align to the best practices stipulated (Maguire *et al*., 2010). Organisational changes are one of the bi-products of ERP deployments, which as a result, if not managed correctly, can cause conflict within the organisation (Maguire *et al*., 2010). The challenge comes about when the question is how to integrate the ERP within the rest of the business and what legacy systems should be kept and what systems or functions should be replaced or consumed.

This is one of the causes of failures in many ERP implementations (Soh *et al*., 2000). Fernandez *et al*. (2018) argue that these best practices are based on the successes of the past which could conflict with the way in which modern day businesses operate and may not be suitable for the forthcoming way in which future organisation operate. Research which was done by Fernandez *et al*. (2018) prove that the complexity of the organisations structure poses as one of the main challenges during ERP system implementation, which is created by all the protocols and bureaucracy which the structure creates.

ERP systems have the tendency to emphasise order and structured streamlined processes, which could in turn have adverse effects on the organisation the system is being implemented in (Fernandez *et al*., 2018). Fernandez *et al*. (2018) indicate that these systems could end up supressing creativity and the element of innovation.

A study conducted by Venkatraman and Fahd (2016) revealed that some of the challenges which were experienced in the Australian setting were concerning leadership or dedication from top management, lack of skilled resources, the impact on business flexibility caused by business process re-engineering, change of management, the selection of a suitable ERP system, ineffective communication issues within the organisation, cost issues, inadequate user training, issues regarding customisation of the system to suit the business, resistance to change by the employees, and redundancy of business processes.

Many organisations which plan to implement ERP systems but fail to realign their business strategies, may suffer from technical and administrative issues (Banaeianjahromi *et al*., 2016). These issues create delays in the ERP implementation and could contribute to failure in the implementation. The effectiveness of ERP implementations is reliant on external stakeholder support, knowledge transfer and knowledge management practices which are essential components during the implementation (Acar *et al*., 2017). ERP systems and its functionality often cover thousands of business activities and offer huge benefits to businesses who overcome these complex challenges (Banaeianjahromi *et al*., 2016).

2.5 ERP IMPLEMENTATION PROCESS

ERP implementation comprise of six stages which include initiation, adoption, adaptation, acceptance, routinisation and infusion (Rajagopal, 2002). This is depicted in Figure 2.1.

Figure 2.1: ERP Implementation Process

Source: Adapted from Li *et al*. (2006: 158)

The first stage of the ERP implementation is referred to as "initiation" (Somers and Nelson, 2001; Li et al., 2006; Rajagopal, 2002). Internal and external factors are used to influence the organisation in deciding whether to implement an ERP system. This stage is critical as the organisation needs to put forward a strong business case as to why an ERP system is needed and what gaps within the business the system will address (Somers and Nelson, 2001). During this stage the knowledge regarding the system and its modules is realised along with what the exact benefits from the implementation would be.

Once this knowledge is absorbed by the organisation, the implementation process enters its second stage which is referred to as the "adoption" stage (Li *et al*., 2006; Rajagopal, 2002). During this stage, a feasibility study and a cost benefit analysis will be undertaken by the organisation. Thereafter, a preferred brand and vendor will be selected through the relevant supply chain management processes.

During the next stage, which is the adaptation stage, the organisation analyses its business processes and accesses the extent to which these need to be re-engineered such that they can exploit maximum benefits from the project. Business process re-engineering has often been

regarded as one of the key success factors when dealing with ERP implementation (Somers and Nelson, 2001; Li *et al*., 2006). After this is complete and the ERP system correctly configured, then end users are trained and their use of the system is observed. This stage is considered as being one of the most difficult stages (Li *et al*., 2006; Rajagopal, 2002).

During the "acceptance" stage, the integration of different modules occurs. Legacy systems are also integrated into the ERP system (Somers and Nelson, 2001; Li *et al*., 2006). During this stage the system is continuously optimised and tailored so that it becomes more user friendly and cater for the needs of the users.

The fifth stage is referred to as the "routinisation" stage. This is where the system has been adopted by the organisation and the users have accepted that this will be the system on which they complete their daily tasks (Somers and Nelson, 2001; Li *et al*., 2006). The true value of integration and coordination of activities within the system are now realised.

The final stage is called the "infusion" stage. This is where the true value of the system is used to enhance the performance of the business (Somers and Nelson, 2001; Li *et al*., 2006). This entire process is repeated after many years of successful operation of the ERP system and when the system will need to be replaced or upgraded.

2.6 ERP IMPLEMENTATION AND ITS RELATION TO KNOWLEDGE MANAGEMENT

Although realizing that an ERP is an implementation process of an information system, it is also a process of knowledge creation, storage or retrieval, transfer and application from knowledge management perspectives (Li *et al*., 2006). This is demonstrated during the selection process of the ERP system. During this process, the functionality of the modules within the ERP system and the learning from experience element from other organisations, who have gone down the route of ERP implementation, are assessed. Organisations usually undergo business process re-engineering and adapt to the best practices processes, which the ERP system utilises, so that they can benefit from the functionality provided. They may often discard their current processes and adopt standardised processes from the ERP system. This means that the explicit business knowledge residing within the ERP system, is then transferred to the adopting organisation (Lee and Lee, 2000; Fernandez *et al*., 2018).

ERP systems are not just a simple computer program or software tool. These systems affect how people work and the entire culture of the organisation. Knowledge management is intimately associated with ERP implementation and knowledge is identified, captured, transferred and applied during this process which provides support to the success of the implementation (see Figure 2.2). A framework which was used to analyse ERP implementation from a knowledge management perspective, was analysed by Lee and Lee (2000). This framework contributed to a better understanding of how a competitive advantage of an organisation could be realised by capitalising on standardising their business processes.

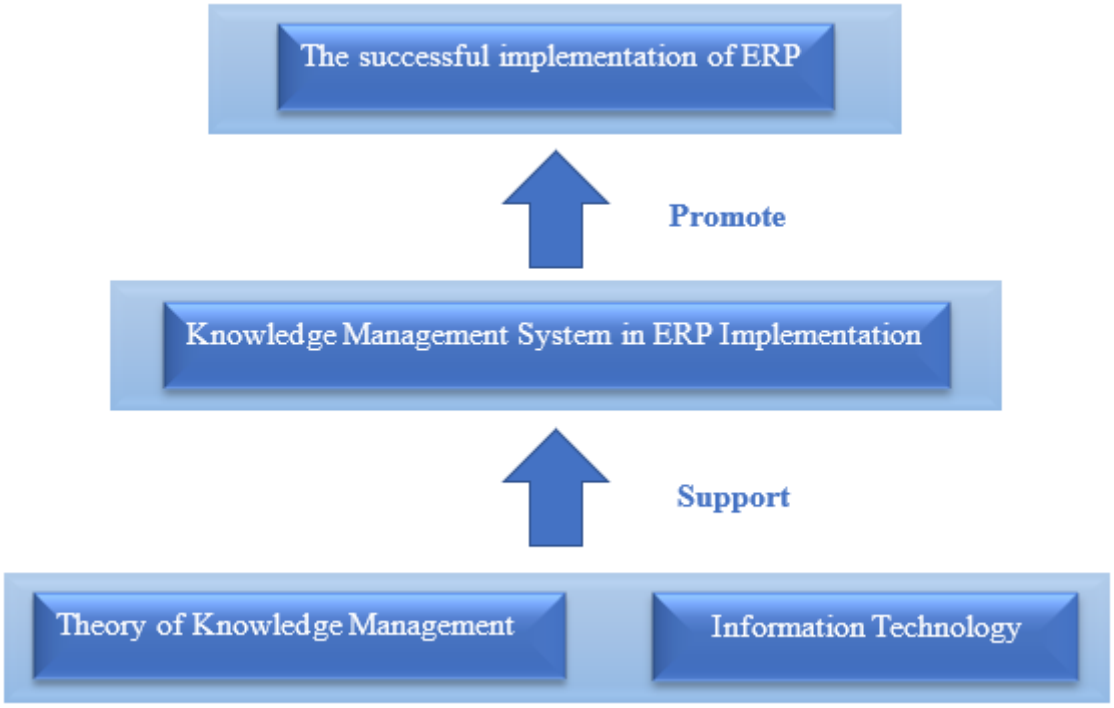
Another study conducted by Newell *et al*. (2003) looked at the simultaneous deployment of both an ERP system as well as a knowledge management system within the same organisation and found that these systems were complementary to each other. Research which was conducted by Ko *et al*. (2005), resulted in a theoretical model being formulated to examine how knowledge transfer is influenced by different knowledge management factors experienced.

The importance of correctly managing knowledge during ERP implementations has been recognised by many authors, but presently the way in which knowledge management activities are executed has not received the attention it deserves (Acar *et al*., 2017).

Jayawickrama *et al*. (2019) argue that because of a lack of sufficient support regarding knowledge management during ERP implementation, many implementations end up failing. This support needs to occur throughout the ERP project lifecycle to ensure that the benefits derived from good knowledge management practices has a positive effect on the entire implementation of the system (Jayawickrama *et al*., 2019).

Section 2.10 examines the challenges during ERP implementation using the framework proposed by Chan (1999) in greater detail. This framework was utilised by Ramburn *et al*. (2013b) who used it to analyse the role which knowledge management played in an ERP implementation. The study took place in a large organisation within South Africa.

Figure 2.2: The relationship between Knowledge management and ERP implementation



Source: Adapted from O'Leary (2002:160)

O'Leary (2002) showed that knowledge management is intimately related to ERP implementation. Using the theory of knowledge management and Information Communication Technology (ICT), "it is possible to identify, capture, transfer and apply knowledge which is created during ERP implementation" (O'Leary, 2002). Figure 2.2 depicts the process which can be used to effectively manage and support the implementation of an ERP system.

2.7 KNOWLEDGE MANAGEMENT

This section describes what knowledge management is and its definition according to different scholars. The different dimensions of knowledge management are unpacked so that one is able to understand the elements regarding knowledge management practices during the implementation phase of ERP systems.

2.7.1 Data, information and knowledge

The meaning and context of data, information and knowledge should be understood before examining the challenges surrounding knowledge management. When examining knowledge management, these terms have different meanings in different contexts (De Long and Fahey, 2000). The first form of knowledge is called "data", which is typically in a raw and unprocessed form. When data is processed and analysed, the product of this transformation is referred to as information. "Knowledge" has been defined by many authors including Davenport and Prusak (1998) who indicate that knowledge is "a mix between experience, values, and information in the correct context", which includes expert insight and this helps to evaluate and analyse new information. Although "knowledge" is related to both "data" and "information", it cannot be referred to as "data" or "information" and therefore the term "knowledge" cannot be used interchangeably (Turban *et al*., 2010). The difference between the three terms can be seen in Table 2.1.

Table 2.1: Classification table of Data, Information and Knowledge

Data	**Information**	**Knowledge**
Simple observations or objective facts of the world:	Data with relevance and purpose:	Valuable information that was synthesised and contextualised to provide Value:
• Context free • Easily captured • Easily structured • Compact and quantifiable • Has no intrinsic meaning	• Specific context • Needs consensus on meaning • Human mediation necessary • Often garbled in transmission • Must be considered within the context that it is received and used	• Hard to capture electronically • Hard to structure • Often tacit • Hard to transfer • Highly personal to the source • Richer, deeper and more valuable than information

Source: Adapted from Pearlson *et al*. (2016: 349)

2.7.2 Knowledge components for knowledge management

Due to the complex nature of knowledge management, this research area can be broken down into sub areas to enable the researcher to better understand and investigate (Lech, 2014; Basu and Kumar Ray, 2014). The three main areas which are discussed in this section are "knowledge types, knowledge layers and knowledge management lifecycle". Past literature has identified these three knowledge areas as key components around ERP implementation also including other information communication system implementations (Parry and Graves, 2008; Dwivedi *et al*., 2009; Tsui *et al*., 2009).

2.7.2.1 Knowledge types

An entire collection of knowledge dealing with ERP implementation can be categorised into different knowledge types, which can be used to investigate issues on knowledge management during ERP implementations (Gable, 2005; Jayawickrama *et al*., 2019). This sub-section examines how past studies have used knowledge types in ERP knowledge management. The three types of knowledge which was identified by Davenport (1998) which needed to be managed during ERP implementation were software specific knowledge, business process knowledge and organisation specific knowledge. Sedera *et al*. (2003) went further and added "knowledge of the client organisation" as another type of knowledge. Sedera *et al*. (2003), Gable (2005) and Jayawickrama *et al*. (2019) all use similar knowledge types to explain enterprise systems in the context of knowledge management. These studies have identified and stated that there are different levels of knowledge between different parties involved in an ERP implementation. Jayawickrama *et al*. (2019) argue that "knowledge of software" is low with clients, medium for consultants and high with vendors. On the other hand, "knowledge of the client" is low with vendors, medium with consultants and high with the client organisation (Jayawickrama *et al*., 2019).

Parry and Graves (2008) argue that knowledge internal and external to the client organisation is particularly important during ERP implementations. Knowledge of the ERP systems "functionality, use, infrastructure, programming and best practices are external knowledge" (Parry and Graves, 2008). Knowledge of business processes and legacy systems can be regarded as internal knowledge (Parry and Graves, 2008).

Another study conducted by Liu (2011), examined the ERP knowledge types, where different success factors dealing with knowledge management were discovered. These included support from senior managers, re-engineering and project management, appropriate consultants and software vendors and lastly proper employer training (Liu, 2011) . The study revealed that there is a positive relationship between knowledge management and the success factors which were described above (Liu, 2011).

Knowledge management practices deployed simultaneously during ERP implementation develop organisation efficiency and flexibility (Newell *et al*., 2003). One of the common patterns identified from reading all the above literature is that based on the knowledge types, knowledge may be internal or external to the client organisation during ERP implementation.

2.7.2.2 Knowledge layers

The four different layers of knowledge management developed by Chen (2010) are know-what, know-how, know-why and know-with layers. Research conducted by Jayawickrama (2015) used these four layers of knowledge management described by Chen (2010) to explore knowledge management in the ERP implementation contexts. The "know-what" layer was utilised to uncover the details around ERP problems as part of the study. The "'know-how' layer was used to analyse how knowledge is created, transferred, retained and re-used". The 'know-why' layer was used in a much in-depth way and relates to knowledge reasoning and why certain knowledge needs to be "transferred, retained and applied in a certain domain" (Jayawickrama, 2015). The 'know-with' layer helps with the relationship between the different types of knowledge and the specific domain which is being analysed (Jayawickrama, 2015).

2.7.2.3 Knowledge management lifecycle

The knowledge management process is made up of many different phases (Jayawickrama, 2015; Gable, 2005). The number of different phases throughout the lifespan of knowledge management would depend on the application of knowledge in a particular situation (Jayawickrama, 2015). The most common number of phases which exist in a knowledge management lifecycle is four phases (Sedera and Gable, 2010; Candra, 2014; Jayawickrama,

2015). Table 2.2 lists the different phases which exist in the knowledge management lifecycle by three different scholars.

Table 2.2: Phases of Knowledge Management

No	Author	Phases of knowledge management Lifecycle				No of phases
1	Sedera and Gable (2010)	Creation	Transfer	Retention	Application	4
2	Candra (2014)	Creation	Retention	Transfer	Application	4
3	Jayawickrama (2015)	Creation	Transfer	Retention	Application	4

From the literature, which was reviewed, some of the most common phases in the knowledge management lifecycle is creation, transfer, retention and application of knowledge which is crucial for any business during any type of deployment or activity which involved these four phases of knowledge management.

2.7.3 Knowledge management defined

Many scholars define knowledge management differently, with some going to the extent to define it per industry. In the development sector, Serrat (2017:1058) defined knowledge management as the "systematic management of processes enabling vital individual and collective knowledge resources to be identified, created, stored, shared and used for benefit". In the manufacturing and service sector Acar *et al*. (2017) describes how firms need to improve their core competencies which can be done by constantly learning and adapting to the changing environment the organisation operates in. Li *et al*. (2006:161) defines knowledge management as "the strategies and processes of identifying, capturing, and leveraging knowledge to help the firm compete".

Wang *et al*. (2007) describes knowledge management as the key enabler to build such competencies. Knowledge management can provide many benefits to a company and in recent years has been established as a competitive strategy (Acar *et al*., 2017). Knowledge management has been a popular area of research and has gained traction as being one of the most promising ways for organisations to succeed in the technology era.

Knowledge management comprises of four basic processes i.e. “knowledge creation”, “store” or “retrieve”, “transfer”, and “application” as introduced in the previous section under the knowledge management lifecycle. Knowledge creation is the most important process in knowledge management (Li *et al*., 2006). Knowledge creation is achieved through the interaction between tacit and explicit knowledge, which resides internal to the organisation (Li *et al*., 2006). Socialisation, externalisation, combination and internalisation are the four conversation modes between the two knowledge types identified above (Alavi and Leidner, 2001).

The socialisation mode is where knowledge creation begins and it is the conversion of tacit knowledge through social interactions within the organisation which leads to new tacit knowledge being created (Alavi and Leidner, 2001). After this new explicit knowledge is created, it is then formalised and adapted to the standards of the organisation and thereafter communicated and retained by the organisation. This explicit knowledge can be combined with new explicit knowledge and intrinsic knowledge by members within the organisation to produce tacit knowledge. This cycle is repeated, and tacit knowledge is continuously created and grows recurrently (Alavi and Leidner, 2001).

2.8 KNOWLEDGE MANAGEMENT CONTRIBUTING TO ERP IMPLEMENTATION SUCCESS

Knowledge management is a key factor contributing to the success of ERP implementations (Motwani *et al*., 2005; Huang, 2010; Sedera and Gable, 2010; Jayawickrama *et al*., 2019). Li *et al*. (2006) describes that there are many knowledge management challenges concerning ERP implementation. External parties, such as vendors and consultants, possess important information about the organisation within which the ERP is being deployed (Huang, 2010). Gaps such as the one that exists between the external parties and internal business personnel, and another such as the one between the internal business and ends users of the ERP system, need to be bridged so that ERP implementations have a greater chance of achieving success (Huang, 2010; Sedera and Gable, 2010).

2.8.1 Employee training

Employee training is one of the major benefits which can be realised through knowledge management in the manufacturing and service sector. The implementation of short-term and long-term training programs will have positive outcomes on the company's performance in the long term (Acar *et al*., 2017). The access to this knowledge needs to be made possible so that employees can always have access to this information and it can be used as a vehicle for employees to perform both in the work and informal settings. In this way employees are empowered to excel at their tasks and can reduce the amount of structure needed in companies (Gunasekaran and Ngai, 2007).

2.8.2 Knowledge as a strategic resource

For knowledge to be beneficial as a strategic resource, Barney (2000) indicates that knowledge needs to satisfy 3 basic criteria. Knowledge must be valuable, rare, and inimitable (Barney, 2000). Hult *et al*. (2006a) defines the "eight different elements of knowledge management", as "memory, tacitness, accessibility, quality, use, intensity, responsiveness and learning capacity". Several studies which have been conducted in the field of knowledge management outline the importance of the use of knowledge management practices during the ERP implementation process (Li *et al*., 2006). The correct use of good knowledge management practices ensures a reduction in implementation costs and offers strategic advantages to the business (Sedera *et al*., 2003). This is achieved through the technology and innovation aspects of ERP systems.

Organisations need to factor those aspects in when deploying any type of information systems and consider all the knowledge requirements surrounding the implementation. The knowledge needed for this exercise can be derived from all the past lessons learnt from ERP implementations which have succeeded and not making the same mistakes as those which have failed. A three-dimensional framework developed by Chan (1999) using past research from ERP implementations is described in detail as one of the frameworks which can be utilised for knowledge management requirements for successful ERP implementation. The framework refers to "project management", "technical knowledge" and "business and management knowledge" (Chan, 1999; Ramburn *et al*., 2013b; Ramburn *et al*., 2013a).

2.9 THEORETICAL FRAMEWORK

The technology acceptance model (TAM) is an example of a rational actor theory which focuses on the ability of organisations to reach their desired outcome, which include belief and environmental constructs (Markus and Tanis, 2000; Gopaul *et al*., 2016). Rational actor theories tend to be very attractive to organisations deploying new technology but negatively affect the organisation when the implementers' vision is taken as is and the rationale behind this decision not questioned (Gopaul *et al*., 2016). This is very important as the research aims to identify the challenges which affect ERP system implementation in the context of knowledge management and this theory does not satisfy the research.

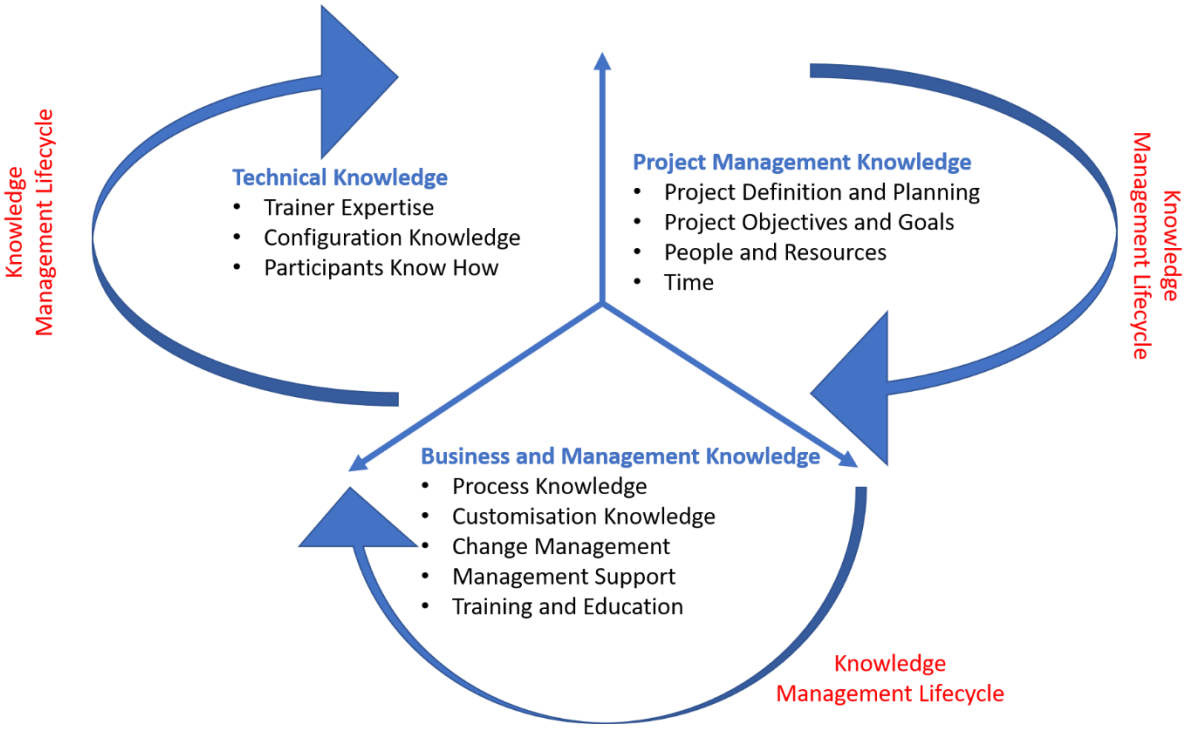
External control theory focuses on the direction of technological development. This theory focuses on environmental forces and holds when academics relate decision making changes in the industry based on technology (Markus and Tanis, 2000). The strength of this theory is that it is noted that people do not have the ability to make their goals a reality more often than not, however this theory falls short as it overlooks extraordinary people who can achieve their goals in these organisations and it does not address the challenges encountered by these people.

Emergent process theory describes that the goals set out by people when implementing new technology are often different to the ones finally achieved or may fall short of these goals. The theory describes that external forces play a major role in these outcomes and are usually overlooked or not identified from the onset (DeSanctis and Poole (1994); Orlikowski and Robey (1991)). Since emergent process theory combine the actions of people considering external forces, this theory will suffice and used in addressing the challenges faced during ERP implementation.

The themes which have emerged from the study conducted on eThekwini Electricity, has been categorised according to the framework put forward by (Chan, 1999). The knowledge dimensions which have been described by the framework, create a good understanding of the knowledge elements that are needed during an ERP implementation. The framework relates to large enterprises such as such as the one in this research. Figure 2.3, which has been adapted from Chan (1999), shows the three knowledge management dimensions which are applicable to a large emerging economy during this phase. The subsections to follow

discusses the different elements of the model put forward by Chan (1999), which incorporates the knowledge management challenges experienced, as well as knowledge management practices.

Figure 2.3: Dimensions of knowledge management during the ERP implementation phase



Source: Adapted from Chan (1999).

2.9.1 Project management knowledge

Project management is an essential component of any project implementation and this is supported by Huang (2010) and Umble *et al*. (2003), who describe project management as one of the critical factors which contribute to the success of an ERP implementation. Chan (1999), outlines the key components as project definition, project planning, resources, time and cost. Looking at the components listed above, one can understand how poor project management could lead to the failure of implementing ERP systems. This is supported by Ramburn *et al*. (2013a) who conducted a similar study in a large enterprise in Cape Town, South Africa. The study examined the dimensions which Chan (1999) described in the framework above and Ramburn *et al*. (2013a) found that there was a major gap related to project knowledge and the employees within the organisation. The study showed that it was

one of the factors which influenced the employees to be resistant, uncertain and have a negative attitude towards the implementation of the ERP system (Ramburn *et al*., 2013a).

Examining past statistics as well as the information presented above, it has been common for more than fifty percent of all ERP implementations to go over the planned timeline (Ramburn *et al*., 2013b). The knowledge about the time required to install ERP systems is very important to the adopting organisation as this affects the project management element. Ramburn *et al*. (2013a) found that the project was put on hold and the "go-live" date for the ERP system was suspended which was related to project management not done correctly. The right mix of people and resources are also important for any ERP project and selecting the wrong training team and incompetent consultants cause a major challenge and have led to ERP implementation failure (Ramburn *et al*., 2013a). Another study conducted by Jayawickrama *et al*. (2019) confirms this and proved that the project management element plays a crucial role in knowledge management during ERP implementation.

2.9.2 Business and management knowledge

This element examines the softer dimensions of knowledge management during ERP implementation. These include business process engineering, change management, management support, consultants, training and development and organisational culture (Ramburn *et al*., 2013a). Process knowledge and knowledge on contextualisation and training content, is essential in ERP implementations if examined from the user's perspective, more especially in large organisations (Ramburn *et al*., 2013a). Ramburn *et al*. (2013a) found that unclear process flow and training not suited to the needs of the user resulted in an overload of data and information. Not informing the users from the organisation about the strategic decisions undertaken which talk to why the ERP system was being implemented, can result in users not seeing the value in the training. This could result in them to not understanding the system and not having the skills required to navigate through the systems. Business processes which have been configured by the system will not be understood and these have long lasting negative effects on the implementing organisation. Training initiatives and the upskilling of employees is an integral part of change management.

2.9.2.1 Management support

Having the support of senior management is critical for almost any type of change program (Fang and Patrecia, 2005). ERP implementations are complex and strong support from executives from the organisation are equally as crucial for transformational projects such as ERP implementations (Davenport *et al*., 1998). Ramburn *et al*. (2013a) showed that by not having support from top and middle management during ERP implementation, the impact could be that users do not take well to the system and that they await the "go ahead" from management before they start showing any interest to use the system. The study also showed that a lack of communication by management about the benefits of the ERP system to the users, could result in them not being motivated to use the system and not being committed to seeing the implementation through and learn to use the software correctly *(Ramburn et al*., 2013a).

2.9.2.2 Change management

ERP implementations involve many processes and procedures to be altered of redesigned so that it can be optimized, and that the organisation can benefit from the efficiency of the system. Therefore, change management is extremely important for the success of ERP implementation. To prevent confusion and instability amongst system owners and employees, change management requires intricate planning and strategy so that the knowledge can flow correctly through the organisation (Motwani *et al*., 2005). A lack of importance attributed to this area creates ERP implementation challenges and can eventually led to ERP implementation failure (Ramburn *et al*., 2013a). By not utilising proper communication channels coupled with a lack of planning and change management drives results in employee confusion and resistance which can cause instability in the project (Ramburn *et al*., 2013a).

2.9.3 Technical knowledge

Technical knowledge has also been identified by Chan (1999) as another dimension of knowledge management and this is an essential component to the success of the system implementation. The elements of this dimension include the attributes of process engineering, software development, networking and infrastructure as well as system setup

and configuration. Ramburn *et al*. (2013a:221) identified three different aspects which affect the technical knowledge element of this model. “System complexity, participants lack of technical knowledge and trainers lack of technical expertise”, were the aspects which affect ERP implementations (Ramburn *et al*., 2013a). System complexity is related to system configuration, which contributes to the system being harder to use and creates more steps and tasks to be undertaken before achieving the end result.

2.10 OTHER KNOWLEDGE MANAGEMENT CHALLENGES DURING ERP IMPLEMENTATION

Other types of knowledge management challenges will be discussed below.

2.10.1 Implementation knowledge

One of the key challenges is that the implementation knowledge of the ERP system is possessed externally to the organisation. This can be held by the software vendor or the consultants who implemented the system (Li *et al*., 2006; Jayawickrama *et al*., 2019; Gopaul *et al*., 2016). This knowledge will typically disappear once the ERP implementation is completed, which means that the adopting organisation must ensure that this knowledge is successfully transferred to the organisation (Jayawickrama *et al*., 2019; Gopaul *et al*., 2016).

2.10.2 Gaps between vendor, consultants and internal staff

The next challenge is the number of gaps which exist during ERP implementation. These gaps exist between the external vendor and the consultants, consultants and the internal experts, gaps between internal experts and the end users, and lastly the gaps between the end users and the different business units (Sedera and Gable, 2010; Gopaul *et al*., 2016). The challenge is how the adopting organisation is going to eliminate these gaps so that it does not affect the organisation in the long term (Gopaul *et al*., 2016).

2.10.3 Tacit knowledge

Another challenge is managing all the tacit knowledge which is created during ERP implementation (Acar *et al*., 2017; Jayawickrama, 2015). There is a lot of new tacit knowledge which is created, which needs to be converted into organisational knowledge so

that it is ready for consumption and reuse by the business (Li *et al*., 2006; Gopaul *et al*., 2016).

2.10.4 System cross functionality

Cross functionality and interconnectivity between different modules within the ERP system are something which has to occur so that the true benefits of the ERP system can be realised. This means that employees internal to the organisation need to have cross functional knowledge of the business, which creates challenges. The challenge is how does the organisation access this cross functional knowledge and utilise it effectively (Acar *et al*., 2017; Gopaul *et al*., 2016).

2.10.5 Knowledge transfer

When employees who are key to the project leave the organisation it is another challenge (Gopaul *et al*., 2016). The valuable knowledge which these employees possess needs to be captured or transferred to other employees within the organisation such that there is no interruption to the system and that work can go on as usual.

2.10.6 Lack of process knowledge

This describes the challenge which exists between all the different stakeholders who are involved in the implementation and where the business processes of the organisation are not fully understood or designed properly (Gopaul *et al*., 2016). Consultants may often not have the desired knowledge to understand the structure and processes which exist in the organisation in which the ERP implementation is occurring. Employees or critical stakeholders may have not been involved in the requirements phase of the implementation which may lead to a number of shortcomings during the implementation (Gopaul *et al*., 2016).

There can also exist a challenge when the executive management of the organisation has a lack of process knowledge of the organisation. Research conducted by Gopaul *et al*. (2016) showed that poor decisions made by executives that are new to the company, contributed to unsuccessful implementations. Often these decisions dealt with process knowledge and organisational structure (Gopaul *et al*., 2016).

The research also showed that there existed a challenge when it came to process knowledge which existed from the end users perspective (Gopaul *et al*., 2016). Gopaul *et al*. (2016) showed that end users are only concerned with the tasks which they have to complete on a daily basis and that they lack a holistic view of how their tasks contribute to the greater organisation. This brought about challenges during training as different types of training needed to be conducted for different types of end-users.

2.10.7 Lack of technical knowledge

This is one of the most common challenges which faces many organisations which proceed on the initiative to implement an ERP system (Jayawickrama *et al*., 2019; Fernandez *et al*., 2018; Hasheela-Mufeti and Smolander, 2017; Ranjan *et al*., 2016; Gopaul *et al*., 2016). Internal staff lack the technical expertise on ERP systems and need more time to understand the system being implemented and the research conducted by Gopaul *et al*. (2016) and Acar *et al*. (2017) show that internal staff need time to understand the new ERP system and learn to solve problems dealing with the ERP.

2.10.8 Knowledge drain

ERP project implementations occur over an extended period of time and often go over the target dates which were initially set at the start of the project which creates a knowledge drain throughout the lifecycle of the implementation (Jayawickrama *et al*., 2019; Fernandez *et al*., 2018; Ranjan *et al*., 2016; Gopaul *et al*., 2016). Gopaul *et al*. (2016) showed that there is often inconsistency in the project teams over this period, as internal and external stakeholders change companies or leave during the project implementation. This leads to a knowledge drain and there is a risk of loss of tacit knowledge as discussed earlier.

2.10.9 Ineffective knowledge management practices

A key factor when implementing any ERP system is the knowledge management practices which are executed throughout the lifecycle of the implementation. Ineffective knowledge management practices can lead to companies or organisations not being able to reuse the existing knowledge which they have gathered from prior implementations or initiatives (Gopaul *et al*., 2016). Inadequate documentation of prior work or tasks done or ineffective mechanisms of sharing information across the organisation could pose major challenges.

The study conducted by Amani and Fadlalla (2016) support this and show that departments which operate in silos have a negative impact in ERP implementations.

2.11 KNOWLEDGE MANAGEMENT PRACTICES DURING ERP IMPLEMENTATION

Table 2.3 summarises the knowledge management activities which Li *et al*. (2006) put forward. The activities are broken down into five stages and each stage describes what activities need to occur.

Table 2.3: Knowledge Management activities in ERP implementation process

Stage	Knowledge Management Activities
Initiation	• Vendor provides ERP software and document
Adoption	• Vendor offers training programs in connection with their products. Explicit knowledge (know-what) could be captured from user manual and training document. • Learn the experience of other organizations. • Carry out investment decision and cost–benefit analysis related to ERP implementation and select appropriate vendor
Adaptation	• Analyse the differences of business process between standard ERP and implementer. • New process knowledge is captured, and new management idea is brought into organization. • Carry out knowledge transfer from vendor, consulting company to project team and from project term to end-users. • The training is offered to end-users. Users should learn the knowledge about ERP system and master operation process. • Learning by using.
Routinization	• Knowledge accumulation.
Fusion	• Knowledge sharing. • Knowledge creation. • The application of new Knowledge Management tools

Source: Adapted from Li *et al*. (2006: 163)

2.12 GAPS IN LITERATURE

Hult *et al*. (2006b), outlines that there is a lack of research done where the relationship between knowledge management challenges and its effects on the implementation of an ERP system has been investigated. This supports the current study, as ERP systems is the main

system used by the supply chain to manage suppliers and payments which is one of the primary functions of large organisations today. Most studies conducted in the context of this study offer only a one dimensional static view of the ERP system and does not fully capture the dynamic nature of ERP systems (Ramburn *et al*., 2013b).

Previous studies fail to provide a fully comprehensive and holistic high-level view of the knowledge management challenges, which include the importance of utilising best practices with regards to knowledge management during the entire implementation phase of ERP systems. This is supported by Candra (2014:505) who advise that "Future research could assess the influence of organizational and knowledge on enterprise resource planning implementation success with more in-depth dimension and measurement items." The current study examines the three-dimensional framework which dynamically captures the elements of knowledge management during ERP implementation.

Amani and Fadlalla (2016) also explain that although there have been many studies regarding knowledge management in general, there exists a gap and a lack of research in the field of knowledge management in the context of ERPs. Jayawickrama (2015: 66) argue that "although effective knowledge management has been recognised as one of the key drivers for successful ERP implementation, there has been a significant shortage of empirical research on management of knowledge related to ERP implementation". He states that this area of research demands more research to be conducted. A recent study conducted by Jayawickrama *et al*. (2019), identified that there are gaps which exist in the domain of knowledge management and knowledge retention during ERP implementation which further supports the reason for this study to conduct research in this area.

2.13 CHAPTER SUMMARY

This chapter provides and overview of ERP systems so that the reader can understand the context of the study which was conducted. A brief history of ERP systems was discussed describing that ERP systems date back to the 1970s and 1980s as the successor to the MRP systems. Different definitions of ERP systems were then examined from the perspective of different authors and scholars. ERP systems try to integrate business processes into a single central system which improves efficiency and the competitiveness of the organisation (Acar *et al*., 2017; Newell *et al*., 2003; Ramburn *et al*., 2013a; Jayawickrama *et al*., 2019).

Many large organisations are dependent on their ERP systems to perform their daily tasks and activities. The implementation of ERP systems in the South African context was looked at and briefly discussed before examining the challenges and problems which plague ERP implementations. A highlight which was brought forward is that to avoid these problems, there should be a focus on the complexity of the implementation and whether the particular choice of system is the best fit for the organisation. Commitment and the dedication from staff members, especially that of senior management, is paramount.

The complete implementation process and its six different steps was then described which created a good foundation to examine knowledge management and its relationship to the implementation of ERP systems. This showed the importance of knowledge management and knowledge management activities during the implementation process of ERP systems.

To understand knowledge management in the current context, this chapter went on to describe the difference between “data”, “information” and “knowledge” before examining the three components of knowledge relating to knowledge management. Multiple definitions of knowledge management were then examined from the perspective of different scholars. Managing knowledge as a strategic resource and employee training was noted as the two critical success factors for ERP implementation.

The theoretical framework on which this study is based was rationalised and the three dimensional model put forward by Chan (1999) was examined in greater detail. The three dimensions of which the model is comprised were project knowledge, business and management knowledge, and technical knowledge. Knowledge management challenges during ERP implementation were discussed from the data gathered in the research leading to the literature review including knowledge management practices during ERP implementation. The chapter concluded by outlining the gaps which exist in the current literature available on this topic.

The next chapter describes the research methodology which was used to conduct the research. The chapter clearly explains why a qualitative research approach was used for this study. The chapter then goes on to describe the method used to collect data, which was through conducting semi-structured interviews.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter discussed the literature review surrounding knowledge management and ERP systems. The current chapter presents and describes the research methodology which was utilised to conduct the study and to achieve the objectives described in Chapter One. The research methodology begins by outlining the aim of the study, the research design, the research paradigm and the setting in which the study occurred. The focus then shifts towards examining the sample selection utilised, data collection technique used and the research instrument in greater detail. The chapter concludes with a discussion around the reliability, validity, bias and ethical considerations around the study.

3.2 AIM OF THE STUDY

The aim of the study was to determine what knowledge management challenges were experienced by eThekwini Electricity during the implementation phase of their ERP system. This would enable the organisation and other organisation to better identify and manage potential knowledge management challenges during this stage of ERP deployment or any other similar software suite.

3.3 RESEARCH DESIGN AND METHODS

Myers (2013) describes the research method as a strategy undertaken which proceeds from the initial assumptions of the study to a research design and thereafter collecting data using different techniques. The researcher's aim with the methodology is to deliver the data of the study so that analysis on the data can be performed, which will help answer the research questions (Creswell and Poth, 2017; Saunders *et al*., 2012). Qualitative, quantitative and mixed method research modes are the most commonly used, although other modes do exist (Creswell and Poth, 2017). On one hand these methods refer to contrasting thoughts about the nature of knowledge and on the other hand these methods refers to the manner in which data is gathered and examined (Saunders *et al*., 2012). The nature of knowledge relates to why research is conducted and how the world is perceived to be, while the latter refers to the representations derived from the findings of the research (Saunders *et al*., 2012).

None of these methods are inherently better than the other but the appropriateness of its application is based on the context in which the research is taking place (Myers, 2009). Since mixed methods are a combination of both qualitative and quantitative methods, some researchers prefer to use this method so that they can leverage the advantage of both methods in a single study (Bryman and Burgess, 2002; Saunders *et al*., 2012).

3.3.1 Quantitative research

One of the easiest ways to distinguish between a quantitative and qualitative research approach is the form in which data is collected, analysed and presented. Quantitative studies present the data in numerical form and qualitative studies present the data as a descriptive narration such as words, so the phenomena can be understood (Saunders *et al*., 2012). This is supported by Pinsonneault and Kraemer (1993) who describe questions such as 'what', 'how much' or 'how many' to be fulfilled by conducting a quantitative study. The quantitative approach to research often requires data to be processed and seen in the form of a map, graph or a statistical representation in a table which can be examined *(Saunders et al*., 2012; Cahyadi, 2016). Usually statistical inspection and analysis is used to test a hypothesis and quantify the relationship between variables in quantitative research (Cahyadi, 2016). In quantitative research, researchers attempt to draw conclusions from the attributes of a large sample set, such that the selected sample set is a true representation of the entire population of the study (Thomas, 2010; Saunders *et al*., 2012; Cahyadi, 2016).

3.3.2 Qualitative research

Denzin and Lincoln (2008) argue that, this type of research should be approached in an interpretive and naturalistic manner as it aims to make sense or interpret the meaning which people bring to it in a social context. This is supported by Cahyadi (2016) who further describe a qualitative research approach as concentrating on the information gathered from peoples experience and opinions in a particular context. Myers (2009) also supports this and states that a qualitative research approach is designed to help bring meaning to people and the social context in which they live. Qualitative research aims to explore the problem currently being experienced as there may be little knowledge about that problem and usually there is some doubt associated with the problem (Thomas, 2010).

Creswell and Poth (2017) describe many different strategies, data collection methods and data analysis modes for qualitative research. Data sources include participant observation, interviews, questionnaires, and other forms of written media (Myers, 2009). In other words, qualitative research involves collecting and analysing non-numeric data which is supported by the scholar's descriptions above.

3.3.3 Selection of the research design

Over the last few decades qualitative methods have become more popular in technical research areas like the ICT domain (Myers and Avison, 2002; Kähkönen *et al*., 2017b). One of the main contributing factors is that there has been a change of focus from technical to organisational and management issues in the ICT or information systems domain (Kähkönen et al., 2017b). Qualitative methods have the power to unlock these issues and are very useful in understanding particular phenomena from the viewpoint of the stakeholders and practitioners who have experienced these phenomena in a particular context (Myers and Avison, 2002).

Natural phenomena were originally examined using quantitative research methods while social and cultural occurrences were studied using qualitative research methods (Saunders *et al*., 2012). Qualitative methods emphasize non-positivist, non-linear and cyclic forms, which allow the researcher to gain new insight and perspective on the research area through every iteration (Thomas, 2003). Given the organisational and social context of this topic, a qualitative research approach was deemed most suitable factoring into consideration the research objectives described in Chapter One. Case study, ethnography, action research and grounded theory are common research methods known in qualitative studies (Creswell and Poth, 2017; Saunders *et al*., 2012). A case study approach is utilised in the current study, as an in-depth analysis of the implementation of the Ellipse ERP system is studied (Creswell and Poth, 2017).

3.4 RESEARCH PARADIGM

According to Myers (1997) research is framed within a paradigm. This paradigm is then viewed through a lens of a particular mindset and then formulated using a specific research technique. The abovementioned is referred to as the methodology used to conduct research

and describes the way in which research is conducted (Maxwell, 2008; Creswell and Poth, 2017). Myers (1997) describes the three different research paradigms in the field of ICT as being the positivist, interpretive and critical paradigms.

Cahyadi (2016) argue that researchers who test universal laws which make up social phenomena often use a positivist approach when conducting research. Researchers who use the positivist paradigm to conduct research, position themselves to be independent observers and tend to use scientific methods in the study (Cahyadi, 2016; Neuman and Kreuger, 2003). This is supported by Ghauri and Grønhaug (2005) and Saunders *et al*. (2012) who describe a positivist approach to use quantitative methods to capture information about the research undertaken, which often requires statistical analysis. Cahyadi (2016) go further to describe that the researcher is decoupled from the subject of the study and uses quantitative analysis to establish the relationship within the study.

Interpretive studies on the other hand attempt to explain a phenomenon by examining the meaning that it has for the participants of the study (Myers, 1997; Myers, 2009; Maxwell, 2012). In this type of paradigm, focus is on social constructions (Myers, 2009). The data collected is often subjective and will need to be interpreted such that meaning can be brought to it (Cahyadi, 2016). The ultimate goal of interpretive research is not to establish the relationship between the variables examined, but to make sense of the social aspect and context of the object which is being studied (Myers, 1997).

A critical research approach attempts to identify and uncover the opposition, conflict and contradiction dealing with the study (Myers, 1997). Cahyadi (2016) argues that in this paradigm the researcher tends to want to expose a hidden agenda and biases that benefit the object of the study. If this is applied to the ICT domain of research then this paradigm of research would seek to uncover misuse of ICT systems and the reasons behind it (Cahyadi, 2016).

Taking the above into consideration both positivists and interpretive researchers regard human behaviour as being patterned and regular (Tuli, 2010). Although this is true, both positivists and interpretivists view this behaviour from different standpoints. Positivists see it in from the perspective of the laws of cause and effect while interpretivists view these as patterns created by humans when they socially interact (Neuman and Kreuger, 2003).

Interpretive studies create deeper insight into a phenomenon, which employ context-based rich data gathering methods and satisfy a researcher's quest for understanding the phenomenon that is being investigated (Tuli, 2010; Neuman and Kreuger, 2003). According to Tuli (2010), data collection methods such as interviews, focus groups and naturalistic observation are some of the common methods used to conduct qualitative studies.

Therefore, the philosophical approach employed in this study is based on the interpretive paradigm, where it allows for the utilisation of data gathering methods which create a deeper insight of knowledge management challenges from a social perspective. The current study involves gathering data from the experiences of the employees of eThekwini Electricity during their ERP implementation by capturing their views and opinions through personal interaction and data gathering and aims to make sense of the challenges experienced. This approach is supported by Creswell and Poth (2017) who describe the interpretive paradigm as one which deals with human beings and gathering information personally.

3.5 STUDY SETTING

The selected organisation for the case study is eThekwini Electricity which distributes electricity to the entire eThekwini municipality region (Electricity, 2018). The organisation's headquarters is located in Durban, South Africa, where all the major system implementations take place. System owners and the control systems for the entire operation of the organisation takes place from the headquarters (Electricity, 2018). eThekwini Electricity was chosen for the case study because the organisation has found it extremely difficult to successfully implement their ERP system. The ERP system which is deployed in the organisation is the Ellipse system. The organisation has gone through a variety of version changes dating back to over two decades ago and are currently on version eight. The study examines the challenges experienced during the upgrade of this system from version five to version eight.

3.6 SAMPLING STRATEGY

The subsections below describe the population selection and the method of sampling used in the current study.

3.6.1 Population and sampling

The total population of the organisation is over two thousand seven hundred employees (Electricity, 2018). There were sixty-four employees from eThekwini Electricity selected as business leads or representatives for this project. From these sixty-four, there were approximately twenty to twenty-five internal employees who were involved directly concerning the decision making of the ERP system at different times in the implementation. These stakeholders consisted of deputy heads, project executives, managers, engineers, database administrators and system users.

The sampling method chosen for the study is purposive sampling due to the nature of the study which can be classified as non-probability sampling (Maxwell, 2012; Myers, 2009; Creswell and Poth, 2017). The participants of the study were selected based on their involvement in the deployment of the organisations ERP system. This choice and justification is supported by Maxwell (2008) who describe purposeful sampling as being a strategy where participants are selected on purpose so that key information which cannot be obtained from other sources is retrieved. This was the most appropriate method of sampling since there was a limited number of individuals from the organisation which were part of the project team and the decisions which were made during this stage of the system implementation. These individuals possessed the first-hand experience and knowledge to provide concise responses to the questions that the research seeks to answer.

Fifteen individuals were chosen as the sample for the study which was primarily based on their experience on ERP systems, as well as their involvement in the project. These consisted of two deputy heads, two project executives, four senior managers, three engineers, one database administrator and three system users (Table 3.2). A study conducted by Guest *et al*. (2006) showed that using a sample set of twelve is sufficient for studies similar to the current one as they found that data saturation occurred from interview twelve onwards and that most of the themes were already identified after the sixth interview. The sample size selected is therefore sufficient for the current qualitative study.

Participants were contacted through phone calls, emails and face to face consultation. All interviews were done face to face and the consent form signed and the interviews recorded. Interviews were conducted at the offices of each participant so that they were more

comfortable, and it lasted an average of forty-five minutes each with one or two spanning close to an hour and a half.

There were some challenges which were encountered such as the availability of the participants or the time they could sacrifice before needing to return to their day to day activities. The researcher also felt that some participants held back their true views and opinions. This may be due to a fear of their jobs being compromised even after being assured that it would not. This is supported by O'Reilly and Parker (2013) who describe that some of the limitations which could be experienced by sample sets that are too large for similar type of studies are time, money and availability of the participants.

Table 3.1: Interview Breakdown

Designation	Number of participants
Directors (Deputy Head)	2
Project Executives	2
Senior Management	4
Engineers	3
Database Administrator	1
System Users	3
Total	**15**

The selection outlined above consisted of a group of experienced employees who possessed a diverse skillset in different elements of business and technical knowledge around projects and ERP system functionality, which O'Reilly and Parker (2013) describe as the best way of collecting quality data. The sample selected also have the specific knowledge surrounding the upgrade of the ERP system which is relevant to this research study.

3.7 INTERVIEW TYPES

Interview questions can comprise of structured, unstructured and semi-structured questions (Ghauri and Grønhaug, 2005). Table 3.2 describes the different types of interviews which can be undertaken as was as the formulation of the responses for each type.

Table 3.2: Interview Types

Interview Type	Formulation
Structured	Both questions and answers are predetermined
Unstructured	Questions and answers are not pre-set
Semi - Structured	Questions have been pre-set, but the answers are not

Source: Adapted from Ghauri and Grønhaug (2005)

The current study allowed interviewees to answer questions freely and in any manner which they could as there were no pre-set answers. The structure of the interview allowed for probing questions to be asked at certain times which could unlock important information. Therefore, semi-structured interviews allowed for this flexibility during the data collection phase of the research. The nature of the research was to investigate the perceptions on knowledge management challenges experienced by the different stakeholders involved during the implementation phase, and semi-structured interviews were seen as the most suitable method to collect the data needed.

Saunders *et al*. (2012) recommend three different types of questioning methods which can be utilised when conducting semi-structured interviews. These include open-ended questions, probing questions and closed ended questions. Since open-ended questions are used to describe a particular situation or event, these were found to be most suitable and were used to develop the research instrument (Saunders *et al*., 2012; Ibrahim, 2018). By using this type of questioning, participants were asked to respond to the different dimensions of knowledge management challenges experienced. Questions were related to the literature review and the theoretical framework which were discussed in Chapter Two. Probing questions were used, where possible, to achieve a higher level of understanding on the

subject matter, which enriched the data gathered (Ibrahim, 2018). This type of instrument design gave the researcher the flexibility to adjust the questions which were formulated to suit the type of interviewee, such that vague responses could be clarified, and that the interviewee did not feel interrogated. The advantage of conducting face to face interviews gave the interviewer the opportunity to explain the context of the questions so that the interviewees would be able to respond in the correct context or would be able to clarify the meaning or the context of the questions with the interviewer before providing a response.

3.8 DATA COLLECTION

Data collection for a large number of studies have focused on top managers to provide data, but the disadvantage when only top managers are interviewed is that they are mostly positive about ERP implementations, since the implementation decisions would have been largely made by themselves. Several studies show that different levels of employees and project team members have different views of the ERP implementation (Cuppen, 2016; Fernandez *et al*., 2018). For this reason, the study has not only limited the interviewees to management.

A few days before interviews commenced, a pilot interview was done using the interview schedule to ensure its trustworthiness (see Appendix A). Manly (2018:1) explains that "it is often preferable to first pilot the interview schedule on several respondents prior to proper data collection. This allows the research team to establish if the schedule is clear, understandable and capable of answering the research questions and if, therefore, any changes to the interview schedule are required." The pilot interview ensured that questions were appropriate for the study, that the interviewee understood the questions and that it was both clear and unambiguous. Interview questions are important as this ensures that the aims of the study are addressed, and that sufficient information can be gathered (Saunders *et al*., 2012).

Therefore, upon commencement of the interviews, the aim and objective of the study was outlined to the interviewee so that they would understand the reason for the study. The interview was open ended which is substantiated by Saunders *et al*. (2012) who state that interviews should not be a simple yes or no answer and that questions should entail more. Also, simpler questions which comprised of more general knowledge question types were asked first and then moving on to the more in-depth questions about the implementation of

the ERP system at eThekwini Electricity. This was done so that the researcher would be able to gauge the level of understanding of key concepts by the participants. Another reason was that the interviewee would become more comfortable and not be as nervous from the start. This creates much more concrete responses and improves the quality of the interview (Myers, 2009). For this reason, some interviews lasted longer than others, since interviewees were able to speak freely and express their views and opinions about the questions pitched to them.

The interviews were conducted using English as a medium of communication. The capturing of responses was done using a voice recorder which was later transcribed. The formulation of the interview questions was guided by the theory discussed in Chapter Two and the responses were later mapped to the concepts of the theoretical framework. Given the fact that interviews were open ended, interviewees were allowed to speak freely and some of the interviewees went off topic which made some of the responses irrelevant to the research. These responses were picked out by the researcher who helped prepare the data for analysis.

3.9 DATA ANALYSIS

Performing qualitative data analysis involves constant reading and data interpretation which should aid in understanding data which is collected during this type of study (Lennie *et al*., 2011). This means that the analysis of data did not occur in a linearly structured manner. Data was collected, summarised and interpreted. After organising the data from the transcripts which was formulated from the voice recordings, the researcher identified key words and phrases which were constantly conveyed by the participants of the study. The words and ideas were used to organise these ideas into the themes. The literature and theoretical framework which was described earlier in Chapter Two was used as a "lens" through which to interpret the data gathered. Similar ideas were grouped according to the elements of the theoretical framework.

Thematic analysis is commonly and widely used in a qualitative research approach to analyse data collected as described by Hsieh and Shannon (2005) and Attride-Stirling (2001). Thematic analysis includes three different approaches, i.e. conventional, directed or summative (Hsieh and Shannon, 2005). These three methods help understand the content of the transcribed data. Assessing key statements or content followed up by the interpretation

of the core content is what is known as a summative assessment. The findings of this study have been linked to literature and through iterative analysis of the data collected. This has enabled the researcher to understand and investigate the objectives concerning the study. Given that this study is interpretive, data which was collected was categorised according to themes which were analysed and related back to the theory described in Chapter Two.

3.10 TRUSTWORTHINESS, CREDIBILITY AND TRANSFERABILITY

There are methods which exist that can verify the trustworthiness and credibility of qualitative research (Twum-Darko *et al*., 2015). These include a comprehensive description of the entire research process which was undertaken and clear and concise research reports which describe and display all observations in the study which led to the set of results being formulated. Bashir *et al*. (2008) describe trustworthiness and the credibility of research by being able to gauge how truthful the results are to what it was intended to analyse by examining the commonalities articulated by multiple participants. This study ensured that by making the entire research as transparent as possible during the analysis and interpretation, that the trustworthiness, credibility and transferability was maintained. By representing the information gathered in this study as close as possible to what has occurred in reality can suffice as validation which is supported by O'Connor and Gibson (2003). Trustworthiness, credibility and transferability is not something that is only practiced during specific parts of the study, but should be a standard that occurs at each and every step of the research process.

The research conducted has ensured that the findings of the study has been trustworthy and credible as well as transferable. The researcher has ensured that the results reflect the actual findings and that the sources were as described to be. The researcher has also ensured that any influence from himself has been avoided by making sure that each and every stage was done according to research methodology and standards described by scholars and literature.

3.11 RESEARCHER BIAS

Researchers may in fact understand specific phenomenon prior to conducting a study, which may introduce bias into the study (Myers, 2009). This must be avoided. A researcher needs to acknowledge his/her beliefs and biases prior to the study and take the necessary

precautions to avoid or suspend this during the study (Tufford and Newman, 2012). For this reason, the researcher acknowledged his bias and ensured that it was minimised throughout the interview process. The selection of interviewees were fair and just and the study ensured that the selection was not biased to gender, age or position within the organisation. Tufford and Newman (2012) indicate that a reflexive journal helps to suspend the bias introduced by the researcher and enables the researcher to manage conflicting thoughts during the entire research process. The current research used notes which prevented and reminded the researcher not to influence the direction of the responses from the interviewees.

3.12 ETHICAL CONSIDERATIONS

The research was undertaken adhering to good ethical practices and ensured that all participants who were interviewed as well as the organisation of the case study were protected. A consent letter was obtained from the head of eThekwini Electricity, granting permission to conduct interviews within the organisation (see Appendix B). Ethics is the appropriateness of the behaviour of the researcher in relation to all the participants who are affected by the study (Irakoze, 2015). Ethical clearance was granted by the University of KwaZulu-Natal's Research Department (see Appendix E) which allowed the researcher to collect data from the participants identified for the study. The ethics guideline provided by the University of KwaZulu-Natal, which outlines good ethical practice, was adhered to throughout this study.

The consent form which was signed by each interviewee (see Appendix C), clearly stated the ethical considerations of the study. This form also stated that the participants' anonymity would be guaranteed, and that participation was completely voluntary. This meant that participants were not forced to be a part of the study and were able to decline being interviewed. Participants who accepted to participate in the study were provided with enough information to enable them to fully understand the nature of the study and know that it is being done to benefit the organisation. All data collected via the research instrument was treated with a high level of confidentiality so that the raw data was only available to the researcher and the supervisor, and on request, from the Graduate School of Business and Leadership within the University of KwaZulu-Natal.

Participants were informed before the commencement of the interviews that they would be recorded via an electronic recording device. All personal and confidential data was not collected, as this was not needed as part of the research. The interviews were formulated such that there is no use of offensive or discriminatory questions. Participants' identities were kept private so that the study could not have any negative effects on them in the workplace.

The data which was collected was not be manipulated in any way by the researcher or any other party. Transcripts of the interviews were kept with the researcher and would only be made available to the university in the event that the data collected was questioned. The trustworthiness, credibility and transferability of the results of this research is demonstrated by taking all the necessary precautions and utilising best practices in research methods so that the complete research process was transparent, and that the analysis of the results was examined and explained in detail.

3.13 CHAPTER SUMMARY

The current chapter described the research methodology which was used to conduct the study. The chapter began by outlining the aim of the study and describing the different types of methodology which can be used to conduct research. The choice of methodology was then justified to use a qualitative research approach. The different paradigms of research were discussed, and an interpretive approach was deemed most suitable for the current study. eThekwini Electricity was the organisation chosen to conduct research on. A detailed analysis of the selected population for the study along with reasons why purposeful sampling was chosen.

Semi-structured interviews were used as the data collection technique which allowed participants to respond freely by using open-ended questioning. Thematic analysis on the data collected provided a detailed insight on the knowledge management challenges experienced by the organisation and to achieve the objectives sought out after. The trustworthiness, credibility and transferability of the data collected was outlined and how bias was avoided in influencing the results. Finally, all the different ethical considerations and practices were discussed and described.

The focus on the next chapter is a presentation of the results from the analysis of the data collected after conducting the interviews within eThekwini Electricity.

CHAPTER FOUR: RESULTS

4.1 INTRODUCTION

The previous chapter fully broke down and described the research methodology which was used to capture the data for this research. This chapter presents the results based on semi-structured interviews which were conducted at eThekwini Electricity. The interviews generated rich qualitative data which examines the experiences and perceptions of the participants of the study during the Ellipse ERP implementation at eThekwini Electricity. Fifteen participants were interviewed as part of the study and deeper insight to the objectives of the study was gathered. Interviews were recorded, transcribed and thematic analysis conducted on the responses from the participants.

This chapter begins by presenting the profile of each participant who was interviewed as well as listing the themes and sub-themes which emerged during the research. Key information based on these themes are presented in direct quotations from the participants which has been extracted from the interviews to highlight key information.

4.2 PARTICIPANT DETAILS

Table 4.1 lists and describes the details of each of the fifteen participants which were interviewed as part of the study. The designation of the participants as well as a range of years of experience is described. The designation refers to the post the participant holds in eThekwini electricity and the years of experience refers to how many years of experience the participant has in the electrical field and not necessarily in the organisation alone.

Table 4.1: Interview Participant Details

Participant	Designation	Years of experience
P1	Deputy Head	10 to 15 years
P2	Deputy Head	25 to 30 years
P3	Project Executive	15 to 20 years
P4	Project Executive	10 to 15 years
P5	Senior Management	20 to 25 years
P6	Senior Management	30 to 35 years
P7	Senior Management	25 to 30 years
P8	Senior Management	10 to 15 years
P9	Engineer	5 to 10 years
P10	Engineer	10 to 15 years
P11	Engineer	10 to 15 years
P12	Senior System User	20 t0 25 years
P13	Senior System User	10 to 15 years
P14	System User	10 to 15 years
P15	Senior Management	15 to 20 years

4.3 EMERGING THEMES AND SUB-THEMES

Table 4.2 describes the themes which have emerged during the interview process. Thematic analysis was performed on the qualitative data gathered during the interview process. The interviews were recorded, and transcripts were formulated which thematic analysis was performed against. Substantiating quotes are given unedited.

Table 4.2: Themes and Sub-Themes

Theme	Sub Theme
Project Management Knowledge	Project definition and planning
	Project Objective and Goals
	People and Resources
	Time
Business and Management Knowledge	Process Knowledge
	Customisation Knowledge
	Change Management
	Management Support
	Training and Education
Technical Knowledge	Trainers Expertise
	Configuration Knowledge
	Participants Know How
ERP Knowledge Transfer	
Communication of Knowledge	
Knowledge Management Practices	Documentation of the ERP system
	Knowledge Repository
Decision Making Knowledge	
Organisational Culture	
Staff Turnover	

4.4 PROJECT MANAGEMENT KNOWLEDGE

Participants indicated that the project management team attempted to manage the project and that the implementing team did their part well, but the organisation did not respond well to change. Some respondents felt strongly about the professionalism of the implementing team and their knowledge and that the organisation was reluctant to support the implementation. Participants said that from a project management perspective, the consultants did their part of the project if one was to look at the information technology (IT) perspective.

From a business perspective, the participants indicated that the implementation team did not have a proper business overview and how the project needed to be delivered to eThekwini Electricity. Participants said that the organisation did not take well to the project because of how the actual deliverable and outcome was handled. Other participants said that the project

started off very well and that the implementation team was very interactive, and the awareness drive was done well as there was some understanding as to what the business was doing with the project.

"*The consultants were very professional they're very good. The problem is that they tended to do everything. The business itself tended to not be involved to the degree that they should be, and that's not necessary the consultant's fault that's also because there's a huge reluctance on the businesses part to get involved they like to sit back and be given.*" (P12)

"From IT project management perspective they did their part purely from a project management perspective but in terms of their business overview and how they delivered that to the business I don't think that went down well, but internally from there IT perspective they did project manage it well but I think the actual deliverable and outcome of it was not handled well and even within the business it wasn't taken on well." (P9)

"Well it started off very well I know there was a really nice interactive, first day it was more a marketing the initiation of the project that was held at Springfield that created a very good awareness about what business is doing." (P10)

4.4.1 Project definition and Planning

Some participants indicated that the planning was poorly done and that a project manager internally to the organisation was missing. There was no communication of project milestones and updates as to what the status of the project was. Meetings were not held regularly. There was a lack of communication about what the project aimed to achieve or even as to the different phases of the project. The project eventually was closed with many items which was promised not delivered.

A participant said that the role of a project manager was taken on by the consultants as there was no representation from the internal organisation. This created a lot of gaps regarding project management within the project. Some participants said that the functionality of the system was reduced as some of the features which were available on an older version was

not available in this implementation. A participant also mentioned that these features were promised to them but were still not delivered. These non-deliverables were not met with any consequences and the project was closed without it being completed. A participant indicated that the project was closed off but not all deliverables were delivered. This indicated that the definition of the project was not outlined correctly or there was no one accountable to make sure that the project delivered on the scope of work.

Participants also said that since there was no one advocating the deliverables for the organisation, the external parties could have easily influenced the delivery. Also, it was mentioned that the project went along even if the business was not ready to receive it due to the lack of accountable personnel within the organisation. Challenges and delays were brought about but the project still went forward without these being properly addressed by the internal organisation.

Some respondents also mentioned that a full requirement exercise for the project was not done extensively enough and that the project team did not engage with the entire organisation which would have added to a correct business specification being developed. There were awareness drives, but participants mentioned that this was done too late and that the project was already under way. The project went on without having a full understanding of what the requirements from the entire organisation was and only catered for some of them.

> *"There was no project updates so there were no milestones which was communicated to us so we didn't meet on a regular basis just say this is where we are this is what we have achieved to date and this is what we hope to achieve in the next quarter or the next phase we didn't get that sort of feedback."* (P10)

> *"My short answer would be no. Primarily, because we didn't have and I felt that we didn't have an internal project manager, who was assigned to the project, we're using a completely outsourced project manager. Yeah. And there were certain gaps with regards to project management that was missing."* (P8)

> *"There were a lot of items or functionality rather that way in five that are not available in eight and to date has not been implemented and a lot of stuff that were promised*

features and stuff I still not delivered. There were no repercussions or consequences there off." (P9)

"The actual update from version five to version eight was closed off while certain things may not have been concluded because also the contact in itself came to an end." (P4)

"We were not able to fully take ownership of the system itself now you obviously you're relying on a third party internally then there was no real champions now for the system or people advocating for the actual system which then did not bode well for the individuals where is this thing initially cause everything there was this champions they could they could then stand influence everybody else. So, the implementation went ahead whilst there was delays and challenges, but it didn't take the organization with along." (P4)

"The reason that wasn't further explored is that the scoping exercise on the Ellipse wasn't thoroughly conducted so when I mentioned that it was good awareness about the project ,the awareness only started once the project kicked in, I believe so awareness should have started prior to that, So there should have engaged with all of the branches and establish like a business specification and business requirement specification for the upgrade and then we would be able to specify what our specific needs where there is just assumption on certain tasks and how to carry it forward there was no investigation on how we could live with some of the final features of the upgrade." (P10)

4.4.2 Project objective and goals

Participants felt very strongly that the deliverables of the project were not met and that there were still many outstanding items which have not been delivered by the implementation. They felt that the scope of what the project wanted to achieve was not delivered and even to date there are many items missing from the deliverables. Some of the participants specifically described missing items from their requirements which was not delivered by the implementation. Participants said that promises were made but not kept and that managers had requested a lot more functionality than what was delivered.

There was a lot of back and forth gathering the requirements for some departments, but some participants said that even with the project being closed, they only received about seventy percent of what they specified in the requirements specification. Some participants said that the quality of data was one area in which the system fell short.

Participants mentioned that they did not know where the project started or whether it had ended. There was no peg in the ground and no big milestone to indicate that the project was a success or failure. Participants mentioned that the initial awareness drive started off well but slowly fizzled out as the project progressed even to the extent of them not knowing if the project was still ongoing or closed off. They did not get what they asked for and the reason for the upgrade was mostly to add an asset management module which was not fully achieved. The reports that the participants used in version five was not in version eight and have not materialised.

"My view that the scope was not delivered when the consultant left site a few months ago a lot of things were not delivered." (P1)

"I'm still waiting for my register to be finalised and completed." (P3)

"A lot of things were promised to be delivered we're not delivered." (P9)

"Not all the tasks were completed and not all the requirements for the business was met. I think overall, a lot of managers felt that we receive less functionality, post upgrade than what we had specified." (P8)

"There was a lot of back and forth initially so all requirements for the control room wouldn't say one hundred percent of all our requirements was met timelessly I think even after closeout there are still a few items which I would in the control room that still require attention I would say from operational point of view we are about seventy percent use of what we are originally set out to be. Where I say that we fell short was in the quality of data." (P10)

"Ellipse eight I didn't even know where was the peg on the ground, To say we are now live on ellipse 8 so that tells you about the awareness on the project and how it started

off very well and eventually just weather down too , basically to be honest I don't really know that ellipse 8 is now as a project closed off , like completely." (P10)

"I would say no, because one is the business case, or the motivation to do the upgrade was based on taking care of asset management and agreed to do that we still suffering today. The second thing is what there was no like for like. So, what we had in the previous version, I think it was five point three, we never even gotten in eight, then there was many different functionality, additional sort of features and modules that we are going to implement as part of upgrade to the best of my ability wasn't implemented. The last one, there was a suggestion that the reports that were completed in five point three will be in eight. Those are our daily, weekly and monthly reports or related reports. We never had it materialized." (P15)

4.4.3 People and resources

Participants mentioned that the organisation did not have ample resources internally that were dedicated to the project and that the organisation relied on the implementation team from the consultants to perform all the tasks and do all the work. Participants also eluded to the fact that the organisation relied on one or two key members from the consultants to articulate what the business sort out to do as these were former ex-employees from eThekwini Electricity. The participants said that the business did not plan on the resources which they needed to complete this implementation and relied completely on the consultants to provide the people to complete the tasks.

Participants said that once these key members of the consulting company got sick, then a lot of the tasks would stop. These former ex-employees knew the company better than the other members from the internal organisation. Participants specifically referred to some of the members by name as experts in their areas. Participants said that the organisation became dependent on these resources to see that the solution was delivered in the organisations best interest even though they were now working for the consulting company.

There were different consultants representing different aspects of the project and the organisation was completely dependent on them to complete a successful implementation. There was a lack of internal resources which participants explained as well as a high staff

turnover within eThekwini Electricity. Participants felt that each time a company came in to perform a task, they would do so without consulting any of the other consultants on site. This resulted in a duplication of tasks and work. Participants also said that the organisation did not follow a standard to manage their knowledge.

Participants said that they were not given access to the back-end system and that no one within the organisation was given access. Some participants also said that they were completely dependent on the consultants and the organisation did not have the necessary resources to understand the Ellipse system or to do any configurations.

> *"One of the areas were the resource component where there were not individuals that could be dedicated to the project. Although there were individuals which were identified during that time."* (P4)

> *"Then also you'll find that on the implementer side for example it did not have many [contractor name]. There was no one to do all of what the business wanted. So, I would say that was one risk. So, when [contractor name] got sick things stopped, but that being said as a business as well I think we dropped the ball in that when you have a contact you have a specified time."* (P3)

> *"Well the guys they had on the ground I mean [contractor name] was the works manager here, so he understood. I would say that [contractor name] was It finance expert , very few people internally can explain oil just may be the way he talks I don't know then the financial implication of things that understanding of grab and the components and during the financial statements , I would say [contractor name] was an expert and then the guys in the background I mean I know even up until a couple years ago I would go to [contractor name] and say [contractor name] I need this can you write me a report , done overnight sometimes. There was a core group of them."* (P3)

> *And I tell you, the only saving grace was [contractor name], because he's had so much of experience. And he knew how, or what the process was, in terms of, you know, certain maintenance processes or certain construction processes. So, he played a big part in trying to fix everything and say, No, this is how it should be. These are the work*

groups that this go to, or these are how you these reports and things like that he had a massive knowledge. (P14)

"There were different consultants during the Ellipse and there were different consultants during the business process mapping and there was a different consultant as well who did the register, it was pragma who did the business processes. So, each came in optimized but as a chain they don't really have the vision to say okay these are how all of these different exercises we're doing ties in together maybe the reason for that is largely because, there is no industry standard from a knowledge management point of view." (P10)

"Everything was in the consultant's hands. And, yes, lots of those consultants, we are ex-employees. Okay, that will on the project, and then basically, that they resigned and became consultants. And on that note, as well, I mean, there's a lot of internal staff that asks for access that couldn't get access, I myself asked for access. Like I wanted access to some of those table files. Yeah. And they said, No, I, if I'm going to authorize something, I can basically have access. So, there is the issue, and then nothing." (P6)

"So, the concern that we have is that we are fully reliant on external consulting company or the specialist company." (P2)

"We didn't have the necessary internal resources to understand beyond. Even in the Ellipse system they created what was called a equipment register and a structure and but the problem is, is that nobody is internally trained to say how do you change that…so there's also almost a complete reliance on somebody from outside was the biggest challenge or biggest quite a problem." (P2)

4.4.4 Time

From a time management point of view, participants said that although the system go-live occurred close to the predicted time, not all the deliverables of the project was met. There were many items which were not delivered on time and some which still have not been delivered to date. Participants said that one of the reasons was that people were not dedicated to the project.

Some participants communicated that delays to the project was brought about by the internal organisation. The organisation was not ready to receive such a system and further delays like the end of the financial year caused the project to be delayed. Some of the milestones were achieved on time but the project overall did not meet all the deadlines.

> *"I think they were pushed a lot for time to get things delivered… in terms of time there a lot of items that still outstanding that were not delivered."* (P9)

> *"In many instances from what I could recall certain activities may not have been completed on time either as I said because of this issue relating to certain individuals not being dedicated to the project."* (P4)
>
> *"For time budget and quality, the issue of time although we were over the initial project plan date the reasons for the delay really around business readiness and the request for example my business was concerned about for example implementation during a year end. So, there was some practicalities there, but we achieved our ultimate project milestones on time."* (P5)

4.5 BUSINESS AND MANAGEMENT KNOWLEDGE

Some participants felt strongly about the project leaders from the implementation consultants not having the relevant knowledge of the system and also not understanding the environment in which the system was being deployed in. The consultants did not have the knowledge of the electric utility domain and there existed a gap between how the business operated and what the system offered. There was a mismatch in this area, and it was not addressed. Participants mentioned that this would have been an area which could have been improved upon.

Participants said that the implementation consultants seemed to have the technical know-how, but they did not understand the business and how the organisation operated. Participants mentioned that there was a gap in terms of the internal organisation and the consultants. The consultants may have understood the software but not the business and the organisation knew how it operated, but did not know the capabilities which the system had to offer.

Participants also mentioned that these systems are quite standard and that the organisation was trying to figure out how they would be able to benefit from using the system. Participants felt that the consultants should be giving them this information rather than them telling the consultants as the consultants would have much more experience implementing these systems in other companies.

"The project leads did not necessarily know the system and neither did they know organization so there was this difficulty in terms of bridging the gap then at least the project did should have at least had well the person would not have fully appreciated I have an understanding of the project But at least should know the environment for example in utility environment what they didn't necessarily have that in my mind that skill and you should have still have the system knowledge which to me I found lacking which could have been a area which could have been beefed on." (P4)

"Maybe the technical guys, yes they had their technical know-how but in terms of maybe the guy is leading some of the areas project managers they did not have an appreciation of our business so it was almost you would have that gap between our internal guys who have appreciation of the business but not fully appreciating what the system could do but then on the other hand you would have the technical guys of the implementation company would have appreciation an understanding of the system but not the business itself and one would expect the guys were leading the project or the project implementation tool on the project leaders to bridge that gap." (P4)

"I'm sure these things are quite standard elsewhere but we were trying to understand how best we could utilize this system well there may be felt that there should be advising us rather than telling them , we should give them an idea functionally how we operate as a business but they should tell us this is what industry is doing" (P10)

4.5.1 Theme: process knowledge

Many participants mentioned that aligning business processes to the ERP system was a challenge. Participants also said that the organisation was dependent on other consulting companies to develop these processes for them. Some participants indicated that matching the businesses processes to the system is a major challenge and this is vital for the success of the implementation. It was highlighted by participants that even to date not all business processes have been engineered properly and that the company doing the mapping of these processes, did not complete it for the entire organisation.

Another problem which was highlighted by participants was regarding the structure of the organisation. Participants felt the organisations structure was not geared to support change and was very rigid in nature and unable to adapt to projects.

> *"I think the biggest thing was aligning the ERP through our processes or aligning the process to the ERP."* (P1)

> "*The biggest problems regarding this organization is that that they are dependent on outside consultants for business processes*." (P12)

> *"The other issue in terms of the business process is that once we had a very intensive business process mapping exercise that was done by [company name] my few years ago. The work planning and control aspect of that is still an issue I don't believe fully that we have we have that that implemented completely."* (P10)

> *"The definition of business process is from a more senior management level they probably saw but often more summarized view of all the operations actually work…guys actually doing the work realized that this is not necessarily how we do it so they had to come in and renewed to explain more an elaborate and then sort of iterate that process to get it concise."* (P10)

> "*The problem in this organization is structurally its unable to respond easily to be re-engineered.*" (P12)

4.5.2 Customisation knowledge

Participants felt strongly about the way that the system was procured, indicating that instead of completely mapping out all the organisations business processes and then finding and customising the chosen ERP to suit the organisation, the organisation went the opposite way around and tried to customise the business to suit the system. Participants were not comfortable to change the entire way they did things to suit a system which they did not know or did not meet their requirements.

Many participants explained that very little was known about the customisations which were done during the implementation of Ellipse version eight and that there was a lack of documentation outlining these customisations. The consultants kept this knowledge to themselves and did not want to upskill or transfer this to the internal staff within eThekwini Electricity.

Participants also explained that the implementing team's knowledge was limited to the scope of the implementation and that they did not fully understand the product which was being implemented. When the participants asked the consultants some questions, they were unable to provide answers or justify certain things. The consultants were only able to provide answers to a narrow question set which only dealt specifically with the implementation. The team was unable to leverage other system functionalities so that the organisation could optimise the way that things are done even though the organisation had purchased the full product and functionality.

> *"I would have preferred that we would have mapped out our business process is first and then went out to market and found an ERP fitted closest to our business processes. In this case it was done the opposite. you bought a ERP first and then you try to customize it through our processes and that's where the biggest resistance for the upgrade came in where people already said I'm used to doing things in this manner and now you bought a patently off the shelf system and you want me to customise my processes."* (P1)

> *"A lot of the customisations they were known by just a few people, few contractors and no internal staff knew what work they had did, it was not documented at all. So that*

became very difficult to figure out what needed to be converted during the transition from five to eight." (P9)

"So what we found when we asked sort of explorative type of questions they couldn't answer through the detail that we in some cases they knew certain aspects of the product very well, what are you going to implement in our business they knew very well, but in cases where business didn't really explore we started probing them about the use of certain other functionalities I think they fell a bit short there. So that's knowledge from the supplier side." (P10)

4.5.3 Change management

Many of the participants communicated that there was no formal change management process which was fully communicated to them regarding the Ellipse ERP implementation and that this information was only communicated to high level staff during steering committee meetings. Some of the participants highlighted that there was no change management process and that they used to contact the contractor directly to get changes done to the system or when problems were encountered with the functionality of the system.

Participants also mentioned that they had to debate with contractors many times before anything was done or before the contractor understood what was wrong. Other participants also said that they were not aware of any change management process and that the only thing that they remember to deal with changes to the system was a defects list.

Participants felt that the implementation of the ERP system was pushed onto them and that the knowledge surrounding the product was not communicated to them. That people were used to doing things as they currently did and the knowledge of the benefits of having such an ERP system deployed in the organisation was not communicated. Participants described eThekwini Electricity as an organisation that did not manage the project well.

Participants further elaborated that the upgrade to version eight of the system was forced upon the organisation and that there was no choice in selecting any other system. There was no consultation with the different stakeholders and no requirements elicitation done. The organisation was limited to the features and functionality that the system had to offer.

"So, change management I think we could have done better there, for me I know I debate with many people. we were told later on that you need to say the same thing seven times before people understand I think maybe they need to do the upgrade people didn't understand, like I'm saying in the internal group of people that sat in the steering committee understood , the next level didn't know why." (P3)

"There wasn't a change management there was only a defects list that was managed well other than that, no." (P9)

"There were issues maybe around resistance to the upgrade maybe people didn't fully appreciate or understand the benefits that could be accrued by the upgrade and then, secondly also the fact that people tend to get stuck in their ways and not wanting to change having now operated any particular way and having to do things differently." (P4)

"Maybe getting to the lower levels showing them examples of if you don't this is how things could go wrong this is how it could save you time." (P3)

"I think the manner in which they upgraded they needed to look at it very business specifically as in what you expecting as a user to see at the end after the upgrade and worked very closely with the end user that when you are testing developing implementing that the user is there with you to see the results, and not to test it at the end of the implementation and to say that this is a product and you have to use it . It was pushed onto the user, but I think that if the user was kept in the loop right from the beginning or need stage end had a closer eye on things they would have guided it better and in the end into what you want in the end the user would have got their requirements. So, the update didn't come from users saying we want this functionality it came from it is saying there's upgrade happening and whether you like it or not it's happening." (P9)

"...on the onset before the project was kick started before not an awareness drive should have been created to illicit business requirements , then they should have had a presentation just say the art of what is possible on the loop system cause expectations and requirements uh something that is very easily mixed up and from a change

management point of view while a system may eventually meet the business requirements it may not necessarily meet the expectations which eventually puts like a doll feeling or emotion in the end user." (P10)

"*This is where we could probably have done a lot better. I generally find it quite a problem with a lot of our IT systems. Very much it's a push strategy that implemented in the organisation rather than a pull strategy."* (P1)

"It was a push strategy, that Ellipse 8 has these advantages, accept it as an organisation. Whether the users liked it or whether the users wanted something different, that was not considered at the early stage. It was really considered a lot later and that is where a lot of our challenges came in, that when it came to implementation, the users had a different expectation from what the consultant or supplier could deliver." (P1)

4.5.4 Management support

Participants felt very strongly about the support of management during any endeavour which the organisation undertakes. In terms of knowledge management, the support of management was lacking. Participants went on to explain that because of this, there was a lot of incorrect decisions which were carried out since there is that lack of support from management. The transference of knowledge through the different levels of staff by managers was not done properly.

Participants indicated that the organisation has no control over knowledge and this should be pushed down by management but has not been done. Currently knowledge is managed using a best effort approach.

Participants highlighted that management did not support the idea of knowledge management in the business and this was a culture in the organisation. It was highlighted that a participant insisted that the business instate a Project Management Office (PMO) but this fell on deaf ears. Some participants even went to the extent of documenting the project management process and presenting this to the organisation, but the lack of accountability by management prevented this initiative from taking off. It was highlighted that the

executive need to take control of this function and have a high-level overview of the projects within the organisation.

"Top down driven in terms of our vision and this is what we want to achieve from a knowledge management point of view and awareness is created and it is push down you know too senior managers and then and senior managers then really drive that awareness down and almost create some level of accountability as in if you don't follow these guidelines they obviously tide into your performance management plan so you Institute some level of control. If there's no control over knowledge then we are not really taking it seriously, so as it stands currently we have no control over our knowledge, it's just best effort some staff to it and some do not so it's based on the level of attitude, level of competency of the technician that's doing the work, so you get variable there was of the degree of knowledge capturing, but you can understand that if you do not get consistent data in certain structures informed then you cannot really make decisions. You might be making incorrect decisions because one person may be capturing an asset very well might lead you to make incorrect decisions based on the knowledge that you are capturing." (P10)

"Well what was clear and apparent to me was there was no knowledge management awareness or culture or methods or approach to knowledge management in the organization, zero." (P5)

"I insisted that we have a project management office, we even documented how's that project management process would work how are you project is registered all of the role players in fact we both had full process model to say if I come up with an idea I take you to my deputy head the deputy had you know that whole process. We pushed very, very hard for business to take ownership of that but it required deputy heads too to sort of embrace that and make it their own and that's where I think we lost traction because deep despite me saying the PMO all projects ultimately should come here. You as the exec should have a helicopter view of all projects. Easy way to start taking control of your business adding value to the business and improving because that's all knowledge management. So, what are you doing how are you doing it, where's the improvement, where the problems, where the challenges can we learn from that? All

of that stuff. In theory everyone we had to do this in practice. Very, very little real support." (P5)

4.5.5 Training and education

Participants highlighted that training was provided but it was not formal training. Training was generalized and participants felt it was ineffective. Some participants outlined that training was planned but the level of training was very ineffective and wasted time and money. There were also initiatives such as train the trainer which did not materialise. The other initiative which started but never materialised was the super-user training which was supposed to be done but was never completed. Even to date there is still a need for training to take place, yet it has been five years since the implementation took place.

Most of the participants highlighted that super users were identified within the organisation and that they were the ones that skills were going to be transferred to by the consultants. The super users were going to be able to troubleshoot the system and perform some of the functions which the consultants performed. This did not happen.

Participants explained that some of their staff did not receive training before the system went live as there was a two-week period in which training took place and it overlapped with the go-live of the system, so some of the staff was not trained by the time the system was implemented.

Other participants indicated that education on the system was not transferred from the implementing company to the internal organisation and that the organisation found many challenges to do basic tasks such as create a report in the Ellipse ERP system. Participants also indicated that the training was very basic and did not equip them with the knowledge to do the tasks which they needed to do daily.

"But there was no real formal training specific to the way we implement. There was generalized training which was incredibly ineffective, and they didn't have a lot of it, so my opinion was that we had probably spending more time and money on training than anything else." (P5)

"We had set up a group of super users that where meant to be trained and they basically became them the consultants in a way with the knowledge to assist but that has never happened to date." (P9)

"But I don't know whether the people understood what was required of them cause when they went for training, they felt that they couldn't do what was expected over and above their normal jobs." (P3)

"There's lots of challenges. And I think the training is still ongoing. We identified recently, a need for training as well." (P7)

"My feeling was the lowest levels of staff, primary, it wasn't so much to be excluded, but they will be trained on a two-week system, which wasn't finalized. So that eventually when the system did go live, there were some changes that they may not have been trained on." (P8)

"Well you see I think that one of the areas which was the issue, while the process is well documented by the project team was deploying that was a not fully passed on through the internal staff to ensure management of the system itself. For example, how to develop it apart or any report while the service provider had the expertise to do that, to my knowledge it wasn't documented in terms of how you do this and that information then passed on through the organization it was more held by the actual service provider although." (P4)

"I think from a very basic perspective it sufficed but I don't think it sufficed in terms of what the user actually required what the user was expecting because a lot of the users working very different business or function streams and the training didn't cater for individual needs but rather and holistic basic entry level." (P9)

4.6 TECHNICAL KNOWLEDGE

Some of the participants opinion was that the vendor had excellent knowledge on the Ellipse system and that they had a better understanding of the business than the organisations

employees. This was demonstrated to them when they were solving issues and configuring the system.

Other participants felt strongly and argued that the technical knowledge of the consultants was limited as they did not achieve or implement the features and functionality which was promised during the initiation of the project. The features which were available in the previous version of the ERP system were not available in this version and the consultants were not able to do this.

> *"They really, really knew their stuff. Excellent, they were able to configure it. They were able to resolve issues very quickly. The actual product itself from a technical level is very good, very good. I think the consultants had the knowledge, I don't doubt their knowledge side of it, they have been part of the business. They knew it a lot better than some of the other employees. I can't question their knowledge of the system."* (P1)

> *"Allan knew the system from his own experience, it was his interacting with the system that allowed him to become a trainer. He knew the system well, but he didn't know it to the point where he didn't know it as intimately, he knew our business."* (P10)

> *"They were very limited about the amount of changes and what you could change in terms of the system. A lot of it was very rigid and fixed and again it's not designed to be completely customizable otherwise it's essentially building a new system, but the different changes that we required and needed were not there even the small changes that were done in five could not be done in eight."* (P9)

> *"I found it was limited. Yeah, primarily, because we didn't achieve the features of function that we could have achieved. Yeah, in the time period that they had to have completed the work."* (P8)

4.6.1 Trainers expertise

Some participants felt that the level of training received from the consultants who facilitated the training was at a lower level than what it was supposed to be. Participants also felt that the trainers had a good understanding of the system, but were not able to articulate this

through the training program as they were technical personnel who assumed the role of trainers. They felt that having proper trainers would have resulted in the skills to be transferred more robustly to the users rather than having technical people try to train staff.

> *"Overall, I don't believe that the level of training which was received was commenced with the work that we needed to implement on the system. I felt the level was much lower than what it needed to be."* (P10)

> *"My feeling was that the trainers were good, technically, but they were not good facilitators, as that they were not trainers. Yeah, they were technical staff. They could take you through a series of steps."* (P8)

4.6.2 Configuration knowledge

Most participants felt strongly that configuration knowledge was held by the consultants and every time changes needed to take place, then the organisation would have to re-engage with the implementing team. Participants felt that the organisation is completely reliable on the consulting company and that all the knowledge they possess will not be transferred to the internal staff within the organisation.

Participants highlighted that the ERP implementation resulted in a lot of their business processes being customised to suit the system and that even to date they are not able to do certain operations on the system. This is related to the increased number of steps that now need to be performed to complete a task. Participants said that this has decreased the efficiency of the system.

> "*We do not have a contract with the consultant and immediately the question got asked of how we would we continue to operate a system without the consultant so that's we are real dependent in the consultant from a knowledge perspective."* (P1)

> *"A lot of our processes had to be changed and tailored around the system and still affected till today we are unable to do certain operations. Quite increase the number of steps required to do things. I think that's one of the biggest things; it's decreased efficiency in a lot of places."* (P9)

4.6.3 Participants know-how

Participants said that they were dependent on the consultants to do any kind of work on the ERP system and that the internal employees who knew how the business operated left the organisation and joined the consulting company doing the implementation of the Ellipse ERP system. Participants also mentioned that no one internal to eThekwini Electricity knew where to go and try to configure the system to how they wanted it to work. There exists this gap between the consultants and the internal staff.

Participants said that they were unable to draw up reports as the internal employees within eThekwini Electricity did not have the knowledge to perform this task on their own. Participants felt strongly that the nominated super users from the organisation were not equipped with access to the system and did not receive the correct level of training to support the internal organisation with the configuration and customisation of the system.

> "*So what happens in order to make your system work and work well and work in the time frame you need it you end up depending on consultants so you'll have business consultants in key roles and key functions and often these business consultants are ex-employees with enormous amounts of knowledge of the actual business itself and they matching that knowledge to the system and they tend to retain that knowledge. If you lose those people you lose key business knowledge, not only on how to run your business but how to make the system run within your business, and that is fairly disastrous.*" (P12)

> *"There may be gaps because they knew a lot of the system; how it worked where to configure things and internally no one knew where to go and do what on anything and the documentation was also quite poor."* (P9)

> *"...the reports we require we were told that it cannot be drawn right now that they do not know how to draw these things*." (P1)

> *"I have never been invited, have also visited with other people that were identified as super users, they don't have that information to fulfil that role. They don't have the right proper access to provide support to their users around them. And they've never*

been received any formal training to actually assist the organization in that space. So that super user aspect of it is still a big gap. Because it's never taken place. It's, it's, it's been an idea that good idea that everybody endorses, but it's never been implemented." (P11)

"The Super users complaining that they don't have access to functionalities. The supplier was keeping the knowledge to themselves, so they didn't have a contract forever in a day. If the documentation was in your face there would have been no excuses." (P3)

4.7 ERP KNOWLEDGE TRANSFER

Participants indicated that they are sceptical that knowledge transfer occurred, since other users continuously seek help to perform their tasks on the system. R12 also indicated that you needed to self tech yourself as a knowledge repository, for the Ellipse ERP system did not exist. It was noted that there was very little knowledge which was available on the Ellipse system which could be accessed online, and that this knowledge had to be created by experienced people who worked on the system for a long time.

Participants highlighted that the vendor only supplied a few resources with specific type of knowledge on the system and that senior system users had to figure out things for themselves on the configuration of the system. It was added that this knowledge on the system was closeted as the consultant said that they are not here to tech anyone. Other participants also supported this and felt strongly about the fact that knowledge transfer did not take place between the implementation company and eThekwini Electricity.

"*The consultants were extremely reluctant to give us information.*" (P12)

"*I'm here to do a job and not here to teach anybody*." (P12)

"… there would be knowledge transfer that takes place between the consultant and the internal employees. Surprisingly that consultant has left site for the second time or third time and I'm not convinced that knowledge transfer took place, yet it was a line item on the contract and our previous head said that he would not allow another support contract unless knowledge transfer takes place." (P1)

"The general understanding throughout the organization yes you may have acquired the knowledge to operate and undertake the functions which were required of you in your role but in terms of troubleshooting and going beyond that whether it's even development of reports or running certain reports that was very limited because reliance was on the actual vendor itself for them to provide those expertise. Service providers didn't want to depart with certain knowledge which could have rendered them redundant so it may not have been fully pushed on our side as an organization although there were certain attempts, but it wasn't fully transferred so the reliance was still there." (P4)

4.8 KNOWLEDGE MANAGEMENT PRACTICES

Some participants highlighted that the organisation had very good knowledge management practices, however there were conflicting views by multiple other participants who said that they did not feel that the organisation did enough in terms of the practices undertaken to manage the knowledge during the ERP implementation. This was because different levels of staff were exposed to different parts of the business and the organisation is not transparent about many things and only makes information available to certain levels of staff.
Participants mentioned that 'Vibe' was used as document storage for the documents within the organisation but not all staff knew about it or how to use it. Some people did not know that it existed or what its intention was. So, during the implementation, some participants said that some documents were uploaded onto 'Vibe' and others were not.

Some participants said that the organisation lacked a strategy in terms of managing knowledge and that although there may have been a drive to capture knowledge, it failed because of the lack of a strategy to manage this process. Participants also said that since there are many departments within the organisation, they all need to "talk the same language" in terms of knowledge management.

"I think we had pretty good knowledge management methods and techniques. If you think about it, we documented the solution very well, all business processes and we tried to set up something that could be repeated for others projects and expand it to other parts of the business. I can tell you right now that is as far as it went. We did that Ellipse upgrade and when the resources never came back and that is where those

initiatives stopped… there was absolutely no continuation from a business point of view." (P5)

"Well they're supposed to be 'Vibe' *right. So I think they put it on there, onto* 'Vibe' *but if you ask people out there they don't even know so we put it in* 'Vibe' *we made self-copies and we and hard copies which we gave to people including the registers of who was trained And all of that, but they still tell you they don't know how to do it so something we doing in terms of communication as an organization we failing."* (P3)

"Some of it was documented but in a written version uploaded onto 'Vibe' *on some documents were kept but then. They were done by internal staff and some of them were done by consultants but it's not a solid documentation don't you can give to anyone to go drop and start running."* (P9)

"I think as the organization on a whole we lacking in knowledge management strategy or a plan. There are two systems there, but people do not use it it's not enforced it's not required to use it, there's no policy stating you need to do it also when employees enter or leave, they're not encourage tool to transform even to absorb knowledge from here. Its left upon the employee to turn navigator and figure things out instead of having a base grounding of this is what has happened and where we are heading." (P9)

"So, whilst there may be a drive to capture knowledge internally and it might be brand specific because we're doing it, from an organizational point of view there's no real vision around it because the vision should have been driving different branches. So eventually what we would find is that all of these knowledge capturing exercises should roll up onto something that gives or acts as an indicator into something else and we find that that should actually be a Top down approach because if it's bottom up you wouldn't get any standard and there is no control." (P10)

4.8.1 Documentation of the ERP system

Participants said that although business processes to implement in Ellipse were documented and stored, the organisation failed to locate this documentation and when other projects took

place, the organisation would end up redoing the work which was previously done. Other participants confirmed this and said that continuous improvement was missing, and this should be a focus area in any business, but it was missing. Participants also said that the element of learning from experience was missing and that the organisation did not capitalise on lessons learned in previous projects.

Other participants felt strongly that the documentation of the system supplied by the consultants was too basic and that the intricate details were missing. This prevented a proper handover of the system from the consultants to eThekwini Electricity staff and that the information that they needed to maintain the system on their own was not shared. The documentation supplied did not allow you to troubleshoot the system or to perform complex functions on it.

> *"I think a pretty good job was done with defining the business processes for Ellipse and this has been put into a repository and has been held. The concerning thing is that every time we implement a new system we go and rehash the same business processes again. In the past six months we had three new systems which we implemented. We had Ellipse which we designed the business process is for. We then had the asset management that we did. We design business processes for asset management. We had the ARC GIS enhancement that took place. Again, the implementers of the ESRI GIS enhancement also design business processes."* (P1)

> *"If this was my business, if I was running the business, I wouldn't take no for an answer. I wouldn't, I would say your role now is to not only to protect my business because it's important you have knowledge of the system and, and, and, and, but also insist that you are always driving continuous improvement. I'm looking for ways to improve the system but that has never happened."* (P5)

> *"There were no lessons learned that was shared with us about previous upgrades or issues that we could encounter, there were no there was no repository about previous upgrades and issues that happened during that and cut over there's none of it."* (P9)

> *"To a small degree information was shared, the basic framework of operations, but the intricate details were not shared of the actual system."* (P9)

"...these are the areas pertaining to your relation that is documented, that you can always refer to, for example, and get the information that you need. But from that perspective, I don't think there was proper handover or sharing of that information." (P7)

4.8.2 Knowledge repository

Participants communicated that the organisation had multiple knowledge repositories which are used by different departments, however there was not a sole system that was stipulated to store knowledge that was created. Participants went on to further say that not everyone in the organisation was aware of the systems available and how to use it which added to the challenges experienced. There was no training given on their online repository and that's why staff were hesitant to use it.

Essentially participants felt that the drive to make them use a single repository for the storage of documents was not there. There needed to be an awareness drive and training on how to use the system to enable the organisation to benefit from the system.

"Yes, it does two repository's the 'Vibe' *system and I considered the U-drive as another repository system, but whether it's really well communicated I don't think so."* (P9)

"The guys did document certain processes. Well, the implementation team they had documents which was stored on 'Vibe' *another system, but it wasn't fully. I think it wasn't fully workshop exposed to their internal guys for them to fully appreciate what is contained within those processes and then begin to own them. So, that I would say was done but also it impacted on the people taking ownership of the system which were implemented. Everyone did not have access to* 'Vibe' *or secondly, we are not trained to utilize* 'Vibe' *or informed part of the material for the invite so that they could access it in their own pace or time so yes information may have been stored on the repository but in the end it didn't really become useful for the people."* (P4)

"I think the way 'Vibe' *is structured, there hasn't been any formal training on* 'Vibe', *people know* 'Vibe' *is there, if you put the link, people learn to access it, but tell somebody to go into* 'Vibe'*."* (P6)

4.9 DECISION-MAKING KNOWLEDGE

Participants mentioned that to their knowledge research on the choice of ERP system was not done to see what products were available in the market. Some participants said that they are sure that there are other off the shelf ERP systems available, which could have satisfied the business requirements better. No options were presented to the organisation on a choice of ERP system.

"…we never did that research. My impression is that we never did this research to see what else was out there." (P1)

"I'm not sure. Maybe they could have been other off the shelf ERP that could be better suited for organization. We never did that research. My impression is that we never did this research to see what else was out there." (P1)

4.10 ORGANISATIONAL CULTURE

Participants felt very strongly about the culture of the organisation. They felt that the organisation is very old fashioned, and this laid-back culture had a negative effect on the implementation of the ERP system. Participants said that this culture does not support the agile and dynamic environment which the ERP system needed to be deployed in, which made things even more difficult.

Participants highlighted that the organisation is not process-driven and that there are many silos which exist throughout the whole organisation. This is the culture which the organisation has established over the years and now it's very difficult to change it.

Participants also mentioned that the organisation was change fatigued. They were tired of the changes that took place and became non-supportive of any initiative. Participants

mentioned that some employees were actively disengaged and actually had a negative impact on projects and initiatives which took place within the organisation.

> *"I've been saying this for years: our organization is a very old fashion archaic organization. It's built around silos, it's not process driven, it has to be a process driven organization across the value chains. We have not adopted that culture in our organization and that is our problem."* (P1)

> *"Change fatigue, when you have people wanting to remain in the marsh rather than have a system that is now transparent an exposed, exposes everything, there was there when the resistance came into it and you can well, just in certain ways, you can't just be disengaged or actively disengaged. So, when you actively disengaged, do I actively going to damage the project whereas you would just go with the flow not adding any value, but I think it was a mix of people deliberately trying to slow the process."* (P3)

> *"There is a culture of apathy we do not have the work ethic correct yet we got a lot of creative very disaffected people so we have an organizational culture here that doesn't lend too much too trade dynamic agile business one stream flow of all the time we tend to if it's working or even if it's not working required happy just to sit in on your salary."* (P5)

> *"Well amongst them there are certain individuals who well quite passionate and saw the benefit so they quickly latched on and almost became the champions, but then others were not really keen on or interested become useful for the implementation you know they want they weren't really useful now for the implementation stay in themselves or firstly having to change their mindset and then to a certain degree not being fully engaged so it impacted then on the ability for them to be comfortable users and for them to pass on that knowledge to the rest of the colleagues."* (P4)

4.11 STAFF TURNOVER

One of the other problems which came through from participants, is that eThekwini Electricity is currently experiencing a large staff turnover. Some staff move within the organisation through transfers and promotions, whilst others retire and resign for better job opportunities. The knowledge which these employees possess, is not being imparted to the

new occupants of their roles. There is no sort of shadowing by another employee before the persons leave their positions in the organisation. Participants also highlighted that staff are not equipped with the right skillset for the roles within the organisation.

Participants also said that staff took the knowledge with them when they left the organisation. Many of the staff ended up joining the consulting companies who were doing the implementation of systems or supporting systems within the organisation. This was clear in this project as many of the consultants working on the ERP upgrade were former employees of the organisation. This should have been identified as a business risk and been avoided.

> *"In this organization because that wasn't that good and there was no other knowledge management mechanism and approach what you get is over years and years and years and years and years of diminishing knowledge base. In fact, you're leaking knowledge you haemorrhage information and knowledge and you lose your intellectual capital. It leaks out of the door. One of the big factors here was an aging workforce where people had lots of knowledge in the kop and they were retiring or leaving early because of external factors obviously we know what they are and you end up where they hasn't been a transfer of knowledge base because in the past not even was that run low. In other words, people tended to just taking an organization for a lot longer so you found that that institutional let's call it intellectual capital sort of growing was kept in the business because people stayed there for longer. As soon as you have lots of churn people coming in and out, in and out, in and out what happens is that you start the knowledge starts to get diluted."* (P5)

> *"...big problem is the turnaround of staff." (P6)*

> *"Also, the issue here will change the way that our staff turnover. Yeah, we never kept the staff in sync. I didn't know who to determine exactly, you could either blame the line manager for not ensuring the staff had the appropriate skills and capabilities."* (P8)

4.12 CHAPTER SUMMARY

This chapter presented the findings from the interviews of fifteen different participants conducted at eThekwini Electricity. Participants all had a good understanding of the concept of knowledge management and were able to articulate this to the interviewer. Various themes were identified and the views and opinions which came out strongly during the analysis of the data was presented. The responses from the participants during the interview process gave a deeper understanding into the challenges faced by the organisation during the ERP implementation phase of the project.

The following chapter discusses the findings which were presented in this chapter against that which was presented in the literature review.

CHAPTER FIVE: DISCUSSION

5.1 INTRODUCTION

The current chapter discusses the research findings which were presented in Chapter Four as part of the qualitative data gathering exercise. The findings of the research conducted is compared to previous studies which were conducted and discussed in Chapter Two. This enables the researcher to distinguish if there are similarities or differences in the findings gathered as part of the study to those findings which were gathered by other scholars previously.

The chapter begins by discussing the selection of the participants for the study and why those particular choices were made. The themes and sub-themes which came through in Chapter Four and the direct quotations is then discussed in detail to establish if there exists any link to the literature and framework which was presented in Chapter Two. These themes are discussed in the context of the objectives of the study.

5.2 SELECTION OF PARTICIPANTS

Participants forming the population of the study were selected based on their involvement in the ERP upgrade. The selection of participants comprised of different levels of staff. This was done so that the researcher could gain an objective view of the experiences of different levels of staff who had different roles in the implementation of the ERP system within eThekwini Electricity. The years of experience were listed as ranges so that no one would be able to identify the participants who were interviewed as the years of experience register those years in the electrical field rather than that of only in the organisation. Fifteen participants were interviewed so that the researcher could gain a deeper understanding of the information gathered.

5.3 KNOWLEDGE MANAGEMENT CHALLENGES EXPERIENCED

5.3.1 Project management knowledge

Project management knowledge was seen to be well known by the implementation consultants and the view from the participants who were interviewed is that the consultants

were good at managing the project. The challenge was that the organisation "did not respond well to change" and there was a "huge reluctance" on the part of the employees within eThekwini Electricity to change. A large number of employees within the organisation did not support the implementation and the organisation expected that the consultants would do all the work and that they would be disengaged and expect a positive outcome. This finding correlates with the one by Ramburn *et al*. (2013a), who describe that there was a gap dealing with project management between the employees and the company doing the deployment of the system which contributed to the failure of the implementation. Banaeianjahromi *et al*. (2016) highlighted the negative impact which project management issues can have on an ERP implementation. Ramburn *et al*. (2013a) proved that resistant employees with negative attitudes have a negative effect on ERP implementation which concurs with the findings from the current study as described above.

The lack of a designated project manager from the organisation left a huge gap in terms of the definition and planning of the project which speaks directly to the research done by Banaeianjahromi *et al*. (2016) where this challenge was also encountered during ERP integration. Feedback was not regular and there were minimal updates to the entire organisation, for everyone to be aware of the current status of the implementation. The management of the project was done by the implementation consultants which created a big gap in terms of the deliverables and milestones which needed to be achieved. The project was closed off with not all the deliverables being delivered which indicates that there was no control over the project from the organisation. Jayawickrama (2015) also showed that the success of an ERP implementation relies on a dedicated project manager or team that manages knowledge throughout the implementation process.

The findings also revealed that functionality was missing during the implementation of Ellipse version eight as compared to the system when version five was implemented which substantiates research conducted by Banaeianjahromi *et al*. (2016) who showed that poor evaluation of a ERP system is a huge challenge. This is a key indicator that the project definition and planning was not done sufficiently as functionality should have not been lost during the implementation. Since the project management was poorly done the organisation failed to address the non-delivered items by the time the contract expired. Planning was also not done involving the entire organisation and this is a major shortfall in terms of addressing business requirements of the system.

Deliverables of the ERP implementation at eThekwini Electricity were not met and the organisation is still left with a half working product where all the features which have been paid for are not working or not set up as yet. The goals of the project which was set out at the start of the project have not been delivered and respondents have communicated that they have even less functionality than before. The organisation does not have a valid contract with the implementation team so none of the issues can be addressed as the team have also left site and moved on to other work.

Examining the findings surrounding people and resources it was found that the organisation failed to have dedicated employees assigned to the implementation of the ERP system. It was noted that specific individuals were identified but failed to materialise in terms of their dedication to the project. Internal employees would dedicate some time to the implementation and spend most of their time doing work which was on their day to day activities as part of their job descriptions. This resulted in them not being completely dedicated to the project.

Another major finding around people and resources was that eThekwini Electricity was completely dependent on key members from the consulting companies which is in agreement with previous studies by Ramburn *et al*. (2013a) who also saw that failed ERP implementations were influenced by people and resources. These individuals were previous ex-employees from eThekwini Electricity and the business put their trust in these individuals to ensure that they did things correctly. The irony was that these individuals no longer worked for eThekwini Electricity and did not owe the organisation anything. Work was completed by completely different consulting companies and there was no sort of agreement between the parties or communication which took place. There would be duplication of work which was done.

Looking at the time element under this theme, the findings revealed that the project did go beyond its planned "go-live" date. It was said by a senior manager that the milestones of the project were met, although this is contradictory to what the other participants said. Most were of the opinion that all the milestones and deliverables of the project were not met and were not delivered on time. Ramburn *et al*. (2013b) said that over fifty percent of all ERP implementations go over the planned timeline which concurs with the responses by the participants in the current research setting.

The study conducted by Ramburn *et al*. (2013a), suspended the project implementation when it was found that the project management element was not done correctly but in the current study eThekwini Electricity failed to do this and suffered a loss of control of their ERP system. The organisation was not able to control what was delivered by the go-live date and had no control of the staff assigned to the implementation. Chan (1999), Ramburn *et al*. (2013a), Ramburn *et al*. (2013b) and Jayawickrama *et al*. (2019) all stress the importance of the project management knowledge element and the findings revealed that eThekwini Electricity failed to take charge of this knowledge management element and thus suffered greatly for it.

5.3.2 Business and management knowledge

The findings revealed that the implementing consultants did not have a complete understanding of the electric utility domain and did not have a true appreciation of the organisation. There was a clear gap between the technical consultants and the internal employees. The feeling was that the technical personnel knew the system well, but did not understand how the business operated and on the other hand the internal employees within eThekwini Electricity knew the business well, but did not understand the system and what its capabilities and limitations were. The organisation also felt that the assigned implementing team should have been advising the business on what functionality was available as part of the ERP package and what was not. Instead the organisation was telling the consultants about how the system should be utilised. This created a challenge and was a gap in the implementation. This finding is supported by Sedera and Gable (2010) and Gopaul *et al*. (2016) who both highlight the importance of bridging this implementation gap.

Process knowledge was a challenge as well as getting things to align. It was undecided if the ERP system should align to the way that the organisation operated or if the organisation should align to how the system was configured to operate. The processes which was developed for the organisation was done by another consulting company which overlapped the implementation of the ERP system and there was a lack of communication between the implementation consultants and the process development consultants. The still exists with parts of the business processes that are yet to be fully developed. Gopaul *et al*. (2016) highlighted this in their research and advises that there should be a clear understanding of

process knowledge and each party's responsibility during the implementation of an ERP system.

Another challenge which was identified is that the organisation is structurally not set up for change. This means that the eThekwini Electricity's operation is not agile enough to respond to the demands of an ERP system. This was not understood by the implementation company and they did not understand the structure of the organisation and neither did they take the time to do so. This relates directly to the research conducted by Gopaul *et al*. (2016) who describe that the businesses structure must also support change especially relating to knowledge management.

Examining the findings dealing with the customisation knowledge it was found that a concise exercise to choose an ERP system was not done properly. The organisation did not know or understand if they had to choose an ERP system first and then customise it to suit the organisation or if they needed to customise the organisation to suit the system. The study done by Venkatraman and Fahd (2016) highlight this as a key challenge during ERP implementation. By not fully understanding what needed to be done, there was resistance from parts of the business as they had opposing views. Eventually when the Ellipse ERP system was customised, only the consultants understood what was done and this knowledge was not shared with eThekwini Electricity which added to the amount of challenges experienced.

Change management in the organisation was not handled well. There was a lack of a formal process which was well communicated by the organisation to all the employees and which everyone was aware of. Changes were addressed in steering committee meetings which dealt with other issues and not solely with the ERP upgrade. Since not all employees were involved in these committees, not all of them were aware of the changes which were done on an ongoing basis. Changes were also sent directly to the consultants which indicate that there was no formal process. This caused a lot of confusion amongst employees who did not understand the mechanism to get their changes seen to. This finding concurs with that of Motwani *et al*. (2005) and Ramburn *et al*. (2013a) and Venkatraman and Fahd (2016) where it was also found that inefficient change management processes leads to confusion and can contribute to resistance which is exactly what occurred at eThekwini Electricity. These

scholars also describe this element as one of the key success or failure elements when implementing an ERP system.

The support by management for the ERP implementation and the management of knowledge was said to be lacking. A participant also said that the culture of management was like that. Another one of the findings under this theme was that suggestions of a project management office were made by employees to the deputy head and that is where it stopped and even to date the office does not exist. All what was required is for the deputy heads to support this initiative and there would have been a dedicated office to support the project activities rather than trying to have full time employees juggle their day to day activities in conjunction with ERP implementation tasks. Fang and Patrecia (2005) say that for any type of change program the support of management is crucial. Davenport *et al*. (1998) and Ramburn *et al*. (2013a) say that ERP implementations are complex and that management support is crucial.

Training was seen as a waste of time and money by some of the participants who were interviewed. There were a lot of plans of what was going to be done which never materialised and the organisation was unable to operate the way it intended to. It was also discovered that there is still a need for training right now. Training was too basic and ineffective as participants felt it was too general. There was an initiative to select super users and upskill them to the point where they could support the organisation internally and the dependency on the consultant could be primarily for very complicated tasks. This super user initiative did not take place and super users were never trained more in-depth than any other user. Not all staff had been trained by the go-live date which also indicated how poorly planned the project was. Hasheela-Mufeti and Smolander (2017) outline that it is a requirement to have training that is of proper quality for the ERP implementation to be effective. This was clearly not done by the implementation team.

5.3.3 Technical knowledge

Technical knowledge of the system and its configuration was not passed on to the internal employees of eThekwini Electricity. There were contradictory views from the participants based on their interactions with the consultants. Some participants were of the opinion that the consultants had good technical knowledge of the system, whereas others felt that their knowledge was limited as the customisations required were not successfully completed.

The findings revealed that the expertise of the trainers was questionable. The participants said that the trainers were good technical people, but they were not good trainers. The implementation team got some of the astute technical people from the project to conduct the training, which was incorrect. Skilled trainers have the ability to transfer knowledge to their students, whereas technical people who do not have this trainer element find it very hard to transfer knowledge. So, this was one of the technical knowledge areas where challenges were experienced.

There was also the element of adding system complexity to the ERP system and the number of steps which were required to complete a task. It was found that more steps were added in the implementation to complete a task when compared to what was previously implemented. Similar challenges were experienced by Ramburn *et al*. (2013b) in a study conducted by them where more steps were added to the original process. The study revealed that adding more steps or clicks added to the challenges which were experienced.

The current study revealed that the organisation did not have the capability to do any configuration changes to the Ellipse ERP system. The vendor did not want to upskill the internal employees in this aspect and whenever major changes needed to take place, experts from Australia needed to be flown in to do these changes. This meant that the system was unable to be supported by eThekwini Electricity and a complete dependency on a third party was established with this implementation. It was also discovered that the number of steps taken to perform a task on the system increased with this implementation. This concurs with the research conducted by Ramburn *et al*. (2013a), who found that a system with more steps to complete a task becomes harder to use and contributes to a higher complexity in the configuration of the system.

5.3.4 Knowledge transfer

The findings revealed that very minimal knowledge transfer occurred between the employees within the organisation and it was a trend that employees left the organisation and joined the consulting company responsible for the implementation. These skills and knowledge that these individuals possessed went with them and eThekwini Electricity relied on these ex-employees to make sure that they would implement the system correctly. This was a key area where the organisation suffered and it is cuts across three themes from the

previous chapter i.e. “participants know how”, “knowledge transfer” and “staff turnover”. This concurs with the findings of Gopaul *et al*. (2016), who see the loss of employees as a challenge when the knowledge that they possess is not transferred to other employees within the organisation.

Implementation knowledge and retaining this knowledge was a big problem for the organisation. Documentation from the implementing team was very general and, in most cases, did not exist. Once the contractors left site when their contract expired, the organisation was left helpless as they did not know where to start when trying to fault find the system or make any sort of changes. This aligns with the research conducted by Jayawickrama *et al*. (2019), Gopaul *et al*. (2016) and Li *et al*. (2006) who found that this knowledge disappears when the vendor or consultants leave site and that this knowledge need to be transferred before the conclusion of the implementation.

5.3.5 Gaps between vendor, consultants and internal staff

Both Sedera and Gable (2010) and Gopaul *et al*. (2016) stress the gaps that exist between these three parties and mention that these gaps need to be eliminated before they start affecting the organisation in which the implementation is taking place. The findings brought to light that eThekwini Electricity failed to address these gaps, and this had a negative effect on the organisation even up to the time this research was being conducted. The organisation is unable to support the system even though they own it and it runs on their own servers which are on the premises. There is, and always has been, a knowledge gap that exists between the vendor, consultants and the internal staff within the organisation. Internal employees are unable to troubleshoot the system or do changes which could be of benefit to the organisation.

Some participants also indicated that this gap may have been created on purpose. The reason for this was that the consultants could guarantee that they would have work to do for the organisation for a long period of time as the ERP system is the core system within the organisation when it comes to day to day tasks. Participants also said that the consultants are on and off site and their contracts have been renewed multiple times so that they could support the ERP system and be on site whenever there were any bugs in the system, or any

customisations needed to be done. If the consulting company was able to upskill the internal employees within eThekwini Electricity, they would not be able to secure future work as the organisation would be able to support their own system.

5.3.6 Communication of ERP knowledge

One of the key challenges which emerged from the findings was that the knowledge of the ERP system and the implementation did not involve the entire organisation. Although the awareness of the implementation was communicated, participants were not previously consulted in order to ascertain their requirements for an ERP system. It was mentioned that the system was pushed onto them and that they had no choice in what system was procured. Users of the system and business process owners were not involved in the selection process and definition of the requirements of the system. This translated into a lot of customisations being done to the system as all the users' requirements were not catered for. There was no choice in the selection of the system. This was in alignment with research conducted by Venkatraman and Fahd (2016), who showed that effective communication is one of the key success factors when implementing ERP systems and that if this element is missing then organisations experience many other challenges related to communication and change management.

Another fundamental problem or challenge which was identified is that the executives of eThekwini Electricity took key decisions on the implementation of the system without consulting all the different stakeholders which the system affected. If they did then they did it as a "push" strategy rather than consulting with them and gathering their requirements for the system. Gopaul *et al*. (2016) showed that this exact same practice resulted in failed ERP implementation in the research they conducted.

5.4 KNOWLEDGE MANAGEMENT PRACTICES CONDUCTED

5.4.1 Documentation

Documentation was an element which received attention by eThekwini Electricity during the implementation of the Ellipse ERP system. There were instances of good practice employed and these documents were stored in a knowledge repository within the

organisation. There were very few documents which were given to the organisation by the implementation team and very often the internal employees wrote their own documents so that they were able to remember and replicate activities. The documentation available publicly on the Ellipse system was minimal. There were no hard and fast rules of how documents should be compiled and on the format of each and every document although there were some templates which could be accessed on the online repository.

Every department did their own documents and the sharing of documents was not common. This brought about its own set of challenges as different parts of the organisation understood things differently. The documentation was not stored in a common place and every department used different storage mechanisms. Documentation was also duplicated over and over again which meant that the organisation wasted time, effort and money getting things such as business processes documented as they were done before. This was the result of not having a proper knowledge management strategy in place in the organisation which everyone was aware of and could follow.

The above brought about the lack of the "learn from experience" element within this project. So, this made the implementation even more difficult, since the organisation could have avoided some of the challenges experienced if these were documented and shared with eThekwini Electricity by the consultants.

5.4.2 Repository for information

eThekwini Electricity had multiple repositories which were used to store data and information regarding the Ellipse ERP system. 'Vibe' which is an online storage repository which was available on the organisation's intranet network was used to store documents for the implementation as well as other activities the organisation performed. The issue was that this repository was not known to all across the business. There was no communication about the use of the system or how and when to use the system. Only some of the employees had knowledge of the system and how to use it correctly. Training on this system was never done and those that used it were self-taught.

Some of the participants also mentioned that they used the "U-Drive" to store documents and data. The U-drive is a network drive which the IT department makes available for the

staff to share data across departments or for other departments to access provided that they have access to the drive. The challenge is that there was no preferred or instructed repository to use for the storage of all knowledge and documents for the organisation. Whichever system suited a department, they would continue to use. It was also mentioned that the organisation failed to instruct the departments what to use. Participants felt strongly about the fact that if the organisation instructed them to use a specific repository to store information and data, then they would have no problem in doing so.

5.5 CHAPTER SUMMARY

This chapter discussed the findings which emerged from the current qualitative research which was conducted at eThekwini Electricity. The findings were discussed in the context of the literature review which was conducted. The themes and sub-themes from the framework which Chan (1999) presented, along with a few other themes identified through the research were described. These were found to have similarities to the knowledge management challenges which were experienced by eThekwini Electricity. The literature review provided support to a number of the themes and sub-themes which emerged during the research, from the context of different scholars.

Further to that the element of knowledge management practices which the organisation performed was also highlighted. Elements of documentation and storage in a repository were also discussed.

The next chapter draws conclusions from the research conducted, describes the limitations and makes recommendations to eThekwini Electricity and indicate further research which can be conducted.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter draws the current study to a close and makes recommendations to eThekwini Electricity as well as other researchers based on the findings which emerged and was presented in the previous chapter. The study explored the knowledge management challenges which eThekwini Electricity experienced during the implementation of their Ellipse version eight ERP system and what knowledge management practices were undertaken by the organisation during the implementation. A gap surrounding this topic which exists in South Africa was identified, and this research has contributed to bridging that gap in the knowledge management field.

The literature review presented and explained the concept of knowledge management and the challenges which were experienced during the implementation phase of an ERP system. A three-dimensional theoretical framework which was derived by Chan (1999) was used in this study along with findings by other scholars. The study was conducted using qualitative research methodology and purposive sampling. Fifteen participants were interviewed with thematic analysis being performed on the transcripts which emerged from the interviews.

This chapter presents and describes the key findings which relate to the objectives set out by the research. The limitations which this research has experienced is outlined and how these were addressed by the researcher. Finally, recommendations to eThekwini Electricity around knowledge management practices is described as one of the objectives as well as recommendations for future research.

6.2 ADDRESSING THE RESEARCH OBJECTIVES

6.2.1 Knowledge management challenges experienced by eThekwini Electricity

The first objective of the study, which was to identify the knowledge management challenges experienced by eThekwini Electricity, was discussed in detail using the theoretical framework with a few new challenges emerging over and above the framework which was put forward by (Chan, 1999). The research around this objective concurs with that of

previous research conducted and one will notice the similarities of the challenges experienced by organisations all over the world. Over and above this the themes of "Decision Making Knowledge", "Organisational Culture" and "Staff Turnover" has been identified as other challenges which have affected the implementation of the ERP system.

6.2.2 Knowledge management practices undertaken by eThekwini Electricity

The second objective was to identify the knowledge management practices with were undertaken by the organisation during the implementation. This has also been discussed using the results from the interviews conducted and the information which was shared. This element has been done knowingly in some cases which has been stipulated as the "documentation" and the "repository" elements. These practices have also been done unknowingly in other cases, similarly to what Li *et al*. (2006) discuss in the knowledge management activities (see Table 2.3) in Chapter Two. One will notice that the organisation does perform knowledge management practices to a certain degree but fails to have a formal strategy in place so that all areas of knowledge management during any sort of implementation of a system is well structured.

6.2.3 Recommendations on knowledge management practices

The third objective was to provide recommendations on knowledge management practices. eThekwini Electricity does perform some practices to manage knowledge, but these do not follow any structure or strategy. Section 6.3 describes this objective in greater detail.

6.3 RECOMMENDATIONS TO SOLVE THE RESEARCH PROBLEM

6.3.1 Knowledge management practices

The third objective of this study was to provide recommendations on how knowledge is managed during ERP implementation at eThekwini Electricity so that these challenges can be mitigated against in future.

6.3.1.1 Culture

One of the themes which emerged in the findings of the research was the culture of the organisation. eThekwini Electricity needs to actively focus on changing the culture of the organisation to one which is more supportive of knowledge management. What this means is that the different departments within the organisation must be willing to share information and be supportive of the roles that each department play within the organisation.

6.3.1.2 Infrastructure

The organisation needs to deploy support systems, whether its hardware or software or even a structure within the organisation to support the storage and management of the knowledge which is created during the implementation of any system. These systems and people need to support the sharing of data and information and make it available for everyone in the organisation to access.

6.3.1.3 Measures to manage change

One of the challenges outlined in the findings was change management. The organisation needs to develop and outline a process that can be used to manage any changes which take place within the organisation that requires changes to be made to systems and processes. This process needs to be communicated throughout the organisation so that each and every employee is aware of what needs to be done and what his or her responsibility in the process is. This will create an environment where changes can be tracked and the duplication of work, as experienced by eThekwini Electricity, can be eliminated.

6.3.1.4 Technology

Although it emerged through the findings of this study that the organisation does have an online system which can be accessed and used by everyone in the organisation, this system has clearly been underutilised. The organisation needs to create a drive and awareness program to force staff to store information in one common repository and not where it suits a particular individual. This will ensure that the IT department can manage the data well and

have it stored and backed up so that in the event of a disaster all the intellectual property and knowledge of the organisation can be preserved and restored.

6.3.1.5 Project Management Office (PMO)

Although some of the participants have mentioned the instatement of a project management office to the organisation, it has not heeded the advice or failed to set up one. Project management plays a critical role in any type of project that is undertaken. The organisation needs to ensure that all projects are handled by a dedicated department or dedicated team with a complete understanding of project management so that the problem, where there is no business representative as the project manager, can be avoided. This department or team needs to ensure that the objectives of the project are met and that this occurs within the planned timeframe. Signoff of all the objectives must be completed before the consultants are paid and before they leave site. The PMO can also ensure that all knowledge relating to implementation of systems are transferred and preserved within the organisation and that relevant skills transfer occurs.

6.3.1.6 Knowledge management strategy

All these practices need to be guided by some process or protocol so that it will enable eThekwini Electricity to be successful. The formulation of a knowledge management strategy is critical for the organisation. This should be a guiding document or protocol which ensures that the correct practices are employed at the correct stages of implementation. It also needs to stipulate where and how data and information is accessed and where all the data should be stored. New and old employees need to be familiar with the strategy and their knowledge added to the knowledge pool either when they arrive or leave the organisation. The same goes with external parties that do any kind of projects for the organisation. The strategy will ensure that there is business continuity under all circumstances.

6.4 IMPLICATIONS OF THIS RESEARCH

The research conducted makes a significant contribution to the body of knowledge which exists in South Africa. There have been no previous studies conducted specifically in an electric utility domain in South Africa, which examines the knowledge management

elements during an ERP implementation. The results from this research can be used by eThekwini Electricity as well as any other large enterprise to deal with future implementations, not only around ERP systems but on other systems as well. These organisations can create better knowledge management practices so that the challenges surrounding knowledge management are not experienced or can be pro-actively dealt with, such that they don't have a negative impact on the business or organisation undergoing the implementation. This could result in more successful implementations which showcase better project management and save time and money so that these can be used in improving other parts of the organisation.

6.5 LIMITATIONS OF THE STUDY

The findings of this study are both very promising and valuable to eThekwini Electricity, but there have been a few limitations which have been encountered and may very useful to other researchers for future studies.

The study only focuses on knowledge management during the implementation phase of the ERP system. There are other stages in the ERP lifecycle as described in the literature review where knowledge may have been managed better or worse. The study only covers the implementation of the Ellipse ERP system. Other ERP systems may have better information publicly available. The sample consists of participants who are employees of eThekwini Electricity. It would have been beneficial if the implementation team from the consulting company were still on site so that participants from the team could also have been interviewed. The sample consisted of fifteen participants. Another limitation was time, as respondents were unavailable to sit for a full hour due to their work duties and meetings. To find a suitable time where both the respondent and the researcher were available was a challenge. There exists an opportunity to convert some of these limitations into further research opportunities for further studies.

6.6 RECOMMENDATIONS FOR FUTURE STUDIES

During the study notes were made on other research ideas which was observed when conducting interviews and also performing the literature review. These ideas were interesting but did not fall within the scope of the current study.

It would be worth considering conducting the similar research topic and framework but with a larger population. The framework can be broken down into multiple case studies to form separate hypotheses and quantitative data analysis through surveys can be collected to test each hypothesis. There is the opportunity to do a similar study on the same organisation and examine the challenges during ERP implementation or examine the challenges during another stage of the project. This study can also be performed in another geographic region which has a different cultural setting to examine if similar results are found. It was also noted that the parent organisation which is eThekwini Municipality makes decisions which affect all other subsidiary organisations such as eThekwini Electricity. There is an opportunity to investigate the impact that these decisions have on the productivity of their clusters and smaller units similar to that of the electricity unit. Another area to explore is the implementation of a different ERP system in a similar environmental setting to establish the similarities and differences. A further aspect that could be investigated is the role of leadership and the impact which it has on the organisation during ERP implementation.

6.7 CHAPTER SUMMARY

The aim of the study conducted was to identify the knowledge management challenges which were experienced by eThekwini Electricity during the implementation of their Ellipse ERP system. The data collected has clearly reflected the challenges which the organisation has encountered during this phase of their system implementation. Another objective was to make recommendations on how the organisation can address these issues and enforce better knowledge management practices. A clear guideline has been provided in this chapter. New themes beyond the theoretical framework have emerged from the study which serves as an indication that the study has added to the area of knowledge which exists in this field. There is also room for further studies to take place which can add to the body of knowledge in this area of research.

"If you've never tried, how will you ever know if there's any chance?"

~ Jack Ma

REFERENCES

ABB. 2007. Reducing stock holdings and achieving greater cost control with ABB Ability™ Ellipse® EAM. Available: https://new.abb.com/enterprise-software/references/ethekwini-electricity [Accessed 10 August 2019].

Acar, M. F.,Tarim, M.,Zaim, H.,Zaim, S. & Delen, D. 2017. Knowledge management and ERP: Complementary or contradictory? *International Journal of Information Management,* 37**,** 703-712.

Alavi, M. & Leidner, D. E. 2001. Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS quarterly***,** 107-136.

Alshawi, S., Themistocleous, M. & Almadani, R. 2004. Integrating diverse ERP systems: a case study. *Journal of Enterprise Information Management,* 17**,** 454-462.

Amani, F. & Fadlalla, A. 2016. Organizing ERP research: a knowledge-centric approach. *Journal of Enterprise Information Management,* 29**,** 919-940.

Attride-Stirling, J. 2001. Thematic networks: an analytic tool for qualitative research. *Qualitative research,* 1**,** 385-405.

Ayağ, Z. & ÖzdemİR, R. G. 2007. An intelligent approach to ERP software selection through fuzzy ANP. *International Journal of Production Research,* 45**,** 2169-2194.

Banaeianjahromi, N, Kahkonen, T, Alanne, A & Smolander, K 2016, Integration obstacles during ERP development. in *2016 49th Hawaii International Conference on System Sciences (HICSS).* IEEE

Computer Society Press, pp. 4697-4706, Annual Hawaii International Conference on System Sciences, 1/01/00.

Barney, J.B., 2000. Firm resources and sustained competitive advantage. In Economics Meets Sociology in Strategic Management. Emerald Group Publishing Limited, Bingley, 203-227.

Bashir, M.,Afzal, M. T. & Azeem, M. 2008. Reliability and validity of qualitative and operational research paradigm. *Pakistan Journal of Statistics and Operation Research,* 4**,** 35-45.

Basu, B. & Kumar Ray, P. 2014. Measuring and evaluating KM capability in an organization: An exploratory case study. *VINE: The Journal of Information Knowledge Management Systems,* 44**,** 267-294.

Bryman, A. and Burgess, R.G., 2002. Developments in qualitative data analysis: an introduction. In Analyzing Qualitative Data (15-31). Routledge.

Cahyadi, I., 2016. Factors influencing knowledge transfer in ERP system implementation within indonesian small and medium enterprises (Unpublished doctoral dissertation, Victoria University).

Candra, S. 2014. Knowledge Management and Enterprise Resource Planning Implementation: a Conceptual Model. *Journal of Computer Science,* 10**,** 499-507.

Chan, R. 1999. Knowledge management for implementing ERP in SMEs. Proceedings of the 3rd Annual SAP Asia Pacific Institute of Higher Learning Forum, SAPHIRE.

Chen, Y. J. 2010. Development of a method for ontology-based empirical knowledge repr esentation and reasoning. *Decision Support Systems,* 50**,** 1-20.

Creswell, J. W. & Poth, C. N. 2017. *Qualitative inquiry and research design: Choosing mong five approaches,* SAGE Publications, Inc., Thousand Oaks.

Cuppen, J. 2016. Enterprise resource planning systems and the effects on management control. Radboud University.

Davenport, T. H. 1998. Putting the enterprise into the enterprise system. *Harvard business review,* 76.

Davenport, T. H., De Long, D. W. & Beers, M. C. J. S. m. r. 1998. Successful knowledge management projects. 39**,** 43-57.
Davenport, T. H. & Prusak, L. 1998. *Working knowledge: How organizations manage what they know*, Boston, Harvard Business Press.
De Long, D. W. & Fahey, L. 2000. Diagnosing cultural barriers to knowledge management. *Academy of Management Perspectives,* 14**,** 113-127.
Denzin, N. K. & Lincoln, Y. S. 2008. *Collecting and interpreting qualitative materials*, Thousand Oaks, Calif, Sage Publications.
DeSanctis, G. & Poole, M. S. 1994. Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization science,* 5**,** 121-147.
Du Plessis, J. D. & Mwalemba, G. Adoption of emerging technologies into ERP systems landscape: A South African study. 2016 IEEE International Conference on Emerging Technologies and Innovative Business Practices for the Transformation of Societies (EmergiTech), 3-6 Aug. 2016. 395-399.
Dwivedi, Y. K., Papazafeiropoulo, A. & Metaxiotis, K. J. J. O. E. I. M. 2009. Exploring the rationales for ERP and knowledge management integration in SMEs.
Ebert, C. 2008. A brief history of software technology. *IEEE Software,* 25**,** 22-25.
Elbanna, A. R. J. & People I. T. 2007. Implementing an integrated system in a socially dis-integrated enterprise: a critical view of ERP enabled integration. *Information Technology and People,* 20**,** 121-139.
Electricity, e. 2018. Annual Report eThekwini Electricity 2018. Durban: eThekwini Electricity. [online] Available at: http://www.durban.gov.za/City_Services/electricity/About%20Us/Pages/Annual-Reports.aspx [Accessed 12 Sep. 2019].
Fang, L. & Patrecia, S. 2005. Critical success factors in ERP implementation. Jönköping University, Jönköping International Business School, JIBS, Business Informatics.
Fernandez, D.,Zaino, Z. & Ahmad, H. 2018. An investigation of challenges in Enterprise Resource Planning (ERP) implementation: The case of public sector in Malaysia. *International Journal of Supply Chain Management,* 7**,** 113-117.
Fleck, J. J. R. p. 1994. Learning by trying: the implementation of configurational technology. 23**,** 637-652.
Gable, G. G. 2005. The enterprise system lifecycle: through a knowledge management lens. *Strategic change,* 14**,** 255-263.
Ghauri, P. N. & Grønhaug, K. 2005. *Research methods in business studies: A practical guide*, FT-Pearson Education, New York, Prentice Hall.
Ghosh, S. 2002. Challenges on a global implementation of ERP software. 2002. IEEE, 101-106.
Gopaul, A.R., Mwalemba, G. and Seymour, L., 2016. Organizational & knowledge challenges faced during an ERP implementation: The case of a large public sector organization. In CONF-IRM (29).
Guest, G.,Bunce, A. & Johnson, L. 2006. How many interviews are enough? An experiment with data saturation and variability. *Field methods,* 18**,** 59-82.
Gunasekaran, A. & Ngai, E. W. T. 2007. Knowledge management in 21st century manufacturing. *International Journal of Production Research,* 45**,** 2391-2418.
Hasheela-Mufeti, V. & Smolander, K. 2017. What are the requirements of a successful ERP implementation in SMEs? Special focus on Southern Africa. *International Journal of Information Systems and Project Management,* 5**,** 5-20.
Holland, C. R. & Light, B. 1999. A critical success factors model for ERP implementation. *IEEE Software,* 16**,** 30-36.

Hsieh, H.-F. & Shannon, S. E. 2005. Three approaches to qualitative content analysis. *Qualitative Health Research,* 15**,** 1277-1288.
Huang, Z. 2010. A compilation research of ERP implementation critical success factors. *Issues in Information systems,* 11**,** 507-512.
Hult, G. T. M., Ketchen, D. J., Cavusgil, S. T. & Calantone, R. J. 2006a. Knowledge as a strategic resource in supply chains. *Journal of Operations Management,* 24**,** 458-475.
Hult, G. T. M., Ketchen Jr., D. J.,Cavusgil, S. T. & Calantone, R. J. 2006b. Knowledge as a strategic resource in supply chains. 24**,** 458-475.
Ibrahim, A. M. S. 2018. A Qualitative Study of the Enterprise Resource Planning (ERP) System Implementation-Related Factors: A Case Study Approach. *KnE Social Sciences***,** 43-54.
Irakoze, J. M. V. 2015. *The effects of information systems on end-users and the organisational processes at a university of technology.* Cape Peninsula University of Technology.
Jayawickrama, U. 2015. *Knowledge management competence for ERP implementation success.* Plymouth, Plymouth University.
Jayawickrama, U., Liu, S., Hudson Smith, M., Akhtar, P. & Al Bashir, M. 2019. Knowledge retention in ERP implementations: the context of UK SMEs. *Production Planning & Control,* 30**,** 1032-1047.
Kähkönen, T., Alanne, A., Pekkola, S. & Smolander, K. 2017a. Explaining the Challenges in ERP Development Networks with Triggers, Root Causes, and Consequences. 40**,** 249-276.
Kähkönen, T., Smolander, K. & Maglyas, A. 2017b. Lack of integration governance in ERP development: a case study on causes and effects. *Enterprise Information Systems,* 11**,** 1173-1206.
Ko, D.-G., Kirsch, L. J. & King, W. R. 2005. Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. *MIS quarterly,* 29**,** 59-85.
Lech, P. 2014. Managing knowledge in IT projects: a framework for enterprise system implementation. *Journal of Knowledge Management,* 18**,** 551-573.
Lee, Z. & Lee, J. 2000. An ERP implementation case study from a knowledge transfer perspective. *Journal of Information Technology,* 15**,** 281-288.
Lennie, J., Tacchi, J., Koirala, B., Wilmore, M. & Skuse, A. 2011. Equal Access Participatory Monitoring and Evaluation Toolkit: Helping communication for development organisations to demonstrate impact, listen and learn, and improve their practices. [online] Available at: https://www.betterevaluation.org/sites/default/files/EA_PM%26E_toolkit_front_pages%26introduction_for_publication.pdf [Accessed 12 Sep. 2019].
Li, Y.,Liao, X. W. & Lei, H. Z. 2006. A knowledge management system for ERP implementation. *Systems Research and Behavioral Science: The Official Journal of the International Federation for Systems Research,* 23**,** 157-168.
Liu, P.-L. 2011. Empirical study on influence of critical success factors on ERP knowledge management on management performance in high-tech industries in Taiwan. *Expert Systems with Applications,* 38**,** 10696-10704.
Madanhire, I. & Mbohwa, C. 2016. Enterprise Resource Planning (ERP) in Improving Operational Efficiency: Case Study. *Procedia CIRP,* 40**,** 225-229.
Maguire, S., Ojiako, U. & Said, A. 2010. ERP implementation in Omantel: a case study. *Industrial Management Data Systems,* 110**,** 78-92.

Manly, L. 2018. *Methods of data collection in qualitative research: interviews and focus groups* [Online]. nature.com. Available: https://www.airsassociation.org/airs-articles/methods-of-data-collection-in-qualitative-research-interviews-and-focus-groups [Accessed 12 September 2019].

Markus, M. L. & Tanis, C. 2000. The enterprise systems experience-from adoption to success. *Framing the domains of IT research: Glimpsing the future through the past,* 173**,** 207-173.

Maxwell, J. A. 2008. Designing a qualitative study. *The SAGE handbook of applied social research methods,* 2**,** 214-253.

Maxwell, J. A. 2012. *Qualitative research design: An Interactive Approach,* Thousand Oaks, Sage Publications.

Motwani, J., Subramanian, R. & Gopalakrishna, P. 2005. Critical factors for successful ERP implementation: Exploratory findings from four case studies. *Computers in Industry,* 56**,** 529-544.

Myers, M. D. 1997. Qualitative research in information systems. *Management Information Systems Quarterly,* 21**,** 241-242.

Myers, M. D. 2009. *Qualitative research in business & management.* Thousand Oaks, CA, Sage Publications Ltd.

Myers, M. D. 2013. *Qualitative research in business and management*. Thousand Oaks, Sage Publications.

Myers, M. D. & Avison, D. 2002. *Qualitative research in information systems: a reader*. Thousand Oaks, Sage Publications.

Neuman, W. L. & Kreuger, L. 2003. *Social work research methods: Qualitative and Quantitative Approaches,* Allyn and Bacon, Whitewater, University of Wisconsin.

Newell, S.,Huang, J. C.,Galliers, R. D. & Pan, S. L. 2003. Implementing enterprise resource planning and knowledge management systems in tandem: fostering efficiency and innovation complementarity. *Information and Organization,* 13**,** 25-52.

O'Leary, D. E. 2002. Knowledge management across the enterprise resource planning systems life cycle. *International Journal of Accounting Information Systems,* 3**,** 99-110.

O'Connor, H. & Gibson, N. 2003. A step-by-step guide to qualitative data analysis. *Pimatisiwin: A Journal of Indigenous Aboriginal Community Health,* 1**,** 63-90.

O'Reilly, M. & Parker, N. 2013. 'Unsatisfactory Saturation': A critical exploration of the notion of saturated sample sizes in qualitative research. Qualitative Research, 13, 190-197.

Orlikowski, W. J. & Robey, D. 1991. Information technology and the structuring of organizations. *Information systems research,* 2**,** 143-169.

Pan, S. L.,Newell, S.,Huang, J.,Galliers, R. D. & Technology 2007. Overcoming knowledge management challenges during ERP implementation: The need to integrate and share different types of knowledge. *Journal of the American Society for Information Science,* 58**,** 404-419.

Parry, G. & Graves, A. 2008. The importance of knowledge management for ERP systems. *International Journal of Logistics: Research Applications,* 11**,** 427-441.

Pearlson, K. E., Saunders, C. S. & Galletta, D. F. 2016. *Managing and using information systems, binder ready version: a strategic approach,* New York, John Wiley & Sons.

Pinsonneault, A. & Kraemer, K. 1993. Survey research methodology in management information systems: an assessment. *Journal of management information systems,* 10**,** 75-105.

Rajagopal, P. 2002. An innovation—diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model. *Information Management,* 40**,** 87-114.

Ramburn, A., Seymour, L. & Gopaul, A. Learning from a failed ERP implementation: The case of a large South African organization. Proceedings of The 4th International Conference on Information Systems Management and Evaluation ICIME 2013, 2013a. 215.

Ramburn, A.,Seymour, L. F. & Gopaul, A. 2013b. Understanding the Role of Knowledge Management during the ERP Implementation Lifecycle: Preliminary Research Findings Relevant to Emerging Economies. Enterprise Information Systems of the Future, Berlin, Heidelberg, Springer, 234-241.

Ranjan, S., Jha, V. K. & Pal, P. 2016. Literature review on ERP implementation challenges. *International Journal of Business Information Systems,* 21**,** 388-402.

Saunders, M., Lewis, P. & Thornhill, A. 2012. *Research Methods for Business Students*, Harlow, Pearson.

Sedera, D., Gable, G. & Chan, T. 2003. Knowledge management for ERP success. *PACIS 2003 Proceedings***,** 97.

Sedera, D. & Gable, G. G. 2010. Knowledge management competence for enterprise system success. *The Journal of Strategic Information Systems,* 19**,** 296-306.

Serrat, O. 2017. Glossary of Knowledge Management. *Knowledge Solutions.* Singapore: Springer.

Soh, C., Kien, S. S. & Tay-Yap, J. 2000. Cultural fits and misfits: is ERP a universal solution? *Communications of the ACM,* 43**,** 47-47.

Somers, T. M. & Nelson, K. The impact of critical success factors across the stages of enterprise resource planning implementations. Proceedings of the 34th Annual Hawaii International Conference on System Sciences, 6-6 Jan. 2001 2001. 10.

Su, Y.-F. & Yang, C. 2010. A structural equation model for analyzing the impact of ERP on SCM. *Expert Systems with Applications,* 37**,** 456-469.

Thomas, D. R. 2003. A general inductive approach for qualitative data analysis. The American Journal of Evaluation, 27(2), 237–246.

Thomas, P. Y. 2010. Chapter 4: Research methodology and design. *UNISA: Unpublished Thesis.*

Tsui, E., Chan, E. W.,Walker, D. H. & Mills, A. 2009. Using a KM framework to evaluate an ERP system implementation. *Journal of knowledge management*.

Tufford, L. & Newman, P. 2012. Bracketing in qualitative research. *Qualitative Social Work,* 11**,** 80-96.

Tuli, F. 2010. The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences,* 6, 97-108.

Turban, E., Sharda, R. & Delen, D. 2010. Decision support systems and intelligent systems (Doctoral dissertation, Univerza v Mariboru, Ekonomsko-poslovna fakulteta).

Twum-Darko, M., Harker, L.-A. & Control L. 2015. Factors influencing knowledge sharing amongst higher education academics at a university in South Africa. *Journal of Corporate Ownership,* 12**,** 280-292.

Umble, E. J., Haft, R. R. & Umble, M. M. 2003. Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research,* 146**,** 241-257.

Venkatraman, S. & Fahd, K. 2016. Challenges and success factors of ERP systems in Australian SMEs. *Systems,* 4(2)**,** 20.

Ventyx 2012. EThekwini Electricity Ellipse 8 Upgrade with Mobility Project Charter. Durban. [online] Available at: https://teaming.elec.durban.gov.za/ssf/s/readFile/folderEntry/20299/8a827d1b3671e1e3013711f70d485da8/1373544817000/lastView/39037%20-%20PC%20-%20Upgrade%20Ellipse_fromVersion%205%20to%208%20-%20Ventyx%20%28v0-04%29.docx [Accessed 13 Sep. 2019].

Wang, E., Klein, G. & Jiang, J. J. 2007. IT support in manufacturing firms for a knowledge management dynamic capability link to performance. *International Journal of Production Research,* 45**,** 2419-2434.

Watkins, P. 2011. Business Case Ellipse 8. Durban: eThekwini Electricity.

Wylie, L. 1990. A vision of the next-generation MRP II. Scenario S-300-339. *Gartner Group*.

Yusuf, Y., Gunasekaran, A. & Abthorpe, M. S. 2004. Enterprise information systems project implementation:: A case study of ERP in Rolls-Royce. *International Journal of Production Economics,* 87**,** 251-266.

Zhang, L. U. & Huang, J. 2012. The moderating factors in the relationship between erp investments and firm performance. *Journal of Computer Information Systems,* 53**,** 75-84.

APPENDIX A: INTERVIEW SCHEDULE

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project
Researcher: Yashveer Ramlakhan (0812990084.)
Supervisor: Dr Cecile Gerwel Proches (0312608318)
Research Office: Ms P Ximba (0312603587)

Examining knowledge management challenges experienced during Enterprise Resource Planning implementation at eThekwini Electricity

Interview Questions

1. What was your role in the upgrade of the ERP systems from version five to version 8?
2. What is your impression of the Ellipse ERP system?
3. What were the knowledge management challenges which were experienced during the implementation?
4. How did these challenges affect the implementation of the ERP system?
5. Have these challenges been addressed? If not, why?
6. What knowledge management practices were undertaken by the implementation team or internally during the ERP implementation?
7. How long before the ERP version 8 went live did training take place? Days? Weeks? Months?
8. How many times did you attend the training sessions?
9. Were there different levels of training for different levels of users? Please elaborate.
10. Was training on version 8 of the ERP system adequately done? Please elaborate.
11. Do you feel that the skills transfer during the training provided you with the competencies to operate the system independently or enabled you to troubleshoot the system without external help? Please elaborate.
12. In your opinion, what could have been done better?
13. What recommendations could you suggest improving the knowledge management practices in respect of the ERP system?
14. Is there anything else that you would like to add?

APPENDIX B: eTHEKWINI ELECTRICITY PERMISSION GRANT

TRADING SERVICES
Electricity Unit
1 Jelf Taylor Crescent
Durban, 4001
PO Box 147, Durban, 4000
Tel: 031 311 1111 Fax: 031 311 9010
www.durban.gov.za

Our ref: 4/8/R/MM/dn – Doc. No. 2136
Enquiries to: M Mthembu telephone 031-3119005

Graduate School of Business and Leadership
University of KwaZulu Natal
Westville
DURBAN
3630

2 July 2019

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

This letter serves to confirm that I, Maxwell Mthembu, Head: of eThekwini Electricity hereby acknowledge and approve the request by Yashveer Ramlakhan to conduct research within eThekwini Electricity for the completion of his Master of Business Administration degree.

Yours faithfully

[redacted]

MAXWELL MTHEMBU
HEAD: ETHEKWINI ELECTRICITY

APPENDIX C: CONSENT FORMS

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project
Researcher: Yashveer Ramlakhan (0812990084)
Supervisor: Prof Cecile Gerwel Proches (0312608318)
Research Office: Ms P Ximba (0312603587)

Dear Respondent,

I, Yashveer Ramlakhan am a Master of Business Administration student, at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal. You are invited to participate in a research project entitled: "Examining knowledge management challenges experienced during Enterprise Resource Planning implementation at eThekwini Electricity". The aim of this study is to examine the knowledge management challenges which were experienced during the implementation phase of eThekwini Electricity's ERP system.

Through your participation I hope to understand the knowledge management challenges which were experienced during the ERP implementation within eThekwini Electricity. The results of the interview are intended to contribute to this field of research and to make recommendations on ways that knowledge management practices can be improved upon.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this interview. Confidentiality and anonymity of records identifying you as a participant will be maintained by the Graduate School of Business and Leadership, UKZN.

If you have any questions or concerns about participating in the interview or about participating in this study, you may contact me or my supervisor at the numbers listed above.

The interview should take about 45 minutes to an hour. I hope you will take the time to participate.

Sincerely

Investigator's signature_____ Date_____

This page is to be retained by the participant

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project
Researcher: Yashveer Ramlakhan (0812990084)
Supervisor: Dr Cecile Gerwel Proches (0312608318)
Research Office: Ms P Ximba (0312603587)

CONSENT

I…… (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

I hereby consent/do not consent to record the interview.

SIGNATURE OF PARTICIPANT DATE

……

This page is to be retained by the researcher

APPENDIX D: LANGUAGE AND EDITING PROOF

Kinnoullweg 53 Kinnoull Road,
Pietermaritzburg, 3209,
South Africa/Suid-Afrika
info@translationxchange.co.za
translationxchange@gmail.com
dzvdberg@gmail.com
Tel./Fax +27 33 386 3570
Cel/ Sel. +27 84 508 6357
27 November 2019

TO WHOM IT MAY CONCERN

Certification of editing of MBA dissertation:

Examining Knowledge Management Challenges experienced during Enterprise Resource Planning Implementation at eThekwini Electricity.

This is to state that I have edited the above dissertation of Yashveer Ramlakhan (Student number 205506486). I can confirm that it conforms to the MBA Dissertation Style Guideline and satisfies the linguistic and editing requirements for such a dissertation.

Sincerely

[redacted]

D.Z. van der Berg

Prof. D.Z. van der Berg
Kinnoullweg 53 Kinnoull Road, Pietermaritzburg, 3209, South Africa/Suid-Afrika
translationxchange@gmail.com dzvdberg@gmail.com
Tel./Fax +27 33-386 3570 Cell +27 84-508 6357
Sworn translator / Beëdigde vertaler

APPENDIX E: ETHICAL CLERANCE APPROVAL LETTER

UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

10 September 2019

Mr Yashveer Ramlakhan (205506486)
Grad School Of Bus &Leadership
Westville Campus

Dear Mr Ramlakhan,

Protocol reference number: HSSREC/00000330/2019
Project title: Examining knowledge management challenges experienced during Enterprise Resource Planning implementation at eThekwini Electricity

Full Approval – Expedited Application

This letter serves to notify you that your application received on 28 August 2019 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid for one year from 10 September 2019.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

Yours sincerely,

[redacted]

Dr Rosemary Sibanda (Chair)

/spm

APPENDIX F: TURNITIN REPORT PAGE 1

Dissertation Final

ORIGINALITY REPORT

6%	3%	2%	5%
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PRIMARY SOURCES

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