Cape Peninsula
University of Technology

# IMPACT OF INFORMATION TECHNOLOGY ON KNOWLEDGE MANAGEMENT AT A SELECTED UNIVERSITY OF TECHNOLOGY

**by**

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# DECLARATION

I, Vusumzi Funda, declare that "**Impact of Information Technology on Knowledge Management at a Selected University of Technology**" represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

26/08/2019

**Signed** **Date**

# ABSTRACT

Information and communication technology (ICT) is an enormous financial investment and its typical intended result is a subsequent positive effect on knowledge management and individual work performance which thus benefit the organisation through strategic competitive advantage. ICT plays a significant role in implementing and supporting knowledge management (KM). However, there are barriers hampering KM due to ineffective use of ICT such as poor knowledge coordination and transfer and unreliability of systems. The main aim of this research was to determine how ICT impacts on KM within higher education institutions (HEIs) in South Africa. Based on the primary research objective, the secondary research objectives were to explore the benefits of ICT in HEIs, find out what the barriers to implementing ICT in HEIs are and explore the key functions of knowledge management at HEIs. The outcome of this study was the proposing of general guidelines for ICT use in order to positively propel knowledge management for competitive advantage of HEIs. The methodology utilised in this study is a case study with a mixed qualitative and quantitative method. Data was collected through questionnaires, site observations and interviews from staff members (n=111) at a selected University in the Western Cape, South Africa. The questionnaire was used for quantitative data, and analysed and interpreted using SPSS software, whereas site observations and interviews were used for qualitative data and analysed through content analysis.

The findings indicate that ICT users have varied levels of competencies when it comes to ICT use. It highlights the challenge for the university management to improve the ICT skills of staff members so that they may expand their ability to comfortably manoeuvre through the ICT system and maximise its benefits, and ultimately, to be more productive for the university. The findings further reveal that there is a need to establish general guidelines for ICT use in order to positively propel KM for competitive advantage of HEIs. Based on the research findings, this study recommends that the university take a comparative approach and examine the gaps in ICT use within the institution. Moreover, it will also be interesting to find out the experiences and views of stakeholders in ICT use at other HEIs such as students, management and teaching staff. This will generate valuable information that can shed more light on the opportunities and challenges of ICT use in KM in HEIs.

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# DEDICATION

For my Mother Thenjiwe Thelma Funda

# GLOSSARY OF TERMS

| | |
|---|---|
| Information Technology (IT): | Machines, computers, communication devices and technology-based items that act to facilitate the improved production, processing and distribution of information (The Management Study Guide, 2016). |
| Information System (IS): | It is a set of interrelated components that collect, manipulate, store, and disseminate data and information (Stair & Reynolds, 2012) |
| Knowledge Management (KM): | it is a process used by organisations to identify and archive the information and knowledge assets that have been collected from the practices of their members (Laal, 2011). |
| Knowledge Sharing (KS): | Activities of transferring or disseminating knowledge from one person, group or organization to another (Lee, 2001) |
| Higher Education Institutions (HEI): | Any institution that provides higher education on a full-time, part-time or distance basis (South Africa Higher Education Act 101 of 1997). |
| University Of Technology (UoT): | It is characterised by being research informed rather than research driven where the focus is on strategic and applied research that can be translated into professional practice (DUT, 2016). |

# ABBREVIATIONS

EL – eLearning

OPA – Online Personal Access

ER – eRequisition

MIS – Management Information System

MAS – Marks Administration System

Libris – Library Information System

Aleph – Integrated Library System

# TABLE OF CONTENTS

# CHAPTER ONE: SCOPE OF THE RESEARCH

## 1.1 Introduction

This chapter presents the background of information and communication technology (ICT) and its impact on knowledge management in the context of a higher education institution in South Africa. In the world of information, knowledge is not just one of the key resources and assets of the organisation, but is a fundamental tool that enables the effective management of other resources in the organisation. In addition, this chapter unpacks the concepts of ICT and knowledge management as well as their relationship in greater detail. Thus a brief history of knowledge management concepts will be outlined with tacit and explicit knowledge being compared and contrasted. The importance of knowledge management in the modern day era for individuals and communities will also be highlighted. Furthermore, the chapter also discuss the research objectives, research questions, problem statement, contextual setting, significance of the study, the study outline and a detailed summary of the study.

To a substantial extent, knowledge management (KM) is very significant in organisational decision making. Hawajreh and Sharabati (2012) note that knowledge management gives organisations a competitive advantage in this dynamic environment. To this end, it is imperative for organisations to improve their work performance and uniqueness through the utilisation of knowledge resources among other organisational resources. Knowledge has therefore, increasingly become a fundamental process in organisations and is a key ingredient for continuous change. The recent advancements in ICT systems have inevitably improved significantly the process of information gathering, repackaging and dissemination. These new technological systems replaced the traditional methods of knowledge management that were largely ineffective. Prior to the introduction of advanced technology, knowledge was recorded and stored in wooden drawers, shelves and cabinets (Akporhonor, 2012:76). Furthermore, CDs, DVDs and pictures were used to manage information.

Against this background, there is amble evidence to suggest that management of information and knowledge is not easy. The proliferation of knowledge necessitates radical changes in the way it is managed and preserved. Ali (2011:5) notes that traditional methods are very rudimental and have resulted in vast amounts of information being lost. This is largely due to the deterioration of organic materials which can also be disposed. Ali (2011:6) also argues that digital mediums are, to a substantial extent, suitable for sharing and managing knowledge. The availability of networks in the use of these mediums guarantees the availability of information due to the replication functions.

ICT play an important role in supporting and implementing knowledge management, as there is a significant relation between knowledge management and ICT (Safarzadeh *et al.*, 2011).

In order for the organisation to move forward in future, it has to employ technology which is a mandatory need for those organisations seeking excellence in performance (Allahawiah *et al*., 2012:235). Against this background, the adoption of technology tools in knowledge management within HEIs and its impact, which is the focus of the study, becomes important as confirmed by reviewed literature. HEIs specialise in the acquisition, organisation, storing and sharing of stored knowledge. This implies that HEIs are no different to corporate companies. HEIs are usually made up of experts with diverse skills who pool their experience and ability towards producing and preserving knowledge. Consequently, there is need for HEIs to augment their information and knowledge management (IKM) to better respond to the issues in the areas where they work (Pircher & Pausits, 2011:8). In this regard, universities undertake this exercise to meet the diverse information needs of their users.

Literature indicates that there is a higher demand for tacit knowledge (which is what one already knows) than explicit knowledge (one which is still in documents). In this regard, and with this context, the present study seeks to investigate the impact of the use of ICT systems on knowledge management in HEIs. The majority of South African universities of technologies are currently using ICT to support knowledge management.

### 1.2 Conceptual background

The independent variable in this study is ICT while knowledge management is the dependent variable. The rationale behind these two variables is that ICT play a key role in facilitating and improving organisational functions. ICT is an important organisational attribute because some studies have shown that it results in preferable organisations targets like high productivity, low absenteeism, and high employee job satisfaction (Shafique, 2015:176). Information technologies are therefore necessary, considering the large amount of knowledge and other activities carried out by these organisations. Blurton (1999:46) defines ICT as “a set of technological tools and resources used to communicate, create, disseminate, store and manage information”. ICTs, therefore, involve a broad range of technologies such as satellite, software applications, intranets, extranets, the World Wide Web, information networks, internet, radio, TV as well as computers (Shafique, 2015:175).

The scope of this study focuses more on software application, computers, information networks and internet, among others. The utilisation of these information and communication technologies is particularly important, considering the diverse informational needs of users in present day HEIs. In addition, ICT systems have also helped HEIs in their every knowledge management function.

According to Whelan and Teigland (2010), ICT is designed to enable quick access to information. In addition, the lower cost of ICT has resulted in the proliferation of information as well as a simplified process of its information access. Filippov and Lastrebova (2010) make the argument that access to information has particularly been improved through the increased access to ICT. Most of the reviewed literature confirms a positive relationship between knowledge management and ICT as well as knowledge management and business performance. Thus, investment in ICT has a significant relationship with knowledge management. According to Kasim (2010), the advent of ICT and the related tools and systems thereof have resulted in the influx of information and enhanced organisational ability to manage knowledge resources.

Furthermore, ICT offers a range of functions that aid the exercise of information collection, storage, editing, retrieval, and transfer. Several countries, South Africa included, have put emphasis on the adoption of ICT in administration functions such as knowledge management. In South Africa, most universities are increasingly using information technologies to speed up their knowledge management processes. In this regard, these universities have developed ultramodern technological infrastructure such as resource-sharing networks and management information systems to improve their knowledge management capacity. ICT can become the catalyst and enabler of knowledge management in HEIs if it could be fundamentally reliable and efficiently commissioned for collaboration between parties interested in sharing knowledge (Shafique, 2015:177). A high percentage of HEI employees, whether academics or administrators, work as experts in their respective disciplines and fields. They advance various economic, engineering, business, humanities or health sciences areas through knowledge creation and development. Organisational knowledge, if implemented, would bring the total of accumulated knowledge, experience and networking across the HEI which will be learning from others' experiences and knowledge sharing across hierarchical, geographical and functional borders (Stair & Reynolds, 2012:25).

The topic covered in this study is very imperative in the management of modern organisations. The integration of ICT systems in knowledge management inevitably sustains the organisations and increases their competitiveness. The study, therefore, reveals clearly the importance of ICT within a scientific framework for improved knowledge management and ultimately improving organisational performance. Such interaction would require ICT to be a strategic backbone in ensuring smooth running of the service, from infrastructure implementation to a secure and consistent maintenance and support service (Leedy & Ormrod, 2010:101-104). ICT that is not reliable and properly coordinated leads to problems such as loss of trust by users, under-usage, unleveraged usage and outright frustration.

Therefore, the impact of ICT on knowledge management in a higher education environment is crucial (Allahawiah *et al*., 2012:235).

Knowledge and knowledge management in the 21st century is treated as a very substantial organisational resource that is critical in decision making and gaining a competitive advantage. According to Shafique (2015:175), “knowledge management is the management of explicit and tacit knowledge, and involves sharing as the central, pivotal element of knowledge management.” Present day organisations are faced with an increasingly dynamic and uncertain environment due to advanced technological inventions. The rapid change in technological development has inevitably increased competition. In this technological era, which is characterised by an unstable environment, organisations that maintain the status quo and do not embrace the changes are destined to fail.

Against this background organisations are obliged to invest in better methods and techniques for exploiting the vast and untapped organisational resources around them. Knowledge management is a very relevant aspect that applies not only to business organisations but also to non-profit organisations and universities. The conventional function of universities is to collect, process, store, disseminate and utilise informational resources through libraries and other departments to render a service to the community. As noted earlier that the environment within which universities operate is changing, knowledge management departments are also providing competitive advantage to these universities.

Furthermore, the knowledge economy necessitate the need for organisations to adopt information technologies that are innovative in order to address new realities. Against this background, organisations need to respond quickly to these changes by brainstorming new strategies that will unleash organisational potential to improve their overall efficiency. Therefore, in order to compete effectively, organisations need to transform and refocus on creating and utilising intellectual assets. Thus, organisations are keen to improve knowledge management since it is the key or most critical metric for organisations in the twenty-first century. Research over the past few years has consistently confirmed that proper knowledge management is to a greater extent linked to such things as organisational effectiveness, efficiency, and productivity among other business success factors. Thus, research results show that ICT leads to improved knowledge management (Pircher & Pausits, 2011:18).

To harness the dynamics of knowledge management, organisations of the twentieth century have recently begun embarking on integrating information technologies into their systems. Numerous studies in recent years have proved that knowledge management that has been designed by information technologies can inevitably lead to positive outcomes (Shafique,

2015:175). In this regard, Stair and Reynolds (2012:25) have conceded that simple, routine, and archaic methods result in serious inefficiencies. Thus, modification of the knowledge management system, through adoption of information technologies, helps the institutions in several ways. Findings of most of the studies have, however, been inconclusive as far as the impact of ICT in knowledge management at HEIs.

To a substantial extent, this study complements the findings from previous studies that have focused on ICT systems and knowledge management, however, there are notable differences in terms of their focus on the application of ICT in the HEIs. The current study focuses on the impact of ICT systems on knowledge management in HEIs. This study is, therefore, the first study on the impact of ICT on knowledge management processes in HEIs. Therefore, this study seeks to further investigate to what degree ICT has on knowledge management in HEIs. There is reason to assume that a higher degree of IT adaptation may result in improved knowledge management in HEIs.

### 1.3 Contextual setting

The utilisation of ICT to support knowledge has become a widespread phenomenon. Up to date, there are 25 accredited universities across nine provinces in South Africa with 11 of them being traditional, eight comprehensive and six universities of technology (South African Info, 2014). To a substantial extent, these universities have the capacity to fulfil the research and academic needs of their students. Knowledge management in these universities involves, among others, acquisition of information, processing and storing information, consultancy services and administration.

Knowledge management contributes immensely to the increased productivity of any organisation when it comes to work performance (Knowledge Management Research Center, 2010). The global economy is today knowledge driven and knowledge resources are the basis for many economic activities.

### 1.4 Problem statement

The fundamental purpose of this study is to investigate the impact of ICT on knowledge management at a specific university of technology in South Africa. Based on the current available literature, there is an acute shortage of research literature on the impact of ICT on KM in HEIs. Therefore, the problem the current study sought to address has been the relationship between knowledge management and ICT and in a university environment. However, there are barriers hampering KM due to ineffective use of ICT such as poor

knowledge coordination and reliability, knowledge transfer and reuse in various organisations.

With the above contextual background, the research problem of this study reads: the lack of reliable and coordinated ICT causes ineffective knowledge coordination, knowledge transfer and knowledge reuse in HEIs. Consequently, this study seeks to augment the literature in this regard.

This study assesses ICT systems' effectiveness in supporting knowledge management. The findings and recommendations from this study are aimed at improving the ICT techniques and methods used by universities in the management of knowledge.

## 1.5 Aims and objectives

This study's aim is to explore and examine the impact of ICT on knowledge management in a selected university of technology in South Africa.

### 1.5.1 Primary objective

The primary research objective of this study is to determine the impact of ICT on knowledge management within a higher education institution in South Africa.

### 1.5.2 Secondary objectives

The secondary research objectives are to:

- Explore the benefits of ICT in HEIs
- Examine the barriers of implementing ICT in HEIs
- Explore the key functions of knowledge management at HEIs
- Determine an effective approach to improving knowledge management through ICT at HEIs

## 1.6 Research questions

There have been significant changes in the external environment in terms of how things are done. These changes have brought about a series of challenges as far as management of knowledge is concerned. In addition, these changes have forced organisations to manage knowledge in such a way that it helps the organisations as a whole. In this respect, this study looks to demonstrate the links that exist between ICT and knowledge management. Thus,

the purpose of the study is to determine whether ICT has an impact on knowledge management at a specific university of technology in South Africa.

In this regard, this study will try to answer the following questions:

- What are the main benefits of ICT in HEIs?
- What are the barriers of implementing ICT in HEIs?
- What are the key functions of knowledge management at HEIs?
- How can knowledge management be improved through ICT at HEIs?

## 1.7 Research process

The research process illustrates the summary of the various stages that employed in order to achieve the objectives of the study and research questions. Furthermore, the research process outlines the problem that will be researched and the manner in which it will be done.

The research process followed for this study is depicted in Figure 1.1 below.

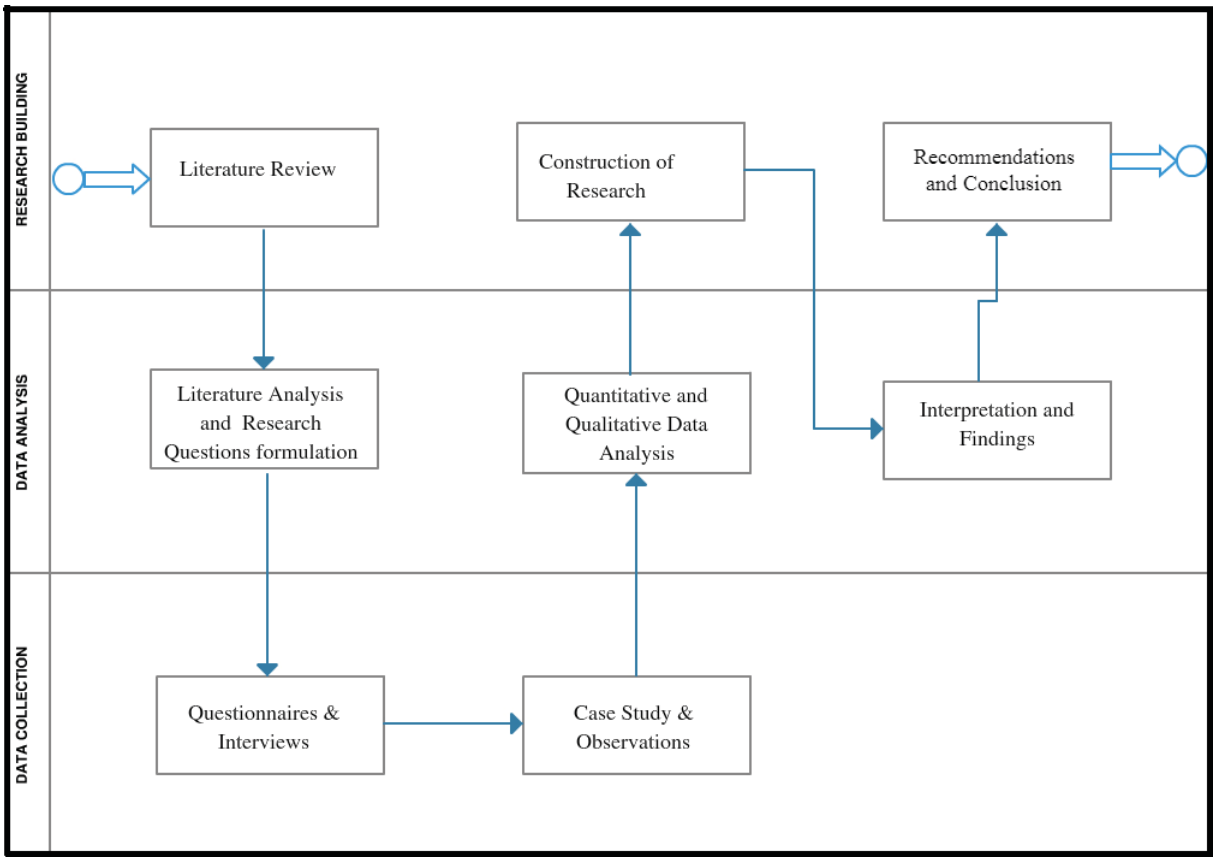



Figure 1.1: Research process (Source: own diagram)

## 1.8 Research design and methodology

The study employed a case study method using a combined quantitative-qualitative method. The combination of the quantitative-qualitative method is most effective to answer the research questions in many researches. This methodology is often described as a mixed method or qual-quant methodology. It includes a multi-disciplinary approach with both quantitative and qualitative techniques for sample measurement and analysis (Krammer, 2011:52). There are more strengths of the quantitative-qualitative method, including the ability to generate and examine theories, confirm findings and obtain breadth and depth on a research topic (Teddlie & Tashakkori, 2009:126).

Qualitative methods are valuable for inferring critical insights from people into the perspectives of a phenomenon while building knowledge on the subjective realities faced by the participants (Venkatesh *et al*., 2013:21). The qualitative phase of the research involves the "spectrum of techniques that make objective and systematic conclusions on the characteristics of messages" (Du Plooy, 2009:30). The qualitative portion of the study can be carried out in conjunction with the quantitative study. While qualitative data is typically informative and credible, it is criticised for lacking statistical robustness when smaller sample sizes are involved, and this makes it difficult to generalise small study results to a larger population (Teddlie & Tashakkori, 2009:127).

Quantitative research involves collecting numerical data, analysing it using statistical tests and using the results to explain a particular phenomenon. Therefore, a mixed method approach will assist in overcoming weaknesses in either the qualitative or quantitative aspects of a study (Khandker *et al*., 2010:1).

## 1.9 Data collection methods

Data was collected through a semi-structured questionnaire, site observations and interviews. The questionnaire was used for collecting quantitative data, whereas site observations and interviews were employed for collecting qualitative data. This study target population consisted of participants from a selected university of technology in South Africa. This university employed nearly 6 700 staff members in total. The number of staff members related to KM was about 250. This included librarians, faculty/department officers and administration staff members.

## 1.10 Data validity and reliability

The qualitative data was analysed through content analysis while quantitative data was analysed and interpreted by using an SPSS software package. This included descriptive statistics such as frequencies, percentages and distribution figures. ANOVA analysis was also carried out to determine the significance of the variables derived from the literature. In addition, Cronbach's alpha was used to calculate the reliability of the dataset.

## 1.11 Scope and delimitation of the study

As stated earlier, the dependent variable of this study was knowledge management on the one hand and ICT as the independent variable on the other. These variables were measured by means of a customised questionnaire. Pertaining to the research, this study was delimited to investigate the impact of ICT on KM in the selected university of technology only. The study excluded all other HEIs because the research purpose was to primarily focus on the selected university of technology. The research focused on ICT practices such as hardware, software and management of knowledge without considering local area networks and support services. This study did not differentiate between explicit and tacit knowledge but focused on general knowledge sharing. The findings of the study, therefore, had limited, if any, application to other institutions.

## 1.12 Ethical considerations

Research ethics typically fall into four categories which includes the following: honesty with professional colleagues, right to privacy, informed consent and protection from harm (Leedy & Ormrod, 2010:101-104). The following research ethics principles and procedures were followed: consent to protect the rights of participants in the research, respect of respondents' autonomy and confidentiality. Additionally, the researcher did not attempt to deliberately fabricate or falsify the findings of the study. The researcher also reported the findings of the study honestly in a fair and objective manner. Finally, the researcher received ethical clearance so that he could proceed with data collection.

## 1.13 Contribution of the study

The study successfully identified gaps in the use of ICT systems and the use of knowledge management by some of the South African universities of technology. The findings for this study will contribute a great deal of practical solutions on the effective use of ICT in knowledge management in South African HEIs.

## 1.14 Layout of the dissertation

This study is divided into six chapters:

- Chapter 1 gives the background of the study and briefly describes the extent of the problem. It also outlines the scope of the study.

- Chapter 2 presents a holistic overview of the research environment which includes examples by country or time period.

- Chapter 3 deals with the reviewing of previous literature where the important concepts to be used in the study are clarified.

- In addition, Chapter 4 considers the methodology used to gather information for the research.

- Chapter 5 deals with the collection of data as well as analysis of primary data and findings presented in this chapter.

- Finally, Chapter 6 gives the conclusion, recommendations and implications regarding the problem under investigation.

## 1.15 Conclusion

ICT deviations such as greater flexibility, knowledge economy and variations of knowledge management systems have a perceivable impact on how knowledge is managed in institutions. Therefore, it is convincingly relevant to study the impact of ICT on knowledge management. Furthermore, many organisations are often characterised by obsolete and inefficient knowledge management systems as a result of organisational structural rigidity as well as lack of adaptability to the external environment. Thus, this study is of fundamental significance, particularly in HEIs that are characterised by the above-mentioned problems. Consequently, the adoption of ICT in knowledge management offers great promise for increasing efficiency and effectiveness in management knowledge; hence, promoting organisational success.

Furthermore, the proposed study contributes significantly to the general body of knowledge in the field of knowledge management. Research points out that ICT enjoys a negotiable relationship with knowledge management. Against this background, it is of paramount importance to study knowledge management and the predictor thereof; that is, ICT.

The study differs from past research in several ways. It amplifies the concept of ICT and its impact on knowledge management in HEIs which has not been studied previously.

# CHAPTER TWO: A HOLISTIC OVERVIEW OF THE RESEARCH ENVIRONMENT

## 2.1 Introduction

The previous chapter was devoted to the introduction of the study, research problem and research objectives. The aim of this chapter is to provide an overview of the impact of information and communication technology (ICT) on knowledge management generally. Hence, it will also shed light on the overall effects of ICT on knowledge management in HEIs at global scale and in South Africa. The chapter is structured into three sections: firstly, it elucidates the issue of ICT on knowledge management at HEIs in general. Subsequently the second part explores on the empirical studies, evidence and observations from different scholars in different countries regarding ICT and knowledge management nexus. As a corollary, a discussion on the impact of ICT on KM at HEI from global perspectives and also from South Africa is provided. The last section provides the concluding remarks by giving a summary of the chapter and identifying the case study.

## 2.2 Global overview of ICT on businesses

The ICT era has brought about tough competition in business to the extent that companies that maintain the status quo are bound to suffer losses and may end up fizzling out completely. To this end, organizations including institutions of higher education are obliged to invest in new techniques that improve quality of work, productivity and customer satisfaction. Schultze and Leidner (2002:214) assert that knowledge is generally collected and managed on the assumption that “knowledge is good”. However, the same authors allude to the notion that knowledge is a “double-edged sword”; whereby, shortages in knowledge can cause various complications, yet too much knowledge can also cause problems. Shortages in knowledge, for example, have been said to cause inefficiencies; expensive mistakes, such as in the case of faulty new products; and chaotic social relations. Conversely, however, too much information has been said to cause “rigidities that are counterproductive” in a dynamic world; the muzzling of diverse points of view; and the formation of excessive accountability (Schultze & Leidner, 2002:214).

In essence, Tseng (2008) proposed a holistic framework (shown in Figure 2.1) to explore the impact of ICT in KM systems. This framework contains five key gaps (Gap 1 to Gap 5) and shows the management and technical gaps that can occur during the Knowledge Management System implementation. Indeed, these gaps highlight the effect of ICT on KM systems because there is a different understanding of KM activities as well as its

implementation in the institution. KM implementation is hindered by the failure to identify these gaps. This conceptual framework will assist to research the effects of ICT on KM and will further illustrate the gaps that might occur when implementing the KM system at the selected university of technology.

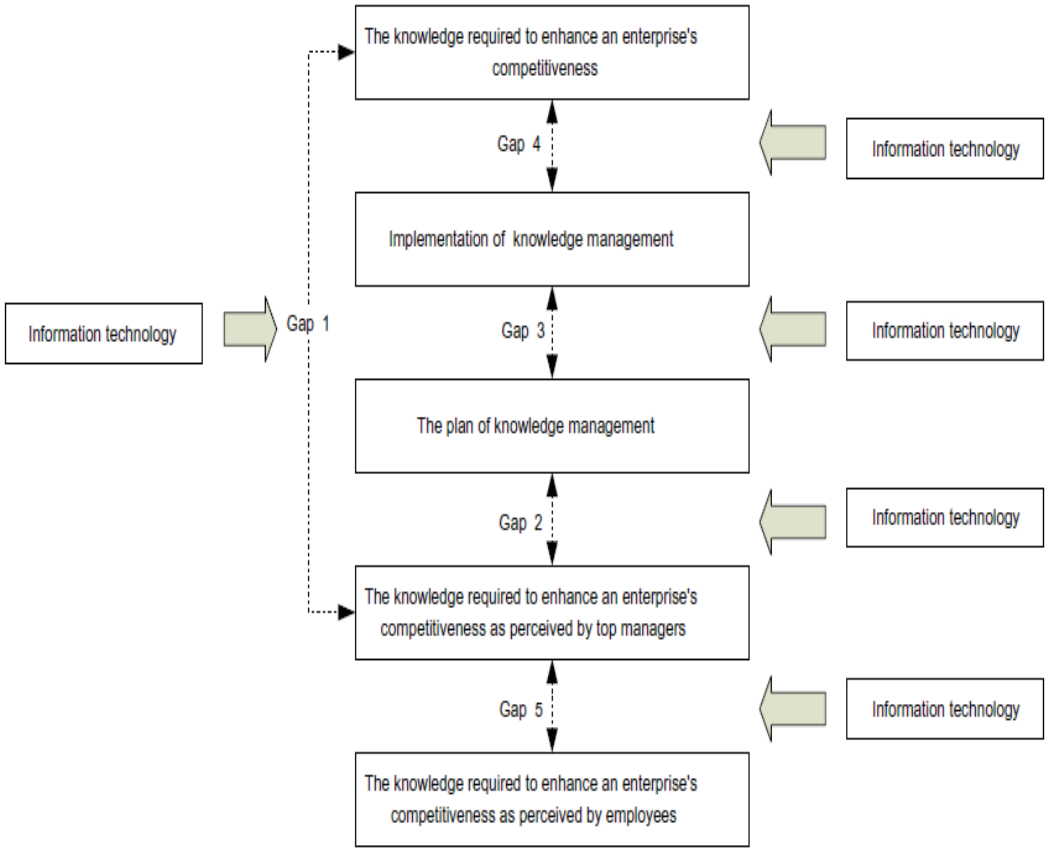



Figure 2.1: Conceptual framework *(Source: Tseng, 2008:152)*

**Gap 1:** The gap between the required knowledge, as perceived by upper management, to enhance an enterprises competitiveness and the knowledge actually required for the competitiveness to be enhanced.

**Gap 2:** The gap between the required knowledge, as perceived by upper management, to enhance an enterprises competitiveness and the KM implementation plan.

**Gap 3:** The gap between the KM implementation plan as per upper management proposal and the KM implementation plan progress.

**Gap 4:** The gap between knowledge from the KMS implementation and the knowledge required for an enterprise's competitiveness enhancement.

**Gap 5:** The gap between the required knowledge, as perceived by upper management and employees, to enhance an enterprises competitiveness

The fundamental purpose of this study is to investigate the impact of ICT systems on knowledge management in a selected university of technology in the country. Lamproulis (2007:40-41) noted that technology plays a significant role in enhancing the creation of knowledge in organizations. Thus the increased adoption of ICT improves the tasks of staff as well as increasing the speed and efficiency of work.

Furthermore, Lamproulis (2007:42) urged senior management to use technology to forumalte and support staff jobs but without the technology having to be the medium of intraction between staff when it comes to transfer of knowledge and its translation into innovation and the perception of ideas. Another study by Hawajreh and Sharabati (2012) sought to establish ICT's influence on knowledge management practices in Jordanian Industrial Companies. The results shows a positive significant relationship between knowledge management practices and ICT. Brahma and Mishra (2015:49) and Conway (2003:69) assert that ICTtools are applied for improving knowledge management; and thereby making an organisation's knowledge resources easy to find and retrieve by users. Brahma and Mishra (2015:46) argue that technology is an important factor in the implementation of KM in organisations as it "complements, supplements and amplifies" the efficacy of the individuals. Specifically, Brahma and Mishra (2015:49) assert that technology enhances the knowledge work (KW) of individuals by augmenting the economic-, labour-, and work-related elements of the organisation.

## 2.3 South African overview

Higher education globally and in South Africa is not only in transition but also under pressure. The role that ICT is playing is not only significant but unprecedented (Lockwood, 2013). South Africa has 6 technological universities spread across the 9 provinces (South African info, 2014). The proliferation of universities has given rise to many academic libraries to oversee the knowledge management in South Africa (Satgoor, 2015: 105). Previous studies by Herselman and Britton (2002) and Beebe (2010: 4) pointed out that there is an increased use of ICT tools such as broadband internet and multimedia platforms, among others, that facilitate effective knowledge management in libraries. The question however is; has these ICT tools been able to improve the acquisition of relevant skills and knowledge?

According to Satgoor (2015:105), most South African universities are funded through the government's Department of Higher Education and Training. Funding is very instrumental in

the existence of universities and their libraries thereof. Thus poor funding of universities might result in lack of proper infrastructure and limited access to ICT among other problems that result in failure to harness knowledge resources. In order to justify the high levels of government funding in HEI, it is expected that universities, would strive to create the best possible learning environments including creating relevant and usable ICTs in line with global trends. It should be acknowledged that in South Africa the political and socio-economic transformation since independence in 1994 has seen an increased number of students and academic staff from previously disadvantaged population groups. This is an expected and welcomed direction in higher education environment but one which has created new challenges. One such challenge has been the difference in ICT literacy between students from different socio-economic backgrounds are at different levels of literacy in ICT skills (Jaffer *et al.*, 2007). HEI therefore need to come up with creative ways to assist all learners enrolled to benefit adequately from the use of ICT, both in their learning activities and their careers.

Preliminary reviews of literature revealed that ICT application for knowledge management in South African universities varies from one university to the other, although all South African universities have benefited from the National Integrated ICT policy which brought about transformations that improved the service delivery in university libraries (National Integrated ICT Policy, 2014). Against this background, there is widespread adoption of ICT across South African Universities and access to information has been improved. The introduction of ICT in the South African economy has impacted positively in terms of development both in rural and urban areas (Statistics South Africa, 2012). In addition, the South African government has shown commitment in improving internet access around the country. This has seen the availability of internet facilities which have assisted many learners enrolled in HEI, particularly those enrolled in distance learning programmes.

Ng'ambi and Seymour (2004) assert that ICT can be used to positively impact the teaching and learning processes in higher education. In addition, Ng'ambi and Seymour (2004) found out that ICT can be used for the effective management of large tutorial classes. It can also be used in certain fields or disciplines to coach students to adapt to certain discipline specific jargon or terms.

Research findings have also pointed out that South African universities are experiencing a major challenge of acute shortages of qualified and skilled ICT personnel in several vital departments such as software development and telecoms among others (Harris, 2011:2). This lack of skills will inevitably negatively impact knowledge management in universities. The challenges discussed above explain why the use of ICT in South African HEI is less than

that of more economically developed countries such as the USA (Jaffer *et al*., 2007). However, Satgoor (2015:105) argued that the availability of ICT infrastructure has presented several opportunities for knowledge management in South African universities such as easy communication and accessibility of education. ICTs are used to enhance and support learning activities in various ways as educational technology. They are being used to develop course material, delineating content, and communication between educator and learners or between learners. ICT is also currently being used extensively by academic researchers in HEI and it is an important tool of keeping pace with the latest developments in every field.

Awuor, Rabah and Maake (2013:253-254) makes the argument that in most libraries, KM has generally been supported by ICT infrastructure. This has been through such diverse areas as sourcing for knowledge through use of the web and other ICT tools, large volumes of information and knowledge in institutional repositories; capacity building and shift from traditional to virtual/online resources and services of internet; transformation of LIS professional roles as subject specialist; access and dissemination of much volumes of information; delivery of information products and services products and print and electronic resources production.

Knowledge Management Australia (2014:1-2), reported that business operational efficiency has been significantly improved through the use of Oracle, Microsoft, emails web content management. Additionally, there has also been significant information access which enhanced collaboration between employees. Information technologies facilities also improve the employee capacity to deliver more reliable meaningful services as they deal with large quantities of information. Conway (2003:70) outlines various approaches that are used to assist in performing KM. For example, repository searches, such as search engines, subscription services, expertise finders, and personalisation aid in the connection of knowledge to users. According to Gray and Tehrani (2003), the use of e-mails, the internet, telephones, information portals, groupware, and intelligent agents are all applied for improving the dissemination and management of knowledge. Gray and Tehrani (2003) group the technologies into three categories, as follows:

- Knowledge sharing methods, such as push, pull and point technologies;
- Dissemination technologies; and
- Retrieval technologies, such as those that interface, search, organise and provide feedback.

ICT plays a very significant role in creating knowledge as well as its management. In this regard, ICT systems provide useful tools for capturing information as well as its application. ICT comes with a variety of capabilities such as archive, transfer, share of information. In addition, these tenets enable efficient and effective classification of information and its dissemination. ICT plays only a supporting role in knowledge management (Sarlak & Forati, 2008).

Afrazeh (2003) noted that the application of ICT in knowledge management improves knowledge by enabling getting the right information at the right time. In this regard, strategic use of ICT becomes a necessity in order to keep abreast of global trends and the rapid changes in the workplace. Therefore, organizations should strive to establish knowledge management system that utilizes ICT systems another to enhance the collection, processing and storage of information. ICT has been applied in various organizational processes such as production, warehousing and sales. Since the inception of computers, they have been used widely in business and the integration of ICT in the all economic and management systems has demonstrated the important role it plays in effective organizational management.

## 2.4 Impact of ICT on HEIs globally

Globally, higher education has undergone profound changes due to the use of ICT across disciplines such as commerce, medicine, engineering, law, social studies and others. There is currently a plethora of discipline specific software packages, used to acquire, manage and disseminate information in institutions of higher education across the globe. ICT provides support for learning activities while some programmes make ICT the subject of learning (Soares & Almeida, 2002). The developmental trajectory of the global society today demands that graduates from institutions of higher education acquire good and relevant ICT skills while they are learning, for use later on in life as working professionals. ICT has also seen an increased number of young people accessing higher education. According to Soares & Almeida (2002), the readily accessible nature of higher education through ICT has seen the loss of the elitist and formal character of higher education by enabling the admission of individuals from all social classes (Soares & Almeida, 2002). Developing countries are faced with the challenge of preparing their HEIs for globalisation and the ICT era of the 21st century. The implementation and use of ICT requires supporting infrastructure such electricity and telecommunication access but in many African countries these services are not well developed. People from all facets of life such as educationists, policy makers, government officials, non-governmental organisations are all concerned with making their societies competitive in the information economy. In the literature, the benefits of ICT are

abundantly described. According to Stair and Reynolds (2012:34), information systems is used by virtually every department in every industry of the economy for analysing data, improving customer service, aiding investment choices, scheduling, performing diagnostics, managing inventory, and aiding in important decisions that affect the success and sustainability of the organisations. However, the facts from research seem to show that ICT has not taken a central role in higher education yet. Even in the most industrialised countries, ICTs are generally not considered central to teaching and learning or knowledge management, they take supporting role, but that is likely to change as the world develops more dependency on ICT.

Institutions of higher education are making use of tools, techniques and methods of generating, processing as well as transference of information. They can also now design, develop, implement as well as manage computer based information systems, particularly software application and computer hardware wherever applicable for the storage, use and dissemination of information. The availability and use of ICT has changed the organization and delivery of higher education globally. The changes include greater access to information, greater communication, increased cooperation and pedagogical improvement among others.

The introduction of ICT, although highly necessary has however presented new challenges such as formulating best practice approaches in ICT, in more economically developed countries such as the United States of America and Western Europe, HEI use ICT at higher levels than in South Africa and other less economically developed countries. This is mainly due to the availability of broadband internet, web-based technologies, cheaper computer sets, conferencing tools and ICT expertise in the USA and Western Europe while these tools are less available in South Africa and other less economically developed countries.

The level of ICT expertise differs from one institution to the other and so does the level of use both between countries and between institutions, even among more economically developed countries. Nonetheless, adequate funding is needed and must be availed for effective ICT implementation because it is generally a costly tool. In the USA however, students from rural backgrounds show high levels of ICT proficiency and the levels of ICT appreciation and use is quite high compared to those of countries like South Africa and other less economically developed nations.

Some scholars assert that, if ICT is sufficiently implemented, it can improve higher education results through collaborative learning, the forming of cyber-communities and renewed forms of conception and organization (Soares & Almeida, 2002). The emphasis is that ICT helps in creating certain valuable capabilities rather than just making information available. Even

globally, there are still impediments and structural restrictions to the full implementation and utilization of ICTs. In developing countries, the implementation and use of ICT in higher education cannot be achieved in isolation without addressing other developmental challenges which the economies are facing. Chief amongst such challenges is the availability of financial resources.

Another notable challenge is that ICTs are usually acquired and installed without any regard or attempts to review student needs. Its introduction is usually a function of top-down approaches. In some cases, this situation may lead to shifting of attention from the main goal of learning while attention is focused on ICT skills. It may also create a digital divide within classes as some students and learners are more familiar with ICT and can benefit more than others. The educators or lecturers are themselves at different levels of articulation of ICT skills, hence different subjects or courses may use ICTs differently. The readily available information on the web is an advantage for learners but, this may lead to increased plagiarism. The bonding process in the relationship between educator and students may suffer as learning occurs online or other ways which do not necessitate the conventional classroom. The high costs of software and hardware have been a notable hindrance in the adoption and use of ICTs in HEI globally.

Tezcan (2006) has also identified five challenges regarding the use of ICT in HEI. These are listed as:

- Poor application design
- Scepticism about ICT effectiveness in learning outcomes improvement.
- Limited administration support
- Steep learning curve on technology use
- Some students and lecturers are not even aware of the assistance available to them in accessing and using ICT.

As a result of these challenges, some students go through HEI and come out without having benefited fully from the availability of ICTs at their institutions (Tezcan, 2006). The realities of the world of employment however, are that, there be changes in the competence profiles of graduates and that such competencies must reflect a higher level of appreciation and articulation of ICTs.

Despite the challenges, ICTs have presented many opportunities and advantages for both learners and educators in higher education. The creation of online classrooms which have become more commonly known as virtual universities is growing globally, as well as self-paced learning. Self-paced learning has flexibility advantages to learn according to the availability of the learner's own time through a variety of ways such as studying of course materials or through web based materials, CDs or pre-recorded classes and seminars as well as browsing the internet. ICTs have an obligation to enable teaching and learning at HEIs and thus encourage students to study and work concurrently.

For governments, as stakeholders in education, ICT has increased the cost effectiveness, capacity of training institutions in the following ways:

- Ability to reach target groups including previously disadvantaged populations
- Enhancing and supporting of the relevance and quality of existing structures
- Ensuring the connection of HEIs and curriculum to emerging information resources and networks
- Promoting opportunities and innovation for lifelong learning
- Local language software interfaces can be developed through ICT programmes

ICTs are also being used to develop course materials, sharing content, delineating content, communication between learners and educator, lesson delivery and academic research. To keep abreast of recent developments in any field, information has to be made available through ICTs. Electronic learning popularly known as e-learning is currently on the rise globally. ICTs encourage greater integration, interaction and higher participation and at the core of this spreading of education is the web and the internet which includes e-portfolios, cyber-infrastructure, digital libraries and online learning object repositories. These connect all stakeholders in education and create a digital identity for each student (Bhattacharya & Sharma, 2007).

It can be concluded, therefore, that despite a number of challenges usually associated with the implementation and use of ICTs in higher education, ICTs has brought a wide range of opportunities including the removal of traditional boundaries to learning. The advantages far outweigh the challenges and HEI globally are on the drive to grow ICT skills within their structures and operations. It is also clear from the foregoing findings that the full potential of ICTs is yet to be realized.

## 2.5 ICT and knowledge management practices

Brahma and Mishra (2015:49) and Conway (2003:69) assert that ICT tools are applied for improving knowledge management; and thereby making an organisation's knowledge resources easy to find and retrieve by users. Brahma and Mishra (2015:46) argue that technology is an important factor in the implementation of KM in organisations as it "complements, supplements and amplifies" the efficacy of the individuals. Specifically, Brahma and Mishra (2015:49) assert that technology enhances the knowledge work (KW) of individuals by augmenting the economic-, labour-, and work-related elements of the organisation.

In earlier work by O'Leary (2004), the impact of ICT on knowledge was categorised into six classifications, namely the storage, organising, massaging, integration, filtering and navigation of the knowledge. The purpose of any ICT, as noted by Brahma and Mishra (2015:49) is ultimately to make the organisation's knowledge asset easy to retrieve and find, so that those who need it can efficiently access and use it. Towards this end, universities in South Africa and abroad have created databases through ICT, which are massive repositories of information available for researchers at all levels.

It is important however to note that South African institutions of higher education are at significantly different levels of appreciation and implementation of ICTs. They can be grouped into five categories in terms of their ICT approaches (Satgoor, 2015). The categories are listed below:

1. Institutions with formed and comprehensive policies in place
2. Special merger issues
3. Institutions with educational and ICT policies embedded into related policies
4. Institutions without ICT policy frameworks evidence in place
5. Institutions with relevant structures but without ICT policy frameworks in place.

The first category, which demonstrate the best progress in the South African higher education context consists of the University of Cape Town, University of Pretoria and Stellenbosch University. The selected University of Technology is rated as category 5 because it has made a large investment into a large computer laboratory and other smaller laboratories and a functional web domain. Moreover more and more e-resources were made available for students although no comprehensive ICT policy is in place yet. This demonstrates that the institutions view the role of ICTs differently in their respective contexts.

## 2.6 Background of UoTs in South Africa

The selected University of Technology was established in 2005 as a merger of Technikons. It is currently the largest university in the Western Cape region in terms of enrolment with more than 30 000 students, several campuses and 70 programs of study. Figure 2.2 below illustrates the management structure of the selected university of technology.

The UoT's vision is to be at the heart of technology education and innovation in Africa, its core values are promoting innovation and efficiency in all its operations. The UoT has modern facilities and impressive infrastructure for teaching and learning. A variety of undergraduate and post-graduate courses are offered. It has a diverse profile of students in terms of race, gender and nationalities as depicted by its Higher Education Data Analysis (HEDA).

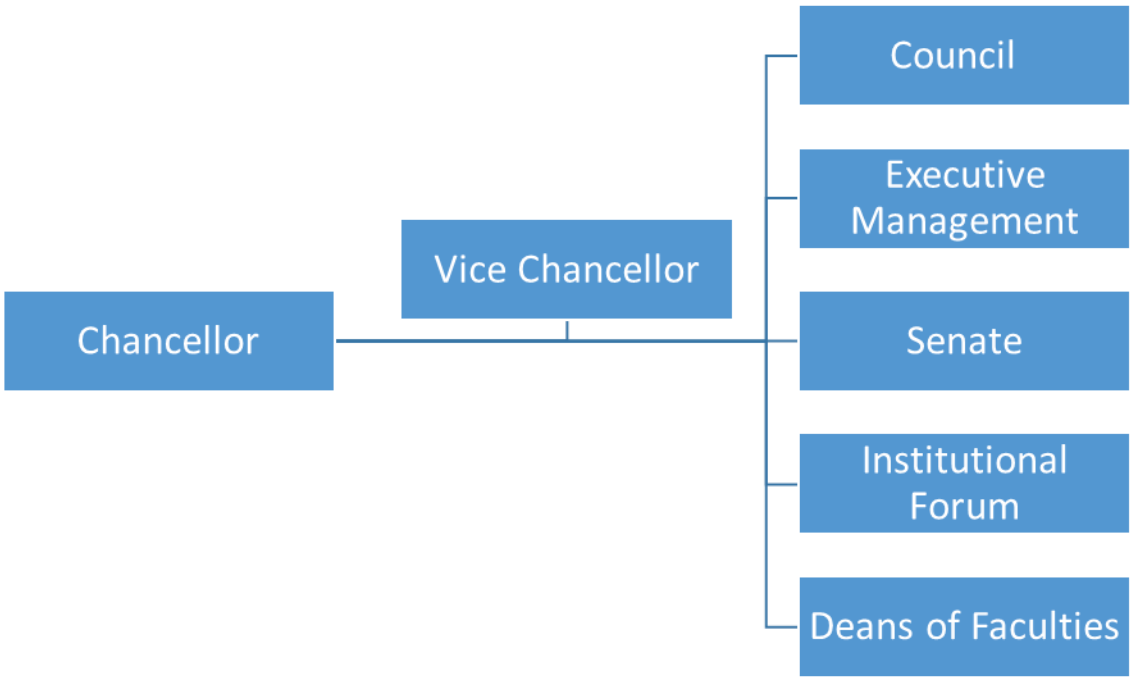



Figure 2.2: UoT leadership structure (Source: own diagram)

Figure 2.3 below illustrates the UoT's Higher Education Data Analysis (HEDA) system which provides live data about UoT's student's enrolment for 2016 academic year. The Institution benefits from this management information system because it provides relevant statistics for effective decision making.

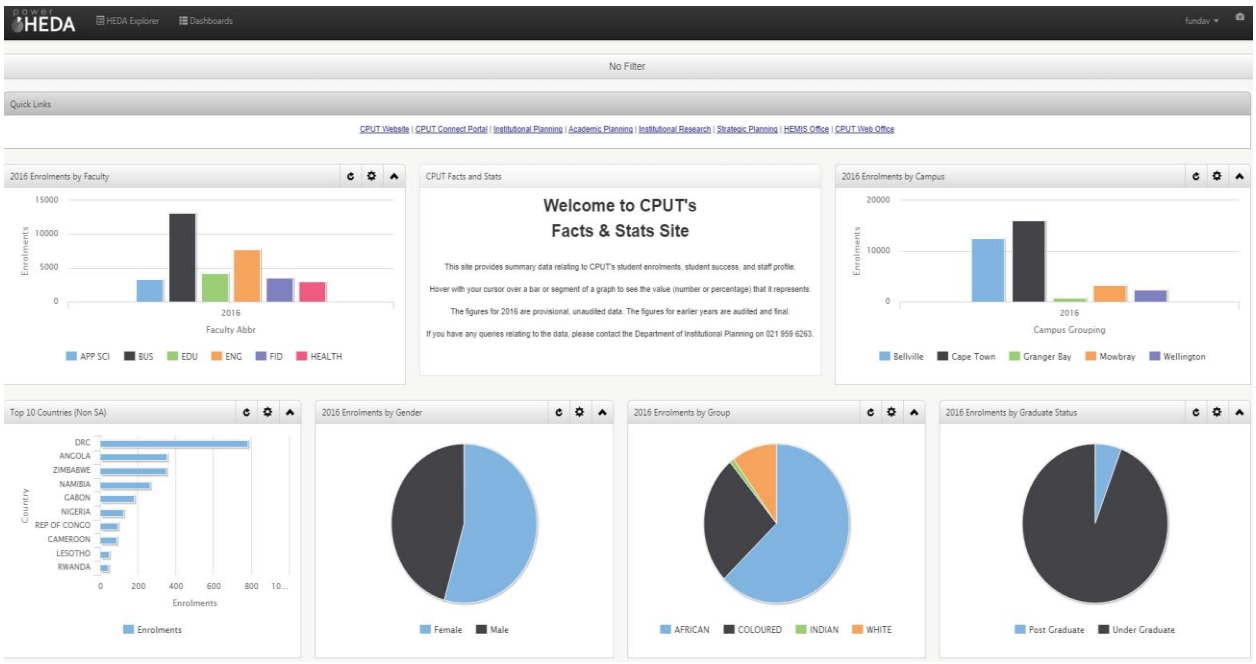



Figure 2.3: Example of Enrolment monitor at UoT (Source: www.cput.ac.za)

## 2.7 Use of ICT at UoT

ICT is an enabler of the operations, particularly knowledge management at the selected UoT. Various technologies are utilised in the UoT for gathering, storing, retrieving, processing, analysing and transmitting knowledge. The institution utilises ICT to implement knowledge sharing, learning, teaching and distribution of educational services and support. The campus is networked thus accessibility of ICT is easy, the library resources, classrooms and laboratories are equipped with modern ICT tools such as adequate computers, internet, interactive whiteboards and projectors. The UoT is making it easy for end-users to access information from anywhere within the institution. To this end the institution has installed several wireless devices at the campus. Staff, students and visitors are therefore able to connect onto ICT services widely across the institution using laptops or smart phones. The UoT has established e-learning centres that operate 24 hours on campus in order make ICT services as accessible as possible for students.

## 2.8 Functions of ICT among UoTs

The academic environment is highly competitive, therefore the ICT Department in higher education institution is a very important component of intellectual expansion and knowledge management. The ICT Department of the UoT provides a range of services from helpdesk, computer laboratories, network management, data management and enterprise application

services. The ICT Department builds relationships with academic and other support departments, which allows for the effective management of its services.

### 2.8.1 Helpdesk

Helpdesk is a customer support function with is responsible for providing ICT support over the telephone, this covers managed desktops, customer service to departments for staff and students. Incidents are logged over the telephone and a helpdesk ticketing system is utilized to track the call. They also provide training solutions for staff and students.

### 2.8.2 Network management

The network unit provides support to the entire institution whereby they administer systems and networks, deploy desktop hardware and software as well as classroom technologies. They are responsible for improving the overall ICT environment, including information security. There is a major emphasis on Information security which covers firewalls, antivirus, policies and security technologies to reduce network vulnerability.

### 2.8.3 Data management

The ICT department develops and maintains software applications for the entire UoT including service departments such as HR, Marketing, Finance and learner management systems.

### 2.8.4 Enterprise application services

Through this unit, the ICT department undertakes services that ensure the institution's computing and networking infrastructure is able to support academics, students and researchers. They use expertise to undertake strategic planning and project management for UoT's projects. The team is responsive to the university by offering support and guidance of ICT projects as well as strategic communication about projects.

## 2.9 Conclusion

In conclusion, the preliminary literature search has indicated that the development of ICT technology inevitably resulted in increased amount of information that can be easily accessed and reproduced (Eppler & Mengis, 2003; Bawden & Robinson, 2008; Filippov & Lastrebova, 2010). In addition, a plethora of literature demonstrates the significant relationship between knowledge management and ICT; as well as the significant relationship between business performance and knowledge management. Song *et al*. (2006) and Zhang,

(2008) shared the same sentiment that pointed out that development of ICT has significant effect on knowledge management and most technological tools enhance organizational capacity. In addition, Lopez *et al. (*2009) also found that knowledge management practices such as knowledge generation, transfer, codification and storage improves as a result of high ICT competency. Kasim (2010) and Safarzadeh *et al. (*2011) confirmed the positive significant relationship between information and technology and knowledge management.

The information presented in this chapter has shown that the use of ICT in HEI in South Africa and abroad has brought revolutionary changes in the availability of information and the way institutions are managed. It has also been shown that there is a growing drive towards increased use of ICT and South African institutions are therefore expected to move towards increased use of ICT so that they are not left behind. This research therefore, seeks to establish the extent to which ICT has impacted knowledge management at the selected university of technology.

The case study is particular on its relevance to the case in that it enrols students from a variety of socio-economic backgrounds and it has a functioning ICT system which can be tested in line with the requirements of this research. This can be done and completed within a reasonable budget and time-frame since the researcher is currently residing within the Western Cape hence no travelling costs involved and the researcher is quite familiar with the way ICT works at the institution and accessibility to information relevant to this research will be relatively easy.

Literature findings on the use of ICT in higher education in South Africa have established that the selected university of technology is among universities with the least developed ICT policies but has made significant investment towards the adoption and use of ICTs. This research will seek to establish how ICTs are being used at the selected university of technology for knowledge management currently.

# CHAPTER THREE: LITERATURE REVIEW

## 3.1 Introduction

In chapter one the key terms and problem statement for this study were discussed. The specific research objectives and important constructs were also highlighted. The fundamental aim of this chapter is to scrutinize the problem statement from a theoretical perspective and also provide various empirical studies contributed by other scholars which are relevant to this study. Thus, this chapter will start with the most fundamental aspect of describing the concepts of knowledge management and institutional ICT and information systems. These constructs are of paramount importance since they determine the success and continued existence of any organization.

The chapter is a reflection of the historical development of the concept of knowledge management and ICT and provide a detailed literature review on the research problem. In addition, this chapter also seeks to unearth various research gaps. Therefore this will provide a detailed account on the knowledge management and ICT as well as their interrelatedness. This chapter will utilize relevant examples of previous research that will be used to broaden the knowledge base in this field of study.

## 3.2 The concept of knowledge management

The concept of knowledge management has developed over time and is a valuable resource that must be effectively managed. The scientific study of knowledge management can be traced back to the 1950s, and has been widely researched. To this end, a number of theoretical grounded definitions of knowledge management have been put forward to describe and assess the construct (Pretorious & Steyn, 2005:41; Becker, 2007:42; Gurteen, 1998:6). This, despite the popularity of the concept “knowledge management”, several definitions of the concept exists in the literature. Pretorious and Steyn (2005:41) argued that knowledge management is the acquisition, creation, and application of knowledge.

Becker (2007:42) defined knowledge management as the way data, information and knowledge are captured, stored and shared and their application to strengthen organisations so that they achieve a competitive advantage. Gurteen (1998:6) perceive knowledge management as organisational applications and technologies, organizational structures, processes, operation principles and design that allows workers to leverage their capabilities and creativity to deliver business value. This definition is also supported by Claver-Cortés *et al.,* (2007:46) who define Knowledge Management as business actions and policies adopted

towards knowledge creation and transfer to all organisational members and the subsequent application of that knowledge towards the end goal of giving the organisation a competitive advantage.Furthermore, Jashapara (2004) also defined knowledge management as an effective learning processes associated with the use of shared human knowledge towards the development and enhancement of human capital. The concept of knowledge management can also be described as the extracting the maximum benefits from all knowledge sources (Fernandez *et al.,* 2004).

Knowledge management has also been described as the combination of human resource management and organizational behaviour concepts, business process development, software engineering, artificial intelligence and knowledge-based systems (Claver-Cortés *et al.,* 2007:46; Becker, 2007:42; Jashapara, 2004). Because of different definitions, knowledge management has also been defined as a process of collecting, storing organisational expertise and experience all towards the objective of improving staff practices, generating more income and overall improvement of the organisation (Sarlak & Forati, 2008).

It is of paramount importance to take note of the profound differences and similarities between these different definitions. However there seem to be consensus on the knowledge management processes such as knowledge acquisition, sharing and application. The definitions provided above clearly highlights the connection between knowledge management and business strategy as it deals with capturing vital information that determines the existence of the organization.

Knowledge management (KM) is a process used by organisations to identify and archive the information and knowledge assets that have been collected from the practices of their members. Stated alternatively, Laal (2011:545) asserts that KM is a mechanism for presenting the available knowledge of an organisation in a manner that would be usable for more than one person; to share across and externally to the organisation. According to Brahma and Mishra (2015:45), KM originated in the early 1990s in response to difficulties in dealing with the ever-increasing volumes of information and knowledge in organisations, and following the increasing complexities of competing in a world of advancing technology and more detailed customer demands. According to Shafique (2015:175), knowledge sharing is the central, pivotal element of knowledge management. To do so, an institution-wide system of KM can suitably aid the knowledge sharing process of both tacit and explicit knowledge (Shafique, 2015:175). As noted by Stair and Reynolds (2012:25), many organisations rely on specialised knowledge management systems (KMSs), such as the organised collection of procedures, software, databases, people and devices to generate, share, use and store an organisation’s experience and knowledge.

### 3.2.1 Tacit vs. Explicit knowledge

According to Jashapara (2004) tacit knowledge is the knowledge which is embedded in the brain and cannot be expressed early whilst explicit knowledge is that knowledge that can be codified early. A knowledge-based view argues that both types of knowledge are important and uninterrupted flow of knowledge results in organizational success.

### 3.2.2 Data, information and knowledge

Stair and Reynolds (2012:5) quantify the meaning of terms by differentiating between data, information and knowledge. They explain that data is the aggregate of raw facts that may be collected in an organisation, such as stock numbers, the time taken to achieve a goal, and so forth. Upon arranging these facts in a "meaningful manner", these data become information. Thus, information is the arrangement of data in such a manner that it derives value beyond simply the value of the independent facts (Stair & Reynolds, 2012:5). Stair and Reynolds go on to explain that knowledge is the understanding that is derived through the awareness of an assemblage of information, and whereby information can be applied in a meaningful manner that supports a task, or aids in the reaching of a decision.

Furthermore, according to Matzkin (2008:157) the most important goal of any organization is to improve their productivity through effective use of organizational resources such as information, labour, and capital among other. To this end, there is a positive relationship between productivity and ICT. The difficult nature of strategic knowledge had resulted in knowledge management increasing in its importance among managers in organizations. According to Kidwell *et al.,* (cited in Laal *et al*., 2011:545), explicit knowledge describes documented information that can be expressed as formal, shared language, and which can "facilitate action". Conversely, tacit knowledge is the learning and know-how that is "embedded within the minds of the people in the organisation". Since the inception of the knowledge economy, knowledge management and its significance have undergone considerable empirical scrutiny. A substantial body of work has focused on determining whether changes in knowledge management actually alter effectiveness and efficiency within organisations. In the study carried by (Karimi & Konsynski, 2003:89; Stair & Reynolds, 2012:35) the empirical relevance of knowledge management in the modern organisational environment was evaluated. The results generally support the predictions that several dimensions of ICT are positively associated with improved knowledge management. Thus evidence has generally been consistent with a positive correlation between ICT and knowledge. This study therefore investigated the relationship between ICT and knowledge and seeks to explore its influence in a higher education environment.

### 3.3 Importance of KM

The majority of 21st century organisations have adopted learning as essential in management of knowledge and this inevitably improves their performance. In this regard, the advent of ICT has provided an opportunity to make use of knowledge through knowledge management systems.

Gupta *et al.,* (2000) argue that the turbulent environment characterised by uncertainty requires organisations to utilise the untapped knowledge resources around them. Most universities have academic libraries whose purpose is to collect, process, disseminate, store and utilise information to serve the university community. Knowledge management has inevitably become an integral component in many organisations, since it strives to promote effective use of intellectual resources for the competitive advantage of organisations. Thus, it has been integrated into other business functions and processes as well because of its potential to bring about potential positive outcomes. Strategic knowledge is regarded to be an essential resource for every organisation and it is something that is difficult to manage. In this regard, knowledge management has grown and developed rapidly across the world and has become increasingly important on the management agenda in recent years. Thus, there has been increasing general awareness of the growth of knowledge.

The impact of knowledge management practices on performance was empirically tested through structural equation modelling by Rasula *et al.,* (2012:147). Their research sampled 329 companies both in Slovenia and Croatia with more than 50 employees each. The results of their study showed that knowledge management practices positively affected organisational outcomes such as product and employee improvement.

Fugate *et al.,* (2009:247), in their study in the logistics industry, found the existence of a strong relationship between knowledge management and the performance of the organisation. In addition, results from numerous studies showed that knowledge management impacted positively on organisational culture, organisational effectiveness and organisational structure and strategy as well as organisational performance (Zheng *et al.,* 2009). Maponya (2004) investigated knowledge management practices in public and private sector entities in the health, education and business sectors in rural South Africa, and his study revealed the dire need to broaden an understanding of knowledge management in an organisational context. Bishop *et al.,* (2008:22) argued that, for a knowledge management initiative to be successful, it should address an organisation's objectives and type of work performed in the organisation. Matzkin (2008:150), in his research, reported that knowledge

management should not be underestimated since it was related to several practices such as human development, employee training workshops, induction and mentoring programmes.

### 3.4 Role of KM in HEIs

Knowledge management has gained widespread acceptance in the academic fraternity, as these institutions strive to create and disseminate better knowledge to society. Oosterlinck and Leuven (2002) argued that institutions of higher education have a major role to play in our time of knowledge society and knowledge economy. Against this background, it is clear that the university does not exist in isolation but it has a huge role to play in society through teaching and research. Thus, the university is always heavily involved in sharing information and knowledge to the academic community.

The increased organisational complexities within higher and tertiary institutions have resulted in the adoption of better ways of transforming knowledge into effective decision making and action (Petrides & Nodine, 2003). Universities tend to focus more on the effective creation and use of knowledge in order to accomplish their mission. This implies that knowledge management is crucial in HEIs.

Furthermore, academic libraries are prominent components of all universities because they capture and share tacit and explicit knowledge. Academic libraries have adopted knowledge management as a viable means to improve their service delivery in this knowledge-based economy. In this regard, libraries should constantly upgrade their knowledge management practices to suit today's library environment. Maponya's (2004) study provides a broad overview of knowledge management and the role it plays in universities and academic libraries. According to Maponya (2004), knowledge management plays a fundamental role in academic libraries, since it can improve their services through enabling the knowledge-sharing culture.

According to the principles of KM, institutions of all types must maximise their available knowledge by storing, accessing and delivering knowledge in some manner, and as noted by Laal (2011:545) HEIs included. In institutions of higher education, research is crucial to knowledge creation and dissemination (Sohail & Daud, 2009:125; Singh, 2010:571). As noted by Cheng *et al.,* (2009:313), the dynamism of the modern world requires institutes of higher education to quickly create knowledge, and also to quickly apply that knowledge.

Cheng *et al. (*2009:313) assert that knowledge sharing is a seemingly "natural activity" among academic institutions, whereby the amount of knowledge generated by conferences, publications and seminars is far higher than in any other industry. Academic institutions are

required to manage, blend and share their knowledge, not only among the students but also among and across faculties and staff themselves (Sohail & Daud, 2009:126). Thus, Singh (2010:571) argues that HEIs must not simply provide knowledge to their students but they must also collaborate and manage their entire knowledge bases for future reference from students and staff. Due to the growing importance of KM in academic institutions, Sohail and Daud (2009:126) assert that several HEIs in the developed world have even received grants to aid in the implementation of their KM practices.

## 3.5 Benefits of KM in HEIs

In HEIs, KM is needed for the acquisition, documentation, transfer, creation, application, collection and donation of knowledge (Sohail & Daud, 2009:129). Shafique (2015:176) asserts that the effective use of knowledge capital in educational institutes can produce better decision-making capabilities, reduce an institute's "product" development cycle time, reduce costs, and improve its administrative and academic services.

### 3.5.1 Key factors of KM in HEIs

In the literature, numerous factors appear repeatedly to challenge the efficacy of KM in institutes of higher education. As noted by Sohail and Daud (2009:130), organisational culture, organisational structure and reward systems are "enablers" that are important for maximising knowledge sharing while barriers or impediments have been noted to include the lack of communication, the asymmetry of knowledge between staff, a lack of incentives, and a lack of trust and focus.

Despite the general nature among institutes of higher education for knowledge sharing, a study by Cheng *et al.* (2009) in Malaysian universities found that "knowledge hoarding" was a prevalent issue preventing the smooth dissemination of knowledge. Cheng *et al*. (2009) asserted, though, that it was possible to affect the willingness of academics to share knowledge through emphasis on personal expectation and through incentive systems. They also found that "forced participation" was ineffective in promoting knowledge sharing. In a separate study, Sohail and Daud (2009:130) discovered that behavioural factors were inherent in influencing the success of knowledge sharing among academic staff – either positively or negatively.

A study by Sarawanawong *et al.,* (2009:288) on Thai universities found that KM was often implemented ineffectively because of poor KM strategic planning. It was found that KM was a new concept for most staff who did not understand KM and these staff members often presented resistance to any initiatives for a KM programme. In order to overcome this

resistance, Sarawanawong *et al.* (2009:289) proposed a “hybrid strategy” focused both on personalisation and the technical aspects of “codification”. This meant improving the technical ability of the staff to capture, codify, store and organise the knowledge. In addition, they argued that generating a committed culture, effective leadership, a KM team, useful measurements and improved ICT were essential for overcoming their challenges in the management of knowledge resources.

Knowledge management is described widely in the literature as a valuable means of tapping the collective intelligence and skills of individuals and organisations to promote productivity and enhance performance (Brahma & Mishra, 2015:43). KM serves to “preserve past legacies” and to “learn new things and initiate new situations for both individuals and organisations in the present and the future” (Brahma & Mishra, 2015:43).

Authors such as Brahma and Mishra (2015:46) have gone so far as to describe knowledge as an asset in organisations within the modern “knowledge era” where any organisation that hopes to garner sustainable growth and development must optimise its knowledge resources. Ermine (2010:294) discusses the concept of *knowledge economics* (KE). Originally proposed by Foray (2004), the principle of KE is that knowledge has properties like an economic asset (Ermine, 2010:294-295).

In consideration of the knowledge asset (KA) of organisations, authors such as Spender (2003:59) have described organisations as “knowledge fields” that are dynamic collections of intrinsically restricted and disjointed bodies of knowledge that together form the organisation’s “K-inventory”. As such, the accessibility and use of knowledge within an organisation is said to have a direct effect on the efficiency of that organisation such as its performance which ultimately affects the financial bottom lines of the organisation and its investors’ returns on investment (ROI) (Brahma & Mishra, 2015:50). Sohail and Daud (2009:125) present an explanation by stating that, “from the point-of-view of an organisation, performance can be improved by providing useful and relevant knowledge to employees”.

### 3.6 Challenges of KM

Schultze and Leidner (2002:214) assert that knowledge is generally collected and managed on the assumption that “knowledge is good”. However, these authors allude to the notion that knowledge is a “double-edged sword”, whereby shortages in knowledge can cause various complications; yet, too much knowledge can also cause problems. Shortages in knowledge, for example, have been said to cause inefficiencies, expensive mistakes such as in the case of faulty new products, and chaotic social relations. Conversely, however, too much

information has been said to cause “rigidities that are counterproductive” in a dynamic world, the muzzling of diverse points of view and the formation of excessive accountability (Schultze & Leidner, 2002:214).

In essence, Tseng (2008) proposes a holistic framework (showed in Figure 2.1) to explore the effect of ICT in KM systems. This framework contains five key gaps and fully illustrates the management gaps that might occur during the implementation of KM systems (Tseng, 2008:151-152). Indeed, these gaps highlight the effect of ICT on KM systems because there is different understanding of KM activities and implementation in employees of different positions. KM implementation is hindered by the inability to identify and resolve gaps. This conceptual framework will assist to research the effects of ICT on KM, and will further illustrate the gaps that might occur when implementing the KM system at the selected university of technology.

## 3.7 The concept of ICT

The ICT era has brought about fierce competition, so much so that companies that maintain the status quo are bound to fizzle out. To this end, organisations are obliged to invest in new techniques that improve quality of work, productivity and customer satisfaction.

### 3.7.1 ICT vs information systems

In broad terms, information systems are the combined networks of components that act in unison in an organisation or establishment to produce, process and distribute information (Management Study Guide, 2016). Stair and Reynolds (2012:4) define an information system as sets of interlinked components designed for purposes of collection, manipulation, storage and dissemination of information and data with built-in feedback mechanisms towards a set objective. These components consist of the people, machines, databanks, processes and technologies, and constitute any system from paper-and-pen methods to more advanced, modern systems of information dissemination. According to the Management Study Guide (2016), ICT is a subset of ICT, constituting the machines, computers, communication devices and technology-based items that act to facilitate the improved production, processing and distribution of information in an information system (IS).

In the literature, the benefits of IS are described appropriately. According to Stair and Reynolds (2012:34), information systems are used by virtually every department in every industry of the economy for analysing data, improving customer service, aiding investment choices, scheduling, performing diagnostics, managing inventory, and aiding in important decisions that affect the success and sustainability of organisations. These information

systems are tools, techniques and methods of generating, processing as well as transferring information. Information systems deal predominantly with the design, development, implementation as well as management of computer-based information systems.

### 3.7.2 ICT opportunities

The availability of ICT infrastructure has presented several opportunities for knowledge management in South African universities such as easy communication and accessibility (Satgoor, 2015:105). In this regard, South African universities are seen to be ahead of their African counterparts. The utilisation of ICT in universities has improved information access through sharing and networking information.

Awuor *et al.,* (2013:253-254) make the argument that KM has been supported by ICT infrastructures within libraries in areas as diverse as sourcing for knowledge through the use of KM, large volumes of information and knowledge in institutional repositories, capacity building and shift from traditional to virtual/online resources and services of internet, transformation of LIS professional roles as subject specialists, access and dissemination of much volumes of information and the delivery of information products and services products such as print and electronic resources production.

KM Australia (2014:1-2) reports that ICT systems such as e-mails and Web content management. In addition, it has resulted in improved information access and encouraged employee collaborations. ICT facilities also improve employee capacity to deliver more reliable and meaningful services, as they deal with large quantities of information.

### 3.7.3 ICT application for KM in South African HEIs

South African universities have gone through tremendous transformation since year 1996 with an increased number of students and academic staff. Reviewed literature points out that the application of ICT that supports knowledge management in South African universities varies from one university to the other. South African universities have benefited from the National Integrated ICT Policy which brought about transformation that had improved the service delivery of libraries (National Integrated ICT Policy, 2014). Against this background, there is widespread adoption of ICT across South African Universities and access to information has been improved. The introduction of ICT in the South African economy has impacted positively on education in terms of development, both in rural and urban areas (Statistics South Africa, 2012). In addition, the South African government has shown commitment in improving internet access around the country.

### 3.7.4 Challenges of ICTs for KM in South African HEIs

Literature results have pointed out that South Africa universities are experiencing a major challenge of acute shortages of qualified skilled ICT personnel in several vital departments such as software development and telecommunications (Harris, 2011:2). This lack of skills will inevitably impact knowledge management in universities negatively. Duncan (2013) looked at the implementation of technology and attendant challenges in hospitals. As a result, the proposed some identified strategies to overcome the noted challenges. Some of the proposed solutions included adaptation of workflow to address one's own needs mitigated process barriers, continuous improvement and adequate training.

### 3.7.5 The role of ICT in KM

ICT plays a significant role in creating knowledge as well as its management. In this regard, ICT systems provide useful tools for capturing information as well as its application. ICT comes with a variety of capabilities such as archiving, transferring and sharing of information. In addition, these tenets enable efficient and effective classification of information and its dissemination. However, ICT only complements knowledge management (Sarlak & Forati, 2008).

ICT assist individuals and organisations to information. However, the relevance and usefulness of that said information need to be first confirmed and determined by the people. For the purposes of converting data into knowledge, there is need to interpret and understand the data in its proper context. The value of knowledge management is seen by the speed of its access and transmission. ICT assist in knowledge creation and in some cases knowledge encryption. Consequently, the proper ICT infrastructure is required as a precursor to successful knowledge management (Afrazeh, 2003). In this regard, strategic use of ICT becomes a necessity in order to keep abreast of the globalisation and the rapid changes in the workplace. Therefore, organisations should strive to establish knowledge management systems that utilise ICT systems in order to enhance the collection, processing and storage of information.

### 3.7.6 The role of ICT in organisational processes

ICT has been applied in various organisational processes such as production and sales. Since the inception of computers they have been used widely, and the integration of ICT in the economic and management systems has proven to play an effective role in organisations.

### 3.8 The impact of ICT on knowledge creation and management

Lamproulis (2007:40-41) notes that technology plays a significant role in enhancing the creation of knowledge in organisations. Thus, the adoption of ICT enhances the efforts of staff to increase the speed and efficiency of work. Another study by Hawajreh and Sharabati (2012) investigates the influence of ICT on knowledge management practices in Jordanian industrial companies and the results reveal a significant positive relationship between ICT and knowledge management practices.

Brahma and Mishra (2015:49) and Conway (2003:69) assert that ICT tools are applied for improving knowledge management, thereby making an organisation's knowledge resources easy to find and retrievable by users. Brahma and Mishra (2015:46) argue that technology is an important factor in the implementation of KM in organisations as it "complements, supplements and amplifies" the efficacy of the individuals working there. Specifically, Brahma and Mishra (2015:49) assert that technology enhances the knowledge work (KW) of individuals by augmenting the economic, labour-related and work-related elements of the organisations.

In earlier work by O'Leary (2004), the impact of ICT on knowledge was categorised into six classifications, namely the storage, organising, massaging, integration, filtering and navigation of the knowledge. The purpose of any ICT, as noted by Brahma and Mishra (2015:49), is ultimately to make the organisation's knowledge asset easy to retrieve and find so that those who need it can access and use it efficiently.

The majority of all the reviewed literature indicate that the development of ICT has inevitably resulted in increased amounts of information that can be accessed and reproduced easily (Eppler & Mengis, 2003; Bawden & Robinson, 2008; Filippov & Lastrebova, 2010. In addition, Lopez *et al.* (2009) found that knowledge management practices such as knowledge generation, transfer, codification and storage improve as a result of high ICT competency. Kasim (2010) and Safarzadeh *et al.* (2011) confirm the significant positive relationship between information and technology and knowledge management. In addition, Paghaleh *et al.* (2011) note that ICT supports knowledge management through enabling knowledge to be disclosed and shared quickly among knowledge channels.

According to literature, ICT is one of the critical success factors of knowledge management. Research results show that the majority of studies in knowledge management point out that ICT systems are crucial for successful knowledge management (Moffett *et al.*, 2003:23; Sherif *et al.*, 2006:796; Artail, 2009). Based on empirical literature, ICT consists of two

essential elements, namely the data-capturing capability that formalises and stores knowledge, and the usage of IT tools that manage knowledge (Rasula *et al.*, 2012). An analysis of literature shows that these two elements have a positive influence on knowledge management as a result of the quality and accessibility of information, among others.

The relationship between ICT and knowledge management has also been researched in the past (Eppler & Mengis, 2003; Bawden & Robinson, 2008; Filippov & Lastrebova, 2010). Their results show that the use of ICT tools and systems inevitably improves knowledge management practices. The survey conducted by Bawden & Robinson (2008) shows that ICT systems are prerequisites to and enablers of knowledge management. Therefore, it suffices to say that ICT systems and tools have a positive relationship with knowledge management practices while a host of authors like Coakes (2006:591) have documented the benefits of ICT. They note that ICT alone is not sufficient for knowledge management. In this regard, his study pointed out the need to match ICT and people for knowledge management to be effective (Coakes, 2006). Through a rigorous literature review it has been discovered that there are very few empirical studies on the impact of ICT on knowledge management practices in HEIs in South Africa.

## 3.9 Theoretical framework

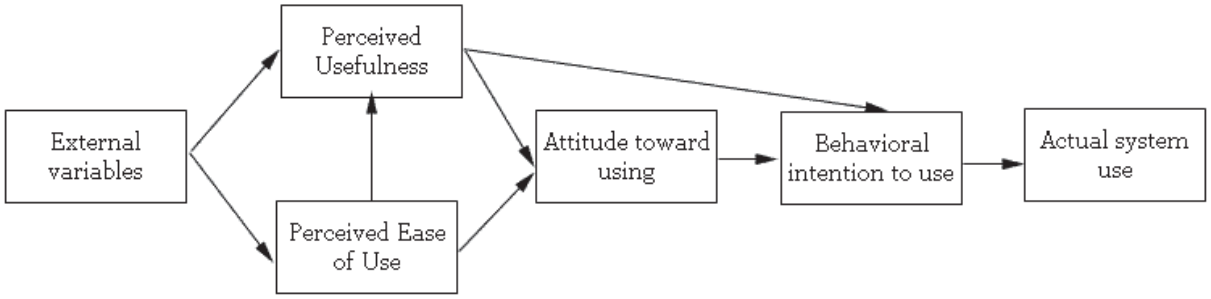
This study has adopted the technology acceptance theory due to the continuous use of ICTs and their usefulness in management knowledge. This model considers the social factors of individuals, technology and organisations which seem to be fundamental to the utilisation of ICTs. This model is adopted to improve understanding of the effects of ICTs on knowledge management. In addition, Venkatesh *et al.*, (2012), Park (2009) and Taiwo and Downe (2013) argue that this model is capable of predicating phenomenon such as users' intention to the use of technologies. In addition, it can be used in different contexts.

### 3.9.1 Technology acceptance model

The study utilises the technology acceptance model (TAM) theory developed by Davis (1989). The TAM has two cognitive beliefs, namely the perceived usefulness and the perceived ease of use. According to the theory, the adoption of ICT is directly influenced by the user's behavioural intentions, attitude, perceived usefulness as well as perceived ease of use of the system. In this regard, the theory emphasises more those salient factors that predict the acceptance and the use of ICT. Davis (1989) notes that perceived usefulness is individuals' belief that a certain technology can improve their work. Davis (1989:320) further claims that the usefulness of most tools and systems can have positive effects both on the

organisation and the individual. According to Davis (1989:320), the other construct of the TAM is the perceived ease of use that relates to the extent to which individuals feel that usage of a system will aid their work. This implies that the adoption of ICT systems will make their work much easier and reduce stress.

Bradley's (2009) study also employed the TAM, as depicted on Figure 3.1 below, in order to investigate librarians' behaviour towards the acceptance and use of information systems in the library environment. Research results reveal that their acceptance of new technology




inevitably enhances organisational efficiency and effectiveness.

Figure 3.1: Technology Acceptance Model (Davis, 1989)

Bradley (2009) notes that perceived usefulness is derived from the acceptance of technology and its capacity to improve work performance. In this regard, the perceived usefulness of ICT, to a substantial extent, depends on the usefulness of its application. For instance, at universities, if knowledge resources personnel such as librarians perceive that ICT is useful and beneficial to their work activities, they are most likely to adopt this new technology. In an attempt to show perceived ease of use, Bradley (2009:279) points out that librarians will find it easier to use new systems in the library environment. This model has gained a lot of support and continues to be used in various organisations to improve their performance. In this regard, the adoption of various ICT tools such as software and internet has been perceived to be very useful for knowledge management.

## 3.10 Conclusion

This chapter took a closer glance at the concept of knowledge management. Fundamental constructs such as information, knowledge and information systems were discussed. Thus, the roots of knowledge management and the effects of ICT on knowledge management were

debated. The discussion in this chapter provided some insights into the application of knowledge management and how it is affected by ICT. The research employed the technology acceptance model as the basis of the study.

# CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY

## 4.1 Introduction

This chapter presents the research design selected, the methodology applied and the research tools used during the research process. It explains how opportunities were exploited and how challenges were dealt with during the research process. The sub-headings are; research design, methodology, case study, literature search, data collection, sampling, data presentation and analysis, validity and reliability and a conclusion. A research design is mainly about the criteria used to gather information, the results produced and how they would be analysed (Mouton, 2001). Methodology refers to the tools and procedures used in the research process (Mouton, 2001) or as explained by Silverman (2013) it refers to "the history of the research process which identifies the decisions made during the research process," or to the epistemological home of an enquiry (Henning, 2014). This research uses both qualitative and quantitative methods in order to respond to the demands of the research questions and the use of both methods is usually referred to as 'triangulation' (Mason, 2012).

## 4.2 Research design

This project has followed an exploratory research design because only few researches have been done on the subject of the impact of ICT use in knowledge management in universities. According to Collis and Hussey (2009), an exploratory research design is carried out when a research subject or area is relatively new with very few or no other studies of the same having been conducted. In order to adequately answer the research questions in this research, an exploratory research design is therefore suitable for this study. The advantage of exploratory research is that it is flexible and adaptable to change and it lays groundwork leading to future research. If an exploratory research has been well conducted, it provides fundamental insight into a subject matter which becomes a vital source of balanced information (De Vaus, 2011).

Figure 4.1 below depicts the research design that was used during this research in order to illicit a response to the questions and objectives of the study.

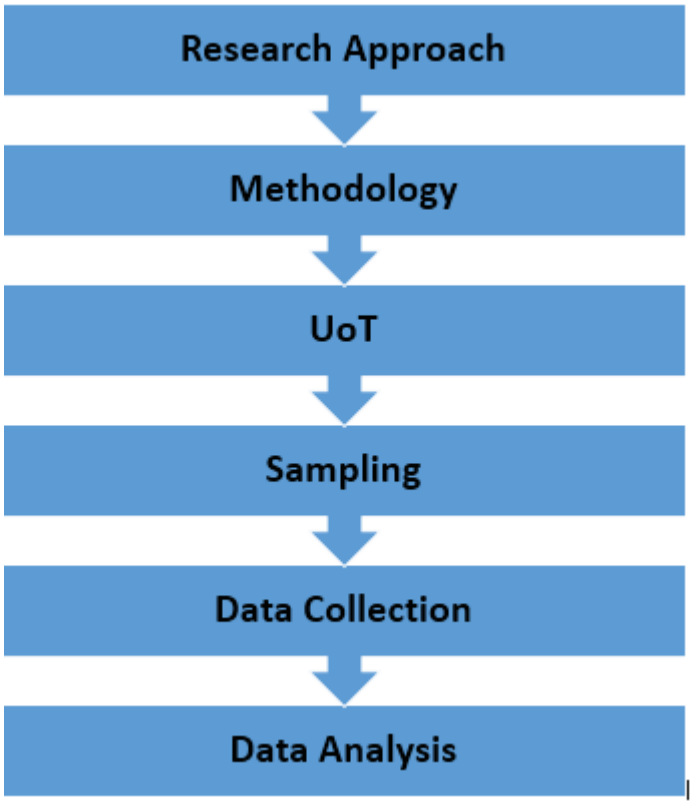



Figure 4.1: Diagrammatic representation of the Research Design

## 4.3 Methodology

A case study research was selected by using a combined Quantitative-Qualitative method in this study and it is typical of case studies and surveys to make use of both qualitative and quantitative methodology (Van Wyk, 2012). The combination of Quantitative-Qualitative methods is most effective when a researcher seeks to answer a particular type of research questions where thorough details are expected. Findings from a case study are usually used for generalisation in broader contexts (Mason, 2012). The methodological approach used in this research is often described as a mixed method, or 'Qual-Quant' methodology, and it includes a multi-disciplinary approach with both quantitative and qualitative techniques for sample measurement and analysis (Krammer, 2011:52). The use of Quantitative-Qualitative method has a number of strengths, including the ability to generate and examine theories, confirm findings, and obtain breadth and depth on a research topic (Teddlie & Tashakkori, 2009).

### 4.3.1 Qualitative Approach

Qualitative methods are valuable for inferring critical insights from people, into the perspectives of a phenomenon; while building knowledge on the subjective realities faced by the participants (Venkatesh *et al*., 2013:21). The qualitative phase of the research involved the "spectrum of techniques that make objective and systematic conclusions on the characteristics of messages" (Du Plooy 2009:30). The qualitative portion of the study was carried out in conjunction with the quantitative study. While qualitative data is typically informative and credible, it is criticised for lacking statistical robustness when smaller sample sizes are involved, and this makes it difficult to generalise small study results to a larger population (Teddlie & Tashakkori, 2009:127).

### 4.3.2 Quantitative Approach

Quantitative research has the advantage of having the statistical robustness that lacks in qualitative methodology and its results are more generalizable where small samples are used. Qualitative research methodology, however has the advantage of enabling the researcher to gather information which is valuable but difficult to quantify such as perceptions, attitudes and other qualitative research attributes. Therefore, where applicable, it is prudent for a researcher, to use both methodologies so as to minimise disadvantages while maximising on the advantages so as to improve the research product. Quantitative research is a research method anchored on the collection, manipulation and analysis of numerical data. Therefore, a mixed method approach will assist in overcoming weaknesses in either of the qualitative or quantitative aspects of a study (Khandker *et al*., 2010:1). The diagram on the next page summarises the research design and methodology used.

## 4.4 Data collection

Data included both primary and secondary data. Lapan and Quartaroli (2009) assert that "there are two sources of evidence on which historians base their analysis and interpretations: primary sources and secondary sources." The primary *data were* collected through the use of questionnaires as this is a quick and cost effective way of collecting data. Secondary data were derived from the primary data (Leedy & Ormrod, 2010:89).

Data were collected through a semi-structured questionnaire, site observations, and interviews. The questionnaire was used for quantitative data, while site observation and interviews were used for qualitative data. Respondents were asked to be part of the study after they were approached directly. Electronic questionnaires were issued by email to the sample population by the researcher. Questionnaires were distributed by email during office

hours, but they could be completed any time convenient to the participant. A demographic questionnaire was used to collect data about the characteristics of the participants. The questionnaire included among other things gender, age, position, education level and years of work service. The duration of each questionnaire survey is between five and ten minutes. The questionnaire was designed to be clear and unambiguous, in order to ensure its consistent interpretation. Answers were initially being recorded online by the system, and the *data were* downloaded on electronic file format for data analysis.

### 4.5 Sampling

The sample of a study refers to a portion of the population of interest that is used in a research study, to represent the entire population (Adams *et al*., 2007:81). The population of interest in a study has all the characteristics that may be used in a study, such as a complete class of individuals, a community, range of events or selection of cultural rituals (Given, 2008:643). The population of interest is comprised of students from a selected University of Technology (UoT) in class of individuals, a community, and range of events or selection of cultural rituals (Given, 2008:643). This study's target population consists of participants from a selected UoT in South Africa. This university has a total of nearly 6700 staff members. The numbers of staff members that are related to KM are about 250. This includes librarians, Faculty / Department officers, Administration staff members. The participants of this study comprise all level of age groups, various races and genders. The questionnaires were distributed to 130 of these relevant staff members and 20 Directors of these units / departments have been selected for interviews. This is an example of stratified sampling, where a certain group is chosen within a larger population because of certain characteristics.

During the site observation process, the researcher visited these relevant units / departments to observe the KM implementation to identify the challenge areas in line with the Tseng's (2008:151-152) "Gap Model" from the literature.

### 4.6 Literature search

A review of similar studies has the potential to enhance the research strategies adopted for another study. This involves making a survey of books, scholarly articles and other sources relevant to a particular issue. A good literature search, provides a critical evaluation and an overview of sources explored and demonstrates to the reader how a research project fits into the broader field (van Wyk, 2012). By making use of both old and current sources, the researcher traces the intellectual progression of an issue within a given field. A good literature review helps to identify where gaps are within the existing literature and helps

resolve conflict amongst seemingly contradictory researches and locates one's own research within a given context of existing literature (Fink, 2014). Literature reviews are best done in ways that include, primary and secondary sources of information, making a critical appraisal of the work yet maintaining one's own voice.

The literature search was thus done in ways that ensured that as much insight as possible is obtained from literature while clearly distinguishing the role of this particular project in relation to the broader body of works done in the field. Literature on the use of ICT on a global scale was searched and reviewed first, then literature on the use of ICT in Africa and lastly the use of ICT in higher education in South Africa. Valuable information on the state of ICT use in various universities in South Africa was unearthed through the literature search. It helped to see how other researchers attempted to present their work on the use of ICT in institutions of higher education, with clarity and rigor and an attempt was made to ensure that this research is equally rigorous and clear.

As a way to gain a deeper comprehension of the contemporary debates and issues pertaining to ICT in knowledge management, it was important to study literature that covered the relevant focus areas. Since the researcher is pursuing a master's degree in commerce, and this is the field of training, literature that looked at ICT from a commercial perspective was a suitable point of departure because it gave the researcher the opportunity to clarify his approach to the subject.

The focus was then narrowed to ICT in higher education in developed countries and this helped to draw comparisons between the less economically developed countries and more economically developed countries. The limitation of this literature search was that there was very little literature on the use of ICT in institutions of higher education in South Africa.

## 4.7 Research instruments

### 4.7.1 Interviews

Interviews can be carried out as individual interviews or as group interviews or focus groups. There are basically three types of interviews, structured, semi-structured and unstructured interviews (Mason, 2012). Data from interviews can be recorded through written notes, (as was the case in this project) or through stenography, audio recording or video recording. The assumption in interviews is that there is a questioner or interviewer, and one or more interviewees. The main aim would be to gather the views of interviewees on a given subject of interest. The advantage of interviews is that they pretty easy to understand and use (De

Vaus, 2011). The interviewer can digress and probe further where necessary. However, there is a disadvantage in that interruptions can occur during the course of an interview as happened once during this research. It also took much more time than originally envisaged to conclude all interviews. The questions asked during the interviews were mostly structured questions as opposed to semi-structured questions. The advantage of structured questions is that they get responses that are easy to categorise and subsequently analyse.

### 4.7.2 Observations

Sometimes, the best way to collect qualitative data is through observation. Observations can be done directly or indirectly, i.e. subjects of observation maybe aware or unaware that they are being observed. It can be continuous or happening at set-times. Data gathered through observation can be categorised as descriptive observations; written down descriptions of what is observed. Inferential observations refer to observations inferred from body language and behaviour. Evaluative observation makes inferences as well as judgement from the behaviour. This will produce a very good description in the long run. Part of the research story would be about the personal experiences acquired by the researcher during the data gathering phase. The main disadvantage of employing observation as a research method is that there is a limitation to what can be observed (Yin, 2014).

### 4.7.3 Questionnaires

Questionnaires are research instruments used for collecting quantitative research information. Usually they include a set of standardised questions that explore a given subject. Data collected by questionnaires include information on opinions, demographics, attitudes and behaviours (Mason, 2012). In this research, questionnaires were a very useful instrument through which vital information on the use of ICT at the selected university was collected.

## 4.8 Data presentation and analysis

Data analysis refers to the process of going through the data and trying to gain as much insight as possible into the data. It involves inspecting, cleansing, transforming and modelling data with the goal of discovering useful information (Koomey, 2016). It involves checking data for anomalies, re-performing important calculations, confirming totals and checking relationships between numbers. The researcher will be looking for patterns, trends, systems and any pointers that may emerge in the data which may help confirm the variables in line with the research objectives. This entails analysing the research data for details that may assist in providing a suitable response to the research questions.

The process of data discussion refers to the evaluation of the data by the researcher by posing relevant questions (Silverman, 2005). Questions such as the following:

- What is the relationship between the main units of the collected data?
- Is there a story that emerges from merging the units together?
- Are there any advantages and disadvantages faced and how did they affect the research outcome?

The qualitative *data were* analysed through content analysis. Content analysis is a commonly employed method of analysis in academic research and it is specified for qualitative data. Cavanagh (1997), as cited by Hsieh and Shannon (2005) states that content analysis is one of several research methods that can be used to analyse data; by researchers. Content analysis is a flexible method that can be used to analyse data and in this case, all aspects of qualitative data were fully assessed using this method.

The quantitative *data were* analysed and interpreted using of SPSS software package. This included descriptive statistics, such as frequencies, percentages and distribution figures. ANOVA analysis was carried out to determine the significance of the variables that derived from the literature. In addition, Cronbach's alpha was used to calculate the reliability of the dataset. Conclusions were then drawn from the results of qualitative analysis as well as the results of quantitative analysis combined. The advantage of combining qualitative and quantitative analysis is that it ensures that conclusions are thoroughly grounded and that results are as truly representative of the reality as possible.

### 4.9 Data validity and reliability

According to Strugwig and Stead (2007:136) data validity and reliability trustworthiness refers to "the extent to which a research design is scientifically sound or appropriately conducted. Validity is a tool to assess if an instrument measures what it is intended to measure." The Cronbach coefficient scale was employed to assess the validity and reliability of the instruments used to gather data for this study. For a research process to pass the validity test, it is suggested that both internal consistency reliability of the instrument and the discriminate validity of the items should exceed 85 percent to be satisfactory.

The following aspects pertaining to data validity and reliability were applied to this research study:

- Questionnaire is designed to enable respondents to answer the questions without negatively affecting the reliability and validity of the data collected

- The research study is transparent and clear enough to allow readers follow the research process and see how the findings led to the conclusions.

A Quantitative-Qualitative method was utilized to draw informative and grounded conclusions from the findings and to ensure that all aspects of the research have been properly and sufficiently represented and that the results are truly representative of the reality. Great findings can be compromised by a sloppy and inconsistent design. At the cornerstone of whether a research design is acceptable or not, is the issue of a properly crafted and consistent design. By ensuring that a research is repeatable, under the same conditions, researcher is addressing reliability concerns. Validity means that research results can stand up to rigorous questioning. For example, in this research, keeping a record of who was interviewed together with the questionnaire samples are some of the ways of ensuring repeatability and therefore reliability and validity.

A typical example of survey was utilised in this study it contained an option of 5 possible responses expected from the participants.

Table 4.1 Example of survey

| | **ITEMS** | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|---|
| **1** | **I can always rely on the university's ICT system** | | | | | |

For ease of reference refer to Appendix B for a list of questions pertaining to the research questionnaires for this study.

### 4.10 Conclusion

This chapter gave a detailed account of the research process and how it was conducted, through a combination of quantitative and qualitative methods, under an exploratory research design. It has also explained how data analysis was done. The next chapter presents and analyses data from research findings.

# CHAPTER FIVE: RESULTS AND DISCUSSION

## 5.1 Introduction

The overall aims of this research were to document the processes around the use and appreciation of ICT within the selected university of technology, and to assess the application of ICT in knowledge management at the specific university of technology.

A total of four questions were formulated to delineate or demarcate the areas of study which would help achieve the overall aims as referred to in the methodology chapter. A total of 111 staff members, both male and female at the institution, completed the questionnaire. As many as 50 questions, including interviews and biographical information (as shown on the questionnaire in Appendix C), were carefully formulated to elicit responses that would help answer the research questions.

Upon verifying the data, Q2 ("It is easy for me to inquire information") was blank for a large majority of respondents. It has thus been removed from data analysed below in order to protect validity and reliability of data. Q2 was meant to elicit response on accessibility of information using the available ICT at the selected HEI.

Having used the various research instruments to gather data, the subsequent task became grouping the data for analysis so that answers for the research questions could be derived from the findings. These were outlined with ICT and its implication for knowledge management being discussed. Answers to questions contained in the questionnaire were the main source of data analysed but there were also comments and observations which provided valuable information.

This research study, therefore, encompasses the writer's personal insight which are a product of the time spent in the setting. During the site observation process, the researcher has visited these relevant departments to observe the KM implementation to identify the challenge areas in line with Tseng's (2008:151-152) gap model from the literature.

## 5.2 Results of pilot study

As part of the pilot study validation of survey questions was conducted to ensure that the questions provided appropriate and meaningful feedback. According to Jackson (2008:71) validity indicate "whether the measuring instruments measures what it claims to measure". Five staff members and three students were approached and asked to complete the questionnaire. The pilot study ensured that questionnaire statements were easy to

comprehend; thus, not complex or unclear. In Appendix A on ethics, the researcher explained the instructions and requirements in order for respondents to complete the questionnaire. A descriptive statistical table (see Annexure F) displays the distribution of statements and responses.

## 5.3 Internal consistency

Reliability testing by means of the Cronbach's alpha coefficient test (refer to Table 5.1) was employed on all the questionnaire statements. Tavakol and Dennick (2011:54) iterated that Cronbach's alpha coefficients of 0.70 to 0.95 might be considered acceptable, and that at times, lower values in certain cases might be accepted. The Cronbach's alpha coefficient of all the questionnaires utilised in Table 5.1 showed a figure of 0.935 which indicated that the instrument was considered reliable and consistent.

Table 5.1: Reliability statistics

| Cronbach's Alpha | Based on Standardised Items | No. of Items |
|---|---|---|
| .935 | .935 | 39 |

## 5.4 Demographical results

In this section, tables and graphs have been used to present the demographical results (refer to Appendix E). These includes gender, age, educational level, work position, years of work experience, level of ICT skill and ICT application type.

### 5.4.1 Gender

Figure 5.1 classifies respondents by gender. It shows that the questionnaires have been filled out by 55 males (49.5%) and 56 females (50.5%). This indicates that the number of respondents in this survey is well balanced. The pie chart below shows the gender ratio of respondents.

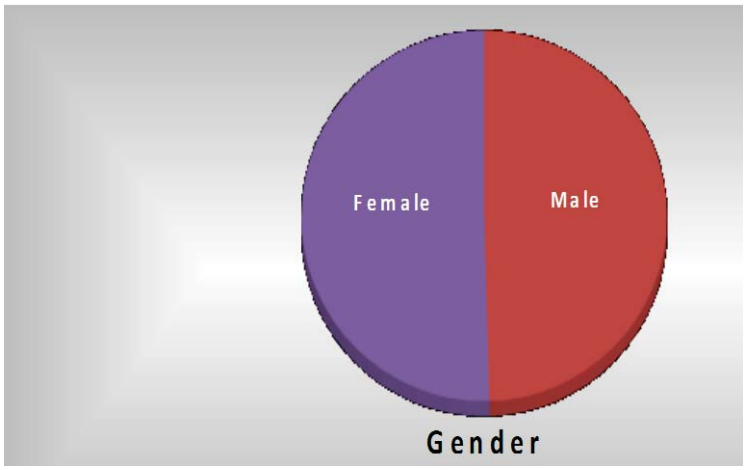



Figure 5.1: Distribution of respondents by gender (%)

### 5.4.2 Age

Figure 5.2 classifies the respondents by age group. The age frequency distribution indicates that 34.2% (n=38) of the respondents fall within the age group of 36-45 years, 24.3% (n=27) within the age group of 26-35 and 20.7% of the respondents (n=23) fall within the age group of younger than 25 years. It also shows that 12.6% of the respondents (n=14) are in the age group 46-55 years while 8.1% of the respondents (n=9) are within the age group of 56 and above.

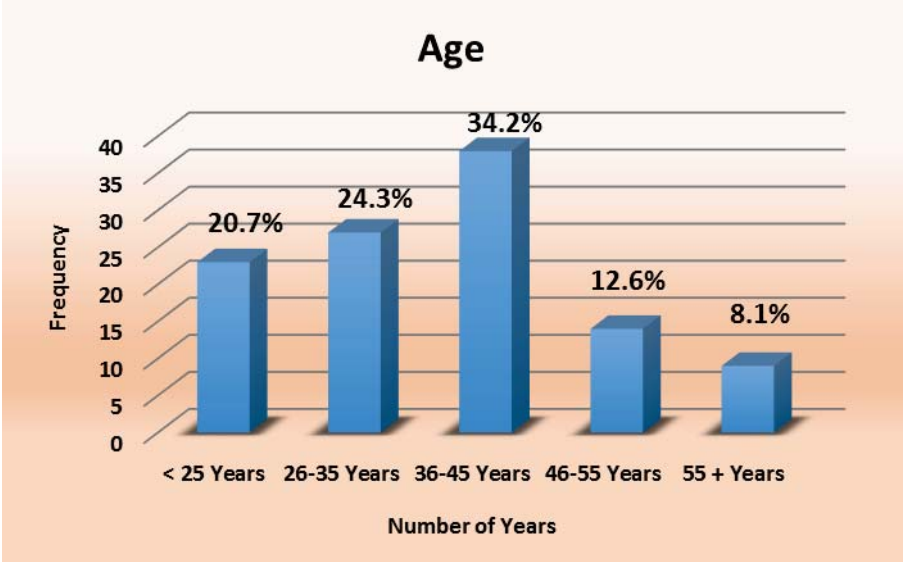



Figure 5.2: Distribution of respondents by age (%)

### 5.4.3 Educational level

Figure 5.3 demonstrates that the level of education the sample population. The respondents have been randomly selected professionals at the selected university of technology with qualifications ranging from matric (Grade 12), diplomas as well as bachelor's and master's degrees and doctorates.

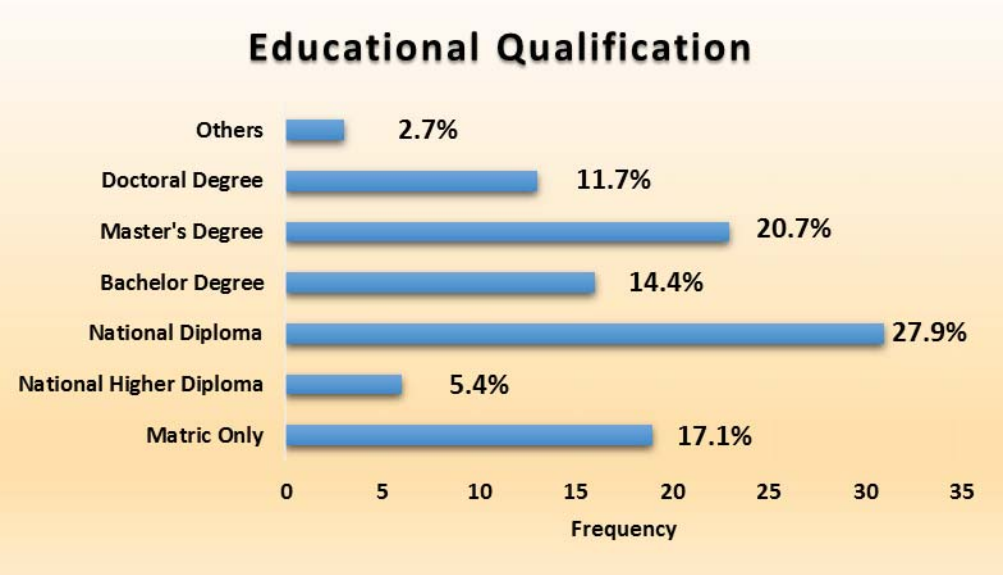



Figure 5.5: Distribution of respondents by educational qualifications (%)

Figure 5.3 indicates that most of the participants or 27.9% (n =31) have a national diploma, 20.7% (n=23) have a master's degree and 17.1% (n=19) have matric (Grade 12) only while 14.4% (n=16) have a bachelor's degree, 11.7% (n=13) hold a doctoral degree, 5.4% (n=6) have a national higher diploma while 2.7% (n=3) have other educational qualifications.

### 5.4.4 Work position

Figure 5.4 below indicates the position the respondents hold in the university of technology. The majority of the respondents, 34.2% (n=38), are academic staff, followed by 30.6% (n=34) students while 18.0% (n=20) are administration staff. Librarians make up 12.6% (n=14) while only 4.5% (n=5) are employed in other positions in the university of technology.

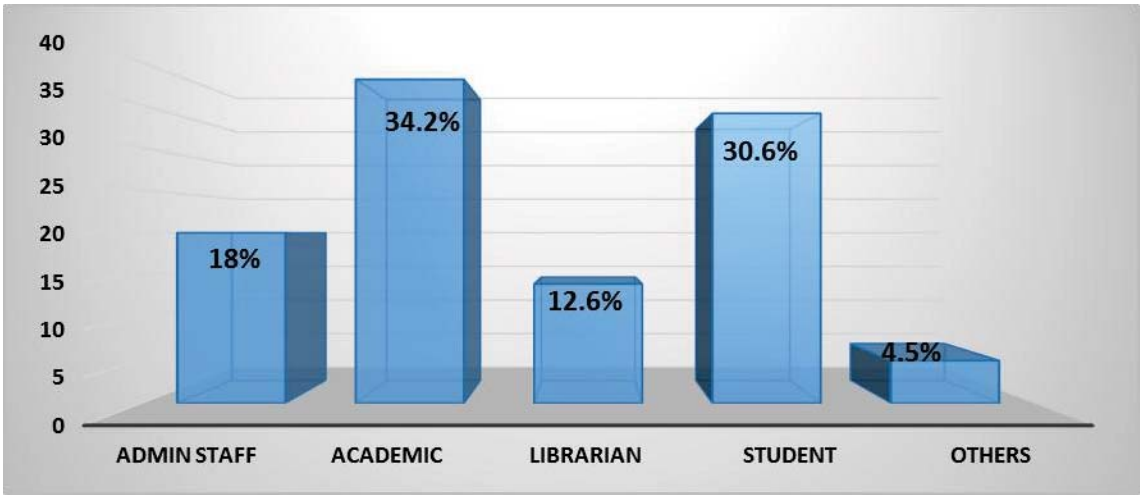



Figure 5.4: Distribution of respondents by position in the institution (%)

### 5.4.5 Years of work experience

Figure 5.5 shows the length of the period served by thr participantsNicole2014 in the institution. The majority of the employees (48.6% or n=54) have been in working in the selected university of technology for four years and more which indicates that they are quite familiar with the ICT applications and use at this HEI, 17.1% (n=19) have been working there for six months but less than 2 years while 15.3% (n=17) have worked there for three years but less than four years. Twelve respondents (10.8%) have worked there for two years but less than three years, while 8.1% (n=9) have worked there for less than six months.


Figure 5.5: Distribution of respondents by years of experience at this institution (%)

### 5.4.6 Level of ICT skill

Figure 5.6 shows the level of ICT skill that the respondents possess. The majority of the respondents or 59.5% (n=66) are computer literate; hence, ICT competent. As the level of ICT skill increases, the frequency number starts to decline; for instance, from competent which is 59.5% to highly skilled where the percent is 25.2% (n=28). ICT professional experts make up the smallest number of respondents or 3.6% (n=4), followed by beginners with 11.7% (n=13). The data indicates that the level of appreciation of ICT among those with ICT skills is much higher than among respondents who just work with ICT programs or innovations, yet without any formal ICT training.

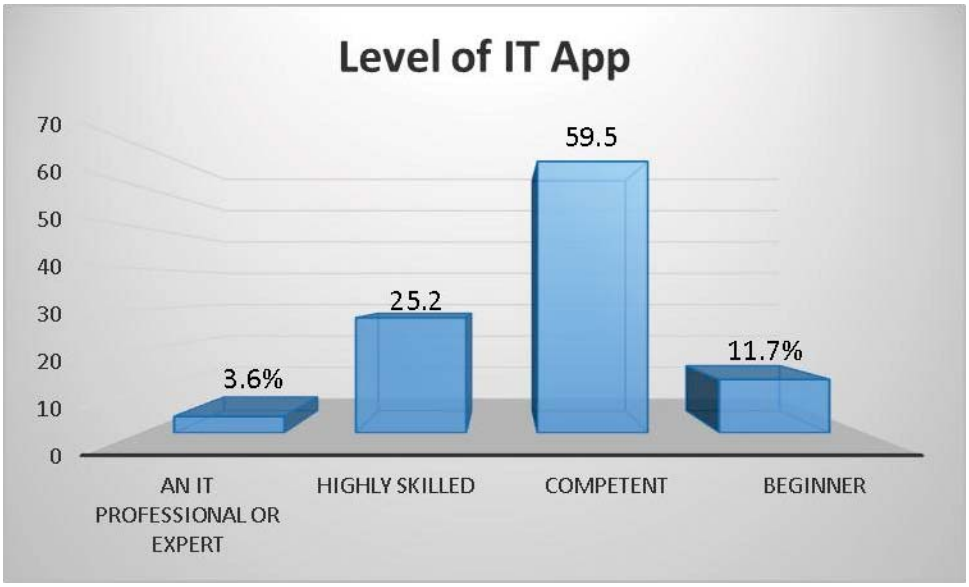



Figure 5.6: Distribution of respondents by level of ICT skills (%)

### 5.4.7 ICT application type

Figure 5.7 below illustrates the ICT application use among the sample population. It indicates that a variety of software packages are used across the different university departments, and that there are local and wireless networks on campus which are used by both students and staff alike. The type of ICT use by the respondents ranges from Microsoft Word and Excel to field-specific programs such as Pastel, e-Requisition and e-Learning. The majority of the respondents, namely 25.2% (n=28) use the e-Learning software which is an application designed to facilitate and support learning, demonstrating the central role ICT has taken in knowledge management at the selected university. This is followed by management information systems with 13.5% (n=15), the marks application system equalling 9.0% (n=10) while the online personal application comes in at 9.0% (n=10). The electronic requisition

stands at 8.1% (n=9) while the library system is 7.2% (n=8). Finally, 28% (n=31) are other applications or a combination of various applications used in the institution.

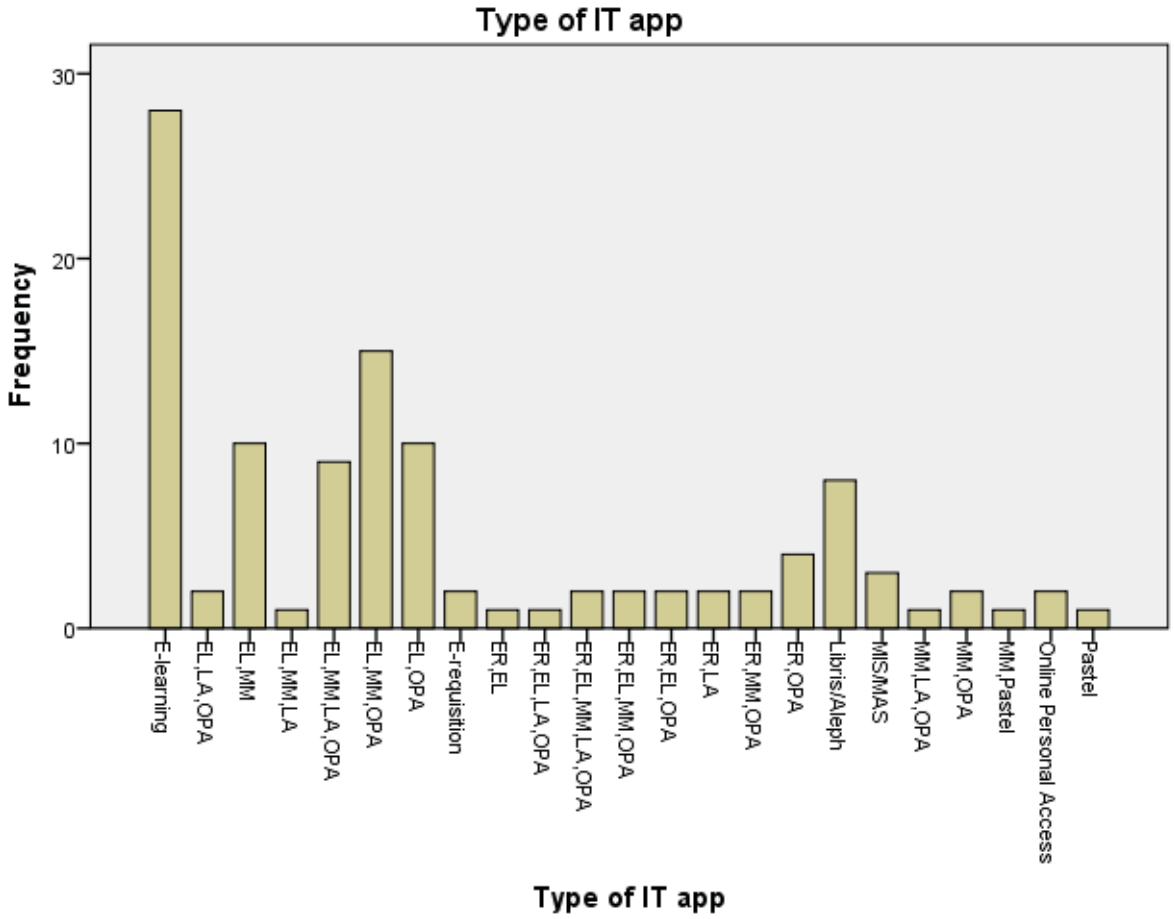



Figure 5.7: Distribution of respondents by ICT application use/type (%)

It is clear that the selected university of technology has fully embraced ICT because all the respondents work at the university in various capacities but they have confirmed that they use ICT in their work although the degree of use varies from one department to the other and from one individual to another. The investment by the university of technology in a wide ranging ICT infrastructure shows that there is an implicit policy to promote it at the university. The infrastructure includes huge computer laboratories, the establishment of ICT networks, Wi-Fi access and trained ICT personnel. ICT is used in all sectors of university life, confirming earlier findings in the literature search which have alluded to the fact that ICT use has revolutionised university operations throughout the world, including in Africa.

## 5.5 Data variation results

According to Leedy and Ormrod (2015:259), One Way Analysis of Variance or ANOVA is utilised to determine the varience among three or more means by comparing the variance. In this study, ANOVA has been employed to examine the data variation measurement and is outlined in depth in Appendix G for key variables between groups of this research project. The main aim is to accurately measure the significance of the key variables. Table 5.2 below shows the significance between all statements and the level of education of the respondents.

Table 5.2: One Way Analysis of Variance (ANOVA) statistical data (educational level)

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Q1 | Between Groups | 10.065 | 6 | 1.677 | 1.394 | .224 |
| | Within Groups | 125.179 | 104 | 1.204 | | |
| | Total | 135.243 | 110 | | | |
| Q3 | Between Groups | 4.026 | 6 | .671 | .679 | .667 |
| | Within Groups | 102.749 | 104 | .988 | | |
| | Total | 106.775 | 110 | | | |
| Q4 | Between Groups | 15.074 | 6 | 2.512 | 1.952 | .079 |
| | Within Groups | 133.863 | 104 | 1.287 | | |
| | Total | 148.937 | 110 | | | |
| Q5 | Between Groups | 8.435 | 6 | 1.406 | 1.114 | .359 |
| | Within Groups | 131.258 | 104 | 1.262 | | |
| | Total | 139.694 | 110 | | | |
| Q6 | Between Groups | 6.032 | 6 | 1.005 | 1.063 | .390 |
| | Within Groups | 98.365 | 104 | .946 | | |
| | Total | 104.396 | 110 | | | |
| Q7 | Between Groups | 7.503 | 6 | 1.250 | 1.046 | .400 |
| | Within Groups | 124.353 | 104 | 1.196 | | |
| | Total | 131.856 | 110 | | | |
| Q8 | Between Groups | 12.425 | 6 | 2.071 | 2.060 | .064 |
| | Within Groups | 104.566 | 104 | 1.005 | | |
| | Total | 116.991 | 110 | | | |
| Q9 | Between Groups | 4.864 | 6 | .811 | .817 | .559 |
| | Within Groups | 103.136 | 104 | .992 | | |
| | Total | 108.000 | 110 | | | |
| Q10 | Between Groups | 16.537 | 6 | 2.756 | 2.279 | .042 |
| | Within Groups | 125.787 | 104 | 1.209 | | |
| | Total | 142.324 | 110 | | | |
| Q11 | Between Groups | 16.867 | 6 | 2.811 | 2.056 | .065 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | 142.215 | 104 | 1.367 | | |
| | Total | 159.081 | 110 | | | |
| Q12 | Between Groups | 17.062 | 6 | 2.844 | 2.718 | .017 |
| | Within Groups | 108.794 | 104 | 1.046 | | |
| | Total | 125.856 | 110 | | | |
| Q13 | Between Groups | 10.161 | 6 | 1.693 | 1.706 | .127 |
| | Within Groups | 103.262 | 104 | .993 | | |
| | Total | 113.423 | 110 | | | |
| Q14 | Between Groups | 7.754 | 6 | 1.292 | .913 | .489 |
| | Within Groups | 147.237 | 104 | 1.416 | | |
| | Total | 154.991 | 110 | | | |
| Q15 | Between Groups | 15.097 | 6 | 2.516 | 1.617 | .150 |
| | Within Groups | 161.840 | 104 | 1.556 | | |
| | Total | 176.937 | 110 | | | |
| Q16 | Between Groups | 12.508 | 6 | 2.085 | 1.436 | .208 |
| | Within Groups | 150.970 | 104 | 1.452 | | |
| | Total | 163.477 | 110 | | | |
| Q17 | Between Groups | 12.885 | 6 | 2.147 | 2.090 | .061 |
| | Within Groups | 106.845 | 104 | 1.027 | | |
| | Total | 119.730 | 110 | | | |
| Q18 | Between Groups | 12.196 | 6 | 2.033 | 1.715 | .125 |
| | Within Groups | 123.282 | 104 | 1.185 | | |
| | Total | 135.477 | 110 | | | |
| Q19 | Between Groups | 14.625 | 6 | 2.437 | 2.356 | .036 |
| | Within Groups | 107.610 | 104 | 1.035 | | |
| | Total | 122.234 | 110 | | | |
| Q20 | Between Groups | 20.652 | 6 | 3.442 | 2.420 | .031 |
| | Within Groups | 147.907 | 104 | 1.422 | | |
| | Total | 168.559 | 110 | | | |
| Q21 | Between Groups | 9.986 | 6 | 1.664 | 2.341 | .037 |
| | Within Groups | 73.924 | 104 | .711 | | |
| | Total | 83.910 | 110 | | | |
| Q22 | Between Groups | 3.546 | 6 | .591 | .678 | .668 |
| | Within Groups | 90.724 | 104 | .872 | | |
| | Total | 94.270 | 110 | | | |
| Q23 | Between Groups | 5.133 | 6 | .855 | .718 | .636 |
| | Within Groups | 123.948 | 104 | 1.192 | | |
| | Total | 129.081 | 110 | | | |
| Q24 | Between Groups | 3.105 | 6 | .518 | .511 | .799 |
| | Within Groups | 105.291 | 104 | 1.012 | | |
| | Total | 108.396 | 110 | | | |
| Q25 | Between Groups | 5.607 | 6 | .934 | 1.114 | .359 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | 87.204 | 104 | .838 | | |
| | Total | 92.811 | 110 | | | |
| Q26 | Between Groups | 4.495 | 6 | .749 | .498 | .809 |
| | Within Groups | 156.496 | 104 | 1.505 | | |
| | Total | 160.991 | 110 | | | |
| Q27 | Between Groups | 5.885 | 6 | .981 | .720 | .635 |
| | Within Groups | 141.754 | 104 | 1.363 | | |
| | Total | 147.640 | 110 | | | |
| Q28 | Between Groups | 2.776 | 6 | .463 | .460 | .836 |
| | Within Groups | 104.593 | 104 | 1.006 | | |
| | Total | 107.369 | 110 | | | |
| Q29 | Between Groups | 17.111 | 6 | 2.852 | 2.392 | .033 |
| | Within Groups | 123.989 | 104 | 1.192 | | |
| | Total | 141.099 | 110 | | | |
| Q30 | Between Groups | 8.390 | 6 | 1.398 | 1.148 | .340 |
| | Within Groups | 126.691 | 104 | 1.218 | | |
| | Total | 135.081 | 110 | | | |
| Q31 | Between Groups | 8.362 | 6 | 1.394 | 1.058 | .393 |
| | Within Groups | 137.007 | 104 | 1.317 | | |
| | Total | 145.369 | 110 | | | |
| Q32 | Between Groups | 3.523 | 6 | .587 | .465 | .833 |
| | Within Groups | 131.414 | 104 | 1.264 | | |
| | Total | 134.937 | 110 | | | |
| Q33 | Between Groups | 4.353 | 6 | .726 | .567 | .756 |
| | Within Groups | 133.124 | 104 | 1.280 | | |
| | Total | 137.477 | 110 | | | |
| Q34 | Between Groups | 7.549 | 6 | 1.258 | .977 | .444 |
| | Within Groups | 133.875 | 104 | 1.287 | | |
| | Total | 141.423 | 110 | | | |
| Q35 | Between Groups | 10.648 | 6 | 1.775 | 1.532 | .175 |
| | Within Groups | 120.451 | 104 | 1.158 | | |
| | Total | 131.099 | 110 | | | |
| Q36 | Between Groups | 13.811 | 6 | 2.302 | 1.877 | .092 |
| | Within Groups | 127.559 | 104 | 1.227 | | |
| | Total | 141.369 | 110 | | | |
| Q37 | Between Groups | 19.728 | 6 | 3.288 | 2.972 | .010 |
| | Within Groups | 115.047 | 104 | 1.106 | | |
| | Total | 134.775 | 110 | | | |
| Q38 | Between Groups | 3.167 | 6 | .528 | .546 | .772 |
| | Within Groups | 100.527 | 104 | .967 | | |
| | Total | 103.694 | 110 | | | |
| Q39 | Between Groups | 3.295 | 6 | .549 | .527 | .786 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | 108.273 | 104 | 1.041 | | |
| | Total | 111.568 | 110 | | | |
| Q40 | Between Groups | 3.820 | 6 | .637 | .592 | .736 |
| | Within Groups | 111.748 | 104 | 1.074 | | |
| | Total | 115.568 | 110 | | | |

The data demonstrates that there is a strong significance between the educational level of staff members and these variables as indicated by Q8, Q10, Q11, Q12, Q17, Q19, Q20, Q21 as well as Q29. The variables that are aligned and significant for years of work experience are Q7, Q8, Q9, Q10, Q16, Q18, Q17, Q19, Q20, Q24 and Q25 (refer to Appendix H).

### 5.6 Descriptive statistical results

A questionnaire was distributed online for the respondents to answer according to their knowledge and usage experience of technology. The technology acceptance model (TAM) was modelled on respondents' feedback by examining several areas related to this subject.

Table 5.3: Code of quantitative data

| No. | Statement | Code |
|---|---|---|
| 1 | The university has a well-organised IT support for KM | Q1 |
| 2 | My IT skills assist me to attain my goals | Q3 |
| 3 | I can always rely on the IT system | Q4 |
| 4 | I seldom lose my information from the IT system | Q5 |
| 5 | It is easy for me to use IT programs/applications | Q6 |
| 6 | I create new knowledge by using IT programs/applications | Q7 |
| 7 | IT helps me to access data, information and other sources easily | Q8 |
| 8 | IT makes it faster for me to process data and information | Q9 |
| 9 | IT supports communication and collaboration within my department | Q10 |
| 10 | IT system is always available at the university | Q11 |
| 11 | IT helps me to identify better solutions for decision-making | Q12 |
| 12 | IT has a positive effect on my knowledge | Q13 |
| 13 | The university keeps IT systems and programs updated | Q14 |
| 14 | I access information without any IT issues at the university | Q15 |
| 15 | I am satisfied as a member of the institution to use IT | Q16 |
| 16 | IT caters for everyone who uses it | Q17 |
| 17 | IT provides information that I need regarding projects and decisions | Q18 |
| 18 | IT meets my work-related needs | Q19 |
| 19 | IT provides an opportunity for personal development and growth | Q20 |
| 20 | I use knowledge every day to attain my goals | Q21 |
| 21 | I can easily access information (books, journals, etc.) | Q22 |
| 22 | I understand my role towards knowledge management | Q23 |
| 23 | IT facilitates knowledge sharing | Q24 |
| 24 | I always share knowledge with my colleagues | Q25 |

| No. | Statement | Code |
|---|---|---|
| 25 | The university provides various workshops and forums for knowledge sharing | Q26 |
| 26 | Knowledge creation is highly encouraged by the department | Q27 |
| 27 | I archive useful information regularly for future use | Q28 |
| 28 | I always plan ahead for contributing to knowledge management | Q29 |
| 29 | Knowledge management issues are addressed by the university | Q30 |
| 30 | I know exactly whom to ask for knowledge when there is a need | Q31 |
| 31 | The university has a strong awareness in pushing research outputs | Q32 |
| 32 | It takes considerable effort to find information at the university | Q33 |
| 33 | My department is benefitting from its knowledge management | Q34 |
| 34 | IT has a positive effect on the knowledge management of my department | Q35 |
| 35 | The university is a knowledge-focused institution | Q36 |
| 36 | The university provides information and communication support tools | Q37 |
| 37 | KM enables integration and coordination with external organisations | Q38 |
| 38 | IT organises the knowledge collaboration process | Q39 |
| 39 | IT in KM develops knowledge worker collaboration | Q40 |

Table 5.3 reflects the categorical variables of the questionnaire, including the frequency for each category for Q1-Q40 in Figure 5.2, and finally, the total percentage for each category. Due to the result from the pilot study, Q2 has been identified as an invalid item. Thus, Q2 has been eliminated from the dataset.

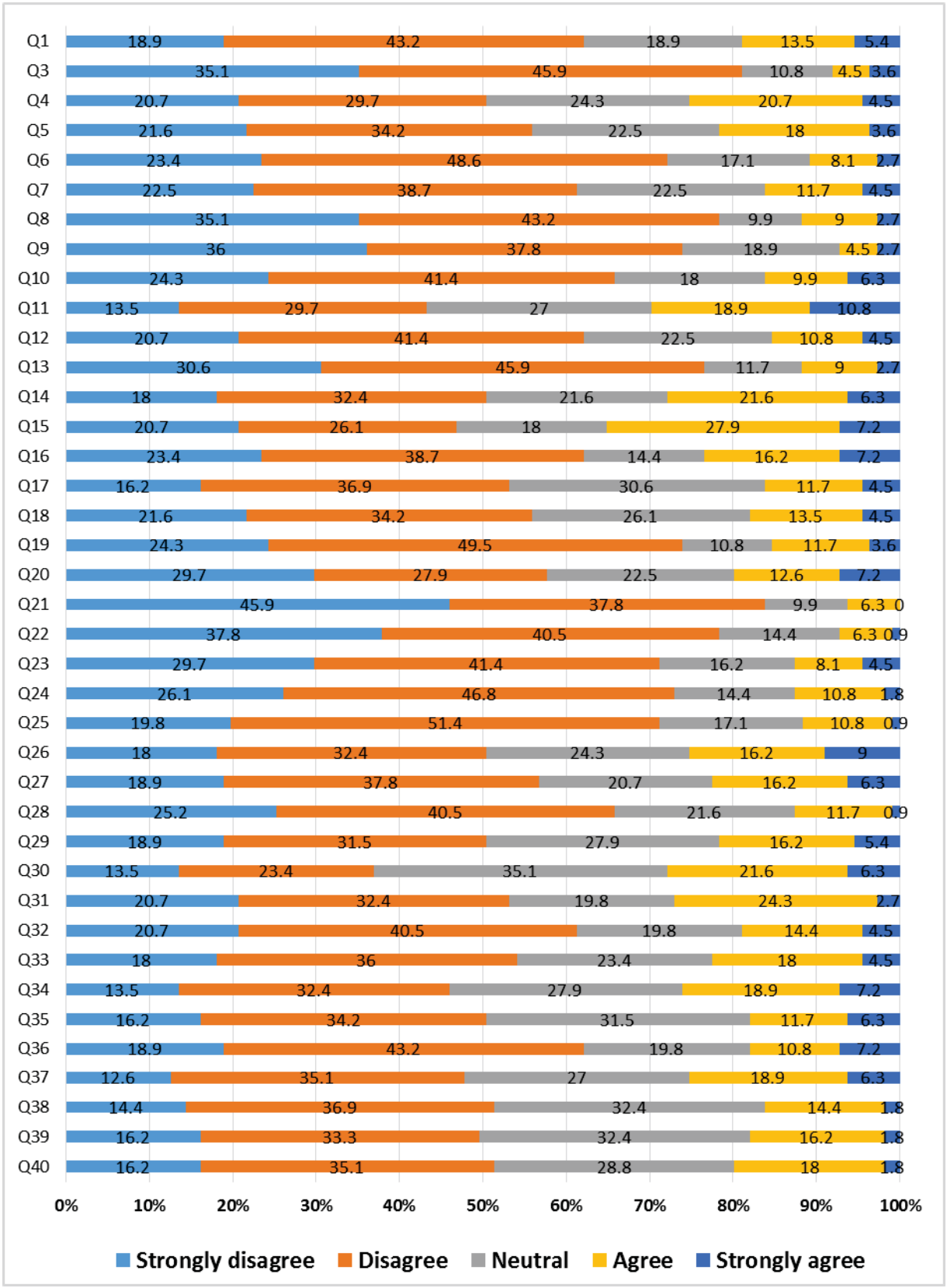



Figure 5.8: Responses from participants (%)

According to the information gathered through structured questionnaires (refer to Appendix F), a total of 111 responses were received. As depicted on Table 5.4, this study was divided into six dimensions relating to the different constructs of the study model.

Table 5.4: Dimensions

| | |
|---|---|
| Dimension 1 | External factors, i.e. gender, age, educational level, work position, years of work experience, etc. |
| Dimension 2 | Perceived usefulness |
| Dimension 3 | Perceived ease of use |
| Dimension 4 | Attitude towards using |
| Dimension 5 | Behavioural intention to use |
| Dimension 6 | Actual systems use |

### 5.6.1 External factors

Q3 showed that more than 80% respondents said they disagreed while 8.1% agreed and the rest were neutral that ICT skills assisted them in attaining their goals. One of the findings during the literature search was that users of ICT in higher education had varied external competencies and that these might have affected their view of the utility and contribution of ICT to knowledge management. The responses obtained during the questionnaire might well have been affected by this fact.

Statement 25 showed that 50.4% of the respondents disagreed to strongly disagreed that the university provided various workshops and forums for knowledge sharing while a total of 24.3% neither agreed nor disagreed (Q26).

According to Q4, 50.4% of respondents indicated that the system was not to be relied upon while 25.2% agreed and stated they could trust the system, and as many as 24.6% of respondents were neutral in their reaction. Although many resources had been evidently invested and significant growth achieved in the use of ICT at the selected UoT, it seemed that management was not able to leverage its advantages such as reliability.

Some of the barriers were caused by management gaps or ineffective ICT policies. Tseng (2008), as shown in Figure 2.1, explained in his holistic framework how management gaps might occur during the implementation of knowledge management systems. This was said to happen when there was a different grasp of activities pertaining to management of knowledge among employees of different positions and where external factors played a role. The data presented in this chapter clearly showed these differences among the selected UoT employees. The data also showed attitudes ranging from highly sceptical to neutral and

positive to highly supportive. Such differing attitudes showed that the implementation and use of IT in the UoT were not embraced fully by the employees.

All staff members who provided negative responses and many others who displayed the same attitudes but were not part of the research might passively resist the growth of ICT use because they had concerns arising from external factors.

### 5.6.2 Perceived usefulness

A total of 62.1% of respondents disagreed that the UoT had a well-organised ICT support system for knowledge management (Q1) while 18.9% said they fully agreed that the UoT had a well-organised ICT support system for knowledge management. However, 19% of respondents were neutral, since they did not agree or disagree.

Over 78% of respondents disagreed to strongly disagreed that ICT helped them to access data, information and other sources easily while 11.7% of respondents were in agreement to strongly agreed with the statement. The remainder of the respondents were neutral on the matter (Q8).

Q9 had a response rate of 16.2% where respondents agreed to strongly agreed that ICT had made it faster for them to process data and information. Similarly, with Q12 more than 60% of respondents disagreed that ICT helped them to identify better solutions for decision making. This response rate demonstrated the fact that there were varied, and in some cases, very negative perceptions towards usefulness of ICT in tertiary institutions. These perceptions were informed by the personal experiences of individuals as well as ICT skills and the availability of ICT and ICT accessories.

To Q40, 28.8% of respondents were neutral, 19.8% agreed to strongly agreed that ICT in KM developed knowledge worker collaboration while 51.3% disagreed to strongly disagreed on the matter

In response to Q5, 21.6% of respondents agreed to strongly agreed that they had seldom lost information from the ICT system while 55.8% disagreed to strongly disagreed with the statement. More than 22% remained neutral. Attitudes ranged from highly sceptical to highly supportive with a third significant group of neutral respondents. ICT adoption and implementation were generally considered two of the essential approaches to higher education globally as demonstrated in the literature search.

The selected UoT, just like other public universities in South Africa, is supported by the government financially through the Ministry of Higher Education (Satgoor, 2002) but that funding may not be sufficient to allow bigger allocations for ICT development and growth. However, at times it may be due to a lack of a concerted effort on the part of the UoT management, since the lack of funding lets them prioritise other forms of expenditure over ICT development. There are typically many competing items of expenditure on a university budget within an environment of limited resources.

It is worthwhile to note that more than 50% of the respondents disagreed that ICT had a positive effect on departmental knowledge management (Q35). This agreed with findings, as no ICT implementation plan was found at the specific HEI; however, according to literature, a good implementation plan was of great importance in order for effective contribution of ICT to KM for HEIs.

### 5.6.3 Perceived ease of use

22.5% of the respondents agreed that perceived ease of use of ICT to obtain information at the institution was lacking (Q33). As established by the literature findings, knowledge management and the adoption of ICT at tertiary institutions were beset by a myriad of challenges, particularly in the African context where all technological advancements were taking place at a much slower pace compared to the rest of the world.

More than 48% of participants disagreed that it was easy for them to use ICT programs/applications. This agrees with literature findings that the lack of training and support is most likely the cause for negative attitudes towards ICT use, improved competencies and levels of appreciation are likely to lead to a subsequent improvement in attitudes and effectiveness (Pircher & Pausits, 2011). The perceived ease of use and level of appreciation were higher among the more educated and experienced workers of the UoT (Q6). Satisfaction might be correlated with the ability to proficiently making use of ICT systems. It could also be argued that long exposure to ICT use created a positive attitude, leading to better levels of appreciation and acceptance.

At least 78.3% of respondents disagreed to strongly disagreed that they could easily access information, books, journals, etc. while 14.4% could neither disagree nor agree (Q22). The UoT needed to find innovative ways to improve perceived ease of use of ICT among all the workers because the findings showed that those with more ICT skills were more likely to appreciate the role of ICT in their work. The same respondents also claimed that ICT made their work easier and better. It was clear that a relationship existed between an ability to

apply ICT skills and an attitude towards the use of ICT. Those who experienced difficulties tended to have negative attitudes towards ICT use while those who were more erudite tended to have a more positive attitude.

Some 12.6% of respondents agreed to strongly agreed that they understood their role towards knowledge management whereas 71.1% disagreed to strongly disagreed (Q23).

More than 43% of respondents disagreed that the specific HEI was a knowledge-focused institution (Q36). Universities all over the world are under pressure to reform, modernise and keep abreast of international developments. So, they have to implement the use of ICT in knowledge management even though they have no explicit programmes that are geared towards promoting a wholesale acceptance of the technology.

In response to Q11, 29.7% of respondents agreed to strongly agreed that ICT systems were always available at the UoT while 27% were neutral. The remainder of the respondents disagreed and strongly disagreed. Literature asserted that the perceived ease of use of ICT would not reach its full potential in any institution unless the management put in place strategies for embracing and embedding the use of IT.

Only 27.9% of respondents agreed to strongly agreed that the selected UoT kept its ICT systems and programs updated while 21.6% neither agreed nor disagreed (Q14). The selected UoT could, therefore, not afford to lag behind the ICT revolution sweeping through institutions of higher education. It should invest more meaningfully in ICT.

### 5.6.4 Attitude towards using

The percentage of responses that are neutral is very high at 32.4% while “disagree” to “strongly disagree” is 49.5%, and “agree” to “strongly agree” stands at 19.8%. These respondents are most probably workers who could give positive responses in future surveys if their comprehension and attitudes towards using ICT systems improve (Q39). One of the respondents has confirmed that there are currently no policies at the selected UoT to up-skill the employees.

Q37 on the questionnaire was designed to elicit information on the efforts of the UoT to improve attitudes towards ICT use in knowledge management. The responses showed that more than 47% of the respondents stated that the UoT was not doing much to provide ICT support tools, with only 25.2% of respondents affirming that something positive was being done.

More than 70% respondents disagreed to strongly disagreed that they always shared knowledge with colleagues while 17% were neutral and 12% agreed to strongly agreed (Q25). It was imperative for the UoT to determine and prioritise ICT needs with the support and commitment of senior management.

A total of 36.9% respondents disagreed to strongly disagreed that KM issues had been addressed by the HEI while 35.1% of respondents were neutral. The establishment of knowledge management programmes, particularly a holistic knowledge management that chose ICT systems that were suitable for the context of the institution, was important for the growth of ICT use at the selected UoT (Q30).

### 5.6.5 Behavioural intention to use

As stated by Matzkin (2008), the most important goal of any organisation is to improve its productivity through the effective use of organisational resources such as information, labour and capital. To this end, technology and productivity have a positive relationship.

Although only 26.1% responded positively to the question of whether their department was benefitting from its knowledge management, this number showed that, though not the majority, there were many workers within the selected UoT whose experiences corroborated the findings in literature as far as behavioural intention to use was concerned (Q34). Those with positive responses could act as enablers and catalysts for the growth process of ICT appreciation.

Furthermore, 21.6% of the respondents indicated that they agreed to strongly agreed that they always planned ahead for contributing to knowledge management (Q29). This supported the notion that demands for knowledge management in institutions of higher education were increasing and becoming more diverse as institutions of higher education strove to become more and more relevant in a globalised world.

Moreover, 56.7% of the participants disagreed to strongly disagreed that knowledge creation was highly encouraged by the department while 22.5% agreed to strongly agreed with the statement, and the remainder of respondents were neutral (Q27).

In response to Q7, 61.2% of the participants disagreed to strongly disagreed that they created new knowledge by using ICT programs/applications. On the other hand, 16.2% of respondents agreed to strongly agreed with that statement.

HEIs the world over have embraced and implemented ICT in their core operations, and this view is supported by findings in the literature search. The adoption and use of ICT in knowledge management in HEIs are thus critical components of intellectual expansion and knowledge management.

Moreover, 16.2% of the respondents agreed to strongly agreed that KM enabled integration into and coordination with the external organisations while a total of 32.4% neither agreed nor disagreed (Q38).

Institutions use ICT applications in generating, processing and transferring vast information central to their operations. Through ICT and other IT-aided programs, knowledge is generally easier to find, store and retrieve, although some respondents in the research did not agree with this view, 18% agreed to strongly agreed while 55.8% disagreed to strongly disagreed and the rest were neutral (Q18). Likewise, only 23.4% agreed to strongly agreed that they were satisfied as members of the institution to use ICT (Q16).

### 5.6.6 Actual system use

In addition, 35.1% of respondents agree to strongly agree that the adoption and actual system use of ICT have allowed them to access information without any issues (Q15), 15.3% agree to strongly agree that they are able to do their work more effectively (Q19) and 19.8% agree to strongly agree that the UoT provides them with ample opportunity for personal growth (Q20). Electronic record-keeping and electronic libraries, including huge databases which are repositories of much valuable information are available at the selected UoT for use by students and staff in their academic needs.

The responses gathered show that using ICT in the management of knowledge at the selected UoT indeed has some benefits. These are assisting them to meet their goals at work, making it easy to accomplish some tasks through the use of different applications and searching for and creating new knowledge. However, the distribution shown by the percentages demonstrates that much still needs to be done to improve the appreciation, accessibility and actual system use of ICT at the institution.

Another 72.9% of respondents disagree to strongly disagree that it can be asserted that ICT facilitates knowledge sharing while only 12.6% of respondents agree and have responded positively (Q24). It can be argued that despite some perceptions to the contrary as shown by some responses in the research ICT has improved communications and the availability of information in institutions of higher education. To this end, 53.1% of the respondents

disagree to strongly disagree that ICT caters for everyone who uses it, whereas 30.6% neither disagree nor agree, and 16.2% agree to strongly agree (Q17).

Only 11.7% of the respondents agree to strongly agree that ICT has a positive effect on their knowledge (Q13). Insufficient research into issues affecting ICT implementation and use may also affect the management and effectiveness of ICT use in any organisation. Knowledge and attitudinal barriers are common in such situations. Therefore, 16.2% of the respondents agree to strongly agree that ICT supports communication and collaboration within departments while a total of 18% neither agree nor disagree (Q10).

In their response to Q28, 12.6% of the respondents agree to strongly agree that they do archive useful information regularly for future use whereas 65.7% disagree to strongly disagree to the statement.

Furthermore, 27% of the respondents agree to strongly agree that they know exactly whom to ask for assistance when they need it while 19.8% neither agree nor disagree and 53.1% disagree to strongly disagree with the statement (Q31). Institutions, including universities, are simultaneously technically and socially oriented; therefore, good design and implementation are not sufficient without taking into account the social factors that may affect the use of ICT. This implies that ICT implementation and growth trajectories should first and foremost be regarded as organisational change trajectories because technology interacts with people's cognitive or intellectual barriers.

In addition, 61.2% of the respondents disagree to strongly disagree that the selected UoT has a strong awareness in pushing research outputs; however, 19% of the respondents agree to strongly agree with 20% of respondents who could neither disagree nor agree (Q32).

Moreover, a total of 83.7% of the respondents disagree to strongly disagree that they use knowledge every day to attain their goals (Q21). The selected university of technology is the largest of this kind of university in the Western Cape in terms of enrolment, and its student population is very diverse.

### 5.7 Interviews

The following qualitative data outcome is based on responses from 20 directors and heads of departments who have been interviewed, seeing that they are key stakeholders in business decision-making from the selected UoT. The interview questionnaire is a data collection instrument with a wide range of questions whose answers are recorded by respondents

(Kumar, 2011:145). Interview questions (refer to Appendix D) have been structured in such a way that the responses will address the main research question. Data gathered from the interviews has been categorised into the following themes as per the investigative questions: ICT challenges, ICT benefits, KM challenges and KM benefits. The interview questions were formulated in the form of general questions which provided a general overview of the participants' perspectives on the variables pertaining to this study. The identity of respondents was coded in order to comply with good ethical conduct. The interviewees' responses are summarised below.

### 5.7.1 ICT challenges

***Directors***

Participants felt that ICT had many challenges even though it supported them in their daily business activities. Eighty percent (80%) of directors from different departments and research units felt that the following were some of the challenges they faced in their day-to-day experiences:

- E-mail not working on some days
- Slow internet connection
- Losing information on computers in the past
- ICT being expensive to implement and the employer sacrificing ICT resources
- ICT systems mostly problematic, making it challenging to perform work tasks due to difficulties
- Small laptop space capacity
- Using personal ICT tools to manage own knowledge
- Insufficient network space and storage space for data and information

***Heads of Departments***

The overwhelming majority of HODs, more than 90%, listed the following ICT challenges with regard to their daily transactions:

- Network connection is slow; cannot access files and repositories
- Computer hardware is bad; slow processor; small memory capacity
- Wireless network is unreliable most of the time.
- Operating system on computers is outdated.
- Computer hardware is not upgraded at the required intervals.
- Learner management software (LMS), Blackboard, is not stable.

- There is a lack of hardware for blended learning.
- They are forced to purchase additional tools with personal funds.

In order to eliminate obstacles and deal with factors contrary to change, there are several recommendations in literature that can be followed by institutions to follow. For example, after giving an overview of problems that hamper ICT implementation, Stewart et al. (2004) put forward possible remedies. In terms of challenges relating to industry, there are a number of solutions which include developing standardised processes or outputs with commonly available ICT applications to facilitate interoperability between users of the same institution. Another recent technique from research was to make public the advantages and extent of the gains that can be derived from using ICT-based communication systems. Coping with the organisational level barrier strategies included adopting ICT-related applications with short learning curves.

### 5.7.2 ICT benefits

***Directors***

The majority of directors indicated that computers reduced the cost of operations, and staff members' concerns should be addressed through capacity-building workshops or exercises. Of these respondents, 60% stated that, although many resources had been invested and significant growth achieved in the use of ICT at the UoT, it seemed that management had not been able to leverage its advantages. The benefits listed by the directors are as follows:

- Antivirus programs are always updated.
- ICT improves communication when all resources to communicate are functional.
- ICT policies and other documents are not easy to find.
- ICT saves time.
- Data management, reporting and sharing can be improved by using IT.

***Heads of Departments***

Respondents point to the importance of a good implementation plan. The absence of strategies and policies, which are well-articulated by the employees, may be a major hurdle in the acceptance and promotion of ICT use at the UoT, with 50% of these respondents naming the following benefits:

- Third-party support is efficient.
- The storage capacity of ICT entails more than people only.

- ICT provides portability so that they can travel with their information.
- ICT allows usage of educational videos, websites and e-books.

### 5.7.3 KM challenges

***Directors***

The general feeling from respondents was the concern that the UoT was lagging behind the ICT revolution sweeping through institutions of higher education in order to enable KM efficiency. The challenges felt by 70% of directors with regard to KM were:

- Only network drives provided for backup with 500 MB space.
- There is no knowledge sharing and workers operate in silos because of the negative organisational culture.
- There is not enough network space and storage space for data and information.
- There is no support or motivation for knowledge management.
- There has been no knowledge management project in the department.
- It is not easy to find relevant information and resources.

***Heads of Departments***

The majority of HoDs (90%) felt that KM was directly affected by ICT, more investment was needed for more meaningful ICT use and acceptance, and thus, they mentioned their challenges as follows:

- Blackboard online access, change and archive processes are nightmarish.
- Staff have to rely on external storage devices which are unreliable and unsafe.
- Archives and records are not digital.
- Always lots of software popups prompt for updates to be done.
- Lots of outdated information, people who must authorise procurement orders, leave applications, software approval and installation are problematic.
- They have a fear of security risk and breach on Cloud networks.
- Some files cannot be shared due to limited email size restrictions.
- There is no network storage for storing and retrieving files.

### 5.7.4 KM benefits

***Directors***

Participants felt that KM had many benefits, especially if implemented efficiently, and 30% of the directors from different departments felt that the following were some of the benefits of KM:

- They are able to access the online student system, Blackboard, while being on- or off-campus.
- Organisational drives exist on the network.
- There is a better flow of business operations where KM is implemented and improved.
- Service desk is prompt in solving their issues.

***Heads of Departments***

HoDs felt that KM crucial in the 21st century. Therefore, 50% of HoDs indicated that most organisations had utilised or implemented KM services or applications to support business processes and activities. As such, they felt some of the benefits of KM were as follows:

- KM facilitates sharing of specialist expertise.
- Innovation is improved by KM.
- Integrating KM into existing processes and information systems is crucial.
- They use third-party resources such as Google Drive and Dropbox to manage their data.

Findings acquired through the responses from the directors and HoDs indicate both negative and positive perceptions of the TAM model. The findings also show inter-construct relations exist between all technology acceptance model constructs (refer to Appendix I). Actual system use, which refers to how technology is accepted, is influenced directly by the intent to use and by perceived usefulness. In turn, behavioural intention to use impacted by perceived usefulness and attitude towards using, and indirectly affected by ease of use and perceived usefulness. Perceived usefulness is directly affected by perceived ease of use. This points to one of the findings during the literature search that users of ICT in higher education have varied competencies or proficiencies, and that these may affect their perception of the usefulness and contribution of ICT to KM. The responses obtained during the interviews may well have been affected by this fact.

## 5.8 Conclusion

As alluded to earlier in the research, the academic environment in the world in general, and in South Africa in particular, is highly competitive. Therefore, the embracing and usage of ICT in any higher education institution are critical components of intellectual growth and expansion as well as knowledge management. Institutions generate, process and transfer vast information through ICT and because of that, knowledge is generally easier to find, store and retrieve. Also, a variety of software packages are used across the different university departments, and the availability of campus networks demonstrates the central role ICT has played in knowledge management.

However, the data presented and analysed has incontrovertibly shown that there is a diversity of views regarding the levels of use and effectiveness of ICT at the selected university of technology as is most probably the case at other universities as well. The challenge for the university of technology's management is to improve the ICT skills of university employees so that they are able to comfortably manoeuvre through the ICT system, to maximise its benefits and ultimately, to be more productive for the UoT. By making budgetary allocations, which prioritise ICT and the concerns of ICT users in the UoT, can also go a long way in ensuring that ICT contributes more meaningfully to knowledge management. Since investment in ICT-related projects tends to be of a substantial cost with a high failure rate, as a proposed guideline from the study, a sound monitoring and evaluation programme can help improve the benefits of ICT use by employing ITC evaluation techniques (Remenyi & Sherwood-Smith, 1999).

Thus, evidence has indicated an inclination towards a positive correlation between ICT and knowledge management. Research findings have been, to a large extent, consistent with literature findings. Theories from literature have helped to shed light on the findings, since the four research questions have been answered through the data presented as well as the interpretations from literature.

The next chapter concludes the study by revisiting the research questions and objectives, as well as identifying limitations, contributions, recommendations and possible future research.

# CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Introduction

The first chapter introduced the study and laid the groundwork and foundation necessary to the study; thus, the objectives, problem statement, research questions and the organisation of the study were provided. Chapter two provided an overview of ICT and KM at HEIs from a global perspective and also from a South African perspective. Chapter three analysed the applicable theoretical and empirical literature. Chapter four presented the research design selected, the methodology applied and the research tools used during the research process. Chapter five elucidated on the data presentation, analysis and interpretation of the results. Finally, this chapter presents an overall summary and conclusions of the research as well as recommendations for policy in the light of the findings and the limitations of the study. The summary and conclusions are drawn purely from the research findings and sectional conclusions while the implications and recommendations are drawn from research findings and also from relevant literature findings. The findings and recommendations are presented first.

## 6.2 Findings

This research explores the usefulness of ICT systems as a support mechanism for knowledge management. The results and suggested solutions from this study have the sole purpose of enhancing the ICT techniques and methods used by universities in knowledge management.

This study set out to assess the effects of ICT on knowledge management in tertiary institutions where the selected university of technology was used as a case study. Research was done through an exploratory qualitative and quantitative research design, and conclusive evidence was gathered which demonstrated that, to a substantial extent, the utilisation of ICT in knowledge management was crucial in organisational decision-making.

Hawajreh and Sharabati (2012) note that knowledge management gives an organisation a competitive advantage in this current dynamic environment and global environment. To this end, it is imperative for organisations, including HEIs, to improve their work performance and uniqueness through the utilisation of knowledge resources among other organisational resources. Knowledge has, therefore, increasingly become a fundamental process in organisations and is a key ingredient for continuous change.

Higher education institutions need to enhance their ICT and IKMs frameworks, in order to contribute appropriately situations they encounter (Pircher & Pausits, 2011). The findings indicate that IT users have varied levels of competencies when it comes to ICT use. The challenge for the university management is to improve the ICT skills of university employees so that they may expand their ability to comfortably manoeuvre through the ICT system, maximise its benefits and ultimately, be more productive for the University of Technology.

There is no holistic framework to address and guide the vital relationship between ICT and knowledge management. Both the research findings and literature findings have revealed that knowledge management and ICT have a strong relationship as outlined in the problem statement. The research findings, however, also show that there is no evident effective coordination of these functions.

## 6.3 Recommendations and implications

This study investigated the role of ICT in management of knowledge in HEIs through a case study of the selected university of technology. The research gathered some very useful information regarding the application of ICT in university operations, including valuable information on worker attitudes towards the use and effectiveness of ICT in knowledge management.

As predicted by the technology acceptance model, as shown on Figure 3.1, the usefulness of technology is affected by perceived ease of use and individual attitudes as well as other external variables. The model maintains that, for total acceptance, there is a need for growth in behavioural intention to use and actual usability of the system; hence, a significant proportion of workers have accepted that ICT use improves work performance while many others say it does not. It may be interpreted as a sign that those who do not accept the statement have not dealt with the need to grow their own understanding of the system.

### 6.3.1 Impact of ICT on KM within HEIs

As explained in the introductory chapter, ICT is a vital tool that enables the effective management of other resources in the organisation. It is, therefore, imperative that each institution of higher education, particularly universities, come up with appropriate policy frameworks that can effectively promote the acceptance and use of ICT. Such policies should be geared towards improving access and removing barriers to ICT use among staff and students.

Another intervention approach could be firstly, to improve confidence among users, emphasise the integral part played by ICT and thirdly ensure skills development through training programs.

### 6.3.2 The main benefits of ICT in HEIs

The study findings show that the use of ICT in knowledge management at the selected HEI has benefits. More benefits can be achieved to improve higher education tasks at the specific institution through collaborative learning such as improved organisational communication. Song *et al.* (2006) and Zhang (2008) share the same sentiment that points out that development of ICT has a significant effect on knowledge management and that most technological tools enhance organisational capacity. This agrees with findings from literature which assert that technology enhances the knowledge work (KW) of individuals by augmenting the economic, labour-related and work-related elements of the organisation (Brahma and Mishra 2015:49).

### 6.3.3 The barriers of implementing ICT in HEIs

Cheater et al. (2005) claims that "barriers may be related to three issues: individual, social, and organisation. In order to fruitfully change behaviour, barriers should be identified and strategies developed to overcome these barriers. Potential barriers to change are costs, lack of skills and resources, time limitations, priority of other businesses, technical difficulties, internal politics, commitment to the current practices and a strong organisational culture." The selected university of technology, therefore, needs to put a plan in place to manage change, as some workers appear to be against change.

### 6.3.4 Key functions of ICT in KM at HEIs

Tezcan (2006) concurs with the view that there is generally a lack of administrative support when it comes to ICT use in HEIs. The scholar goes on to identify other hurdles which can be dealt with through administrative support such as scepticism about the effectiveness of ICT in improving work and learning outcomes and improved software designs. This study also points out that workers have an equally important role as management by personally choosing to invest time in improving their ICT skills.

In the same vein, literature corroborates that, as a result of the challenges noted by Tezcan (2006), some students attend an HEI and leave without having benefited fully from the availability of ICTs at the institution. According to Tezcan (2006) "ongoing vendor involvement, acknowledgment of technology limitations and attempts to address them are

crucial to overcome technology implementation barriers. Staff resistance in the selected UoT has been addressed through clear communication, identifying champions, emphasising new information provided by the system and facilitating collaboration."

### 6.3.5 Ways of improving KM through ICT at HEIs

As a proposed guideline, HEIs need to adopt policies that improve access to ITC use within all their operations. It has been shown that improved access eventually leads to higher levels of appreciation of the role of ICT in any institution. To achieve improved access, institutions of higher education should adopt policies that enable them to invest significant resources towards the adoption, implementation and expansion of ICT use by workers and students. The establishment of long-term, effective, responsive and resilient ICT-friendly environments promotes efficient adoption and application of ICT. It calls for strategic planning on the part of the institutional management.

Institutional support for students and staff is a critical factor in achieving an academic environment where ICT use is both proficient and effective. On the part of national government, continued or increased growth in investment in ICT by funding universities' expansion in ICT knowledge and infrastructure is a good starting point. A national policy, which promotes and facilitates the adoption and implementation as well as expansion of ICT use in universities, is a good starting point for the growth of ICT use in institutions of higher education.

Institutions of higher education, particularly the selected university of technology, need to introduce basic and advanced short courses geared towards improving the levels of ICT proficiency and appreciation among their employees and students. This implies availing to the employees and students the assistance they may need or require in their daily use of ICT. To a substantial extent, knowledge management is critical in organisational decision-making. Hawajreh and Sharabati (2012) note that knowledge management gives an organisation a competitive advantage in a dynamic environment where tough competition surrounds every kind of business.

Cheater et al (2005) state that, "rapid developments in information technologies offer such opportunities that have not been possible for the organisations years ago. In the face of such developments and pressure companies, their employees and especially their managers are faced with the enormous practical and conceptual challenge of transforming today's organisations into automated enterprises. Change may be more likely if the strategies were specifically chosen to address the identified barriers."

## 6.4 Contributions of the study

### 6.4.1 Significance of the study

The study has significant importance in that it has honed the researcher's research capabilities, especially by dealing with a higher education context which requires a lot of time and effort. In addition, the study has enabled the researcher to acquaint himself with how universities of technology use ICT in knowledge management. The goal of the study has been to carry out an inquiry into the effects of ICT on knowledge management in a specific university of technology.

### 6.4.2 Contribution to the body of knowledge

As stated earlier, knowledge management is a relatively emerging concept that has not been researched widely. It is still necessary that the consequences of ICT on knowledge management be established. Therefore, the study contributes valuable insight into the existing body of knowledge in various ways. Firstly, the existing gap regarding the effect of ICT on knowledge management is now context-specific for South African HEIs. Furthermore, the significance of the study emanates from the widespread adoption of ICT in several HEIs. The adoption of this technology in knowledge management will differ significantly from the conventional methods and techniques, thus improving the access of information and the speed of retrieval.

This study contributes to enriching South African knowledge management literature that may arouse interest from prospective researchers and practitioners. The study inevitably provides guidance with regard to the benefits of ICT on knowledge management. Therefore, the research results provide an impetus for practitioners to apply ICT in order to improve their knowledge management operations. The research outputs can also be used in staff development programmes. South African HEIs will be beneficiaries of the research findings of this study.

### 6.4.3 Contribution to existing literature

There are gaps in literature, especially in the ICT and knowledge management domains. Previous studies do not address the relationship of ICT and knowledge management in HEIs. This study pays attention to the relationship between ICT and knowledge management. Therefore, based on that, the study at hand inevitably adds to existing literature in a unique way. In addition, the research output of this study can also be utilised as a reference tool for academic purposes and university management, among others.

## 6.5 Recommendations for further studies

This study investigated the role of IT in knowledge management in HEIs through a case study of the selected university of technology. The study gathered some very useful information regarding the application of ICT in university operations, including valuable information on worker attitudes towards the use and effectiveness of ICT in knowledge management.

However, further studies might be required to show how institutions of higher education could maximise the benefits of ICT in knowledge management. Other studies might take a comparative approach and examine the gaps in ICT use across South African universities. Such studies might also expose the nature of barriers in ICT use and make recommendations on the ways for overcoming such impediments. It will also be interesting to find out the experiences and views of stakeholders in ICT use at other institutions of higher education such as students, management and teaching staff. Such studies may generate valuable information that will shed more light on the opportunities and challenges of ICT use in knowledge management in institutions of higher education.

## 6.6 Limitations of the study

The study provides relevant insight into the relationship between ICT and knowledge management; therefore, it is key to highlight some of the challenges and limitations.

This research was limited to only one University of Technology, which was used as a case study, because the researcher attempted to practically deal with time and resource constraints surrounding the research project. This tends to limit the usefulness and generalisability of the findings. The sample size could not be larger because of a strain in financial resources.

Another limitation of the study had to do with the selection of respondents which was only limited to those involved in knowledge management from relevant units or departments of the UoT, and as such, those divisions were the only ones selected to participate in this study.

## 6.7 Conclusion

The final chapter discussed a number of recommendations pertaining to the various barriers identified in the research. The conclusions drawn from this study are that many factors affect the use of IT in knowledge management at HEIs. There others who believe that ICT is a tool that can improve lives but some are not as enthusiastic. Consequently, there are different

motives and barriers to change in different settings and at different times. As alluded to in the discussions of the findings and also in the recommendations, the level of acceptance of the use and importance of ICT in knowledge management at the selected university of technology is low. An analysis of theories from literature as well as the research findings has shed some light on the causes of such situations.

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# APPENDICES

## Appendix A: Ethics request letter


Graduate Centre for Management
Cape Peninsula University of Technology
P.O. Box 1906, Bellville, 7535
Tel: 0219538723
Cell: 0834306806
Email: fundav@cput.ac.za

Head of Departments: Operations Management, Mechanical Engineering
Cape Peninsula University of Technology

Date: 29 March 2017

**MTECH: BUSINESS INFORMATION SYSTEMS CONSENT LETTER**

| | |
|---|---|
| Principal Investigator: | Mr. Vusumzi Funda |
| Co-investigator: | Dr. Bingwen Yan (Research supervisor, CPUT) |
| Physical Address: | Faculty of Business and Management Sciences<br>Cape Peninsula University of Technology, Bellville Campus<br>Symphony Way, 7535 |

We seek permission to conduct a research for the dissertation as identified above which is being conducted by Mr. Vusumzi Funda and Dr. Bingwen Yan (research supervisor) from the Graduate Centre for Management, in the Business and Management Sciences Faculty, Cape Peninsula University of Technology. The title of the research is: “Impact of Information Technology on Knowledge Management at a selected University of Technology”. The dissertation will be submitted in fulfilment of the requirements for the Master of Technology Degree in Business Information Systems by Vusumzi Funda.

**Purpose of the Research**
The purpose of the research is to explore and examine the effects of information technology tools on knowledge management in selected universities of technology in South Africa and to mitigate the research problem through the implementation of a feasible and viable problem solving mechanism.

**Participants to the Proposed Research**
This survey is intended to be conducted by staff and students. We therefore seek your approval to allow staff members from your organisation to take part in the survey.

**Benefits of participating**
This research will contribute a great deal of practical solutions on the effective use of information technology in knowledge management in higher education environment.

**Ethics**
The participant’s right to privacy is highly considered. The company’s identity and personal information of participants will be strictly kept confidential. All the participants have the right to withdraw from the study at any time. Findings will be reported in an honest fashion. Student participation will be voluntarily based on willingness.

## Appendix B: Ethics Consent

Cape Peninsula
University of Technology

**FACULTY OF BUSINESS &**
**MANAGEMENT SCIENCES**
(Bellville Campus)

*Telephone: +27 21 959 6282*
*E-mail: parkere@cput.ac.za*
*Department: Operations Management*

Date: 04 April 2017

Dear Sir / Madam

RE: Permission to use research population and environment

This letter confirms to grant a permission for Mr. Vusumzi Funda to collect relevant data from CPUT Operations Management staff as audience for his Masters studies. The title of the research is: "Impact of Information Technology on Knowledge Management at a selected University of Technology". The dissertation will be submitted in fulfilment of the requirements for the Master of Technology Degree in Business Information Systems by Vusumzi Funda.

If any additional information required, please contact me.

Yours sincerely,

.....
Mr. Ebrahim Parker
HOD: Operations Management

FACULTY OF BUSINESS
DEPT OF OPERATIONS MANAGEMENT
TEL +27 21 9596282

Cape Peninsula
University of Technology

Cape Peninsula University of Technology
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Cape Peninsula
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POSBUS/PO BOX 1906 BELLVILLE 7535 – TEL. +27 21 959-6496 FAX 086 600 8758
SYMPHONY WAY BELLVILLE 7530

**FACULTY OF ENGINEERING**
**DEPARTMENT OF MECHANICAL ENGINEERING**

# CONSENT LETTER

Date 04 April 2017

Dear Sir / Madam

Re: Permission to use research population and environment

This letter confirms to grant a permission for Mr. Vusumzi Funda to collect relevant data from CPUT Engineering staff as audience for his Masters studies. The title of the research is: "Impact of Information Technology on Knowledge Management at a selected University of Technology". The dissertation will be submitted in fulfilment of the requirements for the Master of Technology Degree in Business Information Systems by Vusumzi Funda.

If any additional information required, please contact me.

Yours sincerely,

**Professor Modify Kaunda**
**(Head of Department of Mechanical Engineering)**

Cape Peninsula University of Technology
04 APR 2017
MECHANICAL ENGINEERING
BELLVILLE CAMPUS

**Appendix C: Questionnaire—Quantitative Data**

**Evaluating the Effects of Information Technology on Knowledge Management at a selected University of Technology**

This is purely an academic exercise, do not; write your name or that of your firm. No information will be passed on to any authorities, you are safe and protected.

**Please cross the applicable boxes (X)**

## SECTION A: BIOGRAPHY

**1. Gender**

| | | |
|---|---|---|
| 1 | Male | |
| 2 | Female | |

**2. Age**

| | | |
|---|---|---|
| 1 | <25 | |
| 2 | 26-35 | |
| 3 | 36-45 | |
| 4 | 46-55 | |
| 5 | >56 | |

**3. Your position in the organisation**

| | | |
|---|---|---|
| 1 | Admin staff | |
| 2 | Academic | |
| 3 | Librarian | |
| 4 | Students | |
| 5 | Others (Please specify) | |

**4. Years of experience at this organisation**

| | | |
|---|---|---|
| 1 | 0 – under 6 months | |
| 2 | 6 months – under 2 year | |
| 3 | 2 year – under 3 years | |
| 4 | 3 years – under 4 years | |
| 5 | 4 years or more | |

**5. Type of IT application that you utilise**

| | | |
|---|---|---|
| 1 | e-requisition | |
| 2 | e-learning (blackboard) | |
| 3 | MIS/MAS | |
| 4 | Libris/Aleph | |
| 5 | Online personal access | |
| 6 | Others (Please specify) | |

**6. Level of IT application that you use**

| | | |
|---|---|---|
| 1 | an IT professional / Expert | |
| 2 | Highly skilled | |
| 3 | Competent | |
| 4 | Beginner | |
| 5 | Other (Please specify) | |

**7. Level of education**

| | | |
|---|---|---|
| 1 | Matric only | |
| 2 | National Higher Diploma | |
| 3 | National Diploma | |
| 4 | Bachelor Degree | |
| 5 | Master Degree | |
| 6 | Doctorate Degree | |
| 7 | Others (Please specify) | |

## SECTION B

Please rank the following by crossing the most applicable. The weightings are; 1 to 5 on an increasing scale (1- strongly agree, 2 – agree, 3 – neutral, 4 – disagree, and 5 – strongly disagree.

| No | **ITEMS** | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|---|
| | **INFORMATION TECHNOLOGY**<br>Machines, computers, communication devices and technology-based items that act to facilitate the improved production, processing and distribution of information. | | | | | |
| 1 | The university has a well organised IT support for KM | 1 | 2 | 3 | 4 | 5 |
| 2 | It is easy for me to inquire information | 1 | 2 | 3 | 4 | 5 |
| 3 | My IT skills assist me to attain your goals | 1 | 2 | 3 | 4 | 5 |
| 4 | I can always rely on IT system | 1 | 2 | 3 | 4 | 5 |
| 5 | I seldom lose my information from IT system | 1 | 2 | 3 | 4 | 5 |
| 6 | It is easy for me to use IT programs/applications | 1 | 2 | 3 | 4 | 5 |
| 7 | I create new knowledge by using IT programs/applications | 1 | 2 | 3 | 4 | 5 |
| 8 | IT helps me to access data, information, and other sources easily | 1 | 2 | 3 | 4 | 5 |
| 9 | IT makes it faster for me to process data and information | 1 | 2 | 3 | 4 | 5 |
| 10 | IT supports communication and collaboration within my department | 1 | 2 | 3 | 4 | 5 |
| 11 | IT system is always available at the university | 1 | 2 | 3 | 4 | 5 |
| 12 | IT helps me to identify better solutions for decision-making | 1 | 2 | 3 | 4 | 5 |
| 13 | IT has a positive effect on my knowledge | 1 | 2 | 3 | 4 | 5 |
| 14 | The university keeps IT systems and programs updated | 1 | 2 | 3 | 4 | 5 |
| 15 | I access information without any IT issues at the university | 1 | 2 | 3 | 4 | 5 |
| 16 | I am satisfied as a member of the institution to use IT | 1 | 2 | 3 | 4 | 5 |
| 17 | IT caters for everyone that uses it | 1 | 2 | 3 | 4 | 5 |
| 18 | IT provides information that I need regarding projects and decisions | 1 | 2 | 3 | 4 | 5 |
| 19 | IT meets my work related needs | 1 | 2 | 3 | 4 | 5 |
| 20 | IT provides an opportunity for personal development and growth | 1 | 2 | 3 | 4 | 5 |

| No | **ITEMS** | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|---|
| | **KNOWLEDGE MANAGEMENT**<br>A process used by organisations to identify and archive the available knowledge and information collected from the practices of its members, in order to present, use and share this knowledge within and around the organisation. | | | | | |
| 21 | I use Knowledge every day to attain my goals | 1 | 2 | 3 | 4 | 5 |
| 22 | I can easily access information (books, journals, etc.) | 1 | 2 | 3 | 4 | 5 |
| 23 | I understand my role towards Knowledge Management | 1 | 2 | 3 | 4 | 5 |
| 24 | IT facilitates knowledge sharing | 1 | 2 | 3 | 4 | 5 |
| 25 | I always share knowledge with my colleagues | 1 | 2 | 3 | 4 | 5 |
| 26 | The university provides various workshops and forums for knowledge sharing | 1 | 2 | 3 | 4 | 5 |
| 27 | Knowledge creation is highly encouraged by the department | 1 | 2 | 3 | 4 | 5 |
| 28 | I archive useful information regularly for future use | 1 | 2 | 3 | 4 | 5 |
| 29 | I always plan ahead for contributing to Knowledge Management | 1 | 2 | 3 | 4 | 5 |
| 30 | Knowledge Management issues are addressed by the university | 1 | 2 | 3 | 4 | 5 |
| 31 | I know exactly who to ask for knowledge when there is a need | 1 | 2 | 3 | 4 | 5 |
| 32 | The university has strong awareness in pushing research outputs | 1 | 2 | 3 | 4 | 5 |
| 33 | It takes a considerable effort to find information at the university | 1 | 2 | 3 | 4 | 5 |
| 34 | My department is benefitting from its Knowledge Management | 1 | 2 | 3 | 4 | 5 |
| 35 | IT has a positive effect on my department's knowledge management | 1 | 2 | 3 | 4 | 5 |
| 36 | The university is a knowledge-focussed organisation | 1 | 2 | 3 | 4 | 5 |
| 37 | The university provides information and communication support tools | 1 | 2 | 3 | 4 | 5 |
| 38 | KM enables integration and coordination with the external organisations | 1 | 2 | 3 | 4 | 5 |
| 39 | IT organises knowledge collaboration process | 1 | 2 | 3 | 4 | 5 |
| 40 | IT in KM develops knowledge worker collaboration | 1 | 2 | 3 | 4 | 5 |

**Appendix D: Interview Questions—Qualitative Data**

**Interview schedule - Manager / Director**

1. **List any negatives about Information Technology you know / have experienced**
    - ……..
    - ……..
    - ……..
    - ……
    - ……
2. **List any positives about Information Technology you know / have experienced**
    - ……..
    - ……..
    - ……..
    - ……
    - ……
3. **List any positives about Knowledge Management you know / have experienced**
    - ……
    - ……..
    - ……..
    - ……
    - ……
4. **List any negatives about Knowledge Management you know / have experienced.**
    - ……
    - ……..
    - ……..
    - ……
    - ……

**Appendix E: Demographic Results**

Table E1: Gender

| Gender | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| Male | 55 | 49.5 | 49.5 |
| Female | 56 | 50.5 | 100 |
| Total | 111 | 100.0 | |

Table E2: Age

| Age Group (years) | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| < 25 | 23 | 20.7 | 20.7 |
| 26-35 | 27 | 24.3 | 45.0 |
| 36-45 | 38 | 34.2 | 79.3 |
| 46-55 | 14 | 12.6 | 91.9 |
| 56 + | 9 | 8.1 | 100.0 |
| Total | 111 | 100.0 | |

Table E3: Educational level

| Education level | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| Matric only | 19 | 17.1 | 17.1 |
| National higher diploma | 6 | 5.4 | 22.5 |
| National Diploma | 31 | 27.9 | 50.5 |
| Bachelor Degree | 16 | 14.4 | 64.9 |
| Master Degree | 23 | 20.7 | 85.6 |
| Doctorate Degree | 13 | 11.7 | 97.3 |
| Others | 3 | 2.7 | 100.0 |

| | | | |
|---|---|---|---|
| Total | 111 | 100.0 | |

Table E4: Work position

| Position | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| Admin Staff | 20 | 18.0 | 18.0 |
| Academic | 38 | 34.2 | 52.3 |
| Librarian | 14 | 12.6 | 64.9 |
| Student | 34 | 30.6 | 95.5 |
| Others | 5 | 4.5 | 100.0 |
| Total | 111 | 100.0 | |

Table E5: Years of work experience

| Tenure | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| 0 – under 0.5 years | 9 | 8.1 | 8.1 |
| 0.5 – under 2 years | 19 | 17.1 | 25.2 |
| 2 – under 3 years | 12 | 10.8 | 36.0 |
| 3 - under 4 years | 17 | 15.3 | 51.4 |
| 4 years + | 54 | 48.6 | 100.0 |
| Total | 111 | 100.0 | |

Table E6: Level of ICT skill

| Level of ICT skill | Frequency | Valid % | Cumulative % |
|---|---|---|---|
| An IT professional or expert | 4 | 3.6 | 3.6 |
| Highly skilled | 28 | 25.2 | 28.8 |
| Competent | 66 | 59.5 | 88.3 |
| Beginner | 13 | 11.7 | 100.0 |
| Total | 111 | 100.0 | |

Table E7: ICT application type

| Type of ICT application use | | | |
|---|---|---|---|
| **Level of IT app** | **Frequency** | **Valid %** | **Cumulative %** |
| E-learning | 28 | 25.2 | 25.2 |
| EL,LA,OPA | 2 | 1.8 | 27.0 |
| EL,MM | 10 | 9.0 | 36.0 |
| EL,MM,LA | 1 | .9 | 36.9 |
| EL,MM,LA,OPA | 9 | 8.1 | 45.0 |
| EL,MM,OPA | 15 | 13.5 | 58.6 |
| EL,OPA | 10 | 9.0 | 67.6 |
| E-requisition | 2 | 1.8 | 69.4 |
| ER,EL | 1 | .9 | 70.3 |
| ER,EL,LA,OPA | 1 | .9 | 71.2 |
| ER,EL,MM,LA,OPA | 2 | 1.8 | 73.0 |
| ER,EL,MM,OPA | 2 | 1.8 | 74.8 |
| ER,EL,OPA | 2 | 1.8 | 76.6 |
| ER,LA | 2 | 1.8 | 78.4 |
| ER,MM,OPA | 2 | 1.8 | 80.2 |
| ER,OPA | 4 | 3.6 | 83.8 |
| Libris/Aleph | 8 | 7.2 | 91.0 |
| MIS/MAS | 3 | 2.7 | 93.7 |
| MM,LA,OPA | 1 | .9 | 94.6 |
| MM,OPA | 2 | 1.8 | 96.4 |
| MM, Pastel | 1 | .9 | 97.3 |
| Online Personal Access | 2 | 1.8 | 99.1 |
| Pastel | 1 | .9 | 100.0 |
| Total | 111 | 100.0 | |

**Appendix F: Descriptive statistics**

Table F1: Descriptive statistics of respondents on all statements

| Variables | Categories | *F | **% |
|---|---|---|---|
| The university has a well organised IT support for KM | Strongly disagree | 21 | 18.9% |
| | Disagree | 48 | 43.2% |
| | Neutral | 21 | 18.9% |
| | Agree | 15 | 13.5% |
| | Strongly agree | 6 | 5.4% |
| My IT skills assist me to attain your goals | Strongly disagree | 39 | 35.1% |
| | Disagree | 51 | 45.9% |
| | Neutral | 12 | 10.8% |
| | Agree | 5 | 4.5% |
| | Strongly agree | 4 | 3.6% |
| I can always rely on IT system | Strongly disagree | 23 | 20.7% |
| | Disagree | 33 | 29.7% |
| | Neutral | 27 | 24.3% |
| | Agree | 23 | 20.7% |
| | Strongly agree | 5 | 4.5% |
| I seldom lose my information from IT system | Strongly disagree | 24 | 21.6% |
| | Disagree | 38 | 34.2% |
| | Neutral | 25 | 22.5% |
| | Agree | 20 | 18.0% |
| | Strongly agree | 4 | 3.6% |
| It is easy for me to use IT programs/applications | Strongly disagree | 26 | 23.4% |
| | Disagree | 54 | 48.6% |
| | Neutral | 19 | 17.1% |
| | Agree | 9 | 8.1% |
| | Strongly agree | 3 | 2.7% |
| I create new knowledge by using IT programs/applications | Strongly disagree | 25 | 22.5% |
| | Disagree | 43 | 38.7% |
| | Neutral | 25 | 22.5% |
| | Agree | 13 | 11.7% |
| | Strongly agree | 5 | 4.5% |
| IT helps me to access data, information, and other sources easily | Strongly disagree | 39 | 35.1% |
| | Disagree | 48 | 43.2% |
| | Neutral | 11 | 9.9% |
| | Agree | 10 | 9.0% |
| | Strongly agree | 3 | 2.7% |

| Variables | Categories | *F | **% |
|---|---|---|---|
| IT makes it faster for me to process data and information | Strongly disagree | 40 | 36.0% |
| | Disagree | 42 | 37.8% |
| | Neutral | 21 | 18.9% |
| | Agree | 5 | 4.5% |
| | Strongly agree | 3 | 2.7% |
| IT supports communication and collaboration within my department | Strongly disagree | 27 | 24.3% |
| | Disagree | 46 | 41.4% |
| | Neutral | 20 | 18.0% |
| | Agree | 11 | 9.9% |
| | Strong agree | 7 | 6.3% |
| IT system is always available at the university | Strongly disagree | 15 | 13.5% |
| | Disagree | 33 | 29.7% |
| | Neutral | 30 | 27.0% |
| | Agree | 21 | 18.9% |
| | Strongly agree | 12 | 10.8% |
| IT helps me to identify better solutions for decision-making | Strongly disagree | 23 | 20.7% |
| | Disagree | 46 | 41.4% |
| | Neutral | 25 | 22.5% |
| | Agree | 12 | 10.8% |
| | Strongly agree | 5 | 4.5% |
| IT has a positive effect on my knowledge | Strongly disagree | 34 | 30.6% |
| | Disagree | 51 | 45.9% |
| | Neutral | 13 | 11.7% |
| | Agree | 10 | 9.0% |
| | Strongly agree | 3 | 2.7% |
| The university keeps IT systems and programs updated | Strongly disagree | 20 | 18.0% |
| | Disagree | 36 | 32.4% |
| | Neutral | 24 | 21.6% |
| | Agree | 24 | 21.6% |
| | Strongly agree | 7 | 6.3% |
| I access information without any IT issues at the university | Strongly disagree | 23 | 20.7% |
| | Disagree | 29 | 26.1% |
| | Neutral | 20 | 18.0% |
| | Agree | 31 | 27.9% |
| | Strongly agree | 8 | 7.2% |
| I am satisfied as a member of the institution to use IT | Strongly disagree | 26 | 23.4% |
| | Disagree | 43 | 38.7% |
| | Neutral | 16 | 14.4% |
| | Agree | 18 | 16.2% |

| Variables | Categories | *F | **% |
|---|---|---|---|
| | Strongly agree | 8 | 7.2% |
| IT caters for everyone that uses it | Strongly disagree | 18 | 16.2% |
| | Disagree | 41 | 36.9% |
| | Neutral | 34 | 30.6% |
| | Agree | 13 | 11.7% |
| | Strongly agree | 5 | 4.5% |
| IT provides information that I need regarding projects and decisions | Strongly disagree | 24 | 21.6% |
| | Disagree | 38 | 34.2% |
| | Neutral | 29 | 26.1% |
| | Agree | 15 | 13.5% |
| | Strongly agree | 5 | 4.5% |
| IT meets my work related needs | Strongly disagree | 27 | 24.3% |
| | Disagree | 55 | 49.5% |
| | Neutral | 12 | 10.8% |
| | Agree | 13 | 11.7% |
| | Strongly agree | 4 | 3.6% |
| IT provides an opportunity for personal development and growth | Strongly disagree | 33 | 29.7% |
| | Disagree | 31 | 27.9% |
| | Neutral | 25 | 22.5% |
| | Agree | 14 | 12.6% |
| | Strongly agree | 8 | 7.2% |
| I use Knowledge every day to attain my goals | Strongly disagree | 51 | 45.9% |
| | Disagree | 42 | 37.8% |
| | Neutral | 11 | 9.9% |
| | Agree | 7 | 6.3% |
| | Strongly agree | 0 | 0% |
| I can easily access information (books, journals, etc.) | Strongly disagree | 42 | 37.8% |
| | Disagree | 45 | 40.5% |
| | Neutral | 16 | 14.4% |
| | Agree | 7 | 6.3% |
| | Strongly agree | 1 | .9% |
| I understand my role towards Knowledge Management | Strongly disagree | 33 | 29.7% |
| | Disagree | 46 | 41.4% |
| | Neutral | 18 | 16.2% |
| | Agree | 9 | 8.1% |
| | Strongly agree | 5 | 4.5% |
| IT facilitates knowledge sharing | Strongly disagree | 29 | 26.1% |
| | Disagree | 52 | 46.8% |
| | Neutral | 16 | 14.4% |

| Variables | Categories | *F | **% |
|---|---|---|---|
| | Agree | 12 | 10.8% |
| | Strongly agree | 2 | 1.8% |
| I always share knowledge with my colleagues | Strongly disagree | 22 | 19.8% |
| | Disagree | 57 | 51.4% |
| | Neutral | 19 | 17.1% |
| | Agree | 12 | 10.8% |
| | Strong agree | 1 | .9% |
| The university provides various workshops and forums for knowledge sharing | Strongly disagree | 20 | 18.0% |
| | Disagree | 36 | 32.4% |
| | Neutral | 27 | 24.3% |
| | Agree | 18 | 16.2% |
| | Strongly agree | 10 | 9.0% |
| Knowledge creation is highly encouraged by the department | Strongly disagree | 21 | 18.9% |
| | Disagree | 42 | 37.8% |
| | Neutral | 23 | 20.7% |
| | Agree | 18 | 16.2% |
| | Strongly agree | 7 | 6.3% |
| I archive useful information regularly for future use | Strongly disagree | 28 | 25.2% |
| | Disagree | 45 | 40.5% |
| | Neutral | 24 | 21.6% |
| | Agree | 13 | 11.7% |
| | Strongly agree | 1 | .9% |
| I always plan ahead for contributing to Knowledge Management | Strongly disagree | 21 | 18.9% |
| | Disagree | 35 | 31.5% |
| | Neutral | 31 | 27.9% |
| | Agree | 18 | 16.2% |
| | Strongly agree | 6 | 5.4% |
| Knowledge Management issues are addressed by the university | Strongly disagree | 15 | 13.5% |
| | Disagree | 26 | 23.4% |
| | Neutral | 39 | 35.1% |
| | Agree | 24 | 21.6% |
| | Strongly agree | 7 | 6.3% |
| I know exactly who to ask for knowledge when there is a need | Strongly disagree | 23 | 20.7% |
| | Disagree | 36 | 32.4% |
| | Neutral | 22 | 19.8% |
| | Agree | 27 | 24.3% |
| | Strongly agree | 3 | 2.7% |
| The university has strong awareness in pushing | Strongly disagree | 23 | 20.7% |
| | Disagree | 45 | 40.5% |

| Variables | Categories | *F | **% |
|---|---|---|---|
| research outputs | Neutral | 22 | 19.8% |
| | Agree | 16 | 14.4% |
| | Strongly agree | 5 | 4.5% |
| It takes a considerable effort to find information at the university | Strongly disagree | 20 | 18.0% |
| | Disagree | 40 | 36.0% |
| | Neutral | 26 | 23.4% |
| | Agree | 20 | 18.0% |
| | Strongly agree | 5 | 4.5% |
| My department is benefitting from its Knowledge Management | Strongly disagree | 15 | 13.5% |
| | Disagree | 36 | 32.4% |
| | Neutral | 31 | 27.9% |
| | Agree | 21 | 18.9% |
| | Strongly agree | 8 | 7.2% |
| IT has a positive effect on my department's knowledge management | Strongly disagree | 18 | 16.2% |
| | Disagree | 38 | 34.2% |
| | Neutral | 35 | 31.5% |
| | Agree | 13 | 11.7% |
| | Strongly agree | 7 | 6.3% |
| The university is a knowledge-focussed organisation | Strongly disagree | 21 | 18.9% |
| | Disagree | 48 | 43.2% |
| | Neutral | 22 | 19.8% |
| | Agree | 12 | 10.8% |
| | Strongly agree | 8 | 7.2% |
| The university provides information and communication support tools | Strongly disagree | 14 | 12.6% |
| | Disagree | 39 | 35.1% |
| | Neutral | 30 | 27.0% |
| | Agree | 21 | 18.9% |
| | Strongly agree | 7 | 6.3% |
| KM enables integration and coordination with the external organisations | Strongly disagree | 16 | 14.4% |
| | Disagree | 41 | 36.9% |
| | Neutral | 36 | 32.4% |
| | Agree | 16 | 14.4% |
| | Strong agree | 2 | 1.8% |
| IT organises knowledge collaboration process | Strongly disagree | 18 | 16.2% |
| | Disagree | 37 | 33.3% |
| | Neutral | 36 | 32.4% |
| | Agree | 18 | 16.2% |
| | Strongly agree | 2 | 1.8% |
| IT in KM develops knowledge worker collaboration | Strongly disagree | 18 | 16.2% |

| Variables | Categories | *F | **% |
|---|---|---|---|
| | Disagree | 39 | 35.1% |
| | Neutral | 32 | 28.8% |
| | Agree | 20 | 18.0% |
| | Strongly agree | 2 | 1.8% |

*F: Frequencies

**%: Percentage out of total

**Appendix G: Data variation statistics**

Table G1: Data variation statistics of respondents on Educational Level

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 95% Confidence Interval for Mean | | | |
| | | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound | Minimum | Maximum |
| The university has a well organised IT support for KM | Matric only | 19 | 2.32 | .885 | .203 | 1.89 | 2.74 | 1 | 5 |
| | National higher Diploma | 6 | 2.17 | 1.169 | .477 | .94 | 3.39 | 1 | 4 |
| | National Diploma | 31 | 2.19 | .910 | .163 | 1.86 | 2.53 | 1 | 4 |
| | Bachelor Degree | 16 | 2.75 | 1.183 | .296 | 2.12 | 3.38 | 1 | 5 |
| | Master Degree | 23 | 2.39 | 1.234 | .257 | 1.86 | 2.92 | 1 | 5 |
| | Doctorate Degree | 13 | 3.08 | 1.441 | .400 | 2.21 | 3.95 | 1 | 5 |
| | Others | 3 | 2.00 | .000 | .000 | 2.00 | 2.00 | 2 | 2 |
| | Total | 111 | 2.43 | 1.109 | .105 | 2.22 | 2.64 | 1 | 5 |
| My IT skills assist me to attain your goals | Matric only | 19 | 1.63 | .684 | .157 | 1.30 | 1.96 | 1 | 3 |
| | National higher Diploma | 6 | 2.17 | .408 | .167 | 1.74 | 2.60 | 2 | 3 |
| | National Diploma | 31 | 2.06 | 1.093 | .196 | 1.66 | 2.47 | 1 | 5 |
| | Bachelor Degree | 16 | 2.00 | .966 | .242 | 1.49 | 2.51 | 1 | 5 |
| | Master Degree | 23 | 2.04 | 1.022 | .213 | 1.60 | 2.49 | 1 | 5 |
| | Doctorate Degree | 13 | 2.00 | 1.291 | .358 | 1.22 | 2.78 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 1.95 | .985 | .094 | 1.77 | 2.14 | 1 | 5 |
| I can always rely on IT system | Matric only | 19 | 2.05 | .911 | .209 | 1.61 | 2.49 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | .548 | .224 | 1.93 | 3.07 | 2 | 3 |
| | National Diploma | 31 | 2.55 | 1.121 | .201 | 2.14 | 2.96 | 1 | 5 |
| | Bachelor Degree | 16 | 2.94 | 1.237 | .309 | 2.28 | 3.60 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Master Degree | 23 | 2.91 | 1.164 | .243 | 2.41 | 3.42 | 1 | 5 |
| | Doctorate Degree | 13 | 2.77 | 1.481 | .411 | 1.87 | 3.66 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.59 | 1.164 | .110 | 2.37 | 2.80 | 1 | 5 |
| I seldom lose my information from IT system | Matric only | 19 | 2.53 | .905 | .208 | 2.09 | 2.96 | 1 | 4 |
| | National higher Diploma | 6 | 1.83 | .408 | .167 | 1.40 | 2.26 | 1 | 2 |
| | National Diploma | 31 | 2.39 | .955 | .172 | 2.04 | 2.74 | 1 | 4 |
| | Bachelor Degree | 16 | 2.94 | 1.181 | .295 | 2.31 | 3.57 | 1 | 5 |
| | Master Degree | 23 | 2.57 | 1.376 | .287 | 1.97 | 3.16 | 1 | 5 |
| | Doctorate Degree | 13 | 2.38 | 1.387 | .385 | 1.55 | 3.22 | 1 | 5 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |
| | Total | 111 | 2.48 | 1.127 | .107 | 2.27 | 2.69 | 1 | 5 |
| It is easy for me to use IT programs/applications | Matric only | 19 | 1.89 | .737 | .169 | 1.54 | 2.25 | 1 | 3 |
| | National higher Diploma | 6 | 2.17 | .408 | .167 | 1.74 | 2.60 | 2 | 3 |
| | National Diploma | 31 | 2.32 | .945 | .170 | 1.98 | 2.67 | 1 | 4 |
| | Bachelor Degree | 16 | 2.50 | 1.033 | .258 | 1.95 | 3.05 | 1 | 5 |
| | Master Degree | 23 | 2.13 | 1.100 | .229 | 1.65 | 2.61 | 1 | 5 |
| | Doctorate Degree | 13 | 2.15 | 1.214 | .337 | 1.42 | 2.89 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.18 | .974 | .092 | 2.00 | 2.36 | 1 | 5 |
| I create new knowledge by using IT | Matric only | 19 | 1.95 | .780 | .179 | 1.57 | 2.32 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | .837 | .342 | 1.62 | 3.38 | 2 | 4 |
| | National Diploma | 31 | 2.39 | 1.022 | .184 | 2.01 | 2.76 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| programs/applications | Bachelor Degree | 16 | 2.44 | 1.094 | .273 | 1.85 | 3.02 | 1 | 5 |
| | Master Degree | 23 | 2.70 | 1.222 | .255 | 2.17 | 3.22 | 1 | 5 |
| | Doctorate Degree | 13 | 2.38 | 1.446 | .401 | 1.51 | 3.26 | 1 | 5 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |
| | Total | 111 | 2.37 | 1.095 | .104 | 2.16 | 2.58 | 1 | 5 |
| IT helps me to access data, information, and other sources easily | Matric only | 19 | 1.53 | .612 | .140 | 1.23 | 1.82 | 1 | 3 |
| | National higher Diploma | 6 | 1.50 | .548 | .224 | .93 | 2.07 | 1 | 2 |
| | National Diploma | 31 | 2.39 | .955 | .172 | 2.04 | 2.74 | 1 | 4 |
| | Bachelor Degree | 16 | 2.00 | 1.317 | .329 | 1.30 | 2.70 | 1 | 5 |
| | Master Degree | 23 | 2.00 | 1.000 | .209 | 1.57 | 2.43 | 1 | 5 |
| | Doctorate Degree | 13 | 2.23 | 1.301 | .361 | 1.44 | 3.02 | 1 | 4 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.01 | 1.031 | .098 | 1.82 | 2.20 | 1 | 5 |
| IT makes it faster for me to process data and information | Matric only | 19 | 1.68 | .671 | .154 | 1.36 | 2.01 | 1 | 3 |
| | National higher Diploma | 6 | 1.83 | .408 | .167 | 1.40 | 2.26 | 1 | 2 |
| | National Diploma | 31 | 2.19 | .910 | .163 | 1.86 | 2.53 | 1 | 4 |
| | Bachelor Degree | 16 | 2.25 | 1.342 | .335 | 1.54 | 2.96 | 1 | 5 |
| | Master Degree | 23 | 2.00 | 1.087 | .227 | 1.53 | 2.47 | 1 | 5 |
| | Doctorate Degree | 13 | 1.85 | 1.068 | .296 | 1.20 | 2.49 | 1 | 4 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |
| | Total | 111 | 2.00 | .991 | .094 | 1.81 | 2.19 | 1 | 5 |
| IT supports communication and | Matric only | 19 | 1.63 | .496 | .114 | 1.39 | 1.87 | 1 | 2 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| collaboration within my department | National Diploma | 31 | 2.39 | .882 | .158 | 2.06 | 2.71 | 1 | 4 |
| | Bachelor Degree | 16 | 2.44 | 1.504 | .376 | 1.64 | 3.24 | 1 | 5 |
| | Master Degree | 23 | 2.83 | 1.267 | .264 | 2.28 | 3.37 | 1 | 5 |
| | Doctorate Degree | 13 | 2.31 | 1.316 | .365 | 1.51 | 3.10 | 1 | 5 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |
| | Total | 111 | 2.32 | 1.137 | .108 | 2.11 | 2.54 | 1 | 5 |
| IT system is always available at the university | Matric only | 19 | 2.26 | 1.098 | .252 | 1.73 | 2.79 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | 1.049 | .428 | 1.40 | 3.60 | 1 | 4 |
| | National Diploma | 31 | 2.68 | 1.013 | .182 | 2.31 | 3.05 | 1 | 5 |
| | Bachelor Degree | 16 | 3.13 | 1.258 | .315 | 2.45 | 3.80 | 1 | 5 |
| | Master Degree | 23 | 3.13 | 1.217 | .254 | 2.60 | 3.66 | 1 | 5 |
| | Doctorate Degree | 13 | 3.46 | 1.506 | .418 | 2.55 | 4.37 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.84 | 1.203 | .114 | 2.61 | 3.06 | 1 | 5 |
| IT helps me to identify better solutions for decision-making | Matric only | 19 | 1.63 | .597 | .137 | 1.34 | 1.92 | 1 | 3 |
| | National higher Diploma | 6 | 2.50 | .548 | .224 | 1.93 | 3.07 | 2 | 3 |
| | National Diploma | 31 | 2.42 | .923 | .166 | 2.08 | 2.76 | 1 | 4 |
| | Bachelor Degree | 16 | 2.19 | 1.047 | .262 | 1.63 | 2.75 | 1 | 5 |
| | Master Degree | 23 | 2.78 | 1.242 | .259 | 2.25 | 3.32 | 1 | 5 |
| | Doctorate Degree | 13 | 2.77 | 1.423 | .395 | 1.91 | 3.63 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.37 | 1.070 | .102 | 2.17 | 2.57 | 1 | 5 |
| IT has a positive | Matric only | 19 | 1.42 | .507 | .116 | 1.18 | 1.67 | 1 | 2 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| effect on my knowledge | National higher Diploma | 6 | 2.33 | .816 | .333 | 1.48 | 3.19 | 2 | 4 |
| | National Diploma | 31 | 2.26 | .999 | .179 | 1.89 | 2.62 | 1 | 4 |
| | Bachelor Degree | 16 | 2.13 | 1.147 | .287 | 1.51 | 2.74 | 1 | 5 |
| | Master Degree | 23 | 2.17 | 1.154 | .241 | 1.67 | 2.67 | 1 | 5 |
| | Doctorate Degree | 13 | 2.23 | 1.166 | .323 | 1.53 | 2.94 | 1 | 4 |
| | Others | 3 | 2.00 | .000 | .000 | 2.00 | 2.00 | 2 | 2 |
| | Total | 111 | 2.07 | 1.015 | .096 | 1.88 | 2.26 | 1 | 5 |
| The university keeps IT systems and programs updated | Matric only | 19 | 2.32 | 1.108 | .254 | 1.78 | 2.85 | 1 | 4 |
| | National higher Diploma | 6 | 2.67 | 1.033 | .422 | 1.58 | 3.75 | 2 | 4 |
| | National Diploma | 31 | 2.68 | .909 | .163 | 2.34 | 3.01 | 1 | 4 |
| | Bachelor Degree | 16 | 2.75 | 1.528 | .382 | 1.94 | 3.56 | 1 | 5 |
| | Master Degree | 23 | 2.74 | 1.287 | .268 | 2.18 | 3.30 | 1 | 5 |
| | Doctorate Degree | 13 | 3.08 | 1.382 | .383 | 2.24 | 3.91 | 1 | 5 |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 2.66 | 1.187 | .113 | 2.43 | 2.88 | 1 | 5 |
| I access information without any IT issues at the university | Matric only | 19 | 2.32 | 1.057 | .242 | 1.81 | 2.83 | 1 | 4 |
| | National higher Diploma | 6 | 2.67 | 1.033 | .422 | 1.58 | 3.75 | 2 | 4 |
| | National Diploma | 31 | 2.55 | 1.207 | .217 | 2.11 | 2.99 | 1 | 5 |
| | Bachelor Degree | 16 | 3.13 | 1.204 | .301 | 2.48 | 3.77 | 1 | 5 |
| | Master Degree | 23 | 3.00 | 1.279 | .267 | 2.45 | 3.55 | 1 | 5 |
| | Doctorate Degree | 13 | 3.23 | 1.641 | .455 | 2.24 | 4.22 | 1 | 5 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |
| | Total | 111 | 2.75 | 1.268 | .120 | 2.51 | 2.99 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| I am satisfied as a member of the institution to use IT | Matric only | 19 | 2.11 | .994 | .228 | 1.63 | 2.58 | 1 | 4 |
| | National higher Diploma | 6 | 2.17 | .753 | .307 | 1.38 | 2.96 | 1 | 3 |
| | National Diploma | 31 | 2.39 | 1.086 | .195 | 1.99 | 2.79 | 1 | 5 |
| | Bachelor Degree | 16 | 2.63 | 1.310 | .328 | 1.93 | 3.32 | 1 | 5 |
| | Master Degree | 23 | 2.57 | 1.308 | .273 | 2.00 | 3.13 | 1 | 5 |
| | Doctorate Degree | 13 | 3.08 | 1.605 | .445 | 2.11 | 4.05 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.45 | 1.219 | .116 | 2.22 | 2.68 | 1 | 5 |
| IT caters for everyone that uses it | Matric only | 19 | 2.00 | .745 | .171 | 1.64 | 2.36 | 1 | 3 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |
| | National Diploma | 31 | 2.74 | .893 | .160 | 2.41 | 3.07 | 1 | 4 |
| | Bachelor Degree | 16 | 2.50 | 1.033 | .258 | 1.95 | 3.05 | 1 | 5 |
| | Master Degree | 23 | 2.65 | 1.152 | .240 | 2.15 | 3.15 | 1 | 5 |
| | Doctorate Degree | 13 | 2.85 | 1.345 | .373 | 2.03 | 3.66 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.51 | 1.043 | .099 | 2.32 | 2.71 | 1 | 5 |
| IT provides information that I need regarding projects and decisions | Matric only | 19 | 1.89 | .937 | .215 | 1.44 | 2.35 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | .837 | .342 | 1.62 | 3.38 | 1 | 3 |
| | National Diploma | 31 | 2.39 | .989 | .178 | 2.02 | 2.75 | 1 | 4 |
| | Bachelor Degree | 16 | 2.63 | 1.204 | .301 | 1.98 | 3.27 | 1 | 5 |
| | Master Degree | 23 | 2.78 | 1.085 | .226 | 2.31 | 3.25 | 1 | 5 |
| | Doctorate Degree | 13 | 2.77 | 1.423 | .395 | 1.91 | 3.63 | 1 | 5 |
| | Others | 3 | 1.67 | 1.155 | .667 | -1.20 | 4.54 | 1 | 3 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Total | 111 | 2.45 | 1.110 | .105 | 2.24 | 2.66 | 1 | 5 |
| IT meets my work related needs | Matric only | 19 | 1.68 | .671 | .154 | 1.36 | 2.01 | 1 | 3 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |
| | National Diploma | 31 | 2.42 | 1.057 | .190 | 2.03 | 2.81 | 1 | 4 |
| | Bachelor Degree | 16 | 2.19 | .911 | .228 | 1.70 | 2.67 | 1 | 5 |
| | Master Degree | 23 | 2.09 | .949 | .198 | 1.68 | 2.50 | 1 | 5 |
| | Doctorate Degree | 13 | 2.85 | 1.519 | .421 | 1.93 | 3.76 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.21 | 1.054 | .100 | 2.01 | 2.41 | 1 | 5 |
| IT provides an opportunity for personal development and growth | Matric only | 19 | 1.74 | .933 | .214 | 1.29 | 2.19 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | 1.049 | .428 | 1.40 | 3.60 | 1 | 4 |
| | National Diploma | 31 | 2.32 | 1.107 | .199 | 1.92 | 2.73 | 1 | 4 |
| | Bachelor Degree | 16 | 2.38 | 1.147 | .287 | 1.76 | 2.99 | 1 | 5 |
| | Master Degree | 23 | 2.87 | 1.254 | .262 | 2.33 | 3.41 | 1 | 5 |
| | Doctorate Degree | 13 | 2.92 | 1.706 | .473 | 1.89 | 3.95 | 1 | 5 |
| | Others | 3 | 1.33 | .577 | .333 | -.10 | 2.77 | 1 | 2 |
| | Total | 111 | 2.40 | 1.238 | .117 | 2.16 | 2.63 | 1 | 5 |
| I use Knowledge every day to attain my goals | Matric only | 19 | 1.63 | .597 | .137 | 1.34 | 1.92 | 1 | 3 |
| | National higher Diploma | 6 | 2.00 | 1.095 | .447 | .85 | 3.15 | 1 | 4 |
| | National Diploma | 31 | 2.19 | 1.108 | .199 | 1.79 | 2.60 | 1 | 4 |
| | Bachelor Degree | 16 | 1.63 | .719 | .180 | 1.24 | 2.01 | 1 | 3 |
| | Master Degree | 23 | 1.61 | .783 | .163 | 1.27 | 1.95 | 1 | 3 |
| | Doctorate Degree | 13 | 1.31 | .480 | .133 | 1.02 | 1.60 | 1 | 2 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 1.77 | .873 | .083 | 1.60 | 1.93 | 1 | 4 |
| I can easily access information (books, journals, etc.) | Matric only | 19 | 2.05 | .705 | .162 | 1.71 | 2.39 | 1 | 4 |
| | National higher Diploma | 6 | 1.83 | .753 | .307 | 1.04 | 2.62 | 1 | 3 |
| | National Diploma | 31 | 2.13 | 1.088 | .195 | 1.73 | 2.53 | 1 | 4 |
| | Bachelor Degree | 16 | 1.75 | .683 | .171 | 1.39 | 2.11 | 1 | 3 |
| | Master Degree | 23 | 1.70 | .876 | .183 | 1.32 | 2.07 | 1 | 4 |
| | Doctorate Degree | 13 | 1.92 | 1.256 | .348 | 1.16 | 2.68 | 1 | 5 |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 1.92 | .926 | .088 | 1.74 | 2.09 | 1 | 5 |
| I understand my role towards Knowledge Management | Matric only | 19 | 2.16 | .834 | .191 | 1.76 | 2.56 | 1 | 5 |
| | National higher Diploma | 6 | 1.83 | .753 | .307 | 1.04 | 2.62 | 1 | 3 |
| | National Diploma | 31 | 2.26 | 1.032 | .185 | 1.88 | 2.64 | 1 | 4 |
| | Bachelor Degree | 16 | 2.13 | 1.204 | .301 | 1.48 | 2.77 | 1 | 5 |
| | Master Degree | 23 | 1.91 | .996 | .208 | 1.48 | 2.34 | 1 | 4 |
| | Doctorate Degree | 13 | 2.62 | 1.609 | .446 | 1.64 | 3.59 | 1 | 5 |
| | Others | 3 | 2.00 | 1.000 | .577 | -.48 | 4.48 | 1 | 3 |
| | Total | 111 | 2.16 | 1.083 | .103 | 1.96 | 2.37 | 1 | 5 |
| IT facilitates knowledge sharing | Matric only | 19 | 1.89 | .994 | .228 | 1.42 | 2.37 | 1 | 5 |
| | National higher Diploma | 6 | 2.00 | 1.095 | .447 | .85 | 3.15 | 1 | 4 |
| | National Diploma | 31 | 2.16 | .779 | .140 | 1.88 | 2.45 | 1 | 4 |
| | Bachelor Degree | 16 | 2.31 | .946 | .237 | 1.81 | 2.82 | 1 | 4 |
| | Master Degree | 23 | 2.26 | 1.137 | .237 | 1.77 | 2.75 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Doctorate Degree | 13 | 2.31 | 1.316 | .365 | 1.51 | 3.10 | 1 | 5 |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 2.15 | .993 | .094 | 1.97 | 2.34 | 1 | 5 |
| I always share knowledge with my colleagues | Matric only | 19 | 2.11 | .658 | .151 | 1.79 | 2.42 | 1 | 4 |
| | National higher Diploma | 6 | 1.67 | .516 | .211 | 1.12 | 2.21 | 1 | 2 |
| | National Diploma | 31 | 2.35 | .877 | .158 | 2.03 | 2.68 | 1 | 4 |
| | Bachelor Degree | 16 | 1.94 | .680 | .170 | 1.58 | 2.30 | 1 | 3 |
| | Master Degree | 23 | 2.48 | 1.201 | .250 | 1.96 | 3.00 | 1 | 5 |
| | Doctorate Degree | 13 | 2.23 | 1.092 | .303 | 1.57 | 2.89 | 1 | 4 |
| | Others | 3 | 2.00 | 1.000 | .577 | -.48 | 4.48 | 1 | 3 |
| | Total | 111 | 2.22 | .919 | .087 | 2.04 | 2.39 | 1 | 5 |
| The university provides various workshops and forums for knowledge sharing | Matric only | 19 | 2.63 | .955 | .219 | 2.17 | 3.09 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | .837 | .342 | 1.62 | 3.38 | 2 | 4 |
| | National Diploma | 31 | 2.45 | 1.150 | .207 | 2.03 | 2.87 | 1 | 5 |
| | Bachelor Degree | 16 | 2.75 | 1.390 | .348 | 2.01 | 3.49 | 1 | 5 |
| | Master Degree | 23 | 3.00 | 1.414 | .295 | 2.39 | 3.61 | 1 | 5 |
| | Doctorate Degree | 13 | 2.54 | 1.391 | .386 | 1.70 | 3.38 | 1 | 5 |
| | Others | 3 | 2.67 | .577 | .333 | 1.23 | 4.10 | 2 | 3 |
| | Total | 111 | 2.66 | 1.210 | .115 | 2.43 | 2.89 | 1 | 5 |
| Knowledge creation is highly encouraged by the department | Matric only | 19 | 2.63 | 1.012 | .232 | 2.14 | 3.12 | 1 | 5 |
| | National higher Diploma | 6 | 2.17 | .983 | .401 | 1.13 | 3.20 | 1 | 4 |
| | National Diploma | 31 | 2.61 | .955 | .172 | 2.26 | 2.96 | 1 | 5 |
| | Bachelor Degree | 16 | 2.25 | 1.183 | .296 | 1.62 | 2.88 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Master Degree | 23 | 2.39 | 1.406 | .293 | 1.78 | 3.00 | 1 | 5 |
| | Doctorate Degree | 13 | 3.00 | 1.472 | .408 | 2.11 | 3.89 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.53 | 1.159 | .110 | 2.31 | 2.75 | 1 | 5 |
| I archive useful information regularly for future use | Matric only | 19 | 2.00 | .882 | .202 | 1.57 | 2.43 | 1 | 4 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |
| | National Diploma | 31 | 2.32 | .909 | .163 | 1.99 | 2.66 | 1 | 4 |
| | Bachelor Degree | 16 | 2.31 | 1.195 | .299 | 1.68 | 2.95 | 1 | 4 |
| | Master Degree | 23 | 2.17 | 1.114 | .232 | 1.69 | 2.66 | 1 | 5 |
| | Doctorate Degree | 13 | 2.38 | .961 | .266 | 1.80 | 2.97 | 1 | 4 |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 2.23 | .988 | .094 | 2.04 | 2.41 | 1 | 5 |
| I always plan ahead for contributing to Knowledge Management | Matric only | 19 | 2.53 | 1.020 | .234 | 2.03 | 3.02 | 1 | 5 |
| | National higher Diploma | 6 | 2.17 | 1.169 | .477 | .94 | 3.39 | 1 | 4 |
| | National Diploma | 31 | 2.81 | .910 | .163 | 2.47 | 3.14 | 1 | 5 |
| | Bachelor Degree | 16 | 1.75 | 1.065 | .266 | 1.18 | 2.32 | 1 | 4 |
| | Master Degree | 23 | 2.78 | 1.242 | .259 | 2.25 | 3.32 | 1 | 5 |
| | Doctorate Degree | 13 | 3.00 | 1.354 | .376 | 2.18 | 3.82 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.58 | 1.133 | .107 | 2.36 | 2.79 | 1 | 5 |
| Knowledge Management issues are | Matric only | 19 | 2.84 | 1.119 | .257 | 2.30 | 3.38 | 1 | 5 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |
| | National Diploma | 31 | 2.84 | 1.003 | .180 | 2.47 | 3.21 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| addressed by the university | Bachelor Degree | 16 | 2.44 | 1.094 | .273 | 1.85 | 3.02 | 1 | 4 |
| | Master Degree | 23 | 2.96 | 1.186 | .247 | 2.44 | 3.47 | 1 | 5 |
| | Doctorate Degree | 13 | 3.38 | 1.261 | .350 | 2.62 | 4.15 | 1 | 5 |
| | Others | 3 | 2.67 | .577 | .333 | 1.23 | 4.10 | 2 | 3 |
| | Total | 111 | 2.84 | 1.108 | .105 | 2.63 | 3.05 | 1 | 5 |
| I know exactly who to ask for knowledge when there is a need | Matric only | 19 | 2.11 | .937 | .215 | 1.65 | 2.56 | 1 | 4 |
| | National higher Diploma | 6 | 2.33 | 1.033 | .422 | 1.25 | 3.42 | 1 | 4 |
| | National Diploma | 31 | 2.52 | 1.151 | .207 | 2.09 | 2.94 | 1 | 5 |
| | Bachelor Degree | 16 | 2.63 | 1.147 | .287 | 2.01 | 3.24 | 1 | 4 |
| | Master Degree | 23 | 2.96 | 1.331 | .277 | 2.38 | 3.53 | 1 | 5 |
| | Doctorate Degree | 13 | 2.69 | 1.182 | .328 | 1.98 | 3.41 | 1 | 4 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.56 | 1.150 | .109 | 2.34 | 2.77 | 1 | 5 |
| The university has strong awareness in pushing research outputs | Matric only | 19 | 2.26 | .991 | .227 | 1.79 | 2.74 | 1 | 5 |
| | National higher Diploma | 6 | 2.17 | 1.169 | .477 | .94 | 3.39 | 1 | 4 |
| | National Diploma | 31 | 2.26 | .930 | .167 | 1.92 | 2.60 | 1 | 5 |
| | Bachelor Degree | 16 | 2.50 | .966 | .242 | 1.99 | 3.01 | 1 | 4 |
| | Master Degree | 23 | 2.65 | 1.369 | .285 | 2.06 | 3.24 | 1 | 5 |
| | Doctorate Degree | 13 | 2.62 | 1.446 | .401 | 1.74 | 3.49 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.41 | 1.108 | .105 | 2.21 | 2.62 | 1 | 5 |
| It takes a considerable effort | Matric only | 19 | 2.42 | 1.261 | .289 | 1.81 | 3.03 | 1 | 5 |
| | National higher Diploma | 6 | 2.50 | 1.378 | .563 | 1.05 | 3.95 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| to find information at the university | National Diploma | 31 | 2.55 | .995 | .179 | 2.18 | 2.91 | 1 | 5 |
| | Bachelor Degree | 16 | 2.56 | .892 | .223 | 2.09 | 3.04 | 1 | 4 |
| | Master Degree | 23 | 2.87 | 1.254 | .262 | 2.33 | 3.41 | 1 | 5 |
| | Doctorate Degree | 13 | 2.31 | 1.182 | .328 | 1.59 | 3.02 | 1 | 4 |
| | Others | 3 | 2.00 | 1.000 | .577 | -.48 | 4.48 | 1 | 3 |
| | Total | 111 | 2.55 | 1.118 | .106 | 2.34 | 2.76 | 1 | 5 |
| My department is benefitting from its Knowledge Management | Matric only | 19 | 2.58 | .902 | .207 | 2.14 | 3.01 | 1 | 5 |
| | National higher Diploma | 6 | 2.67 | 1.211 | .494 | 1.40 | 3.94 | 1 | 4 |
| | National Diploma | 31 | 2.77 | 1.023 | .184 | 2.40 | 3.15 | 1 | 5 |
| | Bachelor Degree | 16 | 2.38 | 1.088 | .272 | 1.80 | 2.95 | 1 | 5 |
| | Master Degree | 23 | 2.83 | 1.337 | .279 | 2.25 | 3.40 | 1 | 5 |
| | Doctorate Degree | 13 | 3.31 | 1.377 | .382 | 2.48 | 4.14 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.74 | 1.134 | .108 | 2.53 | 2.95 | 1 | 5 |
| IT has a positive effect on my department's knowledge management | Matric only | 19 | 2.26 | .933 | .214 | 1.81 | 2.71 | 1 | 5 |
| | National higher Diploma | 6 | 2.50 | 1.225 | .500 | 1.21 | 3.79 | 1 | 4 |
| | National Diploma | 31 | 2.45 | .925 | .166 | 2.11 | 2.79 | 1 | 4 |
| | Bachelor Degree | 16 | 2.50 | 1.033 | .258 | 1.95 | 3.05 | 1 | 5 |
| | Master Degree | 23 | 3.00 | 1.243 | .259 | 2.46 | 3.54 | 1 | 5 |
| | Doctorate Degree | 13 | 2.92 | 1.320 | .366 | 2.13 | 3.72 | 1 | 5 |
| | Others | 3 | 1.67 | .577 | .333 | .23 | 3.10 | 1 | 2 |
| | Total | 111 | 2.58 | 1.092 | .104 | 2.37 | 2.78 | 1 | 5 |
| The university is a | Matric only | 19 | 2.05 | .780 | .179 | 1.68 | 2.43 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| knowledge-focussed organisation | National higher Diploma | 6 | 2.50 | 1.049 | .428 | 1.40 | 3.60 | 1 | 4 |
| | National Diploma | 31 | 2.29 | .864 | .155 | 1.97 | 2.61 | 1 | 4 |
| | Bachelor Degree | 16 | 2.13 | .957 | .239 | 1.61 | 2.64 | 1 | 5 |
| | Master Degree | 23 | 3.00 | 1.508 | .314 | 2.35 | 3.65 | 1 | 5 |
| | Doctorate Degree | 13 | 2.77 | 1.423 | .395 | 1.91 | 3.63 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.44 | 1.134 | .108 | 2.23 | 2.65 | 1 | 5 |
| The university provides information and communication support tools | Matric only | 19 | 2.21 | .787 | .181 | 1.83 | 2.59 | 1 | 4 |
| | National higher Diploma | 6 | 2.83 | .983 | .401 | 1.80 | 3.87 | 2 | 4 |
| | National Diploma | 31 | 2.55 | .995 | .179 | 2.18 | 2.91 | 1 | 4 |
| | Bachelor Degree | 16 | 2.50 | 1.095 | .274 | 1.92 | 3.08 | 1 | 5 |
| | Master Degree | 23 | 2.87 | 1.180 | .246 | 2.36 | 3.38 | 1 | 5 |
| | Doctorate Degree | 13 | 3.69 | 1.109 | .308 | 3.02 | 4.36 | 2 | 5 |
| | Others | 3 | 3.00 | 1.732 | 1.000 | -1.30 | 7.30 | 2 | 5 |
| | Total | 111 | 2.71 | 1.107 | .105 | 2.50 | 2.92 | 1 | 5 |
| KM enables integration and coordination with the external organisations | Matric only | 19 | 2.47 | 1.020 | .234 | 1.98 | 2.97 | 1 | 5 |
| | National higher Diploma | 6 | 2.50 | .837 | .342 | 1.62 | 3.38 | 2 | 4 |
| | National Diploma | 31 | 2.55 | .888 | .160 | 2.22 | 2.87 | 1 | 4 |
| | Bachelor Degree | 16 | 2.31 | 1.138 | .285 | 1.71 | 2.92 | 1 | 5 |
| | Master Degree | 23 | 2.48 | 1.082 | .226 | 2.01 | 2.95 | 1 | 4 |
| | Doctorate Degree | 13 | 2.69 | .855 | .237 | 2.18 | 3.21 | 1 | 4 |
| | Others | 3 | 3.33 | .577 | .333 | 1.90 | 4.77 | 3 | 4 |
| | Total | 111 | 2.52 | .971 | .092 | 2.34 | 2.71 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| IT organises knowledge collaboration process | Matric only | 19 | 2.37 | .955 | .219 | 1.91 | 2.83 | 1 | 4 |
| | National higher Diploma | 6 | 2.67 | 1.033 | .422 | 1.58 | 3.75 | 2 | 4 |
| | National Diploma | 31 | 2.65 | .915 | .164 | 2.31 | 2.98 | 1 | 4 |
| | Bachelor Degree | 16 | 2.25 | 1.291 | .323 | 1.56 | 2.94 | 1 | 5 |
| | Master Degree | 23 | 2.57 | 1.080 | .225 | 2.10 | 3.03 | 1 | 4 |
| | Doctorate Degree | 13 | 2.69 | .947 | .263 | 2.12 | 3.26 | 2 | 5 |
| | Others | 3 | 3.00 | .000 | .000 | 3.00 | 3.00 | 3 | 3 |
| | Total | 111 | 2.54 | 1.007 | .096 | 2.35 | 2.73 | 1 | 5 |
| IT in KM develops knowledge worker collaboration | Matric only | 19 | 2.42 | .902 | .207 | 1.99 | 2.86 | 1 | 4 |
| | National higher Diploma | 6 | 2.50 | 1.225 | .500 | 1.21 | 3.79 | 1 | 4 |
| | National Diploma | 31 | 2.58 | .958 | .172 | 2.23 | 2.93 | 1 | 4 |
| | Bachelor Degree | 16 | 2.25 | 1.065 | .266 | 1.68 | 2.82 | 1 | 4 |
| | Master Degree | 23 | 2.61 | 1.158 | .241 | 2.11 | 3.11 | 1 | 5 |
| | Doctorate Degree | 13 | 2.92 | 1.115 | .309 | 2.25 | 3.60 | 1 | 5 |
| | Others | 3 | 2.33 | .577 | .333 | .90 | 3.77 | 2 | 3 |
| | Total | 111 | 2.54 | 1.025 | .097 | 2.35 | 2.73 | 1 | 5 |

Table G2: Data variation of respondents on Years of work experience

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Std. | Std. | 95% Confidence Interval for Mean | | | |
| | | N | Mean | Deviation | Error | Lower Bound | Upper Bound | Minimum | Maximum |
| The university has a well organised IT support for KM | 0-under 6 months | 9 | 2.56 | 1.014 | .338 | 1.78 | 3.33 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.11 | .737 | .169 | 1.75 | 2.46 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.67 | .888 | .256 | 2.10 | 3.23 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.18 | 1.185 | .287 | 1.57 | 2.79 | 1 | 5 |
| | 4 years or more | 54 | 2.56 | 1.239 | .169 | 2.22 | 2.89 | 1 | 5 |
| | Total | 111 | 2.43 | 1.109 | .105 | 2.22 | 2.64 | 1 | 5 |
| My IT skills assist me to attain your goals | 0-under 6 months | 9 | 2.11 | 1.167 | .389 | 1.21 | 3.01 | 1 | 5 |
| | 6 months-under 2 years | 19 | 1.79 | .713 | .164 | 1.45 | 2.13 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.08 | 1.165 | .336 | 1.34 | 2.82 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.00 | 1.118 | .271 | 1.43 | 2.57 | 1 | 5 |
| | 4 years or more | 54 | 1.94 | .979 | .133 | 1.68 | 2.21 | 1 | 5 |
| | Total | 111 | 1.95 | .985 | .094 | 1.77 | 2.14 | 1 | 5 |
| I can always rely on IT system | 0-under 6 months | 9 | 2.11 | 1.269 | .423 | 1.14 | 3.09 | 1 | 5 |
| | 6 months-under 2 years | 19 | 2.47 | 1.172 | .269 | 1.91 | 3.04 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.92 | .996 | .288 | 2.28 | 3.55 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.35 | 1.057 | .256 | 1.81 | 2.90 | 1 | 4 |
| | 4 years or more | 54 | 2.70 | 1.207 | .164 | 2.37 | 3.03 | 1 | 5 |
| | Total | 111 | 2.59 | 1.164 | .110 | 2.37 | 2.80 | 1 | 5 |
| I seldom lose my information from IT system | 0-under 6 months | 9 | 2.22 | 1.202 | .401 | 1.30 | 3.15 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.79 | 1.032 | .237 | 2.29 | 3.29 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | 2 years-under 3 years | 12 | 3.08 | .996 | .288 | 2.45 | 3.72 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.65 | 1.272 | .308 | 1.99 | 3.30 | 1 | 5 |
| | 4 years or more | 54 | 2.22 | 1.076 | .146 | 1.93 | 2.52 | 1 | 5 |
| | Total | 111 | 2.48 | 1.127 | .107 | 2.27 | 2.69 | 1 | 5 |
| It is easy for me to use IT programs/applications | 0-under 6 months | 9 | 1.56 | .527 | .176 | 1.15 | 1.96 | 1 | 2 |
| | 6 months-under 2 years | 19 | 2.05 | .524 | .120 | 1.80 | 2.31 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.33 | 1.155 | .333 | 1.60 | 3.07 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.18 | .883 | .214 | 1.72 | 2.63 | 1 | 4 |
| | 4 years or more | 54 | 2.30 | 1.110 | .151 | 1.99 | 2.60 | 1 | 5 |
| | Total | 111 | 2.18 | .974 | .092 | 2.00 | 2.36 | 1 | 5 |
| I create new knowledge by using IT programs/applications | 0-under 6 months | 9 | 1.33 | .500 | .167 | .95 | 1.72 | 1 | 2 |
| | 6 months-under 2 years | 19 | 2.16 | .765 | .175 | 1.79 | 2.53 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.75 | 1.138 | .329 | 2.03 | 3.47 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.35 | 1.169 | .284 | 1.75 | 2.95 | 1 | 5 |
| | 4 years or more | 54 | 2.54 | 1.145 | .156 | 2.22 | 2.85 | 1 | 5 |
| | Total | 111 | 2.37 | 1.095 | .104 | 2.16 | 2.58 | 1 | 5 |
| IT helps me to access data, information, and other sources easily | 0-under 6 months | 9 | 1.33 | .500 | .167 | .95 | 1.72 | 1 | 2 |
| | 6 months-under 2 years | 19 | 1.58 | .507 | .116 | 1.33 | 1.82 | 1 | 2 |
| | 2 years-under 3 years | 12 | 2.17 | 1.115 | .322 | 1.46 | 2.87 | 1 | 5 |
| | 3 years-under 4 years | 17 | 1.88 | .993 | .241 | 1.37 | 2.39 | 1 | 4 |
| | 4 years or more | 54 | 2.28 | 1.140 | .155 | 1.97 | 2.59 | 1 | 5 |
| | Total | 111 | 2.01 | 1.031 | .098 | 1.82 | 2.20 | 1 | 5 |
| IT makes it faster for me to | 0-under 6 months | 9 | 1.33 | .500 | .167 | .95 | 1.72 | 1 | 2 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| process data and information | 6 months-under 2 years | 19 | 1.79 | .631 | .145 | 1.49 | 2.09 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.17 | 1.193 | .345 | 1.41 | 2.92 | 1 | 5 |
| | 3 years-under 4 years | 17 | 1.71 | .772 | .187 | 1.31 | 2.10 | 1 | 3 |
| | 4 years or more | 54 | 2.24 | 1.098 | .149 | 1.94 | 2.54 | 1 | 5 |
| | Total | 111 | 2.00 | .991 | .094 | 1.81 | 2.19 | 1 | 5 |
| IT supports communication and collaboration within my department | 0-under 6 months | 9 | 1.67 | .707 | .236 | 1.12 | 2.21 | 1 | 3 |
| | 6 months-under 2 years | 19 | 2.00 | .882 | .202 | 1.57 | 2.43 | 1 | 4 |
| | 2 years-under 3 years | 12 | 1.92 | 1.165 | .336 | 1.18 | 2.66 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.18 | 1.237 | .300 | 1.54 | 2.81 | 1 | 5 |
| | 4 years or more | 54 | 2.69 | 1.146 | .156 | 2.37 | 3.00 | 1 | 5 |
| | Total | 111 | 2.32 | 1.137 | .108 | 2.11 | 2.54 | 1 | 5 |
| IT system is always available at the university | 0-under 6 months | 9 | 2.56 | 1.014 | .338 | 1.78 | 3.33 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.53 | 1.124 | .258 | 1.98 | 3.07 | 1 | 4 |
| | 2 years-under 3 years | 12 | 3.58 | 1.084 | .313 | 2.89 | 4.27 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.59 | 1.372 | .333 | 1.88 | 3.29 | 1 | 5 |
| | 4 years or more | 54 | 2.91 | 1.186 | .161 | 2.58 | 3.23 | 1 | 5 |
| | Total | 111 | 2.84 | 1.203 | .114 | 2.61 | 3.06 | 1 | 5 |
| IT helps me to identify better solutions for decision-making | 0-under 6 months | 9 | 1.67 | .707 | .236 | 1.12 | 2.21 | 1 | 3 |
| | 6 months-under 2 years | 19 | 2.05 | .848 | .195 | 1.64 | 2.46 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.58 | 1.084 | .313 | 1.89 | 3.27 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.29 | 1.404 | .340 | 1.57 | 3.02 | 1 | 5 |
| | 4 years or more | 54 | 2.57 | 1.021 | .139 | 2.30 | 2.85 | 1 | 5 |
| | Total | 111 | 2.37 | 1.070 | .102 | 2.17 | 2.57 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| IT has a positive effect on my knowledge | 0-under 6 months | 9 | 1.67 | .500 | .167 | 1.28 | 2.05 | 1 | 2 |
| | 6 months-under 2 years | 19 | 1.89 | .875 | .201 | 1.47 | 2.32 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.08 | 1.165 | .336 | 1.34 | 2.82 | 1 | 5 |
| | 3 years-under 4 years | 17 | 1.71 | 1.105 | .268 | 1.14 | 2.27 | 1 | 5 |
| | 4 years or more | 54 | 2.31 | 1.025 | .139 | 2.04 | 2.59 | 1 | 5 |
| | Total | 111 | 2.07 | 1.015 | .096 | 1.88 | 2.26 | 1 | 5 |
| The university keeps IT systems and programs updated | 0-under 6 months | 9 | 2.67 | 1.000 | .333 | 1.90 | 3.44 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.37 | 1.342 | .308 | 1.72 | 3.02 | 1 | 5 |
| | 2 years-under 3 years | 12 | 3.17 | .937 | .271 | 2.57 | 3.76 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.18 | 1.286 | .312 | 1.52 | 2.84 | 1 | 5 |
| | 4 years or more | 54 | 2.80 | 1.139 | .155 | 2.49 | 3.11 | 1 | 5 |
| | Total | 111 | 2.66 | 1.187 | .113 | 2.43 | 2.88 | 1 | 5 |
| I access information without any IT issues at the university | 0-under 6 months | 9 | 2.44 | 1.130 | .377 | 1.58 | 3.31 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.58 | 1.346 | .309 | 1.93 | 3.23 | 1 | 5 |
| | 2 years-under 3 years | 12 | 3.25 | 1.138 | .329 | 2.53 | 3.97 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.29 | 1.263 | .306 | 1.64 | 2.94 | 1 | 4 |
| | 4 years or more | 54 | 2.89 | 1.269 | .173 | 2.54 | 3.24 | 1 | 5 |
| | Total | 111 | 2.75 | 1.268 | .120 | 2.51 | 2.99 | 1 | 5 |
| I am satisfied as a member of the institution to use IT | 0-under 6 months | 9 | 2.00 | 1.323 | .441 | .98 | 3.02 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.00 | .745 | .171 | 1.64 | 2.36 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.83 | 1.193 | .345 | 2.08 | 3.59 | 2 | 5 |
| | 3 years-under 4 years | 17 | 1.94 | 1.298 | .315 | 1.27 | 2.61 | 1 | 5 |
| | 4 years or more | 54 | 2.76 | 1.228 | .167 | 2.42 | 3.09 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Total | 111 | 2.45 | 1.219 | .116 | 2.22 | 2.68 | 1 | 5 |
| IT caters for everyone that uses it | 0-under 6 months | 9 | 2.33 | 1.118 | .373 | 1.47 | 3.19 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.16 | .898 | .206 | 1.72 | 2.59 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.92 | .900 | .260 | 2.34 | 3.49 | 2 | 5 |
| | 3 years-under 4 years | 17 | 2.00 | .935 | .227 | 1.52 | 2.48 | 1 | 4 |
| | 4 years or more | 54 | 2.74 | 1.067 | .145 | 2.45 | 3.03 | 1 | 5 |
| | Total | 111 | 2.51 | 1.043 | .099 | 2.32 | 2.71 | 1 | 5 |
| IT provides information that I need regarding projects and decisions | 0-under 6 months | 9 | 2.00 | 1.118 | .373 | 1.14 | 2.86 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.16 | .958 | .220 | 1.70 | 2.62 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.75 | 1.055 | .305 | 2.08 | 3.42 | 1 | 5 |
| | 3 years-under 4 years | 17 | 1.76 | .752 | .182 | 1.38 | 2.15 | 1 | 3 |
| | 4 years or more | 54 | 2.78 | 1.144 | .156 | 2.47 | 3.09 | 1 | 5 |
| | Total | 111 | 2.45 | 1.110 | .105 | 2.24 | 2.66 | 1 | 5 |
| IT meets my work related needs | 0-under 6 months | 9 | 1.89 | .928 | .309 | 1.18 | 2.60 | 1 | 4 |
| | 6 months-under 2 years | 19 | 1.74 | .806 | .185 | 1.35 | 2.13 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.67 | .985 | .284 | 2.04 | 3.29 | 2 | 5 |
| | 3 years-under 4 years | 17 | 1.76 | .903 | .219 | 1.30 | 2.23 | 1 | 4 |
| | 4 years or more | 54 | 2.46 | 1.111 | .151 | 2.16 | 2.77 | 1 | 5 |
| | Total | 111 | 2.21 | 1.054 | .100 | 2.01 | 2.41 | 1 | 5 |
| IT provides an opportunity for personal development and growth | 0-under 6 months | 9 | 1.56 | 1.014 | .338 | .78 | 2.33 | 1 | 4 |
| | 6 months-under 2 years | 19 | 1.84 | 1.015 | .233 | 1.35 | 2.33 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.58 | 1.165 | .336 | 1.84 | 3.32 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.41 | 1.502 | .364 | 1.64 | 3.18 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | 4 years or more | 54 | 2.69 | 1.179 | .160 | 2.36 | 3.01 | 1 | 5 |
| | Total | 111 | 2.40 | 1.238 | .117 | 2.16 | 2.63 | 1 | 5 |
| I use Knowledge every day to attain my goals | 0-under 6 months | 9 | 1.56 | 1.014 | .338 | .78 | 2.33 | 1 | 4 |
| | 6 months-under 2 years | 19 | 1.47 | .612 | .140 | 1.18 | 1.77 | 1 | 3 |
| | 2 years-under 3 years | 12 | 1.83 | .718 | .207 | 1.38 | 2.29 | 1 | 3 |
| | 3 years-under 4 years | 17 | 1.76 | 1.033 | .250 | 1.23 | 2.30 | 1 | 4 |
| | 4 years or more | 54 | 1.89 | .904 | .123 | 1.64 | 2.14 | 1 | 4 |
| | Total | 111 | 1.77 | .873 | .083 | 1.60 | 1.93 | 1 | 4 |
| I can easily access information (books, journals, etc.) | 0-under 6 months | 9 | 1.89 | .601 | .200 | 1.43 | 2.35 | 1 | 3 |
| | 6 months-under 2 years | 19 | 1.58 | .607 | .139 | 1.29 | 1.87 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.25 | 1.055 | .305 | 1.58 | 2.92 | 1 | 4 |
| | 3 years-under 4 years | 17 | 1.71 | .920 | .223 | 1.23 | 2.18 | 1 | 3 |
| | 4 years or more | 54 | 2.04 | 1.009 | .137 | 1.76 | 2.31 | 1 | 5 |
| | Total | 111 | 1.92 | .926 | .088 | 1.74 | 2.09 | 1 | 5 |
| I understand my role towards Knowledge Management | 0-under 6 months | 9 | 1.78 | .833 | .278 | 1.14 | 2.42 | 1 | 3 |
| | 6 months-under 2 years | 19 | 1.74 | .653 | .150 | 1.42 | 2.05 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.42 | .996 | .288 | 1.78 | 3.05 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.00 | 1.061 | .257 | 1.45 | 2.55 | 1 | 4 |
| | 4 years or more | 54 | 2.37 | 1.218 | .166 | 2.04 | 2.70 | 1 | 5 |
| | Total | 111 | 2.16 | 1.083 | .103 | 1.96 | 2.37 | 1 | 5 |
| IT facilitates knowledge sharing | 0-under 6 months | 9 | 1.33 | .707 | .236 | .79 | 1.88 | 1 | 3 |
| | 6 months-under 2 years | 19 | 2.00 | 1.106 | .254 | 1.47 | 2.53 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.00 | .853 | .246 | 1.46 | 2.54 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | 3 years-under 4 years | 17 | 2.12 | .781 | .189 | 1.72 | 2.52 | 1 | 4 |
| | 4 years or more | 54 | 2.39 | 1.017 | .138 | 2.11 | 2.67 | 1 | 5 |
| | Total | 111 | 2.15 | .993 | .094 | 1.97 | 2.34 | 1 | 5 |
| I always share knowledge with my colleagues | 0-under 6 months | 9 | 1.78 | .667 | .222 | 1.27 | 2.29 | 1 | 3 |
| | 6 months-under 2 years | 19 | 1.63 | .496 | .114 | 1.39 | 1.87 | 1 | 2 |
| | 2 years-under 3 years | 12 | 2.58 | .900 | .260 | 2.01 | 3.16 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.41 | .939 | .228 | 1.93 | 2.89 | 1 | 4 |
| | 4 years or more | 54 | 2.35 | .974 | .133 | 2.09 | 2.62 | 1 | 5 |
| | Total | 111 | 2.22 | .919 | .087 | 2.04 | 2.39 | 1 | 5 |
| The university provides various workshops and forums for knowledge sharing | 0-under 6 months | 9 | 2.11 | 1.054 | .351 | 1.30 | 2.92 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.53 | 1.219 | .280 | 1.94 | 3.11 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.92 | 1.084 | .313 | 2.23 | 3.61 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.94 | 1.435 | .348 | 2.20 | 3.68 | 1 | 5 |
| | 4 years or more | 54 | 2.65 | 1.184 | .161 | 2.32 | 2.97 | 1 | 5 |
| | Total | 111 | 2.66 | 1.210 | .115 | 2.43 | 2.89 | 1 | 5 |
| Knowledge creation is highly encouraged by the department | 0-under 6 months | 9 | 2.56 | 1.014 | .338 | 1.78 | 3.33 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.05 | .848 | .195 | 1.64 | 2.46 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.75 | .965 | .279 | 2.14 | 3.36 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.71 | 1.312 | .318 | 2.03 | 3.38 | 1 | 5 |
| | 4 years or more | 54 | 2.59 | 1.252 | .170 | 2.25 | 2.93 | 1 | 5 |
| | Total | 111 | 2.53 | 1.159 | .110 | 2.31 | 2.75 | 1 | 5 |
| I archive useful information regularly for future use | 0-under 6 months | 9 | 2.00 | .866 | .289 | 1.33 | 2.67 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.00 | .943 | .216 | 1.55 | 2.45 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | 2 years-under 3 years | 12 | 2.08 | .669 | .193 | 1.66 | 2.51 | 1 | 3 |
| | 3 years-under 4 years | 17 | 1.94 | .966 | .234 | 1.44 | 2.44 | 1 | 4 |
| | 4 years or more | 54 | 2.46 | 1.059 | .144 | 2.17 | 2.75 | 1 | 5 |
| | Total | 111 | 2.23 | .988 | .094 | 2.04 | 2.41 | 1 | 5 |
| I always plan ahead for contributing to Knowledge Management | 0-under 6 months | 9 | 2.44 | 1.014 | .338 | 1.67 | 3.22 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.26 | 1.147 | .263 | 1.71 | 2.82 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.75 | .866 | .250 | 2.20 | 3.30 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.47 | 1.125 | .273 | 1.89 | 3.05 | 1 | 5 |
| | 4 years or more | 54 | 2.70 | 1.207 | .164 | 2.37 | 3.03 | 1 | 5 |
| | Total | 111 | 2.58 | 1.133 | .107 | 2.36 | 2.79 | 1 | 5 |
| Knowledge Management issues are addressed by the university | 0-under 6 months | 9 | 2.44 | 1.014 | .338 | 1.67 | 3.22 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.74 | 1.147 | .263 | 2.18 | 3.29 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.75 | .965 | .279 | 2.14 | 3.36 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.82 | 1.185 | .287 | 2.21 | 3.43 | 1 | 5 |
| | 4 years or more | 54 | 2.96 | 1.132 | .154 | 2.65 | 3.27 | 1 | 5 |
| | Total | 111 | 2.84 | 1.108 | .105 | 2.63 | 3.05 | 1 | 5 |
| I know exactly who to ask for knowledge when there is a need | 0-under 6 months | 9 | 2.22 | .972 | .324 | 1.48 | 2.97 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.42 | 1.261 | .289 | 1.81 | 3.03 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.00 | .953 | .275 | 1.39 | 2.61 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.47 | 1.125 | .273 | 1.89 | 3.05 | 1 | 4 |
| | 4 years or more | 54 | 2.81 | 1.150 | .157 | 2.50 | 3.13 | 1 | 5 |
| | Total | 111 | 2.56 | 1.150 | .109 | 2.34 | 2.77 | 1 | 5 |
| The university has strong | 0-under 6 months | 9 | 2.11 | 1.054 | .351 | 1.30 | 2.92 | 1 | 4 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| awareness in pushing research outputs | 6 months-under 2 years | 19 | 2.32 | 1.003 | .230 | 1.83 | 2.80 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.50 | 1.168 | .337 | 1.76 | 3.24 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.41 | 1.121 | .272 | 1.84 | 2.99 | 1 | 4 |
| | 4 years or more | 54 | 2.48 | 1.161 | .158 | 2.16 | 2.80 | 1 | 5 |
| | Total | 111 | 2.41 | 1.108 | .105 | 2.21 | 2.62 | 1 | 5 |
| It takes a considerable effort to find information at the university | 0-under 6 months | 9 | 2.67 | 1.000 | .333 | 1.90 | 3.44 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.53 | 1.307 | .300 | 1.90 | 3.16 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.42 | .996 | .288 | 1.78 | 3.05 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.53 | 1.281 | .311 | 1.87 | 3.19 | 1 | 5 |
| | 4 years or more | 54 | 2.57 | 1.075 | .146 | 2.28 | 2.87 | 1 | 5 |
| | Total | 111 | 2.55 | 1.118 | .106 | 2.34 | 2.76 | 1 | 5 |
| My department is benefitting from its Knowledge Management | 0-under 6 months | 9 | 2.44 | .882 | .294 | 1.77 | 3.12 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.58 | 1.017 | .233 | 2.09 | 3.07 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.58 | 1.084 | .313 | 1.89 | 3.27 | 1 | 5 |
| | 3 years-under 4 years | 17 | 2.59 | 1.278 | .310 | 1.93 | 3.25 | 1 | 5 |
| | 4 years or more | 54 | 2.93 | 1.179 | .160 | 2.60 | 3.25 | 1 | 5 |
| | Total | 111 | 2.74 | 1.134 | .108 | 2.53 | 2.95 | 1 | 5 |
| IT has a positive effect on my department's knowledge management | 0-under 6 months | 9 | 2.22 | 1.093 | .364 | 1.38 | 3.06 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.21 | .787 | .181 | 1.83 | 2.59 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.42 | .900 | .260 | 1.84 | 2.99 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.59 | 1.278 | .310 | 1.93 | 3.25 | 1 | 5 |
| | 4 years or more | 54 | 2.80 | 1.139 | .155 | 2.49 | 3.11 | 1 | 5 |
| | Total | 111 | 2.58 | 1.092 | .104 | 2.37 | 2.78 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| The university is a knowledge-focussed organisation | 0-under 6 months | 9 | 1.89 | 1.054 | .351 | 1.08 | 2.70 | 1 | 4 |
| | 6 months-under 2 years | 19 | 1.89 | .658 | .151 | 1.58 | 2.21 | 1 | 3 |
| | 2 years-under 3 years | 12 | 2.25 | .754 | .218 | 1.77 | 2.73 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.53 | 1.328 | .322 | 1.85 | 3.21 | 1 | 5 |
| | 4 years or more | 54 | 2.74 | 1.200 | .163 | 2.41 | 3.07 | 1 | 5 |
| | Total | 111 | 2.44 | 1.134 | .108 | 2.23 | 2.65 | 1 | 5 |
| The university provides information and communication support tools | 0-under 6 months | 9 | 2.11 | .928 | .309 | 1.40 | 2.82 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.11 | .809 | .186 | 1.72 | 2.50 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.42 | .996 | .288 | 1.78 | 3.05 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.71 | .985 | .239 | 2.20 | 3.21 | 1 | 4 |
| | 4 years or more | 54 | 3.09 | 1.154 | .157 | 2.78 | 3.41 | 1 | 5 |
| | Total | 111 | 2.71 | 1.107 | .105 | 2.50 | 2.92 | 1 | 5 |
| KM enables integration and coordination with the external organisations | 0-under 6 months | 9 | 2.44 | 1.014 | .338 | 1.67 | 3.22 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.32 | 1.057 | .242 | 1.81 | 2.83 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.42 | .669 | .193 | 1.99 | 2.84 | 1 | 3 |
| | 3 years-under 4 years | 17 | 2.41 | 1.004 | .243 | 1.90 | 2.93 | 1 | 4 |
| | 4 years or more | 54 | 2.67 | .991 | .135 | 2.40 | 2.94 | 1 | 5 |
| | Total | 111 | 2.52 | .971 | .092 | 2.34 | 2.71 | 1 | 5 |
| IT organises knowledge collaboration process | 0-under 6 months | 9 | 2.44 | .882 | .294 | 1.77 | 3.12 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.42 | 1.121 | .257 | 1.88 | 2.96 | 1 | 5 |
| | 2 years-under 3 years | 12 | 2.58 | 1.084 | .313 | 1.89 | 3.27 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.18 | .809 | .196 | 1.76 | 2.59 | 1 | 4 |
| | 4 years or more | 54 | 2.70 | 1.021 | .139 | 2.42 | 2.98 | 1 | 5 |

| Descriptive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. | Std. | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Total | 111 | 2.54 | 1.007 | .096 | 2.35 | 2.73 | 1 | 5 |
| IT in KM develops knowledge worker collaboration | 0-under 6 months | 9 | 2.11 | 1.054 | .351 | 1.30 | 2.92 | 1 | 4 |
| | 6 months-under 2 years | 19 | 2.16 | .958 | .220 | 1.70 | 2.62 | 1 | 4 |
| | 2 years-under 3 years | 12 | 2.50 | 1.000 | .289 | 1.86 | 3.14 | 1 | 4 |
| | 3 years-under 4 years | 17 | 2.59 | 1.064 | .258 | 2.04 | 3.14 | 1 | 5 |
| | 4 years or more | 54 | 2.74 | 1.013 | .138 | 2.46 | 3.02 | 1 | 5 |
| | Total | 111 | 2.54 | 1.025 | .097 | 2.35 | 2.73 | 1 | 5 |

## Appendix H: One Way Analysis of Variance (ANOVA) Statistical data

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| Q1 | Between Groups | 4.761 | 4 | 1.190 | .967 | .429 |
| | Within Groups | 130.482 | 106 | 1.231 | | |
| | Total | 135.243 | 110 | | | |
| Q3 | Between Groups | .978 | 4 | .244 | .245 | .912 |
| | Within Groups | 105.797 | 106 | .998 | | |
| | Total | 106.775 | 110 | | | |
| Q4 | Between Groups | 5.253 | 4 | 1.313 | .969 | .428 |
| | Within Groups | 143.684 | 106 | 1.356 | | |
| | Total | 148.937 | 110 | | | |
| Q5 | Between Groups | 10.848 | 4 | 2.712 | 2.231 | .071 |
| | Within Groups | 128.846 | 106 | 1.216 | | |
| | Total | 139.694 | 110 | | | |
| Q6 | Between Groups | 4.830 | 4 | 1.208 | 1.286 | .280 |
| | Within Groups | 99.566 | 106 | .939 | | |
| | Total | 104.396 | 110 | | | |
| Q7 | Between Groups | 13.771 | 4 | 3.443 | 3.090 | .019 |
| | Within Groups | 118.085 | 106 | 1.114 | | |
| | Total | 131.856 | 110 | | | |
| Q8 | Between Groups | 12.095 | 4 | 3.024 | 3.055 | .020 |
| | Within Groups | 104.896 | 106 | .990 | | |
| | Total | 116.991 | 110 | | | |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| Q9 | Between Groups | 9.776 | 4 | 2.444 | 2.637 | .038 |
| | Within Groups | 98.224 | 106 | .927 | | |
| | Total | 108.000 | 110 | | | |
| Q10 | Between Groups | 15.289 | 4 | 3.822 | 3.189 | .016 |
| | Within Groups | 127.035 | 106 | 1.198 | | |
| | Total | 142.324 | 110 | | | |
| Q11 | Between Groups | 10.551 | 4 | 2.638 | 1.882 | .119 |
| | Within Groups | 148.530 | 106 | 1.401 | | |
| | Total | 159.081 | 110 | | | |
| Q12 | Between Groups | 9.259 | 4 | 2.315 | 2.104 | .085 |
| | Within Groups | 116.597 | 106 | 1.100 | | |
| | Total | 125.856 | 110 | | | |
| Q13 | Between Groups | 7.540 | 4 | 1.885 | 1.887 | .118 |
| | Within Groups | 105.884 | 106 | .999 | | |
| | Total | 113.423 | 110 | | | |
| Q14 | Between Groups | 9.673 | 4 | 2.418 | 1.764 | .142 |
| | Within Groups | 145.318 | 106 | 1.371 | | |
| | Total | 154.991 | 110 | | | |
| Q15 | Between Groups | 8.970 | 4 | 2.243 | 1.415 | .234 |
| | Within Groups | 167.967 | 106 | 1.585 | | |
| | Total | 176.937 | 110 | | | |
| Q16 | Between Groups | 16.999 | 4 | 4.250 | 3.075 | .019 |
| | Within Groups | 146.478 | 106 | 1.382 | | |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| | Total | 163.477 | 110 | | | |
| Q17 | Between Groups | 11.916 | 4 | 2.979 | 2.929 | .024 |
| | Within Groups | 107.813 | 106 | 1.017 | | |
| | Total | 119.730 | 110 | | | |
| Q18 | Between Groups | 18.309 | 4 | 4.577 | 4.141 | .004 |
| | Within Groups | 117.168 | 106 | 1.105 | | |
| | Total | 135.477 | 110 | | | |
| Q19 | Between Groups | 14.510 | 4 | 3.627 | 3.569 | .009 |
| | Within Groups | 107.725 | 106 | 1.016 | | |
| | Total | 122.234 | 110 | | | |
| Q20 | Between Groups | 17.128 | 4 | 4.282 | 2.997 | .022 |
| | Within Groups | 151.431 | 106 | 1.429 | | |
| | Total | 168.559 | 110 | | | |
| Q21 | Between Groups | 2.892 | 4 | .723 | .946 | .441 |
| | Within Groups | 81.018 | 106 | .764 | | |
| | Total | 83.910 | 110 | | | |
| Q22 | Between Groups | 5.044 | 4 | 1.261 | 1.498 | .208 |
| | Within Groups | 89.226 | 106 | .842 | | |
| | Total | 94.270 | 110 | | | |
| Q23 | Between Groups | 8.332 | 4 | 2.083 | 1.829 | .129 |
| | Within Groups | 120.749 | 106 | 1.139 | | |
| | Total | 129.081 | 110 | | | |
| Q24 | Between Groups | 9.798 | 4 | 2.450 | 2.633 | .038 |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| | Within Groups | 98.598 | 106 | .930 | | |
| | Total | 108.396 | 110 | | | |
| Q25 | Between Groups | 11.485 | 4 | 2.871 | 3.742 | .007 |
| | Within Groups | 81.326 | 106 | .767 | | |
| | Total | 92.811 | 110 | | | |
| Q26 | Between Groups | 5.193 | 4 | 1.298 | .883 | .477 |
| | Within Groups | 155.798 | 106 | 1.470 | | |
| | Total | 160.991 | 110 | | | |
| Q27 | Between Groups | 5.654 | 4 | 1.413 | 1.055 | .383 |
| | Within Groups | 141.986 | 106 | 1.339 | | |
| | Total | 147.640 | 110 | | | |
| Q28 | Between Groups | 6.086 | 4 | 1.521 | 1.592 | .182 |
| | Within Groups | 101.284 | 106 | .956 | | |
| | Total | 107.369 | 110 | | | |
| Q29 | Between Groups | 3.448 | 4 | .862 | .664 | .618 |
| | Within Groups | 137.651 | 106 | 1.299 | | |
| | Total | 141.099 | 110 | | | |
| Q30 | Between Groups | 2.528 | 4 | .632 | .505 | .732 |
| | Within Groups | 132.553 | 106 | 1.250 | | |
| | Total | 135.081 | 110 | | | |
| Q31 | Between Groups | 8.799 | 4 | 2.200 | 1.707 | .154 |
| | Within Groups | 136.571 | 106 | 1.288 | | |
| | Total | 145.369 | 110 | | | |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| Q32 | Between Groups | 1.344 | 4 | .336 | .267 | .899 |
| | Within Groups | 133.593 | 106 | 1.260 | | |
| | Total | 134.937 | 110 | | | |
| Q33 | Between Groups | .385 | 4 | .096 | .074 | .990 |
| | Within Groups | 137.093 | 106 | 1.293 | | |
| | Total | 137.477 | 110 | | | |
| Q34 | Between Groups | 3.832 | 4 | .958 | .738 | .568 |
| | Within Groups | 137.592 | 106 | 1.298 | | |
| | Total | 141.423 | 110 | | | |
| Q35 | Between Groups | 6.592 | 4 | 1.648 | 1.403 | .238 |
| | Within Groups | 124.507 | 106 | 1.175 | | |
| | Total | 131.099 | 110 | | | |
| Q36 | Between Groups | 13.835 | 4 | 3.459 | 2.875 | .026 |
| | Within Groups | 127.534 | 106 | 1.203 | | |
| | Total | 141.369 | 110 | | | |
| Q37 | Between Groups | 19.113 | 4 | 4.778 | 4.379 | .003 |
| | Within Groups | 115.661 | 106 | 1.091 | | |
| | Total | 134.775 | 110 | | | |
| Q38 | Between Groups | 2.332 | 4 | .583 | .610 | .657 |
| | Within Groups | 101.362 | 106 | .956 | | |
| | Total | 103.694 | 110 | | | |
| Q39 | Between Groups | 4.067 | 4 | 1.017 | 1.003 | .410 |

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| | Within Groups | 107.500 | 106 | 1.014 | | |
| | Total | 111.568 | 110 | | | |
| Q40 | Between Groups | 6.664 | 4 | 1.666 | 1.622 | .174 |
| | Within Groups | 108.903 | 106 | 1.027 | | |
| | Total | 115.568 | 110 | | | |

## Appendix I: Inter-Item Correlation Matrix

| | Q1 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 | Q25 | Q26 | Q27 | Q28 | Q29 | Q30 | Q31 | Q32 | Q33 | Q34 | Q35 | Q36 | Q37 | Q38 | Q39 | Q40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q3 | 0.27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q4 | 0.35 | 0.396 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q5 | 0.19 | 0.224 | 0.263 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q6 | 0.36 | 0.463 | 0.403 | 0.343 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q7 | 0.37 | 0.302 | 0.193 | 0.29 | 0.517 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q8 | 0.39 | 0.475 | 0.329 | 0.09 | 0.496 | 0.36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q9 | 0.37 | 0.391 | 0.308 | 0.171 | 0.48 | 0.33 | 0.747 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q10 | 0.39 | 0.265 | 0.336 | 0.297 | 0.357 | 0.35 | 0.509 | 0.57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q11 | 0.32 | 0.224 | 0.452 | 0.118 | 0.258 | 0.18 | 0.353 | 0.23 | 0.31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q12 | 0.36 | 0.326 | 0.292 | 0.162 | 0.337 | 0.39 | 0.475 | 0.43 | 0.49 | 0.542 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q13 | 0.25 | 0.458 | 0.326 | 0.113 | 0.364 | 0.34 | 0.59 | 0.46 | 0.39 | 0.367 | 0.678 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q14 | 0.38 | 0.29 | 0.403 | 0.259 | 0.313 | 0.22 | 0.225 | 0.14 | 0.43 | 0.502 | 0.351 | 0.383 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q15 | 0.45 | 0.311 | 0.508 | 0.257 | 0.405 | 0.21 | 0.245 | 0.3 | 0.34 | 0.557 | 0.337 | 0.29 | 0.612 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q16 | 0.55 | 0.267 | 0.504 | 0.252 | 0.49 | 0.34 | 0.416 | 0.32 | 0.42 | 0.596 | 0.359 | 0.37 | 0.604 | 0.697 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q17 | 0.51 | 0.253 | 0.491 | 0.199 | 0.463 | 0.41 | 0.494 | 0.4 | 0.39 | 0.465 | 0.382 | 0.462 | 0.576 | 0.6 | 0.72 | | | | | | | | | | | | | | | | | | | | | | | | |
| Q18 | 0.46 | 0.343 | 0.301 | 0.19 | 0.437 | 0.36 | 0.513 | 0.48 | 0.36 | 0.396 | 0.425 | 0.503 | 0.511 | 0.514 | 0.52 | 0.67 | | | | | | | | | | | | | | | | | | | | | | | |
| Q19 | 0.42 | 0.438 | 0.389 | 0.207 | 0.503 | 0.26 | 0.567 | 0.51 | 0.41 | 0.385 | 0.399 | 0.529 | 0.58 | 0.597 | 0.58 | 0.67 | 0.67 | | | | | | | | | | | | | | | | | | | | | | |
| Q20 | 0.46 | 0.335 | 0.374 | 0.28 | 0.385 | 0.45 | 0.524 | 0.41 | 0.53 | 0.416 | 0.548 | 0.512 | 0.44 | 0.4 | 0.5 | 0.57 | 0.59 | 0.64 | | | | | | | | | | | | | | | | | | | | | |
| Q21 | 0.11 | 0.157 | 0.047 | 0.05 | 0.168 | 0.04 | 0.224 | 0.26 | 0.11 | -0.03 | 0.142 | 0.265 | 0.194 | 0.028 | 0.16 | 0.2 | 0.12 | 0.27 | 0.14 | | | | | | | | | | | | | | | | | | | | |
| Q22 | 0.27 | 0.155 | 0.196 | 0.003 | 0.268 | 0.18 | 0.325 | 0.36 | 0.15 | 0.16 | 0.214 | 0.248 | 0.239 | 0.261 | 0.3 | 0.33 | 0.22 | 0.33 | 0.16 | 0.516 | | | | | | | | | | | | | | | | | | | |
| Q23 | 0.3 | -0.04 | 0.032 | -0.06 | 0.127 | 0.08 | 0.3 | 0.35 | 0.2 | 0.181 | 0.215 | 0.212 | 0.157 | 0.143 | 0.23 | 0.23 | 0.33 | 0.27 | 0.22 | 0.329 | 0.51 | | | | | | | | | | | | | | | | | | |
| Q24 | 0.28 | 0.007 | 0.181 | 0.088 | 0.112 | 0.2 | 0.256 | 0.31 | 0.37 | 0.211 | 0.22 | 0.25 | 0.276 | 0.298 | 0.32 | 0.35 | 0.4 | 0.26 | 0.4 | 0.23 | 0.42 | 0.594 | | | | | | | | | | | | | | | | | |
| Q25 | 0.18 | 0.041 | 0.017 | 0.093 | 0.108 | 0.16 | 0.19 | 0.16 | 0.14 | 0.016 | 0.048 | 0.061 | 0.069 | 0.078 | 0.2 | 0.23 | 0.17 | 0.21 | 0.29 | 0.358 | 0.32 | 0.467 | 0.48 | | | | | | | | | | | | | | | | |
| Q26 | 0.21 | -0.12 | 0.027 | 0.168 | 0.014 | 0.19 | -0.04 | 0.14 | 0.21 | 0.018 | 0.049 | -0.06 | 0.044 | 0.079 | 0.11 | 0.03 | 0.1 | 0.02 | 0.29 | 0.095 | 0.2 | 0.466 | 0.42 | 0.39 | | | | | | | | | | | | | | | |
| Q27 | 0.32 | -0.1 | -0.09 | -0.07 | 0.067 | 0.17 | 0.11 | 0.14 | 0.14 | 0.089 | 0.134 | 0.006 | 0.1 | 0.08 | 0.18 | 0.17 | 0.18 | 0.18 | 0.33 | 0.079 | 0.3 | 0.431 | 0.36 | 0.44 | 0.54 | | | | | | | | | | | | | | |
| Q28 | 0.19 | 0.076 | 0.034 | -0.24 | 0.042 | 0.09 | 0.221 | 0.2 | 0.03 | 0.1 | 0.058 | 0.129 | 0.097 | 0.176 | 0.15 | 0.16 | 0.2 | 0.18 | 0.13 | 0.325 | 0.42 | 0.314 | 0.34 | 0.35 | 0.232 | 0.315 | | | | | | | | | | | | | |
| Q29 | 0.09 | -0.02 | -0.08 | -0.1 | 0.029 | 0.14 | 0.104 | 0.16 | 0.16 | 0.109 | 0.108 | -0.04 | 0.114 | -0.04 | 0.02 | 0.04 | 0.1 | 0.14 | 0.2 | 0.211 | 0.16 | 0.405 | 0.25 | 0.4 | 0.417 | 0.485 | 0.33 | | | | | | | | | | | | |
| Q30 | 0.23 | -0.07 | 0.032 | 0.019 | 0.01 | 0.1 | 0.041 | 0.12 | 0.22 | 0.205 | 0.128 | 0.019 | 0.31 | 0.145 | 0.2 | 0.1 | 0.19 | 0.19 | 0.27 | 0.176 | 0.27 | 0.401 | 0.47 | 0.3 | 0.548 | 0.514 | 0.291 | 0.662 | | | | | | | | | | | |
| Q31 | 0.25 | 0.055 | 0.141 | -0 | 0.137 | 0.11 | 0.249 | 0.29 | 0.23 | 0.106 | 0.274 | 0.362 | 0.048 | 0.116 | 0.19 | 0.16 | 0.32 | 0.19 | 0.24 | 0.294 | 0.35 | 0.27 | 0.37 | 0.26 | 0.237 | 0.28 | 0.296 | 0.232 | 0.486 | | | | | | | | | | |
| Q32 | 0.3 | 0.192 | 0.134 | 0.037 | 0.208 | 0.18 | 0.371 | 0.25 | 0.15 | 0.276 | 0.269 | 0.297 | 0.102 | 0.185 | 0.28 | 0.26 | 0.36 | 0.27 | 0.32 | 0.242 | 0.47 | 0.315 | 0.31 | 0.23 | 0.276 | 0.33 | 0.446 | 0.243 | 0.344 | 0.56 | | | | | | | | | |
| Q33 | 0.03 | 0.105 | 0.023 | 0.035 | 0.042 | 0.2 | 0.059 | 0.1 | 0.01 | -0.06 | -0.03 | -0.12 | -0.07 | 0.009 | 0.08 | 0.11 | 0.06 | 0.07 | 0.09 | 0.189 | 0.04 | 0.113 | 0.07 | 0.22 | 0.12 | 0.102 | 0.126 | 0.25 | 0.146 | 0.06 | 0.15 | | | | | | | | |
| Q34 | 0.43 | -0.02 | 0.062 | 0.127 | 0.15 | 0.25 | 0.251 | 0.21 | 0.38 | 0.222 | 0.335 | 0.143 | 0.183 | 0.162 | 0.29 | 0.25 | 0.28 | 0.28 | 0.44 | 0.204 | 0.34 | 0.464 | 0.52 | 0.39 | 0.438 | 0.522 | 0.337 | 0.331 | 0.494 | 0.34 | 0.36 | 0.22 | | | | | | | |
| Q35 | 0.47 | 0.058 | 0.147 | 0.062 | 0.115 | 0.22 | 0.133 | 0.23 | 0.44 | 0.238 | 0.314 | 0.151 | 0.287 | 0.29 | 0.3 | 0.25 | 0.3 | 0.25 | 0.42 | 0.181 | 0.25 | 0.405 | 0.48 | 0.31 | 0.543 | 0.474 | 0.325 | 0.361 | 0.574 | 0.37 | 0.31 | 0.13 | 0.67 | | | | | | |
| Q36 | 0.35 | -0.02 | -0.12 | -0.1 | -0.02 | 0.26 | 0.129 | 0.24 | 0.32 | 0.08 | 0.254 | 0.162 | 0.134 | 0.148 | 0.12 | 0.15 | 0.35 | 0.27 | 0.35 | 0.197 | 0.24 | 0.4 | 0.38 | 0.34 | 0.469 | 0.533 | 0.308 | 0.324 | 0.434 | 0.4 | 0.37 | 0.11 | 0.54 | 0.69 | | | | | |
| Q37 | 0.34 | 0.013 | 0.097 | -0.1 | 0.04 | 0.22 | 0.217 | 0.17 | 0.23 | 0.347 | 0.267 | 0.205 | 0.222 | 0.291 | 0.34 | 0.27 | 0.32 | 0.3 | 0.41 | 0.146 | 0.28 | 0.388 | 0.44 | 0.32 | 0.36 | 0.362 | 0.451 | 0.366 | 0.525 | 0.34 | 0.34 | 0.08 | 0.55 | 0.58 | 0.60 | | | | |
| Q38 | 0.24 | -0.1 | 0.016 | 0.011 | 0.082 | 0.09 | 0.077 | 0.21 | 0.19 | 0.05 | 0.154 | 0.008 | 0.062 | 0.086 | 0.16 | 0.07 | 0.16 | 0.15 | 0.24 | 0.274 | 0.35 | 0.463 | 0.39 | 0.31 | 0.533 | 0.357 | 0.36 | 0.476 | 0.561 | 0.4 | 0.39 | 0.23 | 0.47 | 0.52 | 0.46 | 0.51 | | | |
| Q39 | 0.16 | 0.025 | 0.224 | 0.051 | 0.011 | 0.02 | 0.153 | 0.16 | 0.19 | 0.171 | 0.184 | 0.157 | 0.194 | 0.186 | 0.15 | 0.18 | 0.28 | 0.23 | 0.34 | 0.269 | 0.37 | 0.386 | 0.45 | 0.36 | 0.429 | 0.297 | 0.47 | 0.226 | 0.446 | 0.34 | 0.40 | 0.15 | 0.53 | 0.49 | 0.39 | 0.53 | 0.58 | | |
| Q40 | 0.18 | -0.05 | 0.022 | 0.113 | -0.04 | 0.12 | 0.133 | 0.19 | 0.33 | 0.079 | 0.231 | 0.119 | 0.228 | 0.113 | 0.15 | 0.18 | 0.22 | 0.22 | 0.42 | 0.295 | 0.37 | 0.502 | 0.58 | 0.44 | 0.583 | 0.475 | 0.354 | 0.395 | 0.614 | 0.32 | 0.34 | 0.22 | 0.56 | 0.60 | 0.55 | 0.59 | 0.64 | 0.73 | |

**Appendix J: Conference presentation made during the course of the study**

Dr. Bingwen Yan, Mr. Vusumzi Funda
Effects of information technology on knowledge management: an empirical study in a higher educational institution.
International Conference on Business and Management Dynamics, September 7 - 8, 2016, Cape Town, South Africa.

ICBMD2016

DELEGATE CERTIFICATE

THIS CERTIFICATE IS TO CERTIFY
THAT

**Vusumzi Funda**

ATTENDED THE

**INTERNATIONAL CONFERENCE ON BUSINESS AND MANAGEMENT DYNAMICS 2016**

**AS A**
**DELEGATE**

**CONFERENCE DATES**: 07th – 08th SEPTEMBER 2016

**VENUE**: CRYSTAL TOWERS, CANAL WALK, CAPE TOWN,
SOUTH AFRICA

DR M TWUM-DARKO
CONFERENCE CONVENER

08 SEPTEMBER 2016
DATE

MR WILLEM LOTTER
ACTING DEAN OF FACULTY OF BUSINESS & MANAGEMENT SCIENCES

Cape Peninsula University of Technology

NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY | HP-GSB HAROLD PUPKEWITZ Graduate School of Business

**Appendix K: Conference presentation made during the course of the study**

Dr. Bingwen Yan, Mr. Vusumzi Funda
Information Technology as a facilitator for effective knowledge management in South African higher education environment
International Conference on Business and Management Dynamics, August 29 - 31, 2018, Cape Town, South Africa

## Appendix L: Declaration by language editor

**DECLARATION BY LANGUAGE PRACTITIONER**

I, Yvonne Smuts, hereby declare that I have been appointed by Vusumzi Funda ("the candidate") to attend to the linguistic aspects of the research report that is hereby submitted in fulfilment of the requirements for the degree Magister Technologiae: Business Information Systems in the Faculty of Business and Management Science at the Cape Peninsula University of Technology.

To the best of my knowledge, all suggestions and recommendations made by me in this regard have been attended to by the candidate.

Title of dissertation: *Impact of Information Technology on Knowledge Management at a Selected University of Technology*

Date: 6 August 2019

(Ms) Y Smuts
*BA (Languages) (UP)*
*HED (cum laude) (UP)*
*SATI Accredited Translator (1002242)*