



Cape Peninsula
University of Technology

**FACTORS INFLUENCING IT INVESTMENTS IN A SELECTED UNIVERSITY OF
TECHNOLOGY**

by

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Dissertation submitted in partial fulfilment of the requirements for the degree

Master of Technology Business Administration

in the Faculty of Business and Management Sciences

at the Cape Peninsula University of Technology

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August 2016

DECLARATION

I, Pumza Makaula, declare that the contents of this dissertation 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.

Signed

Date

DEDICATION

I would like to dedicate this study to my late father Sonkwenkwe, who mentored and inspired me about my future until his last moments; to my mother Ntombizandile, who has been praying, encouraging and supporting me in my quest towards this degree; and to my lovely son Siphe for being patient, supportive and praying throughout the journey.

Thank you so much for all your support. Without you I wouldn't have been able to obtain my degree today.

ACKNOWLEDGEMENTS

This journey was incredible and filled with challenges but God made it possible. Thank you, Lord, for being my rock.

I wish to express my gratitude and appreciation to the following:

- a) My mother for her continuous support, prayers, encouragement and being there for me from time to time;
- b) My son for his support, patience and prayers;
- c) My family for their tireless support, motivation and for being there for me when I needed them most;
- d) My colleagues and friends for always being there for me during difficult times and for their continued support and encouragement; and
- e) Dr Michael Twum-Darko my supervisor, for his guidance, valuable input and support throughout the journey.

ABSTRACT

The study, using a selected University of Technology (UoT) as a case study, investigated factors influencing information technology (IT) investments in adopting new technologies in University of Technologies (UoTs). The objective is to determine the benefits of IT investments in UoTs and the impact on UoT operations. Technology is constantly advancing and impacting on organisations' decisions and how to acquire the right technology for effective administration. IT-investment decisions require unique understanding and management by organisations to properly adapt to changing technology. The research was based on the premise that the purpose of deploying new technologies in any organisation is to reduce the costs of running the organisation and to improve operational effectiveness. This would include Higher Education Institutions (HEIs). However, at most UoTs there is a slow response to adopting new technologies, making them lag behind in the deployment of such technologies. This research adopted a mixed method using structured interviews as a data-collecting method from 12 participants from a selected UoT. The respondents were chosen using the purposeful sampling technique. The data collected was transcribed verbatim, coded and analysed using content analysis and Excel. The findings showed that there is a lack of infrastructure, lack of IT support, lack of knowledge, inadequate training, lack of software, exclusion of second and third year students and technology users' from IT-investment decisions. Based on the findings, it has been recommended that more support and training is required to use technology effectively. UoTs should be at the cutting edge of technology and implement a mobile application. The cost of adopting technologies should be reduced and develop software like Open Source Software. Furthermore, UoT need to acquire right technology and invest in resources and technology to enable appropriate technologies. Moreover, second and third year students; and technology users' should be engaged in the implementation of new technologies. The output is presented as a general framework to guide UoTs and perhaps traditional universities on IT-investment decisions. The implication of the research outcome is guidelines to encourage universities to invest in appropriate technology to improve infrastructure for the effective administration of HEIs. Ethical guidelines were used to ensure that participation in this study was voluntary and participants have the right to anonymity.

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ACRONYMS AND ABBREVIATIONS

BS	Business Strategies
BLS	Blackboard Learning System
DHET	Department of Higher Education and Training
ET	Educational Technologist
HEE	Higher Education Environment
HEI	Higher Education Institution
HEIs	Higher Education Institutions
HES	Higher Education System
HEMIS	Higher Education Management Information System
HLEs	Higher Learning Environments
HLIs	Higher Learning Institutions
HoD	Head of Department
HoDs	Head of Departments
IT	Information Technology
ITs	Information Technologies
ITS	Information Technology System
ITTs	Information Technology Tools
OM	Operational Management
PEOUOT	Perceived Ease of Use of Technology
PUOT	Perceived Usefulness of Technology
ROI	Return-on-investment
SAUs	South African Universities
TAM	Technology Acceptance Model
TMS	Top Management Support
TRA	Theory Reasoned Action
TUs	Traditional Universities
UoT	University of Technology
UoTs	University of Technologies
WebCT	Web Course Tools

DEFINITIONS AND TERMS

- a) Epistemology refers to theories that are formed, explained and organised through knowledge of IT investments.
- b) Higher Education Institutions refers to universities in the world which form part of the study.
- c) Innovation refers to an idea, practice or object that is perceived as new by an individual or other unit of adoption.
- d) Managing benefits are clarified as the process of organising and managing IT investments in order to obtain the potential benefits of adopted technologies.
- e) Ontology refers to what we think reality looked like and how we view the world (social reality) about factors influencing IT investments.
- f) Organisational culture is explained as a connection between technology users' and technology adoption within an institution.
- g) Organisational factors are described as factors influencing the adoption of new technologies.
- h) Operational Management is explained as a function to ensure that new technologies have been adopted effectively.
- i) Paradigms are explained as models or frameworks for reflecting and understanding the shape of what we see and how we understand it.
- j) Technology refers to a design for instrumental action that reduces uncertainty in the cause-effect relationships involved in achieving a desired outcome.
- k) Technology Acceptance Model refers to technology users' attitude and intention to the use of technology for IT investments.
- l) Technology adoption is defined as a choice to attain and practise an innovation.
- m) Top management support refers to the support of technology adoption and a realisation of the potential benefits of investing in IT.
- n) Variable is defined as a property that takes different values.

CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

Technological advancement in Information Technology (IT) and its adoption and diffusion in organisations is ever increasing at an astonishing rate. The extent of this is that it is embedded in the various operations of organisations. IT now plays a critical role in the support of daily operations and the strategic positioning of organisations. Decisions on the use of IT have been noted as the most important organisational and managerial activity (Tarabay & Eigbire, 2009: 1), particularly in institutions of higher learning.

This chapter discusses the background to the study, the problem statement, objectives of the study including main and specific objectives, research questions concerning the study, the ethical consideration processes that were followed in conducting the study, a delineation of the study, contribution of the research, overview of chapters that were undertaken during the study and a summary highlighting key areas within the study.

Any organisation that needs to adopt new technologies should make business-strategy decisions before investing in any type of technology for a business system. Reviewed literature thus far has proposed different frameworks or methodologies concerning how to go about making technology-investment decisions. Tarabay and Eigbire (2009: 1) argue that the mutual conclusion is that no single, simple methodology gave a consistent, reliable and optimal solution to managers facing IT-investment decisions. Unlike the innovation of new technologies, the adoption of technology frequently emerges as a constant and deliberate practice. The innovation eventually determines the speed of economic growth and the rate of change of productivity (Hall & Khan, 2002: 3). At this point in time, the adoption of new technologies may contribute little to a users' well-being depending on the satisfaction and behaviours in using the adopted technologies. Furthermore, Hall and Khan (2002: 3) argue that benefits and costs can influence the decisions made by the suppliers of new technologies.

Gunasekaran, Love, Rahimi and Miele (2001: 350) and Dekleva (2005: 4) argue that investing in IT can be a costly, time-consuming exercise and complex to justify. This study sought to investigate the factors influencing IT-investment decisions in adopting new technologies in a university. Even though the study investigates both internal and external factors, the focus was more on internal factors influencing IT investments. The aim is to interpret the factors influencing IT-investment decisions in a selected university of technology. The next section discusses the background of the study.

1.2 BACKGROUND

As indicated in the previous section, the advancement of technologies in information technology (IT) used by organisations is ever increasing at an astonishing rate and has extended to the point that it is embedded in the various operational activities of organisations. Brown and Motjopolane (2005: 21) argue that technologies are constantly advancing and consequently require management to adapt to the changing environment. Therefore regular alignment, both information technology (IT) and business strategies (BS), is required.

Mohan, Ahlemann and Braun (2011: np) argue that there is a lack of alignment between business and IT and that is one of the reasons that unrealistic benefits were identified or not realised at all. Drawing from the work of Brown and Motjopolane (2005: 20), it is arguable there is a need to align strategies of both management of technology and management of transformation to accomplish value from IT investments, particularly in Higher Education Institutions (HEIs). Naude and Holland (2004: 165) ascertain that, globally, tertiary education tends to be an international activity in these modern times and as such HEIs are more dependent on the efficient use of technology for internal and external communication. For example: academics, administrators, students and researchers all undertake tasks that are increasingly performed by using information technologies (ITs) and often involve a wide audience.

Most UoTs in South Africa are more prone to technology challenges. One of the challenges was a combination of a virtual-learning environment for academics, non-academics, researchers and students (including undergraduates and postgraduates). The advancement of technology is expected to cut costs and improve operational effectiveness to reduce the use of paper in HEIs. To this end, the university still operates in a traditional manner, using manuals and hesitant to use online processes effectively to avoid queues, save time and travel costs.

For example, submissions of applications for studying at the selected UoT are done manually and there are still long queues for submissions. This has frustrated many prospective students who are interested in enrolling at the UoT and also the administration staff who assist these students. New technologies should better the lives of people, be user friendly and accessible anywhere. However, there seems to be slow response to new technology adoption and as such HEIs are lagging behind in the deployment of new and appropriate technologies.

For example, in all faculties staff members and students are required to show their staff or student cards to security personnel at an entrance of a building from time to time in order to be allowed to enter the premises or they may be asked to sign a log book. This practice is time consuming. What happened to the benefits of IT? New technologies should continue to support the entire institution and help to respond to the needs of the UoT community. Frequent breaks in network connectivity within the institution are a concern.

For example, a lecturer in a marketing class on campus was unable to play a video to demonstrate a concept in the classroom; and administrators attending to students sometimes struggle to print documents as a result of poor connectivity. Another example is that of a researcher who could not receive e-mails from external stakeholders of a stakeholder-meeting notification and invitation, and only received them after the meeting due to bad connectivity emanating from the type of technology deployed.

New technologies should be deployed constantly to 'refresh' the existing infrastructure to continuously create a robust IT infrastructure in support of the UoTs work. This undermines the university's ability to deliver to its students and stakeholders, and as such management must pay attention to continuously adopting new technologies. Some studies indicate that most HEIs invested heavily in IT to support teaching and learning; and several methods and frameworks have been proposed concerning the benefits of IT investments, but nothing seems to work out (Nicol & Coen, 2003: 46; Ward & Elizabeth, 2006: 418; Tarabay & Eigbire, 2009: 1).

On the other hand, Rogers' Diffusion Innovation Theory has also proven to be the most appropriate and cited framework that has been used for the adoption of technology in the Higher Education Institution (HEI) environment (Sahin, 2006: 14). There is a gap that relates factors influencing IT-investment decisions in adopting technology, and this study intended to understand in order to realise the potential benefits. The role of technology has become critical in the HEI environment as more people depend on the use of technology at all times, including academics, non-academics, researchers and students both undergraduate and postgraduate (Allen, Kern & Mattison, 2002: 159).

However, few challenges have been highlighted such as: insufficient technology resources, the lack of management support, lack of coordination, infrequent inspection and lack of a systematic approach (Allen, Kern & Mattison, 2002: 160). Nationally, it has been argued that HEIs are spending increasingly more of their budgets on the implementation of technology but still lack the ability to improve the quality of technology (Czerniewicz, Ravjee & Mlitwa, 2006: 54). From the experience of working in educational institutions, a number of challenges

have been observed in the way and manner technology is managed. It has been realised that academics and non-academics, students and researchers are experiencing problems regarding the network server which is constantly down and this consequently brings performance down as well.

It has often been reported to management that students are frequently unable to access the Internet. Some students were unable to register online at the various campuses. This has resulted in long queues and the extension of registration dates as students have still to register. On the other hand, those who managed to register could not access course guidelines on Blackboard. It was also revealed that administrators were unable to execute administrative functions on the information technology system (ITS) e.g. requisitions, access information and to validate applications online, and meet deadlines due to technological challenges. Based on the background provided, it has therefore become necessary to conduct a study on investigating the factors influencing IT investments in a selected UoT. Once the factors are found, recommendations are made regarding how IT investments can be improved in this university. The next section discusses the problem statement of this study.

1.3 PROBLEM STATEMENT

There are factors influencing IT-investment decisions in HEIs which have not been properly identified. According to Hesselmann, Ahlemann and Böhl (2015: 585) and; Keswani, Banerjee and Patni, (2008:1), there are still problems in adopting new technologies in different operations of academic and non-academic departments that seek to improve effectiveness and efficiency of use of technology in HEIs. As alluded to in the previous paragraph, the newly formed UoT, together with its increasing number of students since 2005, still has not benefited from its IT investments. The rapid growth in IT has brought remarkable changes in the twenty-first century, and has influenced the demands of modern society. IT is becoming increasingly important in our daily lives and our educational system. Understanding the influence of IT in the workplace and everyday life, today's educational institutions try to restructure their educational curricula and classroom facilities in order to bridge the existing technology gap in teaching and learning. The restructuring process of the UoT requires an effective adoption of appropriate technologies in its operational activities in order to provide learners with knowledge of specific subject areas to promote meaningful learning and to enhance professional productivity (Tomei, 2005: 195).

Hesselmann, Ahlemann and Böhl (2015: 585) further state that gaining the potential benefits of IT investments has remained a problem. If this challenge is not addressed there will perpetually be inadequate IT investments in teaching and learning in academic environment

(Coombs, 2015: 363), e.g. in a UoT. The section that follows provides objectives and questions of the study under investigation.

1.4 RESEARCH OBJECTIVES AND QUESTIONS

The table below summarises the key features of the proposed study from the problem statement, through the research questions, and to the main and specific objectives and methods that were adopted.

Problem context	Factors influencing IT-investment decisions in HEIs have not been properly identified.	
Main objective	The study identified the factors influencing IT-investment decisions in a selected UoT.	
Main research question	What are the factors influencing IT-investment decisions in a selected UoT?	
Investigation questions	Specific objectives	Methods
What strategic tools are available?	Interpret good IT strategies	Document analysis and references from experts
What are the educational activities in HEIs?	Interpret potential benefits of IT	Document analysis; selected interviews with management, researchers, academics and non-academics
What technologies are available to support educational activities in HEIs?	Identify available IT resources used to support educational activities in HEIs	Semi-structured interviews
What are the general benefits of investing in IT for HEIs?	Implement best practice	Document analysis and semi-structured interviews
What steps are needed in order to realise the benefits?	Develop a framework for investing in IT for HEIs	Content analysis of interviews against model of good practice

Table 1.1: Research objectives and questions

The next section provides a detailed process of ethical considerations that was followed in order to conduct this study.

1.5 ETHICAL CONSIDERATION

The previous section provided a brief summary of the proposed study, from the problem statement, through the main research questions, to the sub-research questions, main and specific objectives, and methods adopted in this study. This section explained the ethical consideration of the study. The ethics management plan describes the steps that were taken

to ensure the ethical enactment of a research study (Creswell, 2013: 56). The available ethical guidelines of a selected UoT were used to guide the study. No vulnerable persons were involved in this study (Hennink, Hutter & Bailey, 2011: 63).

This study involved interactions only with non-academics and academics, researchers and management whose work involves IT. Participants were advised by means of a participation letter about the purpose of the study, their right to withdraw, their right to anonymity and their right to see and review the output of the research; and about the way data and output from the study were managed. Participants were also informed that the information gathered from their semi-structured interviews was confidential and their participation was voluntarily (Creswell, 2013: 57).

Letters with a detailed description of the study requesting permission to interview participants (Hennink, Hutter & Bailey, 2011: 66) were sent directly to the directors or HoDs, and to the participants. Furthermore, participants' names were kept confidential. All original data and information were kept confidential, including documents, voice recordings and transcripts. Data and information were rendered anonymous before they were used by means of coding or aggregation into summary tables and graphs, or in the case of verbatim quotations by making no reference to the name or position.

Content derived from data or information provided by the participants may later be included in presentations, working papers, conference papers, journal papers and books, which may be made publically available as printed or digital outputs from the study (Hennink, Hutter & Bailey, 2011: 64). Finally, an ethical clearance certificate from the UoT ethics committee was granted to conduct the study within the university. The paragraph that follows explains the delineation of the study.

1.6 DELINEATION OF THE STUDY

The previous paragraph looked at the ethical consideration to ensure the guidelines of the university are followed. This section explained the delineation of this study. The study was conducted in a selected UoT in the Western Cape Province in South Africa. The semi-structured interviews were restricted to those working in IT-related functions within a selected UoT. The study focused on factors influencing IT-investment decisions and those that hinder the university to invest in IT. The study looked at investigating factors influencing IT investments in the university. The contribution of the research is mentioned in the next paragraph.

1.7 CONTRIBUTION OF THE RESEARCH

As alluded to in the previous section, the study was conducted in a selected UoT in the Western Cape Province of South Africa. This subsection clarifies the contribution of the study. The findings of the study will assist HEIs in South Africa to determine how they have benefited from IT-investment decisions and their role in education management. The study further provides information to HEIs the benefits of good IT investment decisions.

The contribution therefore is general guidelines to guide IT-investment decision makers as supposed to the current methodologies which are found in most literature. A conceptual framework, developed to guide the design and implementation of the data collection instrument, also contributed to a good understanding of the problem. A general framework for understanding the factors influencing IT-investment decisions in UoTs has been proposed.

The evaluation of the current literature on similar problems provided a deeper understanding of how and why the problem had existed. This chapter concludes with an overview of all chapters covered in this study and a summary of this chapter is also provided. The section that follows provides a brief overview of chapters from Chapter One to Chapter Five.

1.8 OVERVIEW OF CHAPTERS

The contribution of the study was discussed in the previous section as follows: the findings of the study will assist HEIs in South Africa to identify the factors that may influence IT investments and act on them accordingly; the study will also help universities in SA to realise the benefits of investing in IT and its role in education management; and the study will also assist institutions to invest wisely in adopting the technologies of their preference, and derive the real and full potential benefits from IT investments.

This section presented an overview of each chapter. This dissertation comprises five chapters, including an introduction and background, literature review, research design, findings and interpretation, and lastly the conclusion, contribution, recommendations and further research for the study.

Chapter One introduces the study and gives the background of the research. This chapter clearly explains what research was about and why it was done, and it presents the background of the study, objectives of the study (both main and specific objectives), the statement of the research problem, main research question, sub-research questions, and delineation and contribution. This chapter also discusses all the processes that were followed

to ensure that research ethics were adhered to. It concludes by an overview of all chapters and a summary of this chapter.

Chapter Two discusses details of the literature review identified from the research literatures alluded to and related to the study under investigation. A particular consideration is given to the SA context in investigating factors influencing IT investments in the higher learning institutions' (HLIs) environment in adopting new technologies. It begins by discussing an overview of education in South Africa and of education globally. This is followed by information technology in Higher Education Institutions in South Africa and information technology tools. This chapter also discusses innovation and technology adoption. It also demonstrates and discusses the technology acceptance model at length.

This chapter also looks at the factors influencing IT-investment decisions both internal and external. It also describes managing benefits of IT investments, the effective management of IT investments, the successes and failures of IT investments, challenges versus opportunities of IT investments and integrated solutions of IT investments in HEIs. The conceptual framework guides the design, and the implementation of the data-collection instrument has been illustrated in this chapter. It concludes with a summary of the chapter which enlightens the title of the next chapter.

Chapter Three discusses the research design and methodology adopted for this study. The following are discussed: research approach, research paradigm, the case, historical background of the university, the University 2020 vision, unit and object of analysis, population of the study, sampling technique, and sampling size, methods of data collection, methods of data analysis, reliability, validity, ethical consideration and summary of this chapter. Finally, this chapter also discusses the data analysis that was used for Chapter Four.

Chapter Four presents the findings and interpretation of the data analysis gathered from semi-structured interviews within a selected UoT. Findings of the study are discussed, interpreted and presented in figures and tables. This chapter also illustrates a proposed general framework for understanding of the factors influencing IT-investment decisions. This will help UoTs and other universities in the world to invest in IT effectively.

Lastly, **Chapter Five** discusses the contribution, conclusion, recommendations, further research and final words. The following paragraph summarises the key points that were discussed in this chapter.

1.9 SUMMARY

This chapter introduced the study and discussed the problem. The chapter also clearly indicated the nature of study and the investigating approach to the factors influencing IT-investment decisions in a selected UoT. The objectives and research questions that guided the study were also discussed. Furthermore, the chapter discussed the procedures followed to ensure that research ethics are maintained. The chapter also discussed how the study was conducted in the selected UoT and how the participants were drawn from the employees working directly with or closely with IT-related functions within the UoT. The next chapter discusses details of the relevant literature reviewed from the research literatures related to the area under investigation.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter, Chapter One, discussed the background and the objectives of this study, including main and specific objectives. The problem statement, main and sub-research questions, and methods, were also discussed. The ethical consideration, delineation, contribution, overview of the chapters and summary of the study were also covered. To reiterate, the study investigates the factors influencing IT-investment decisions in a selected UoT. As mentioned in Section 1.8 of Chapter One, this chapter reviews and discusses relevant literature from previous studies relating to this research. It also provides a view of various concepts contributing to the factors influencing IT-investment decisions in adopting new technologies in a selected UoT. The nature of the study requires a review of existing and recent literature relating to the study.

This chapter discusses the following: overview of education in South Africa, overview of education globally, information technology in higher education institutions in South Africa, innovation and technology adoption, technology acceptance model, factors influencing IT investments in general and particularly in institutions of higher learning both internal and external. This chapter also looks at managing benefits of IT investments, effective management of IT investments, successes and failures of IT investments, challenges versus opportunities of IT investments and integrated solutions of systems in Higher Education Institutions (HEIs). The chapter ends by offering a conceptual framework as an initial framework to understand and tease out the problem. The next section discusses an overview of education in South Africa.

2.2 OVERVIEW OF EDUCATION IN SOUTH AFRICA

Before discussing this section, it was important to understand factors influencing IT investments in education in South Africa. As stated in the previous section, this section provides an overview of education in South Africa. Jaffer, Ng'ambi and Czerniewicz (2007: 132) argue that HEIs are going through tremendous pressure in increasing contributions globally from diverse groups of students and generating acquired skills of the adopted technologies within HEIs. Jaffer, Ng'ambi and Czerniewicz (2007: 132) further note that effective technologies improve the quality of teaching and learning, particularly in South African universities (SAUs).

It has also been noted that adopted technologies are supposed to take learners away from the classrooms; this practice seems to be challenging (Ozkan & Koseler, 2009: 1286), especially in HEIs. Knapper (2001: 94) also identifies various challenges facing teaching and learning technologies as follows: “Lack of personal contact between teachers and students, inadequate assessment methods to measure sophisticated learning goals, less opportunity for students to integrate knowledge from different fields and apply what they learn to the solution of real-world problems.”

Despite the IT-related challenges, some research literature states that teaching and learning are no longer restricted to traditional classrooms in the modern environment (Wang, Wang & Shee, 2007: 1793). Online teaching of the adopted technology has also been identified as a challenge because it requires extra time and effort, and not all faculties are technology literate in teaching with technology tools. The readiness of students to learn online is complex and most students prefer learning with technology that leads to a better attitude towards learning and equips them with more confidence (Saba, 2009: 5).

Saba (2009: 5) argues that the traditional context of learning is experiencing a drastic change of technologies as it intends to improve teaching and learning in HEIs. Saba (2009: 2) further claims that the role of technologies has been seen as a catalyst for change, particularly in HEIs. The study explores the factors influencing IT investments in this university. As indicated at the beginning of this chapter, the next section gives a brief overview of education globally.

2.3 OVERVIEW OF EDUCATION GLOBALLY

As alluded to in the previous section, effective technologies improve the quality of teaching and learning, particularly in SAUs; but this practice seemed to be quite challenging. It was important to observe education globally and how it influences IT investments towards adopted technologies. This subsection provides an overview of education globally. The work done indicates that globally, education is going through transformation to improve teaching and learning (Tagoe, 2014: 85). Tagoe (2014: 85) indicates that one of the reasons was to ensure that universities and communities engage in partnerships with students and university stakeholders to pursue the solutions of IT investments.

It has been noted that IT has been lagging behind in some developing countries such as Kenya in sub-Saharan Africa (Irura & Munjiru, 2013: 250). Furthermore, technology adoption in education has become a challenge. A number of problems that are hindering the use of technology has been identified as: a lack of access to IT resources, lack of time for training, lack of models of good practice in IT, a negative attitude towards technology in education,

administrative and institutional support. The following section discusses information technology in higher education institutions in South Africa.

2.4 INFORMATION TECHNOLOGY IN HIGHER EDUCATION INSTITUTIONS IN SOUTH AFRICA

2.4.1 Introduction

The previous section reviewed the literature for both South African and global education. In order to invest in IT effectively within a selected university, it was necessary to look at IT literature principally in South Africa, which was the focus area of this study. To restate, this section views IT in HEIs in South Africa. Most companies continue to implement different systems that are not supporting the existing structures; and overall business efficiency may decline. This may affect the factors influencing IT investments in adopting technologies and the 'productivity paradox' of IT (Brynjolfsson, 1993: 67; Roztocki & Weistroffer, 2007: 1032).

Current literature indicates that most HEIs have invested heavily in technologies to support teaching and learning (Nicol & Coen, 2003: 46). Nicol and Coen (2003: 46) further state that HEIs in developed countries relate technologies to the national policy frameworks and are driven by financial support bodies, while SAUs indicate no specific policies in adopting effective new technologies, especially in HEIs. Jaffer, Ng'ambi and Czerniewicz (2007: 131) also support the statement that HEIs have been adopting technologies to support and improve the quality of education in teaching and learning.

Jaffer, Ng'ambi and Czerniewicz (2007: 132) also indicate that redressing past inequalities and the transformation of the higher education system (HES) has remained the key challenges facing HEIs. However, there are still concerns over the adoption of technologies in order to access technology benefits and to inform IT-investment decisions. Some universities adopted technology in their teaching systems thirty years ago. For example, the University of Transkei, Rhodes University and the University of the Western Cape have been using the PLATO system as a technology platform since the early 1980s for the educational delivery of teaching and learning (Hodgkinson-Williams, 2010: 5).

Hodgkinson-Williams (2010: 5) also laments that, thirty years later, most HEIs are now using different applications of technologies to support teaching and learning functions, such as Web Course Tools (WebCT) or Blackboard Learning System (BLS) and Learning Management System (LMS). Nevertheless, it has been reported that HEIs are pressed by an increasing and immense pressure to meet social transformation, acquire the skills needed to

improve external and internal policies and to deliver performance within institutions (Jaffer, Ng'ambi and Czerniewicz, 2007: 132).

It has also been noted that education challenges are worsened by the students realism and pragmatism of lacking the knowledge and skills required when joining HEIs (Jaffer, Ng'ambi and Czerniewicz, 2007: 132). Therefore, additional support is occasionally needed to provide those students with the necessary technology in order to be in line with the institutional strategies and realise the potential benefits of IT investments.

For example, most students who studied in rural schools do not have the technological knowledge and skills compared to the ones who studied in urban and modern schools where technology skills are compulsory. This realism is still an ongoing phenomenon for the new arrivals that recently joined HEIs from disadvantaged schools. The need to adopt IT is indeed very important to create a competitive advantage for any organisation (Gottschalk, P. & Taylor, 2000: 1) particularly in SAUs. The evaluation of business has brought a major challenge (Renkema, 1998: 181). The next paragraph explains the information technology tools.

2.4.2 Information Technology Tools

The previous section studied the IT literature in conjunction with the challenges of adopting new technologies within HEIs. These are as follows: accessing technology benefits, students pragmatism of lacking knowledge and skills required when joining HEIs. In order to interpret the understanding of good IT strategies, it was important to look at the information technology tools (ITTs) and understand the available tools within an institution. This section answers one of the research questions of what strategic IT tools are available within a selected university. In answering this question, Keswani, Banerjee and Patni (2008: 3) identify a number of ITTs available in HEIs. These are as follows:

Blogs, Forums, Communities, Webcast, PodCast, User Groups, PISACCA (Google) and Flickr (Yahoo), W3Schools.com, Webopidia, Wikis, Webconferencing, Videoconferencing, Chat, E-mail, Instant Messaging, Bulletin Board, VOIP, Data Conferencing, Shout Box, Image Board, YouTube, and SlideShare.

The following section provides a brief description of innovation and technology adoption. It also demonstrates and explains the technology acceptance model. The details for individual sections mentioned below are explained separately.

2.5 INNOVATION AND TECHNOLOGY ADOPTION

2.5.1 Innovation

As mentioned in the previous section, this paragraph provides a brief description of innovation and technology adoption which influenced IT-investment decisions within a university. More importantly, an innovation definition was significant to implement best practice in order to reap the potential benefits of investing in IT. Rogers (2003: 12) defines an innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption”. This means an innovation can be considered for some time but can still be fresh when “individuals perceived it as new” (Sahin, 2006: 14).

Kandiri (2014: 48) notes that “technology characteristics play a major role in technology adoption”. Kandiri (2014: 48) further claims that the perception of technology users’ is imperative, especially when technology adoption takes place. Rogers (2003: 13) supports this statement by indicating that “technological innovation creates uncertainty in the minds of potential adopters (about its expected consequences), and presents an opportunity for reduced uncertainty in another sense (information based technology).”

Rogers (2003: 13) continues by clarifying that the reduction of “...uncertainty (the information embodied in the technological innovation itself) represents the possible efficacy of the innovation in solving an individual’s felt need or perceived problem. This advantage provides motivation that impels an individual to exert effort in order to learn about the innovation.”

Although several studies give different definitions of innovation, it goes without saying that innovation is an initiative that needs to be looked at before adopting technologies within HEIs. So technology users’ should try innovation in order to sense whether the use of new adopted technologies would be worthwhile or not. The next paragraph discusses details of technology adoption.

2.5.2 Technology Adoption

It is agreeable that technology has become the vehicle for the execution of our daily functions and we cannot do without it. Abukhzam and Lee (2010: 61) argue that technology is general and technology is in business. The general definition is that technology is “the knowledge of the manipulation of nature for human purposes”. Abukhzam and Lee (2010: 61) further explain technology in business as “knowledge and work techniques used by organisations in delivering their products and services.”

On the other hand, Rogers (2003: 12) explains technology as a “design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome”. At the same time, Rogers reveals the components of technology as hardware and software. These two aspects are clarified as follows: the hardware aspect refers to a “tool that embodies technology as a material or physical object, whereas software aspect includes an information base for the tool”.

Secondly, Abukhzam and Lee (2010: 61) continue by explaining technology adoption as the “process through which organisations or individuals decide to make full use of innovation in their daily businesses”. Hall and Khan (2002: 1) define technology adoption as a choice to attain and practise an innovation. Some studies describe technology adoption as a key that eliminates the risk of committing to IT investments (Brynjolfsson & Hitt, 1998: 3). This could have a positive impact on IT investments directly or indirectly on the overall success of the organisations. Brynjolfsson and Hitt (1998: 3) further argue that many managers, practitioners and scholars propose various methods of IT investments, but there seems to be a negative influence of making decisions for investing in IT within a university.

Finally, anecdotal evidence shows a constant argument for investing in the IT ‘Productivity Paradox’ and ‘IT for value’ (Brynjolfsson & Hitt, 1998: 3). Galliers and Leidner (2003: 13) remark that technology adoption is an important tool that plays a vast role within HEIs. However, the implication is that the adoption of new technologies brings no increased business value. On the other hand, it has been revealed that IT investments bring along positive results but their benefits have proven relatively difficult (Tarabay & Egbire, 2009: 1), especially in HEIs.

Tinio (2003: 21) argues that technology adoption needs clear and specific objectives, guidelines and time-bound targets, plus the mobilisation of needed resources and political commitment at all levels to see the initiative through. Tinio (2003: 21) further recommends that before any technology-based programme, the uncertainty of numerous categories of technologies in the country in general and educational systems should be noticed at all levels, particularly in HEIs. Tinio (2003: 21) identifies that the adoption of new technologies within HEIs remains cheaper and easier, especially where education is riding on large-scale developments by government or private sectors. On the other hand, Sahin (2006: 14) and Rogers (2002: 20) report that the adoption of technologies in education lies within institutions and the way they are managed. Rogers (2002: 20) further discusses technology as a set of established institutional norms. These involve teaching methods, faculty autonomy, and notions of productivity.

Sahin (2006: 14) further indicates that several methods and frameworks were proposed to effectively and efficiently invest in IT within HEIs. However, Rogers' Diffusion of Innovations Theory has been suggested in various research literatures, particularly when implementing technology within HEIs. The section that follows discusses the technology acceptance model. This also illustrates a model that observes technology users' responses towards adopted technologies, their attitude in using technologies, and behaviours in adapting to effective technologies within HEIs.

2.5.3 Technology Acceptance Model

In understanding technology users' perceptions of technology towards the adoption of technologies, the technology acceptance model (TAM) has been used as part of the study. TAM has been proven as a model that helps understanding the way IT investments have been managed, how technology users' perceive the adopted technologies within an institution, how they need technologies to be adopted, how flexible they are using new technologies, the attitude towards the use of adopted technologies, their behavioural intention in using adopted technologies, the actual systems in use and external variables (Legris, Ingham & Colletette, 2003: 193).

For these reasons, it was necessary to adopt this model as this might answer some of the concerns for this study. Also when the university wants to excel in technology, it is important to understand technology users' perceptions (Motaghian, Hassanzadeh & Moghadam, 2013: 159). This model indicates the factors influencing IT investments in adopting technologies which were being ignored by most people who work closely with technologies and those who are making decisions to adopt them (Liew, 2015: 40).

Figure 2.1 (below) was used to check technology users' responses towards adopted technologies, their attitude in using technologies and behaviours in adapting to effective technologies within HEIs (Legris, Ingham, & Colletette, 2003: 193). Abukhzam and Lee (2010: 62) claim that technology users' attitudes are reasons for adopting technologies within an organisation. Abukhzam and Lee (2010: 62) further mention organisational and managerial characteristics. These are as follows: fear of loss of autonomy and fear of a security breach is the key influencing technology users' attitudes to adopted technologies. Abukhzam and Lee (2010: 62) describe attitude as a "complex conundrum of feelings, desires and fears that create a state of readiness." The figure below shows the steps of the factors influencing IT investment decision to adopt effective technology within HEIs.

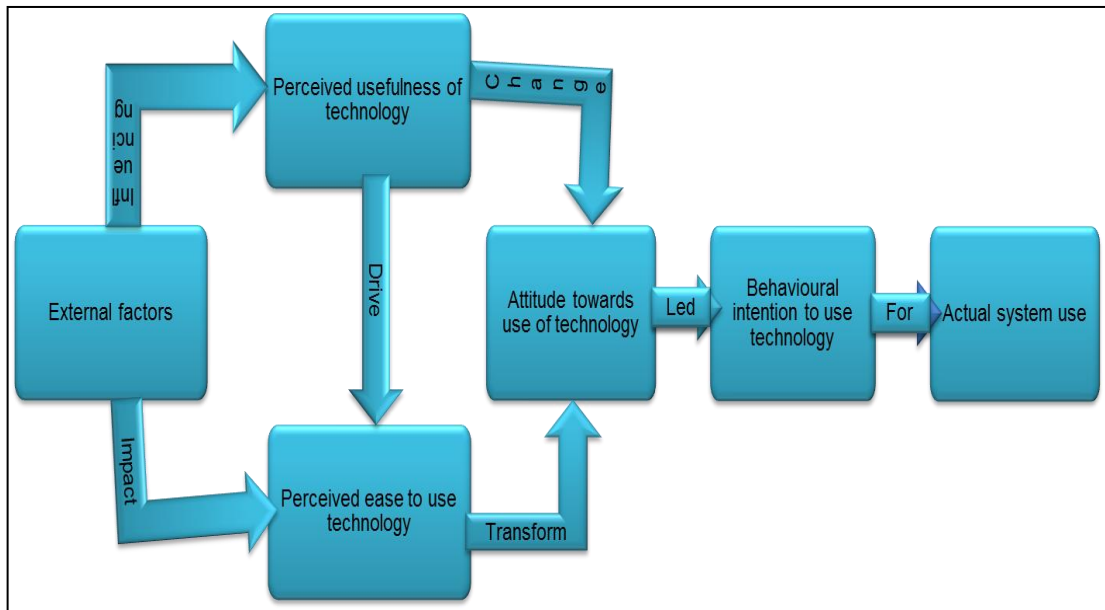


Figure 2.1: Adapted TAM (Legris, Ingham & Colletette, 2003: 193)

According to Abukhzam and Lee (2010: 63), TAM has been used mostly in technology adoption because it indicates technology users' attitudes and intention to use adopted technology for IT investments. Besides, TAM also recommends two factors which influence technology users' attitudes to using adopted technology: these are (i) the Perceived Usefulness of Technology (PUOT), where technology users' envisage new technology adoption to influence IT investments within HEIs; and (ii) the Perceived Ease to Use Technology (PEOUT), where technology users' believe that adopted technology would need less effort. In addition, "TAM is also based on Theory Reasoned Action (TRA)." TRA concerns technology users' behaviours towards the use of the adopted technology. Furthermore, TRA has been noticed as widely used influential theories, particularly in describing the relationship between attitudes to adopted technology, the intention to innovate, technology adoption and usage of innovation (Abukhzam & Lee, 2010: 63).

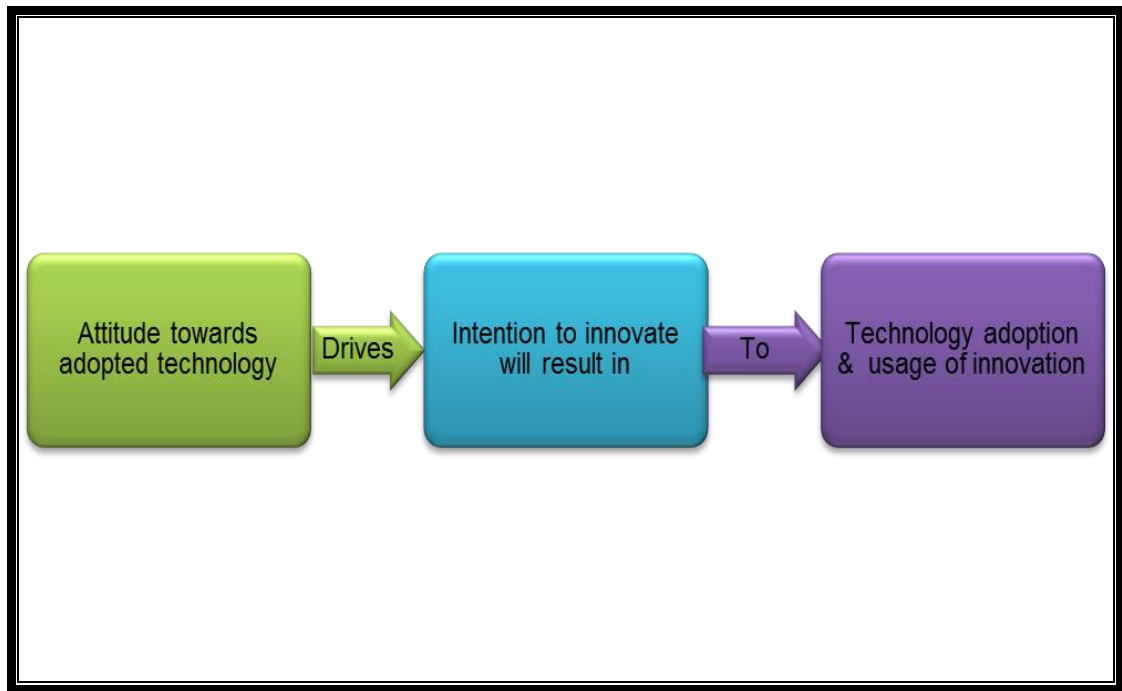


Figure 2.2: Theory Reasoned Action (Abukhzam & Lee, 2010: 63)

As mentioned earlier in the beginning of this section, technology is extensive and cannot be ignored; we cannot live without it because it drives our daily functions from time to time. The research sought to investigate the factors influencing IT investments in adopting new technologies within a selected university. The section that follows provides a narrative of the factors influencing the adoption of technologies within HEIs.

2.6 FACTORS INFLUENCING IT INVESTMENTS

As alluded to in the previous section, TAM and TRA have been discussed and illustrated. Firstly, TAM looks at how technology users' perceive the adopted technologies within an institution. It then looks at how useful technologies need to be adopted within an organisation, and how flexible they are in the use of newly adopted technologies. The technology users' attitude to the use of technology and their behavioural intention in using technology has been observed. Lastly, actual systems in use and external variables have been observed as well.

Secondly, TRA illustrates the relationship between attitude to adopted technology, the intention to innovate, technology adoption and the use of innovation. As this study looks at factors influencing IT investments and related decisions, it was necessary to understand those factors. This section provides a view of the factors influencing IT investments. It also

answers question of what are the IT-related challenges in adopting new technologies. Later, this section discusses both internal and external factors influencing investments of IT.

Yeo (2002: 243) identifies various “influencing factors as pre-occupation with technology in project planning, technology focus over human relations, poor stakeholder management, poor consultation, design by committee, practical solution of management problem, poor competence of project management and project team, and poor selection decisions”. Tarabay and Eigbire (2009: 1) argue that organisations need to make decisions before investing in any type of technology. Furthermore, Tarabay and Eigbire (2009: 1) state that different frameworks and methodologies on how to make IT-investment decisions have been proposed by various HEIs and industries.

Despite the effort made, the assumption was that no single or simple framework and methodologies were found to be consistent, reliable and provide optimum solutions to support management who are faced with the difficulties of making IT-investment decisions (Tarabay & Eigbire, 2009: 1). Although the factors influencing IT investments for the adoption of new technologies involve both internal and external factors of organisations, the study focused on the adoption of technology within an organisation (Abukhzam & Lee, 2010: 60).

Furthermore, both internal and external factors mention technological factors but they differ because one looks at technology internally within an organisation, while the other looks at factors of technology worldwide. As mentioned earlier, the section that follows begins by discussing internal factors influencing IT investments within an organisation; thereafter it provides a brief view of the external factors influencing IT investments.

2.6.1 Internal factors influencing IT investments

The study aimed to identify the factors influencing IT investments and related decisions in a selected UoT. For the purpose of the study, it was necessary to understand the internal factors that impact on IT investments within an institution. This section looks at the internal factors influencing investing in IT. Tarabay and Eigbire (2009: 7) identify five internal factors influencing IT investments in adopting new technologies within universities. These are as follows: organisational factors, external pressure or support, the Perceived Usefulness of Technology (PUOT), the Perceived Ease Of Use of Technology (PEOUT) and technological factors.

All these factors are significant because they look at different perspectives within an organisation. Despite the number of factors provided, two of these factors – PUOT and PEOUT – have been identified as the most important factors, especially in clarifying the use

of technologies that might affect IT investments, the perception of technology users' behaviour as well as attitudes to adopted technologies (Legris, Ingham & Colletette, 2003: 192). As discussed in the previous section, all internal factors influencing IT investments are described separately below. The next paragraph begins by discussing organisational factors and factors that may influence IT investments within an organisation.

2.6.1.1 Organisational factors

To implement best practice of IT investments, it was imperative to observe the organisational factors of a university. This paragraph explains the organisational factors influencing investing in IT in order to realise the potential benefits of adopting technologies within an institution. Organisations are categorised by high business complexity irrespective of the size (Tarabay & Eigbire, 2009: 7). Tarabay and Eigbire (2009: 7) identified some organisational factors influencing IT investments within HEIs, which are: (a) the size of an organisation, (b) the top management support and (c) the organisational culture. The following discusses details of the individual factors separately.

2.6.1.1.1 Size of the organisation

Before making decisions to invest in IT, it was important to consider the size of an organisation. The size of the organisation influences its IT investments (Tarabay & Eigbire, 2009: 7). Size is an important organisational factor of technology adoption (Lippert & Govindarajulu, 2006: 153). Lippert and Govindarajulu (2006: 153) report that organisational size is connected with IT investments. Tarabay and Eigbire (2009: 7) claim that there should be a direct correlation between the size and percentage of organisations where technology has been adopted. The next paragraph provides a brief description of top management support (TMS).

2.6.1.1.2 Top Management Support (TMS)

In order to have good IT strategies, TMS required prior knowledge and understanding, during implementation and post-implementation of new technologies. TMS influences IT investments within an organisation (Tarabay & Eigbire, 2009: 7). Tarabay and Eigbire (2009: 7) note that an organisation would not successfully gain the potential benefits of IT investments without TMS. It has been argued that TMS should understand the strategic role of IT investments within an institution (Manfreda & Stemberger, 2014: 109). Manfreda and Stemberger (2014: 110) define TMS as a support of technology adoption and realisation of the potential benefits of investing in IT.

According to Kandiri (2014: 47), the adoption of technology is quite complex because it influences the budget of an organisation. Kandiri (2014: 47) further comments that technology adoption may be easier or more difficult because it involves both top management and operational management. Kandiri (2014: 48) also claims that top management transforms technology advancement, helps with budgets and supports technology users.' In order to effectively invest in IT, organisational culture needs to be taken into account. This might impact on the adoption of technologies within a university. The next section provides a view of an organisational culture.

2.6.1.1.3 *Organisational Culture*

This section looks at organisational culture. It is important for an organisation to look at the culture before making decisions to adopt technologies within a university. Organisational culture also influences IT investments within an institution (Taylor, 2015: 278). As mentioned in the next chapter (Chapter Three) in Section 3.4.2.3, the university culture plays a vast role because the success of the university depends on partnerships with students, academics, non-academics, and support staff. Furthermore, the university intends to treat everyone with respect and adopt a harmonious environment (*Vision 2020: The Strategic Plan*, 2011: 2 - 4).

Organisational culture impacts on the consistent operation of the business (Tarabay & Eigbire, 2009: 7 & Boynton & Zmud, 1987: 61). Kandiri (2014: 43) explains organisational culture as a connection between technology users' and technology adoption within an institution. On the other hand, Tarabay and Eigbire (2009: 7) define organisational culture as a possession of assumptions, shared beliefs, meanings, and values of people. Kandiri (2014: 43) further clarifies that organisational culture relates to the success of an organisation.

The findings of this study indicate that the non-involvement of technology users' influence IT investment-decisions when adopting technology within an institution. This has been indicated in Section 4.8. Kandiri (2014: 44) supports the statement and argues that 'users' involvement' is directly linked to the success of an organisation particularly when adopting technologies. Kandiri (2014: 44) also contests that technology users' involvement has a strong sense of ownership, thus improving technology acceptance.

The technology users' involvements have three benefits of investing in IT. These are as follows: usage of the system, technology users' acceptance, and technology users' satisfaction towards adopted technologies. This is also supported by TAM in Section

2.5.3, Figure 2.1. It shows technology users' perception of adopted technology, technology users' attitudes to using technology, and behaviour when using technology. Kandari (2014: 45) further emphasises that technology users' involvement may influence IT-investment innovation and the future operations of a selected university.

Kandiri (2014: 46) further argues that technology users' effective participation in adopted technologies should be encouraged in order to gain technology benefits. Kandiri (2014: 46) also states that technology users' should be involved from the initiation to the final phase of the IT project as well as to the post-implementation phase. The next paragraph discusses the details of external pressure or support.

2.6.1.2 External Pressure or Support

In order to understand how external pressure or support influences IT investments in education, this paragraph discusses external pressure or support viewed from other research literature. Many who study the literature state that external pressure involves some elements of technology adoption and influences the attitudes and behaviours of technology users' within an institution (Pearson & Grandon, 2005: 5 & Tarabay & Eigbire, 2009: 11).

Tarabay and Eigbire (2009: 11) further argue that external pressure or support is vital, particularly when an organisation make decisions to outsource the adoption of technologies. This is because organisations obtain a backup and technology users' receive training; adopted technologies are maintained and updated from time to time (Tarabay & Eigbire, 2009: 11). To reiterate, the section that follows looks to the perceived usefulness of technology. This factor has been supported by TAM in Section 2.5.3, Figure 2.1.

2.6.1.3 Perceived Usefulness of Technology (PUOT)

To restate, the PUOT was discussed in TAM, Section 2.5.3 in Figure 2.1. The PUOT influences technology users' attitudes towards the use of adopted technologies within a selected university. This paragraph provides a brief view of PUOT and how this affects IT investments in adopting new technologies. Tarabay and Eigbire (2009: 11) argue that technology users' perceive usefulness of technology and believe that the adopted technologies will improve their performance (Tarabay & Eigbire, 2009: 11). Tarabay and Eigbire (2009: 11) further state that the more technology users' perceived usefulness of technology and its adoption, the more influence they have in IT investments within HEIs. The following paragraph explains perceived ease of use technology in detail.

2.6.1.4 Perceived Ease of Use Technology (PEOUT)

As alluded to in the previous section, this factor was also explained in TAM, Section 2.5.3 in Figure 2.1; technology users' believe that adopted technologies need less effort and time. This means that they believe that it would improve the effective adoption of technologies. This section explained PEOU in detail. Tarabay & Eigbire (2009: 11) claimed that PEOU is the effort and time technology users' takes to use adopted technologies. Tarabay and Eigbire (2009: 11) further explain that the more time technology users' spend on using adopted technologies, the easier and more accepted it becomes (Tarabay & Eigbire, 2009: 11), particularly in HEIs. The section that follows views the details of technological factors.

2.6.1.5 Technological factors

In order to interpret the potential benefits of IT investments, it was important to look at the factors of technology within HEIs. As indicated in Section 2.5, the following were discussed as forms of innovation when adopting technology, technology adoption and the technology acceptance model. This section provides a view of technological factors in detail. Tarabay and Eigbire.(2009: 11) indicate that investing in IT may improve the ongoing operations of a business and realise the potential benefits. Tarabay and Eigbire (2009: 11) further note that the benefits of technology principally need to integrate data and systems simultaneously. The factors influencing IT-investment decisions to adopt technology have been classified in three categories:

- To improve the performance of ongoing operations,
- To integrate data and systems, and
- To avoid a business risk to become critical.

As mentioned in the last paragraph of Section 2.6, the next section discusses the external factors influencing IT investments in detail.

2.6.2 External factors influencing IT investments

More importantly, one has to look at external factors as well before making decisions to invest in IT. The external factors influence the acceptance of new technologies within an organisation. The main research question was: What are the factors influencing IT investment-decisions in a selected UoT?

As indicated in the previous section (2.6.1.2), most organisations decide to outsource the adoption of technologies because it provides the following benefits: backup and technology users' received training, maintenance and updates of adopted technologies from time to

time. A number of internal factors influencing IT-investment decisions within an organisation have been viewed. Now it is time to look at external factors influencing IT investments within an institution. If a university really needs to adopt effective technologies, the above two factors need to be tied together with one rope because one cannot do without the other.

Some organisations decide to outsource (Tarabay & Eigbire, 2009: 11). Tarabay and Eigbire (2009: 12) highlight four external factors that an organisation needs to look at when making decisions to invest in IT. These embrace political, economic, social and technological factors. These are discussed below to give an understanding of how they influence IT-investment decisions within a university. Firstly, political factors are discussed and, it is concluded by the explanation of technological factors, which were also covered in the previous section (2.6.1.5) of the internal factors influencing IT investments. As mentioned earlier, the following paragraph provides a view of the political factors learnt from the research literature.

2.6.2.1 Political factors

To implement best practice of investing in IT, political factors should be addressed before any technology adoption. As stated in the previous section, this paragraph clarifies the political factors influencing IT investments. The policies and actions that are formed by government bodies interpret the manner of good IT strategies for performing daily operations (Tarabay & Eigbire, 2009: 12). Legislation may also have a direct influence on investing in IT within HEIs.

According to Tarabay and Eigbire (2009: 13), political institutions influence IT investments on different levels, such as international, national and regional. Tarabay and Eigbire (2009: 13) further report that tax regimes and fiscal policies also need to be observed because they influence IT investments. The next section proceeds by discussing economic factors.

2.6.2.2 Economic factors

The general benefits of investing in IT in HEIs are associated with the budget and costs of an organisation. As indicated in the previous paragraph, this section discusses the economic factors of IT investments. According to Tarabay and Eigbire (2009: 12) economic factors influencing IT investments in adopting new technologies within an institution. Tarabay and Eigbire (2009: 12) identified some economic factors influencing the effective adoption of technologies. These includes: gross domestic power, gross national purchasing power, interest rates, inflation, exchange rates, unemployment figures, plus wage and price controls (Tarabay & Eigbire, 2009: 12), particularly in HEIs. The next paragraph describes the social factors.

2.6.2.3 Social factors

In understanding what technologies are available to support educational activities in HEIs, it was necessary to engage the university community. As stated earlier in the previous paragraph, this section describes the social factors influencing IT-investment decisions in HEIs. Social factors are associated with technology users' because they focus on technology users' attitudes and beliefs regarding adopted technologies within an institution (Tarabay & Eigbire, 2009: 12).

Tarabay and Eigbire (2009: 12) claim that social factors are also linked with the demand and supply of an organisation. Social factors show demographic factors influencing IT investments within a university. These factors include skill and education, birth rates, population growth, and regional population shifts (Tarabay & Eigbire, 2009: 12). Organisations need to be able to position their market appropriately in order to gain the benefits of IT investments. The section below takes us through the technological factors.

2.6.2.4 Technological factors

The study investigates factors influencing IT investments when adopting new technologies within a selected university. This aims to identify factors influencing IT investments. In fulfilling the above objective, it was important to look at the technological factors influencing IT investments. This section also discusses innovation, technology adoption, technology acceptance model and action. As alluded to in the previous section (2.5.2), technology has a two-fold definition: a "design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome" and a "process through which organisations or individuals decide to make full use of innovation in their daily businesses".

To reiterate, technological advancement is ever-increasing and changes fast. Tarabay and Eigbire (2009: 12) emphasise the importance of catching up with technological changes in order to promote technology in the market, principally in HEIs. Tarabay and Eigbire (2009: 12) further explain that the use of technology helps to reduce costs and increase the productivity of business practices. The section that follows discusses managing the benefits of IT investments.

2.7 MANAGING BENEFITS OF IT INVESTMENTS

As part of the study, the research explored the factors influencing IT investments and how the benefits are managed within a university. In realising the ways technologies were

managed and interpreted for best practice, this section describes how the benefits of IT investments were managed. The question asked was: What are the benefits of IT investments and how were these benefits managed in HEIs?

Paivarinta, Dertz & Flak (2007: n.p.) define managing benefits as the process of organising and managing IT investments in order to obtain the benefits of adopted technologies. According to (Mohan, Ahlemann, & Braun, 2011: n.p.), work done in the 1990s in the UK with an empirical study on industry practices provided a similar explanation of managing benefits. They described managing benefits as “the process of organising and managing benefits arising from the use of IT.”

In understanding IT investments, Gunasekaran et al. (2001: 351) argue that “the purpose of IT investments is to improve operational efficiency of an organisation, reduce costs and improve profit levels”. According to the (Bai, Dhavale & Sarkis, 2016: 508), “IT investments are increasingly more complex, more strategic, and greater in scope.” Furthermore, it is still difficult to measure the business benefits of IT investments. Despite the complexity of managing the benefits of IT investments, various studies have argued that managing the benefits of IT investments could positively influence organisations’ performance.

On the other hand, poorly managed benefits of IT investments can hinder organisations’ performance, and this may result in unjustified benefits for an institution (Gunasekaran et al., 2001: 351). Managing IT investments is complex and the implications of decisions are often not realised (Balasubramanian, Kulatilaka & Storck, 2000: 39). Furthermore, management practice provides some insight as to the origins of the inability to deliver business benefits, especially in HEIs.

When considering Return-on-Investment (ROI) calculations, organisations are too pre-occupied with manipulating the denominator-reducing spend, and failing to focus on how deploying IT can create business value and deliver significant benefits to the organisation (Balasubramanian, Kulatilaka & Storck, 2000: 39). The decision-making practice of IT investments was vital because it reduces the risk of committing to IT investments which could have a positive or negative impact of the organisation (Tarabay & Eigbire, 2009: 1).

As mentioned earlier in Section 2.4, reviewed literatures have proposed various frameworks and methodologies for investing in IT; Balasubramanian, Kulatilaka & Storck, 2000: 39; Ryan, Harrison & Schkade, 2002: 85). Tarabay and Eigbire, 2009: 1; Balasubramanian, Kulatilaka and Storck, 2000: 39; and Ryan, Harrison and Schkade, 2002: 85 have further highlighted that the proposed frameworks and methodologies seem to have a negative

influence on making IT-investment decisions and managing those investments, because decisions are not well understood in HEIs. The section that follows provides a brief description of the effective management of IT investments.

2.8 EFFECTIVE MANAGEMENT OF IT INVESTMENTS

As indicated in the previous section, managing the benefits of IT investments proves to be increasingly more complex, more strategic and greater in scope. Furthermore, it is still difficult to measure the business benefits of IT investments. Managing the benefits of IT investments could have positive versus negative results. In order to effectively manage the general benefits of investing in IT, it was necessary to study research literatures of the effective management of IT investments.

The Cranfield model has been suggested as the best and most cited model for managing the benefits of IT investments (Hesselmann, Ahlemann & Böhl, 2015: 585). This model clearly shows the overall business benefits of investing in IT (Condrón, 2011: 1). According to Condrón (2011: 2), this model provides overall guidance and the structure of business benefits for managing benefits, particularly in HEIs. Furthermore, it provides five stages of benefit management, especially when making decisions to adopt effective technologies within an institution. These are as follows: identifying and structuring the benefits; planning the realisation of benefits; executing the benefits-realisation plan; evaluating and reviewing the results; and discovering the potential for further benefits (Marchand & Peppard, 2008: 25 & Paivarinta, Dertz & Flak, 2007: n.p.).

This model accommodates pre-investment appraisals, post-investment evaluations, and how organisations can dynamically administer the claimed realised benefits of IT investments (Ward, Hertogh & Viaene, 2003: 3). However, the research literature suggests that a clear methodology should be considered when investing in IT to ensure that IT projects deliver the anticipated as well as the expected benefits by organisations and are actually realised (Paivarinta, Dertz & Flak, 2007: n.p.).

Nevertheless, current research output on this subject matter clearly shows that some organisations continuously consider social sub-system concerns when making IT-investment decisions; some do not and the context of making IT-investment decisions have changed significantly in the past few years (Dehning, Richardson & Stratopoulos, 2005: 989). The impact of IT-investment decisions on business benefits should be taken into account (Dehning, Richardson & Stratopoulos, 2005: 990), particularly in HEIs. Anecdotal evidence

from the reviewed literature indicates that some businesses have spent more than 4.2% of annual revenue on IT investments (Lin, Pervan & McDermid, 2005: 235).

Although some organisations continue to invest extensively in IT, benefits have not been well understood (Braun, Mohan & Ahlemann, 2010: 1). Regardless of the large spending on IT, it is complex to implement effective technologies and ensuring that expected benefits are actually realised (Lin, Huang & Cheng, 2007: 175; Lin, Pervan & McDermid, 2005: 235), especially, in South African Universities.

Braun, Mohan and Ahlemann (2010: 3) report that most organisations focus on the objectives of managing IT investments and the successful implementation of technologies, rather than realising the expected business benefits, especially in HEIs. Like developing countries, technology users' need to be convinced of using the adopted technologies within an institution in order to understand the benefits of investing in IT (Keswani, Banerjee & Patni, 2008: 2). As discussed at the beginning of this section, the model below illustrates the five phases of managing the benefits of IT investments.

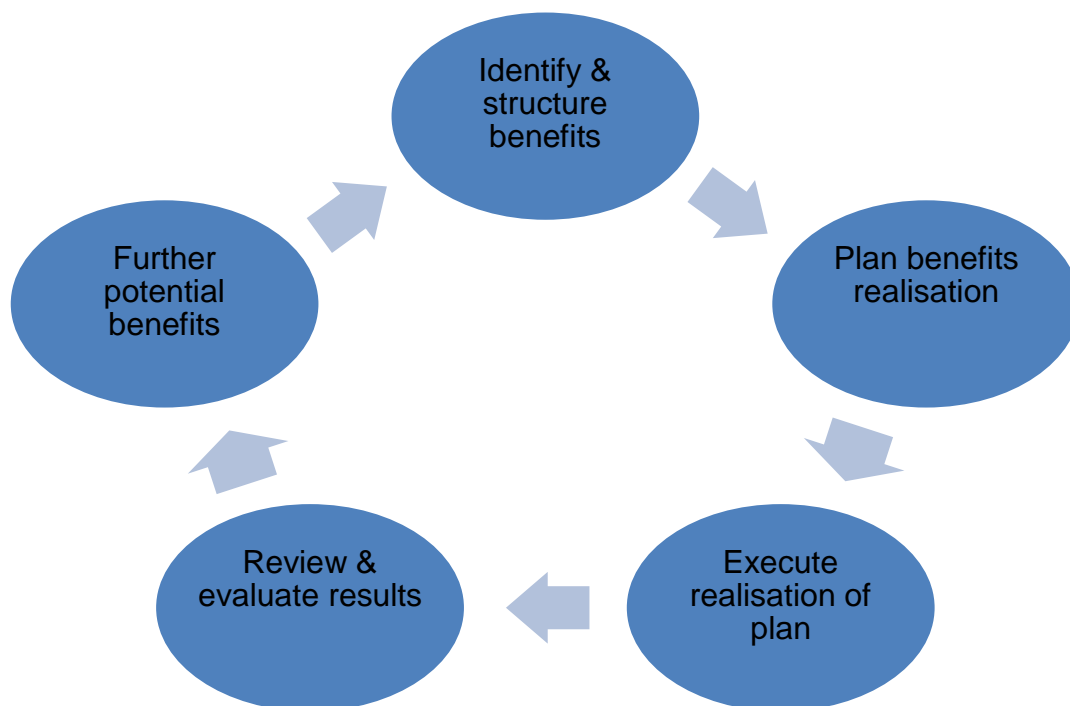


Figure 2.3: Cranfield Model of benefit management (Marchand & Peppard, 2008: 25).

The next section discusses the successes and failures of IT investments.

2.9 SUCCESSES AND FAILURES OF IT INVESTMENTS

The main research question of the study was: What are the factors influencing IT investments within a selected university? In answering this question it was important to look at the successes and failures of IT investments, to ensure that adopted technologies work and that technology users' are using technology successfully. It has been noted that the realisation of the potential benefits of IT investments is often seen as a pending challenge (Ahlemann, Hesselmann, Braun & Mohan, 2013: n.p.). The successes and failures of IT projects influence IT investments within an organisation (Yeo, 2002: 243). This section distinguishes between factors influencing and those that hinder the successes and failures of IT investments.

This began by discussing factors influencing IT investments in adopting new technologies within an institution. These factors are stated as follows: organisational culture, inadequate reporting structure, political pressures, vested interests, influences, and an improper level of management commitment (Yeo, 2002: 243). Yeo (2002: 242) further categorises IT failures into four factors: correspondence, process, interaction and expectation failures. As mentioned in the previous section (2.6.1), organisational culture was discussed at length as the organisational factor influencing IT investments within an organisation.

To reiterate, organisation culture has been explained in this chapter in Section 2.6.1.1.3 and in the 2020 Vision in Chapter Three in Section 3.4.2.3 as a factor influencing IT investments within a university. External pressures for technology adoption were also discussed in Section 2.6.1.2. This section proceeds by describing factors hindering the successes and failures when adopting technology within an organisation. These factors include the absence of technology users' involvement during the adoption of new technologies, a lack of an understanding of the potential benefits, technical difficulties when adopting effective technology, a lack of training to use technology, insufficient support from top management and a perceived complexity of technology use (Abukhzam & Lee, 2010: 60).

On the other hand, an earlier study claims that investing in IT seems to be one of the most important factors influencing the successes and failures of an organisation (Lin, Pervan & McDermid, 2005: 236). Earlier studies in IT and organisational change show no consistent support of both IT and organisational change relationships (Weill, 1992: 308). Weill (1992: 310) further indicates no relationship between business performance and resources allocated for data processing.

Finally, some research literature reported no positive relationships of IT spending and successes (Dehning & Richardson, 2002: 8), especially in a higher education environment

(HEE). However, various studies conducted in service sectors also report negative relations in IT investments which have resulted in a failure to boost national productivity growth (Teo, Wong & Chia, 2000: 270). Anecdotal evidence also shows that no relation exists between IT and a return on investments; instead it indicates no net contribution to total output (Teo, Wong & Chia, 2000: 271). Statistics cited by Roach indicate the output per production per worker increased by 16.9% in the mid-1970s and 1986, while output per information worker decreased by 6.6%.

On the other hand, some literature found positive relationships between IT investments and business performance. These are as follows: major payoffs occur in areas of available information; the efficiency of operational performance and interaction with the public; and business performance linked to the level of IT investments intensity (Dehning & Richardson, 2002: 9). Some studies show the increasing complexities of justifying rising IT expenditures and ensuring that the benefits of IT investments are realised and delivered (Lin, Lin & Tsao, 2005: 46 & Lin, Pervan & McDermid, 2005: 235). Furthermore, it has been debated that benefits need to be understood in order to deliver the benefits of IT investments; otherwise IT on its own does not deliver benefits within an organisation.

Many research literatures acknowledge IT investments as major factors that determine the successes and failures of organisations but there is still some concern and they are not well understood (Lin, Pervan & McDermid, 2005: 236; Roztocky & Weistroffer, 2007: 1031), principally in HEIs. Furthermore, it has been argued that system failure and potential benefits could not be realised without an appropriate programme of organisational change. In addition, system failures are estimated between 30% and 70%; this might be caused by the failure of business to address business change, as well as organisational challenges.

The literature review thus far suggests that approximately 20% of projects obtain the anticipated benefits of IT investments, while in the late 1980s "it was estimated that up to 70% of IS project fail". By the late 1990s, approximately 90% of IT projects fail to meet their goals", while the British Computer Society [BCS, 2004] concluded that only 16% of IT projects were considered as successful (Braun, Mohan & Ahlemann, 2010: 3). The lack of effective evaluation and understanding of IT benefits causes failure of IT projects within HEIs (Lin, Pervan & McDermid, 2005: 237).

According to Dehning, Richardson and Stratopoulos (2005: 1004), the drawbacks of management's failure to see in the long-run that business benefits have impacted on the success of IT investments, especially if management does not have any particular expertise

in IT. In addition, the monitoring and evaluation of adopted new technologies can also cause a failure. The following contributing factors of IT investments have also been identified:

- complexity when evaluating benefits after the adoption of new technologies,
- many organisations have poor IT-adoption practices,
- many organisations provide little attention to tangible benefits when IT-investment decisions are made, and
- it is considered too costly to undertake the proper post-implementation views on the benefits of IT investments.

Some studies reveal that few organisations have benefits-realisation approach, while others pay more attention to justifying IT investments and little effort to ensure that potential benefits are realised (Lin, Pervan & McDermid, 2005: 238), particularly in HEIs. The Chaos survey report shows the successes and failures of IT projects for three years from 1994 to 1998 (Heemstra & Kusters, 2000: 308). The figure below has been supported by Yeo's Table 1 for project resolution type (Yeo, 2002: 242).

Yeo (2002: 242) has underlined the following:

- Successful projects offer fewer features and functions than originally specified.
- Failed projects are cancelled at some point during the development cycle.
- Challenged projects are completed and operational but over budget and over time estimates.

The figure below provides a summary report of challenges, failures and successes of IT projects.

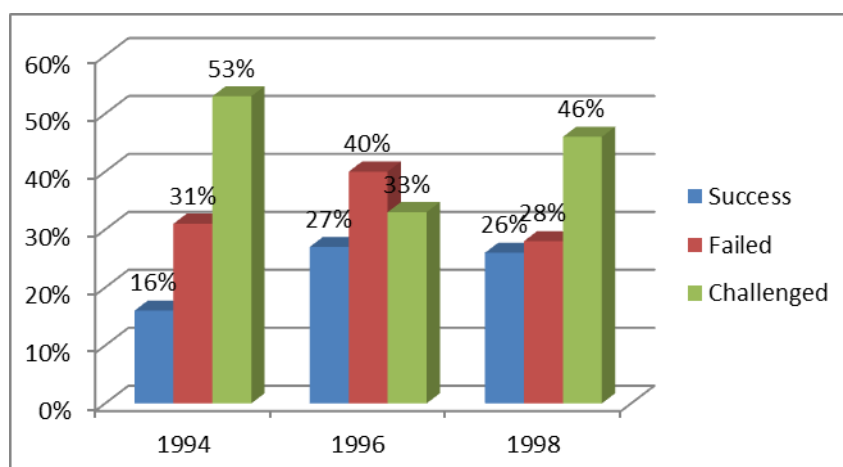


Figure 2.4: Chaos Report adapted from (Heemstra & Kusters, 2000: 308)

The next section introduced the reader to the challenges and opportunities of IT investments.

2.10 CHALLENGES VERSUS OPPORTUNITIES OF IT INVESTMENTS

As alluded to in the previous section, successes and failures influence IT investments within an institution. In answering the main research question, it was important to look closely at the successes and failures of IT investments and to ensure that adopted technologies work and technology users' are using technology successfully. A distinction was made between factors influencing IT investments and those that hinder IT investments. The factors influencing IT investments are as follows: organisational culture; inadequate reporting structure; political pressures; vested interests; influences; and an improper level of management commitment.

The factors that hinder the successes and failures of IT investments comprise: the absence of technology users' involvement during the adoption of new technologies; a lack of an understanding of the potential benefits; technical difficulties in adopting effective technology; a lack of training to use technology; insufficient support from top management; and perceived complexity of technology use. The adoption of technologies involves challenges as well as opportunities. To interpret good IT strategies, it was necessary to look at the challenges and opportunities of adopting new technologies. So, this section has looked at the challenges and opportunities influencing IT investments within a university.

Benefits and costs are the major constraints influencing IT investments (Lin, Pervan & McDermid, 2005: 235), particularly in SA universities. Most organisations are seeking value for money and have spent a huge amount of money in IT investments, but it is still complicated to invest effectively. This challenge has become unpredictable in social, political and economic infrastructures. To restate, mismanagement has also been noted as another challenge influencing the adoption of technologies of IT investments in HEIs (Brynjolfsson, 1993: 70).

Furthermore, most organisations focus on implementing technologies rather than realise the expected business benefits in order to balance IT investments. A fair balance of IT investments can turn out to be an opportunity to obtain the expected potential benefits as well as business benefits of IT Investments (Ward, Hertogh & Viaene, 2007: 2). Some studies reveal that adopted technologies have turned out to be a successful for an ever-increasing number of opportunities (Dehning, Richardson & Stratopoulos, 2005: 989).

It has been noted from the literature reviewed thus far that technology presents set of activities concerning practical application with opportunities for safe, self-paced and various activities not possible in a non-digital context (Czerniewicz, Ravjee & Mlitwa, 2006: 41). From an HEI perspective, academics, non-academics and students are agents of technologies because they have vast knowledge of adopted technologies for IT investments (Czerniewicz, Ravjee & Mlitwa, 2006: 8). On the other hand, both the management of technology and the management of transformation are vehicles of a technology that recognises and supports individuals at an operational level. The next section discusses the integrated solutions of systems in HEIs.

2.11 INTEGRATED SOLUTIONS OF IT INVESTMENTS IN HEIS

The previous section discussed the challenges and opportunities influencing IT investments in adopting new technologies within a university. In order to understand what steps are needed to realise the potential benefits of IT investments, it is important for the investor to study trends of IT investment challenges and opportunities in order to avoid bad investments. This paragraph looks at the integrated solutions of the systems in HEIs.

Tinio (2003: 11) claims that technology adoption needs clarity, especially in HEIs. Moreover, the broader objectives of IT investments should guide the choice of technologies to be adopted within HEIs. The potential benefits of IT investments vary as to how, why, when and where it is used and who is responsible for its use. Although the use of technology can improve the quality of education, it can also bring more challenges, particularly when implementing new technologies together with the existing one. Paivarinta, Dertz, & Flak, 2007: n.p.) argue that technology implementation is still at the infancy phase, principally in HEIs. Paivarinta, Dertz & Flak, 2007: n.p.) further argue that managing benefits could be the solution, as listed below:

- it avoids the loss of clearly achievable benefits
- it identifies and realises more extensive benefits
- it reduces IT costs for some investments
- it cancels or re-directs projects with no benefits in sight
- it identifies essential IT functionality with regard to organisational goals
- it reduces the amount of IT functionality focusing on change in core business practices.

The section that follows indicates a model for the conceptual framework of the study.

2.12 CONCEPTUAL FRAMEWORK

A conceptual framework was constructed based on gaps in the literature. The conceptual framework guides the design and implementation of the data-collection instrument. The figure simply shows a linkage and key elements that illustrate the nature of the problem. This figure further illustrates the internal and external factors which were identified as vital in the literature, especially when identifying the factors influencing IT investments in a selected UoT. A conceptual framework comprises of symbols and this has been used to conceptualize the problem which has been explained in Table 2.1 below. As indicated in Chapter One, the purpose of the research is to determine the factors influencing investment in IT within a university. A conceptual framework was used to identify the factors of IT investments. As mentioned in this paragraph, the table below explains symbols of the problem conceptualization framework. The framework was used to guide the design and analysis of the data collection instrument.

Table 2.1: Symbols and explanations of a Conceptual Framework (Figure 2.5)

Symbols	Explanations
A	Indicates the link between factors influencing UoT management in making decisions to adopt new technologies.
B	Shows that UoT strategy drives the management of technology and the management of transformation in making decisions to invest in IT.
C & D	Illustrate that decisions may facilitate IT investments in improving the academic operations of the university.
E	Demonstrates that UoT strategy drives academic operations in adopting technologies.
F	Shows that academic operations affect the performance of the university community.
G	Indicates that the performance of a selected UoT influences the factors of IT investments.

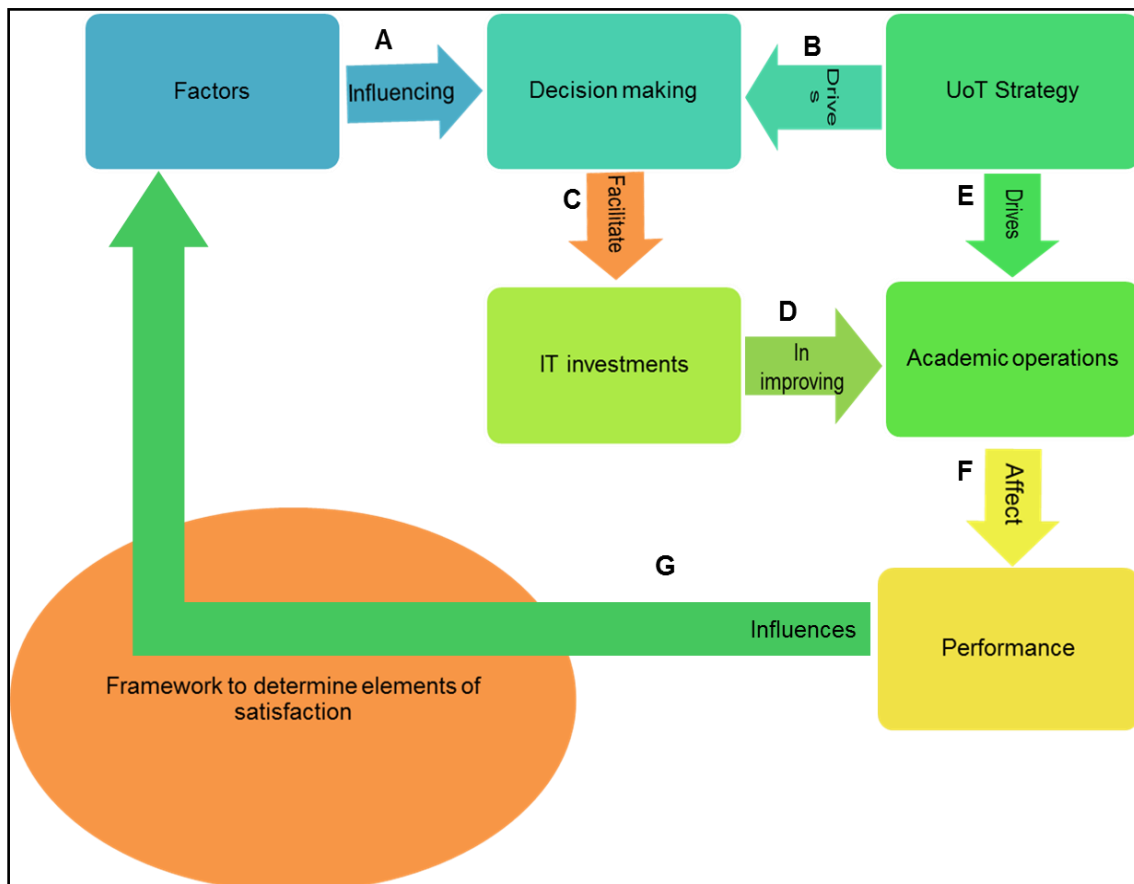


Figure 2.5: Conceptual Framework

The next section provides a brief summary of this chapter.

2.13 SUMMARY

This chapter began by discussing an overview of education in South Africa. This was followed by an overview of education globally and information technology in higher education institutions in South Africa. This chapter also discusses innovation and technology adoption. It also clarifies and illustrates the technology acceptance model. The reviewed literature also looks at the factors influencing IT investments, both internal and external. This chapter also explains the following: managing the benefits of IT investments; effective management of IT investments; successes and failures of IT investments; challenges and opportunities of IT investments; and integrated solutions of systems in HEIs. The conceptual framework which guides the design of the data-collection instrument was developed. The next chapter discusses the research design, data collection and data-analysis methods used for this study.

CHAPTER THREE: RESEARCH DESIGN

3.1 INTRODUCTION

The previous chapter discussed the following: an overview of education in South Africa; an overview of education globally; information technology in higher education institutions in South Africa; innovation and technology adoption; technology acceptance model; factors influencing IT investments in general and particularly in HLIs, both internal and external; managing benefits of IT investments; effective management of IT investments; successes and failures of IT investments; challenges versus opportunities of IT investments; and integrated solutions of systems in HEIs. The previous chapter ends by offering a conceptual framework and a summary.

This chapter viewed the nature and methods used in conducting the study in a selected university of technology (UoT) in the Western Cape Province of South Africa. A single case study of a selected UoT has been chosen for this study. The selected UoT is the biggest university in the Western Cape by number of students. The selected UoT was intended to combine a virtual-learning environment for academics, non-academics, researchers and management. The study employed a mixed method (Onwuegbuzie & Johnson, 2006) to identify the factors influencing IT-investment decisions. Even though qualitative and quantitative method differs, a combination of the two can be used for in-depth understanding of the phenomenon and verification of the findings from the selected participants (Locke, Spirduso, & Silverman, 1998: 121). The study used semi-structured interview questions to gather data from the selected participants.

To reiterate, the study focused on investigating the factors influencing IT investments in adopting technology. The study aimed to identify the factors influencing IT investments in a selected UoT. This chapter discusses the following areas: research approach; research paradigm; the case; historical background of the university; the university's 2020 vision; unit and object of analysis; population of the study; sampling technique; sampling size; methods of data collection; methods of data analysis; reliability; validity; ethical consideration; and summary of a chapter.

The diagram below simply indicates areas that are covered in this chapter, including the method approach that has been adopted for the study; it also discusses the data analysis for the next chapter (Chapter 4). To further elaborate, each technique is discussed in detail according to the sequence of the figure below.

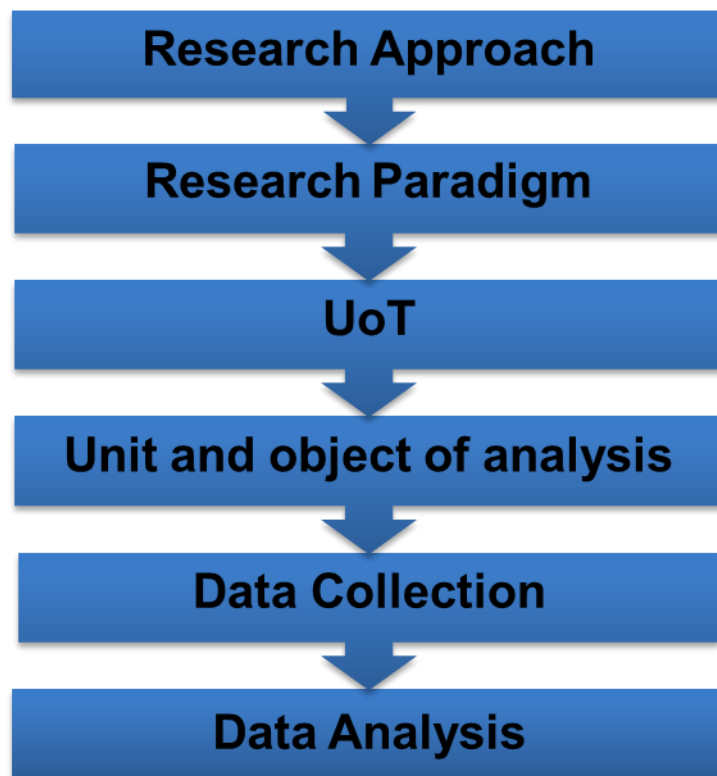


Figure 3.1: Research Design

The section that follows discusses the research approach of the study.

3.2 RESEARCH APPROACH

The study area, historical background and University 2020 Vision have been observed. As alluded to in the previous section, the study adopted a mixed method to allow a researcher to study people's experiences, obtain in-depth information and verify findings from the participants (Hennink, Hutter & Bailey, 2011: 8-9). In addition, this is a strong approach because it expand understanding of the phenomenon and gives an opportunity to verify the results from the study participants (Onwuegbuzie & Johnson, 2006 & Locke, Spirduso & Silverman, 1998).

This also involved techniques which are primarily inductive and deductive, and propositions are taken into consideration concerning what is being perceived and the people involved. In this research, a mixed method helped in identifying factors influencing IT investments in managing IT adoption in HEIs. It also indicated how the potential benefits were understood and measured when effective technology has been adopted in a selected UoT. It was enthusiastic to the naturalistic perspective and to the understanding of human beings

(Denzin & Lincoln, 2008: 10 & Onwuegbuzie & Johnson, 2006). The next section provides details of the research paradigm.

3.3 RESEARCH PARADIGM

The research approach has been described at length in the previous section. This paragraph discusses the research paradigm. An interpretative paradigm was adopted for the study under investigation. Hennink, Hutter and Bailey (2011: 11) explain paradigms as models or frameworks for reflecting and understanding the shape of what we see and how we understand it. Paradigms are also defined as general theoretical assumptions, laws and techniques for a particular application that the members of a specific scientific community have adopted (Wills, 2007: 8).

The interpretative paradigm seeks to understand a person's life experiences from the perspective of the people themselves; this is often referred to as the *emic* perspective (Hennink, Hutter & Bailey, 2011: 14). The interpretative paradigm involves studying the subjective meanings that attach people to their experiences, rather than focusing on facts. Interpretative paradigms also "acknowledged that peoples' perceptions and experiences of reality are subjective and can be multiple perspectives on reality" (Hennink, Hutter & Bailey, 2011: 15).

The known perceptions that people live by, whether they be fact or fiction, are the realities in their lives after all (Denzin & Lincoln, 2008: 32). These are real people with real perceptions which inform the way they understand things and the subsequent responses to the environment they live in. It was intended to aid the understanding of subjective meaningful experiences and the meaning of social actions and interactions. The necessity to use ontology and epistemology in this paradigm as suggested by some literature studies (Hennink, Hutter & Bailey, 2011: 11 & Wills, 2007: 8).

According to Hennink, Hutter and Bailey (2011: 11) and Wills (2007: 8), ontology refers to what we think reality looks like and how we view the world (social reality) about factors influencing IT investments, which are experienced by management in integration-effective technology. On the other hand, epistemology explores issues of how e.g., IT is managed in order to gain potential benefits (Hennink, Hutter & Bailey, 2011: 11 & Wills, 2007: 8). Lancaster (2005: 21) refers to ontology as the "nature of phenomenon" while epistemology is how theories are formed, explained and organised through knowledge of IT investments.

Epistemology describes how participants' evidence is combined based on individual opinions (Creswell, 2013: 20). Furthermore, a mixed method was used for providing an "in-depth

understanding, and verification of the findings. Mixed method was employed to identify factors influencing IT-investment decisions (Creswell, 2013: 48). Gray (2004: 74) defines 'variable' as a property that takes different values. The section that follows briefly discusses the case of a selected UoT used to conduct this research in meeting the set objectives of the study.

3.4 THE CASE

The study was conducted in a selected UoT in Cape Town, Western Cape, South Africa. A UoT was chosen as a single case study to carry out this research and to gain a rich understanding of the factors influencing IT investments in adopting effective technology, particularly in SAUs (Saunders, Lewis & Thornhill, 2009: 146). Saunders, Lewis and Thornhill (2009: 146) further explain that a case study allows for different kinds of data to be collected for a better understanding of the phenomenon, and helps to put that understanding in a proper context. Creswell (2013: 97) indicates that a case study involves "the study of a case within a real-life, contemporary context or setting". The next section gives a brief historical background of the university.

3.4.1 Historical background of the University

In understanding the educational activities within HEIs, it was important to obtain a historical background of a selected university. This paragraph provides a brief background of a selected UoT. This UoT was the first newly merged university in the Western Cape surrounded by traditional universities such as the University of Cape Town (UCT), the University of Stellenbosch (US) and the University of the Western Cape (UWC). This was established in January 2005 and was formed by both the Cape and Peninsula Technikons.

This merger was part of a national transformation process that shaped the higher education landscape in South Africa. Currently, this institution is the only UoT in the Western Cape and is the largest university in the region, with more than 30 000 students and several campuses; it offers more than 70 programmes (www.cput.ac.za). The following section discusses the University 2020 Vision in details.

3.4.2 The University 2020 Vision

In order to identify the factors influencing IT investments in adopting new technologies within a university, it was necessary to look for the University Vision and its role. This section provides a brief view of the University 2020 Vision. It was noted that the UoT was faced with challenges of establishing an identity and creating a place of learning for the highest quality education. The selected university was founded on a long history and tradition. This university intends to build and enhance its reputation (Vision 2020 : The Strategic Plan, 2011: 2 - 4).

As indicated in the conceptual model of the study in Section 2.12, Figure 2.5, the UoT strategy drives management in making decisions to facilitate IT investments within a university. In order to make such decisions, anecdotal evidence of a strategic-plan document should be available. This document aims to provide an influencing framework for actions in the next decade. It is designed to provide a context for existing frameworks and plans for guided teaching and learning, research and community engagement. It also aims at providing motivation and inspiration to build an excellent university (Vision 2020 : The Strategic Plan, 2011: 2 - 4). The following are discussed separately below: partnerships, innovation and university culture. The next paragraph describes partnerships in detail.

3.4.2.1 Partnerships

Partnerships also influence IT investments within a university. Partnerships are the means of obtaining the aims of an institution. Partnerships are very important, especially when an organisation intends to outsource the adoption of technologies. Partnerships are evident as principal vehicles for the enhancement of work-integrated learning and as a critical factor in the success of many other activities in the university (Vision 2020 : The Strategic Plan, 2011: 2 - 4). There has been an increasing global trend to promote partnerships for extensive education (Waitoller & Kozleski, 2013: 36). Waitoller and Kozleski (2013: 36) further claim that partnerships improve students' learning and educational experiences. The paragraph that follows explains innovation within a university.

3.4.2.2 Innovation

As mentioned in Chapter Two, Section 2.5.1, Rogers (2003: 12) defines an innovation "as an idea, practice or object that is perceived as new by an individual or other unit of adoption." This means an innovation could have been deliberated for some time but can still be fresh when "individuals perceives it as new" (Sahin, 2006: 14).

To reiterate, Kandiri (2014: 48) notes that “technology characteristics play a major role in technology adoption.” Kandiri (2014: 48) further claims that the perception of technology users’ is imperative, especially when technology adoption takes place. Rogers (2003: 13) supports this statement: “technological innovation creates uncertainty in the minds of potential adopters (about its expected consequences), and presents an opportunity for reduced uncertainty in another sense (i.e., information based technology).”

This section discusses innovation as a way of finding new solutions to real issues in the world and for becoming a leading UoT in SA. The university intends finding new ways of managing the institution and breathing new life into teaching, learning and community-engagement activities. It also determines that the innovative practices should be pervasive in the university (*Vision 2020: The Strategic Plan*, 2011: 2 - 4). It perceives the implementation of best practices for IT Investments and increased innovation for both administrative and managerial practices. The next section explains the University Culture.

3.4.2.3 The University Culture

To reiterate, Chapter Two, Section 2.6.1.1.3, discusses organisational culture as an important factor that plays a huge role within an institution, principally when making decisions to adopt technologies effectively. Taylor (2015: 278) claims that organisational culture influences IT investments within an institution. Organisational culture impacts on the consistent operations of the business (Tarabay & Eigbire, 2009: 7 & Boynton & Zmud, 1987: 61). Kandiri (2014: 43) explains organisational culture as a connection between technology users’ and technology adoption within an institution.

On the other hand, Tarabay and Eigbire (2009: 7) define organisational culture as a possession of assumptions, shared beliefs, meanings and values of people. Kandiri (2014: 43) further clarifies that organisational culture relates to the success of an organisation. This section looks at university culture within an institution. The success of the university depends on partnerships with students, academics, non-academics and support staff as well as external stakeholders. Furthermore, the university intends to treat everyone with respect and adopt a harmonious learning and teaching environment (*VISION 2020: The Strategic Plan*, 2011: 2-4). To this end, the university anticipates to attract and retain the best staff and students. The section below describes objective departments or units.

3.5 UNIT AND OBJECT OF ANALYSIS

In order to understand what steps are needed to realise the potential benefits of IT investments, there was a need to know the stakeholders influencing IT investments within a university. According to Bradly (2010: 12) and Condrón (2011: 2), stakeholders need to be engaged first in order to identify the benefits of IT investments as an early part of any change process (Bradly, 2010: 12; Condrón, 2011: 2). Bradly (2010: 11) defines stakeholders as people who have a stake in the adoption of technologies within a university.

Stakeholders are engaged to formulate a vision for a business (Bradly, 2010: 13) in order to realise the potential benefits of IT investments in HEIs. The unit and object of analysis were stakeholders of a selected UoT in different departments and units. The unit and object of analysis were perceived, expected, or actual benefits of IT investments in a selected UoT.

The figure below indicates a link between management, academics, non-academics and researchers. The UoT links all stakeholders that were targeted for the study. Semi-structured interviews were conducted with management, researchers, non-academics and academics in order to identify some of the factors influencing IT investments based on availability. As mentioned in the next section on the methods of data collection, interviewees were expected to participate in their offices.

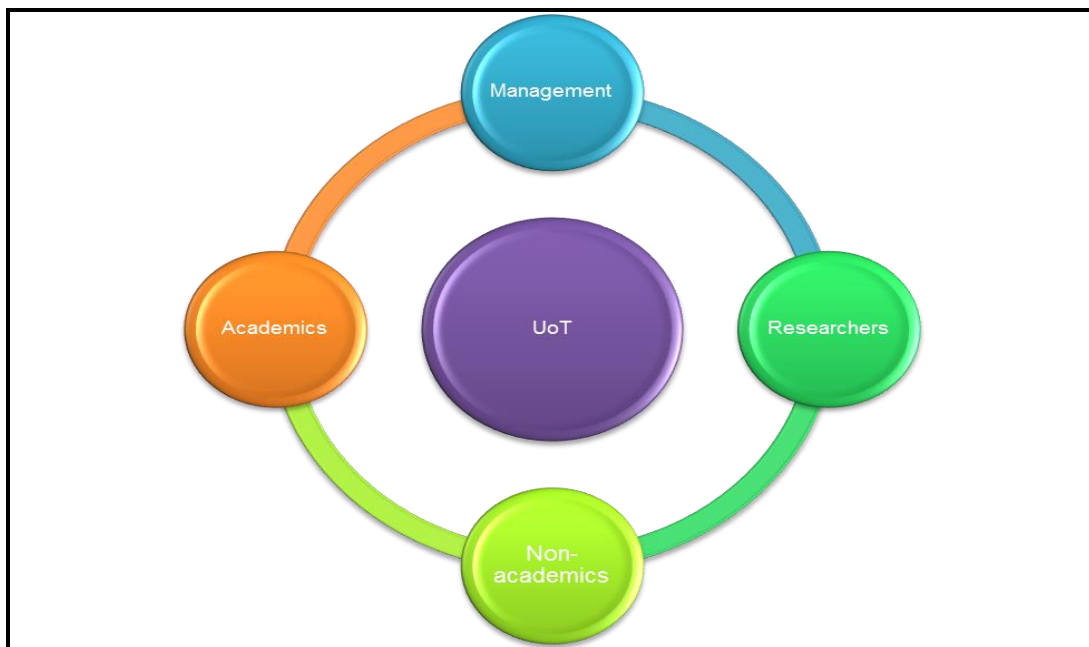


Figure 3.2: Targeted UoT Stakeholders

The population of the study is discussed in the next paragraph.

3.6 POPULATION OF THE STUDY

As indicated above, this paragraph discusses a population of the study. In understanding the strategic tools available within a university, it was necessary to inductively target a population for the study. A population is defined as the “total number of possible units or elements that are included in the study” (Gray, 2004: 82). The study inductively targeted twelve participants from a selected UoT in different fields, genders, professions and groups that are involved in the use of, or are working closely with, technology such as management, researchers, academics, and non-academics. This was done to get an in-depth understanding of participants’ perceptions and behaviours regarding the influence of IT investments within a university. The section that follows discusses the sampling technique used for this study.

3.7 SAMPLING TECHNIQUE

The sampling technique influences IT investments. In order to have a better understanding of implementing best practice of effective technologies, a purposeful sampling technique was employed in this study (Creswell, 2013: 156). “This means selecting individuals and sites for the study that can purposefully inform an understanding of the research problem and central phenomenon in the study.” Purposeful sampling offers a researcher with an opportunity to determine the participants to be sampled, the form of sample to be taken and the number of participants or sites to be sampled.

According to Creswell (2013: 156), individual participants who have experience of the phenomenon being studied were chosen in order to get the anticipated answers to the enquiry. Purposeful sampling helps in responding to the concerns of the research (Saunders, Lewis & Thornhill, 2009: 237). The selection criteria of the research participants were UoT stakeholders from different departments or units. The selection were mainly done with those working closely with IT, involved in decision making for the adoption of technologies, knowledgeable about the technologies based on role, responsibility and experience of two years or longer within an institution.

In order to identify factors influencing IT investments underpinned by the objectives of the study to collect the required data, twelve participants through purposeful sampling were interviewed. Three heads of department (HoDs), one director and one manager on decision making, four educational technologist (ET), one researcher, one lecturer and one technologist were interviewed to meet the expected sampling size of the study. The table below gives a brief summary of the university stakeholders who participated voluntarily in this study.

Descriptions	Respondents	Number
	Director	1
Educational Technologist1	ET1	1
Educational Technologist2	ET2	1
Educational Technologist3	ET3	1
Educational Technologist4	ET4	1
Head of Department1	HoD1	1
Head of Department2	HoD2	1
Head of Department3	HoD3	1
	Lecturer	1
	Manager	1
	Researcher	1
	Technologist	1
	Total	12

Table 3.1: UoT Stakeholders

The next paragraph explains a sampling size of the study.

3.8 SAMPLING SIZE

As indicated in the previous sections, semi-structured interviews were conducted mainly with twelve specific stakeholders from different departments or units. The selection was made to understand respondents' perceptions concerning the factors influencing IT investments within a University. In obtaining the objectives of the study, the targeted population were mostly management, researchers, academics and non-academics. The details of data collection methods are provided in the next section.

3.9 METHODS OF DATA COLLECTION

The previous section discusses the sampling size of the study. In finding factors influencing IT investments, this section discusses methods of data collection. Data was collected primarily through semi-structured interviews with persons involved in IT and/or IT related work in the department (Lancaster, 2005: 65). In order to collect data, one-on-one interviews were conducted with particular stakeholders as stated in the previous paragraph. The interviews were scheduled using e-mail and phone calls. There were time constraints due to a lack of resources and researcher's commitments that were beyond the researcher's control.

Semi-structured interviews were adopted to get a good understanding of individual experiences and challenges being encountered in adopting effective technologies (Yin, 2003: 93) "Interviews are open-ended by nature" (Yin, 2003: 90). Participants were asked open-ended questions about their opinions concerning the effectiveness of technologies within a selected UoT. Open-ended interviews were suitable for obtaining open-ended answers. Voice recordings, with permission from participants, were used during interviews to record information as some of the answers might not have been in line with the questions; moreover they would ensure a complete record (Creswell, 2013: 168).

In addition, participants were thanked for their time in sharing their ideas and experiences, and were requested to indicate if they were interested in follow-up information (Creswell, 2013: 168; Gray, 2004: 226). This also helped the researcher in transcribing and analysing the data. Some aspects of research that were covered in the introduction were discussed again at the end (Hennink, Hutter & Bailey, 2011: 131). Data collected from semi-structured interviews helped with understanding of the available new infrastructure; this must continue to support existing technologies in order to improve the way technology is managed. Stakeholders were expected to participate in their offices for thirty minutes or more depending on the participant's experience (Hennink, Hutter & Bailey, 2011: 130).

It is anticipated that the findings of this study will assist management in identifying the factors influencing IT investments in adopting effective technologies and understanding the potential benefits to be gained from IT investments. This, it is presumed that it would assist in finding a suitable tool to be used in the life-long learning of HEIs. The interviews aimed to obtain information about perceptions of IT investments, technology adoption and benefits. The next section discusses the methods of data analysis.

3.10 METHODS OF DATA ANALYSIS

The previous section explained methods of data collection for the study. In understanding the factors influencing IT investments, it was important to look at the findings of the study. To restate, data was collected primarily through semi-structured interviews from the person in charge or the operations of the department (Lancaster, 2005: 65). This section presents the collected data as discussed in the previous section. They were analysed as a science (Hennink, Hutter & Bailey, 2011: 205) using a process of coding, code condensing and were presented data in figures, tables and discussions (Creswell, 2013: 180).

Hennink, Hutter and Bailey (2011: 205) further state that “data analysis involves a process of immersion in data which enables a researcher to identify and interpret the experiences of the study participants.” Open coding was adopted to aggregate “the text or visual data into small categories of information” (Creswell, 2013: 184). The content analysis technique of semi-structured interviews and analysis against models of good practice was used to analyse data.

The information gathered from the semi-structured interviews was subjected to a detailed content analysis and was used to draw up a list of factors influencing IT investments within a selected UoT. The open-ended questions were planned to encourage the participants to provide more specific information related to technologies (Saunders, Lewis & Thornhill, 2009: 329). The data collected from semi-structured interviews was transcribed verbatim and analysed in order to achieve the anticipated objectives of the study using the Excel technique (Gray, 2004: 227). The Excel technique was useful in understanding perceptions and behaviours of people within the situation and perspective. The next section explains the reliability of the study under investigation.

3.11 RELIABILITY

Reliability has been explained as an indication of consistency between two measures of the same thing (Gray, 2004: 92). For reliability, the coding were guided by categories that emerged from data (Gasson, 2003: 94). Semi-structured interview questions were employed to collect data. The data has been analysed through content analysis and Excel. The next section provides a view of validity.

3.12 VALIDITY

For validity, participants were interviewed to describe their processes and test validity of the data. The study used the content analysis technique to investigate the participants' perceptions regarding the factors influencing IT investments with respect to the adopted technologies within a selected UoT. Validity refers to an instrument that quantifies what was anticipated to be measured in the study (Gray, 2004: 219). Gray (2004: 219) emphasises that certain criteria can be used to test validity, such as interview techniques to build rapport and trust.

On the other hand, one can encourage participants to demonstrate, "expand on their initial responses" to ensure that the interview methods are adequate to explore in-depth information and construct "interview schedules with questions drawn from the literature", as cited by (Arksey & Knight, 1999). The next section follows describes details of the ethical consideration.

3.13 ETHICAL CONSIDERATION

This section provides a brief description of the ethical consideration. Ethics also influences IT investments in the adoption of effective technologies. It was vital that the ethics-management plan described the steps that were taken to ensure ethical enactment of the master's study, a project to be managed by the undersigned (Creswell, 2013: 56). The available ethical guidelines of the selected UoT were used to guide the study starting from the participants in the ethical issues of the study.

3.13.1 Participants

No vulnerable persons were involved in this study (Hennink, Hutter & Bailey, 2011: 63). The study involved interactions only with non-academics and academics, researchers and management members whose work involves IT. Participants were advised by means of a participation letter about the purpose of the study, their right to withdraw, their right to anonymity and their right to see and review the output of the research and about the way data and output from the study were managed. Participants were also informed that the information gathered from their semi-structured interviews was confidential and their participation was voluntarily (Creswell, 2013: 57).

3.13.2 Participants recruitment

Letters with a detailed description of the study requesting permission to interview participants (Hennink, Hutter & Bailey, 2011: 66) were sent directly to the directors or HoDs, and to the participants. Furthermore, participants' names were kept confidential.

3.13.4 Management of the research data

All original data and information was kept confidential, including documents, voice recordings and transcripts. Data and information was rendered anonymous before it was used by means of coding or aggregation into summary tables and graphs, or in the case of verbatim quotations by making no reference to the participant's name or position. Content derived from data or information that was provided by the participants may later be included in presentations, working papers, conference papers, journal papers and books, which may be made publicly available as printed or digital outputs from the study (Hennink, Hutter & Bailey, 2011: 64).

3.13.5 Ethical issues

The ethical clearance application form was submitted to the ethics committee with the following supporting documents: ethics management plan, participation letter, research questions, HDC1.1 and HDC1.2 for the proposed study for the ethics approval certificate at a selected UoT. The study concludes by summarising the most important areas covered in this chapter.

3.14 SUMMARY

In summary, this chapter outlines the nature and the research design used to conduct this study. It then discusses the method adopted for this study, the research instruments used, validity, reliability, a case study selected for this study as well as ethical considerations. Furthermore, semi-structured interviews were conducted with management, researchers, academics and non-academics in a selected UoT. Finally, this chapter also discusses the data analysis that was used for the next chapter (Chapter Four). The next chapter discusses findings and interpretations of the study in details.

CHAPTER FOUR: FINDINGS AND INTERPRETATION

4.1 INTRODUCTION

The previous chapter discussed the following: the research approach, research paradigm, the case, historical background of the university, the University 2020 Vision, the unit and object of analysis, population of the study, sampling technique, sampling size, methods of data collection, methods of data analysis, reliability, validity, ethical consideration and a summary of this chapter. This chapter provides the findings and interpretation of the study. The data collected is presented in figures and tables, discussed and interpreted. This chapter also proposed a general framework that will help UoTs and universities to realise the benefits of IT investments from the adopted technology.

To restate, the study adopted a mixed method as a research design, as mentioned in Chapter Three in Section 3.1. The data gathered from management, academics, non-academics, and researchers in a selected UoT was discussed in detail. Approximately, twelve semi-structured interviews were conducted with selected participants as indicated in the previous chapter.

To reiterate, the study sought to investigate the factors influencing IT investments in a selected UoT. The discussion in this section was guided by the main research question and aimed at answering the sub-research questions as stated in Chapter One in Section 1.4 (Table 1.1). Drawing from Section 1.4 and Table 1.1., the analyses of data was structured according to the main research question. The categories are designed based on the participants' responses. The following explains the terms that were used to represent the respondents' who participated in this study:

- Director refers to the person in charge of the department or unit.
- Educational Technologist (ET) refers to someone who works closely with technologies.
- Head of Department (HoD) refers to someone who oversees the department or unit.
- Lecturer refers to someone who is qualified to teach tertiary students in one or more subject areas and conduct research projects in HEIs.
- Manager refers to a person who plans, coordinates, directs and organises the activities or functions of individuals within a department or unit of an organisation.
- Researcher refers to a person who carries out his / her project towards a degree or non-degree.
- Technologist refers to someone who takes part in the implementation of different applications.

The section that follows discusses and analyses responses from the participants from the main to the sub-research questions. The graphs and tables are illustrated, discussed and interpreted.

4.2 FACTORS INFLUENCING IT INVESTMENTS IN A SELECTED UOT

This question was to identify factors influencing IT investments regarding adopted technologies in a selected UoT. Participants were asked to indicate the factors influencing IT investments at a selected university. The question was: What are the factors influencing IT-investment decisions in a selected UoT?

According to the responses from the participants, 30% of the respondents indicated that they are influenced by a lack of infrastructure; 10% of the respondents are influenced by a lack of software; 10% of the participants are challenged by the learning management system. On the other hand, 50% of the respondents were not knowledgeable. The implication is that the UoT is influenced by a lack of infrastructure, lack of knowledge, lack of software and the learning management system. This confirms what Lekhanya (2013: 1563) says. From their responses:

Director: *There are too many challenges and we are just a small part of much bigger picture, but think for yourself the major components of the broader system.*

ET2: *There are many challenges so it's education, lack of knowledge, IT, lack of infrastructure, lack of wireless, Internet, etc.*

ET4: *I would tell you from my point of view, the major challenge is that there is this "thing" ... Learning Management System (LMS) that can benefit teaching and learning so much but I just have a feeling that it is been underutilised.*

HoD1: *More importantly, every so often the system goes down.*

HoD2: *I think within my portfolio as [...], is the lack of software to track the development of staff members in terms of having a database of information, "thing"... where you can see that you know the staff member is busy with his / her master's, busy with doctorate or is an early stage researcher, where you can manage all their publications or tracker, which conferences have they been going through over the past years.*

As indicated in Chapter Two in Section 2.5.2, technology adoption involves both internal and external factors (Abukhzam & Lee, 2010: 60). These factors are very important, particularly when making decisions to invest in IT within an institution.

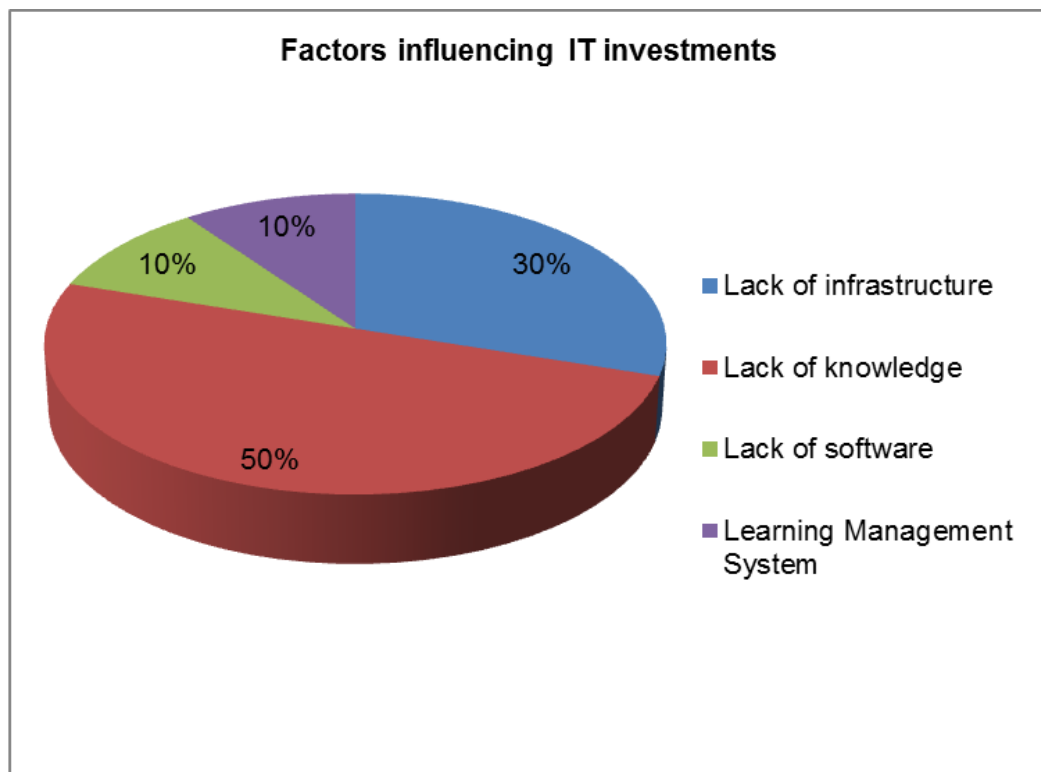


Figure 4.1: Factors influencing IT investments

The next section describes Information Technology challenges.

4.3 INFORMATION TECHNOLOGY RELATED CHALLENGES

This question was to explore IT challenges that technology users' deal with when using or accessing technologies within a university. This question was also to observe the attitude and behaviours of technology users' to adopted technologies as indicated by Legris, Ingham and Collette (2003: 193) in Chapter Two in Section 2.5.3. The participants were asked to indicate the challenges they had with information technology in a selected university. The question was what are the IT-related challenges in a selected UoT?

Forty percent (40%) of the respondents are faced with a lack of infrastructure; 40% of the participants are challenged by IT support; 10% of the respondents have problems using Excel; 10% of the respondents noted a fear of using technology; 10% of the participants are challenged by ITS. Beside the high rate of the lack of infrastructure and IT support, it is clear

that technology users' have not reaped the intended benefits of IT investments in adopted technologies within an institution.

To reiterate, Jaffer, Ng'ambi and Czerniewicz (2007: 132) confirm that Higher Education Institutions are still faced with few challenges such as: redressing past inequalities; transformation of the higher education system (HES); an effective adoption of technologies in order to access technology benefits; and to inform IT-investment decisions. From their responses:

Technologist: *There are challenges in using technology; it means they were not thought how to integrate those technologies in their classrooms in the teaching. Furthermore, most of them will tell you it's just hard work; you know, it's for them to teach with technology; it means okay, right, some classes may be they do not have that, the equipment which means they have to put equipment, set equipment in their classrooms, so some will tell you it's just too much work. I can say also is okay, which most of the lecturers will say they say support is not there.*

Brown and Motjolo-pane (2005: 20) note that HEIs are more dependent on the effective use of technology for internal and external communication. Tarabay and Eigbire (2009: 12) further explain that the use of technology helps to reduce costs and increase the productivity of business practices.

Director: *There are many challenges and we are just a small part of the much bigger problem, there is ITS as a service provider, okay, "thing" ... they make more resolutions in the integrated software.*

As indicated in Chapter Two, Session 2.11, technology adoption needs clarity, especially in HEIs (Tinio, 2003: 11). Furthermore, the use of technology can improve the quality of education, but it can also bring more challenges, particularly when adopting new technologies to the existing one. On the other hand, Paivarinta, Dertz & Flak (2007: n.p.) argue that technology adoption is still at the infancy phase, particularly in HEIs.

Researcher: *'There are many challenges but I can say in conversion but what I know is in management. Some people are not very good at IT or they are just fearing of using technology or they don't have a clue what it is about; and because of that they are not ready to use it, so that is a challenge. Another challenge is security because people are using this technology but they are not sure of the security of the documents they are sending, or the documents which they are saving in the system, which are secured so security is an issue... Another challenge is about the*

technology; it is moving so fast; before you have realised it you find out what you are using is already an old version, so the technology is moving very fast, so it means you have to keep on changing a number of times while you to keep on investing. The challenge is you have to have a constant amount of investments every time when the technology is changing.

Lecturer: *My computer couldn't print to the uni-printers, okay, and I had to wait for almost three weeks; you log a call, they will say okay, we going to do it and they will e-mail you everything to be able to do it and it never happens; you phone them, oh, they are coming.*

ET1: *No, we have a lot of them; one of the challenges is the IT support. We seem to have a problem with IT support in that, for example, when speaking with a lot of lecturers who are using Blackboard, some literally tell me that we are not going to be using Blackboard because every time they are using, like, they are doing some [...], the Network is down and they got to reschedule exams. A lot of time, especially in [...] Campus, the Internet is down and when it is down you cannot print, you cannot look for anything online and a lot of the work we do is the research thing, you have got to look for evidence, you got to look for articles, you got to look for something because we store a lot of our work online, you can't go to Google Docs and check your calendar because the Internet is down.*

HoD2: *For my specific issue, Excel spreadsheet. All the information is continuously captured in spreadsheet because it is not a database; it's hard to update it, which is not very user friendly at all.*

ET3: *I think mostly the challenges would be on the modules because it's always not up, especially when you are using the elements of Blackboard because those students depend on Blackboard and more and more lecturers are lecturing; that might be one thing.*

ET4: *IT support, you see, each and every institution, if you want to succeed in implementing Blackboard your IT support is key.*

HoD3: *Eh... the first challenge I see is very basic and that is just uptime and access to the Internet, and that is the first thing, mostly wireless access. It is not smooth across campuses; I'm travelling a lot between the two main campuses and it is not possible for me to simply go with all my devices.*

HoD1: I believe the IT support needs very serious consideration by the university.

The figure below indicates the encountered challenges within a selected university. It has been illustrated that university stakeholders are challenged by IT support and a lack of infrastructure.

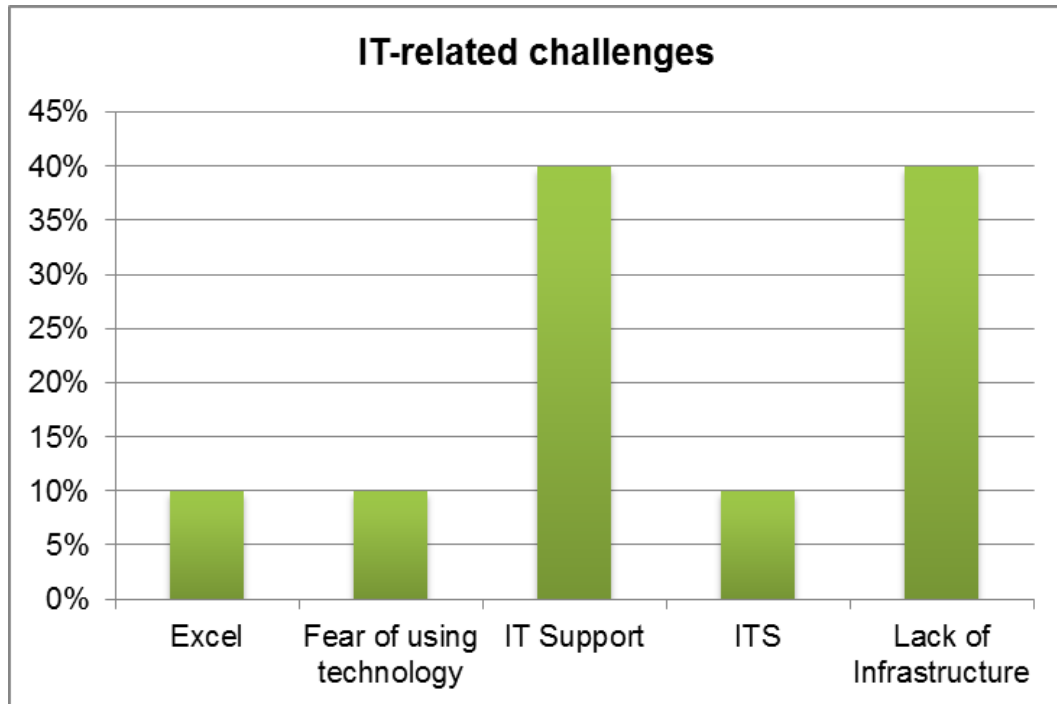


Figure 4.2: IT-related challenges

The section that follows discusses the method of the best use of Information Technology.

4.4 METHOD OF THE BEST USE OF INFORMATION TECHNOLOGY

This question was to discover the best methods that can be used for technology. The respondents were asked: What do we have to do well to make the best use of Information Technology? Respondents were expected to indicate the ways in which technology can be used effectively and also offered recommendations for improvement in managing technology.

Most respondents indicated that technology can improve if used effectively and there is effective IT provision in place. Few respondents did not respond and did not give the reasons. Ten percent (10%) of the participants showed that lecturers should be included more in using technology, not only administration; 10% of the respondents indicated the need for effective IT provision; 10% of the respondents demonstrated that top management

should be the champions in searching for technology opportunities and must be educated in order for the technology to be well used or well implemented; 10% of the participants indicated that postgraduate students should be provided with iPads in order to stay connected; 10% of the participants stated that they need a quick access to infrastructure; 10% of the respondents illustrated that the institution needs a concerted vision to decide on the type of technology that should be adopted; and 10% of the participants showed that technology users' should be engaged more in the adoption of new technologies. Some of the reasons for technology users' involvement are as follows: searching for their perceptions in using technology; searching for the problems they are experiencing in using technologies; and looking for their suggestions in terms of the right technology. Only 30% of the respondents did not give suggestions for the best methods of improving technology in HEIs. Despite the different points of view, the implication is that technology exists and can improve.

Rogers (2002: 19) claims that an effective use of technology in the classroom requires a paradigm shift from teaching to learning, which requires adequate training in technology, learning and adequate technical support. As alluded to in Chapter Two (Section 2.8, Figure 2.3), the Cranfield model has been suggested as the best and most cited model for managing the benefits of IT investments (Hesselmann, Ahlemann & Böhl, 2015: 585). Furthermore, TAM was used to check technology users' responses to new technologies, attitudes towards using technologies, and behaviours in adapting to effective technologies within HEIs (Legris, Ingham, & Collette, 2003: 193). This is confirmed by their responses:

Technologist: *If the technology should be used effectively at [...], we must get lecturers to use technology not only for administrative purpose; no we are here not to do administration, we are here to teach.*

Director: *Having effective IT provision in place which allows us to do what we need to do and keep us up to date basically; so I think this is kind of the major / the overall challenge.*

Researcher: *Yes, what I can add is to try to educate, first of all for the technology to be very well used or very well implemented; it needs the championship of the management, the top management, so if the top management are champions about the new opportunities, then you will find that things will be moving smoothly because there were not much questions. Another thing is training; as I say, these things are moving fast. The technology is changing; it needs people to be trained so people they need to move for further studies, training for seminars, so that to catch and understand how technology is going.*

Lecturer: *I think that we can do a lot more; just imagine if somebody comes to register at [...] okay especially postgraduate students, come and register at [...], then you get some cheap Ipad; there are cheaper ones now; it doesn't have to be from Apple you know, and say oh welcome to [...] there's something to keep you connected, you know, and you stay connected.*

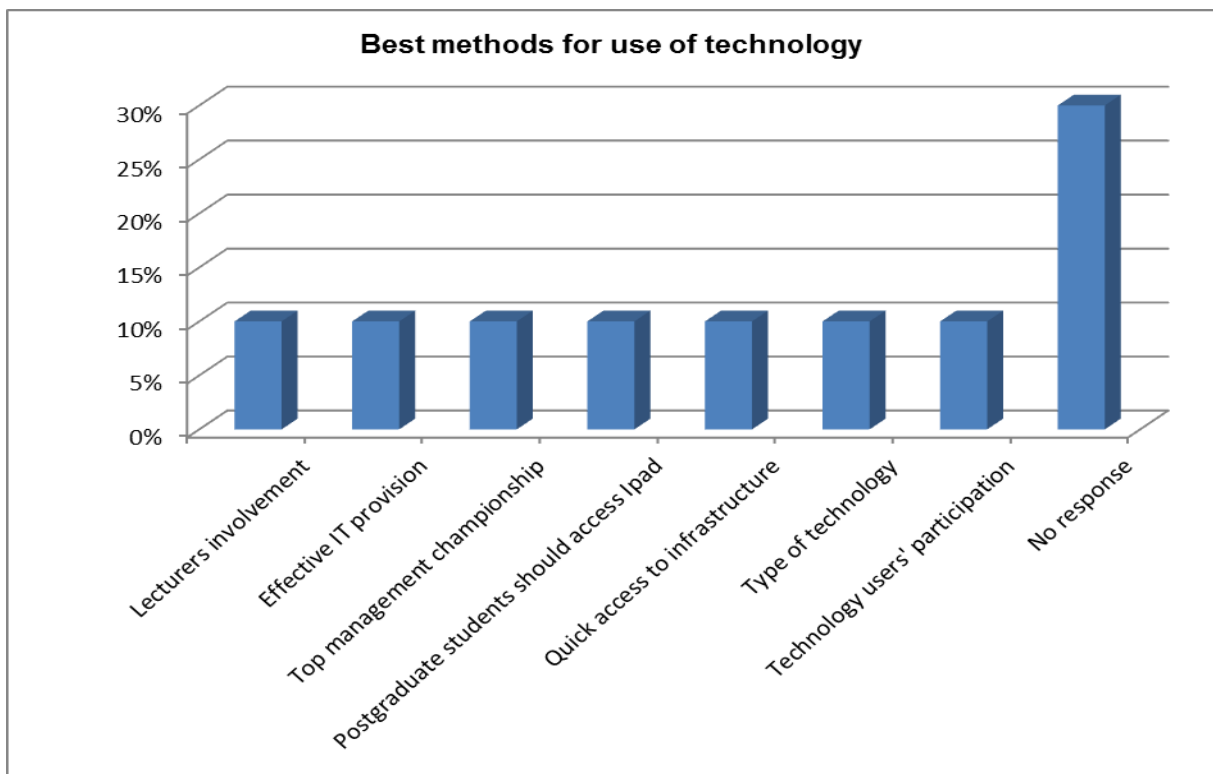
HoD2: *Quick access to infrastructure if required.*

ET2: *I think the institution need to have a concerted vision on what technology to use, how to use it and where to use it.*

HoD3: *I think what could be done differently is to involve the users more and to ask the people on the usage level, the everyday users, what they think, what they feel, what they consider to be bad, what problems they have... "thing" ... I have been working here almost thirty years, I have never been asked once and I'm supposed to be an expert on website visibility and website usability.*

The figure below illustrates a detailed summary concerning the methods that can be used to improve effective operations in a selected university.

Figure 4.3: Best methods for use of technology



The next section discusses details of the benefits of IT investments.

4.5 BENEFITS OF IT INVESTMENTS

This question was to understand best practice of the general benefits of investing in IT. The question was: What are the benefits of IT investments in HEIs? The participants were enthusiastic to show the benefits of IT investments within a university.

Responses from the respondents showed that 80% of the respondents received the benefits of IT investments in different applications; 10% of the participants have computer skills; 10% of the respondents indicated that they are leaving the information age; 30% of the respondents showed Microsoft Outlook as one benefit that works for the university community; 10% of the participants have a pedagogical knowledge; 10% of the participants illustrated Social Media as another benefit influencing IT investments; and 10% of the participants have technology knowledge. On the other hand, 20% of the respondents are not knowledgeable about adopted technologies. The implication is that Microsoft Outlook is one of the benefits that work for the university community. From the participants' responses:

Technologist: *The teachers who teach with technology are able to you know when you have a class; you have the pedagogical knowledge to be integrated with the tool.*

Director: *Microsoft Outlook, some Microsoft option.*

Researcher: *Workers themselves are gaining benefits of knowing new technology of how to do fast; they become more and more efficient.*

Lecturer: *The benefits, "thing" ... I think it also depends on the user; you remember technology also has something to do with how you use it, "thing" ... how good you are with the technology would get you better results than somebody who is not good with the technology, even if the technology was to be available.*

ET1: *One other benefit of technology is this thing in technology, is that we are leaving the information age; there's no way that you can sit back.*

Uys, Nleya and Molelu (2004: 68) argue that the Information Age demands transformational initiatives. Furthermore, technological revolution has become pervasive in HEIs in Africa with the wide extensiveness of global networks like the Internet.

HoD2: *Microsoft Outlook.*

ET2: *I think for us, social media mainly around communication, interaction, feedback, extending [...] in the classroom.*

ET4: *Students have benefited big time; it's very convenient and all users have benefited in terms of computer skills, yes, and lecturers have benefited computer skills and convenience they have now the quality of because it is natural.*

According to the (Bai, Dhavale & Sarkis 2016: 508), "IT investments are increasingly more complex, more strategic, and greater in scope." Furthermore, it was still difficult to measure the business benefits of IT investments. Despite the complexity of managing the benefits of IT investments, various study literatures argue that managing the benefits of IT investments could positively influence organisations' performance or negatively hinder organisations' performance (Gunasekaran et al., 2001: 351).

The figure below illustrates a summary of the benefits of IT investments.

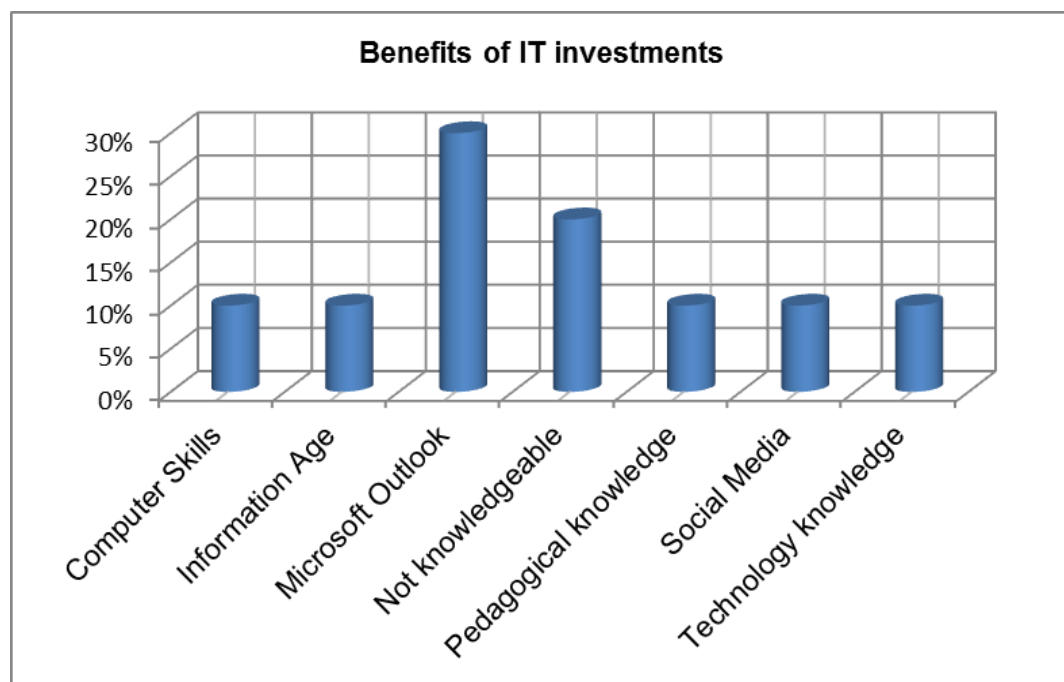


Figure 4.4: Benefits of IT investments

The section that follows looks at delivering the benefits of IT investments.

4.6 DELIVERING THE BENEFITS OF IT INVESTMENTS

This question was to identify the methods to which benefits can be delivered within an institution. The question was: How can they deliver the benefits of IT Investments?

Not all respondents responded to this question. Some respondents indicated the need for pedagogical content knowledge in the teaching and learning environment. On the other hand, the participants indicated that they need LMS to deliver the benefits of IT investments.

Eighty percent (80%) of the respondents chose not to answer; whatever reasons they had I don't know. Only 20% of the respondents answered this question. Those who answered provided the following: 10% of the respondents indicated that technology users' need to have pedagogical content knowledge; another 10% of respondents indicated LMS as a need for the university stakeholders. The implication was that the university still face problems of delivering the benefits of IT investments. This supports the statement of (Ward, De Hertogh, & Viaene, 2007: n.p.). Coombs (2015: 363) confirms that most organisations fail to deliver the anticipated benefits of IT investments from IT projects. From their responses:

Technologist: Teachers who teach with technology must have Pedagogical Content Knowledge.

Director: We should have systems that work consistently and allow people to do what they want to do through Learning Management System (LMS); more operational than they think.

Some universities observe LMS as a move to providing a competitive advantage and increasing flexibility within the university (McNeill, Arthur, Breyer, Huber, & Parker, 2012: 58). Principally, LMS has considerably adopted to support the teaching and learning process in HEIs. Ozkan and Koseler (2009: 1285) note that teaching and learning are no longer restricted to traditional classrooms. The success of LMS has been measured as an emerging concept of both social and technical issues (Ozkan & Koseler, 2009: 1286). As mentioned in the previous section, the table below illustrates the responses from the participants.

Table 4.1: Delivering benefits of IT investments

Respondents	Percentages
Did not answer	80%
Need pedagogical content Knowledge	10%
Need LMS	10%

The following section looks at the strategic influence of technology that supports teaching and learning in HEIs.

4.7 STRATEGIC INFLUENCE OF TECHNOLOGY IN SUPPORTING TEACHING AND LEARNING

This question was to explore and understand the strategic influence of technology in supporting teaching and learning in a selected university. The question was: How does the institutional strategy influence technology in supporting teaching and learning?

Responses from the respondents shows that 30% of the respondents use Blackboard as their support; 10% of the respondents are influenced by Social Media; 10% of the respondents seek social networks as their institutional support; 10% of the respondents make use of ITS; 20% of the respondents are not knowledgeable about the support offered by the institution; and 10% of the respondents affirm that they are not the right people to answer this question. Based on the feedback from the participants, the universities have adopted technologies to support teaching and learning, but there are still problems in using technologies. (Nicol and Coen (2003: 46) confirm that most universities invest heavily in IT to support teaching and learning. The respondents had the following remarks:

***Lecturer:** I'm not sure whether I can give you the institutional strategies but I believe that everybody brags about technology and needs to [...], everywhere you will hear the need for technology and using ICT educational and what not.*

***ET1:** There's this new conception that is Blackboard, and Blackboard is not the only technology which can be used in teaching and learning; there's Social Media and Social Network which need to be used in the teaching and learning.*

***HoD2:** Oh, I'm not the right person to answer this question because I don't teach any undergraduate, so, but I know that they are very active.*

ET3: “Thing” ... I think [...] would have quite an intense answer to that because she is done with all surveys and things like the effect of technology.

HoD3: It would be the whole e-Learning environment which is Blackboard plus all its extra attachments, eh, things like Turn-It-In facility which we got recently.

HoD1: I think the IT system is very important for teaching and learning with the students and for the academics. I think the provision of computer access, the provision of e-mail, the provision of Internet access, especially for the students and for the colleagues; you know, it’s important for that strategy.

The figure below illustrates technologies that support teaching and learning.

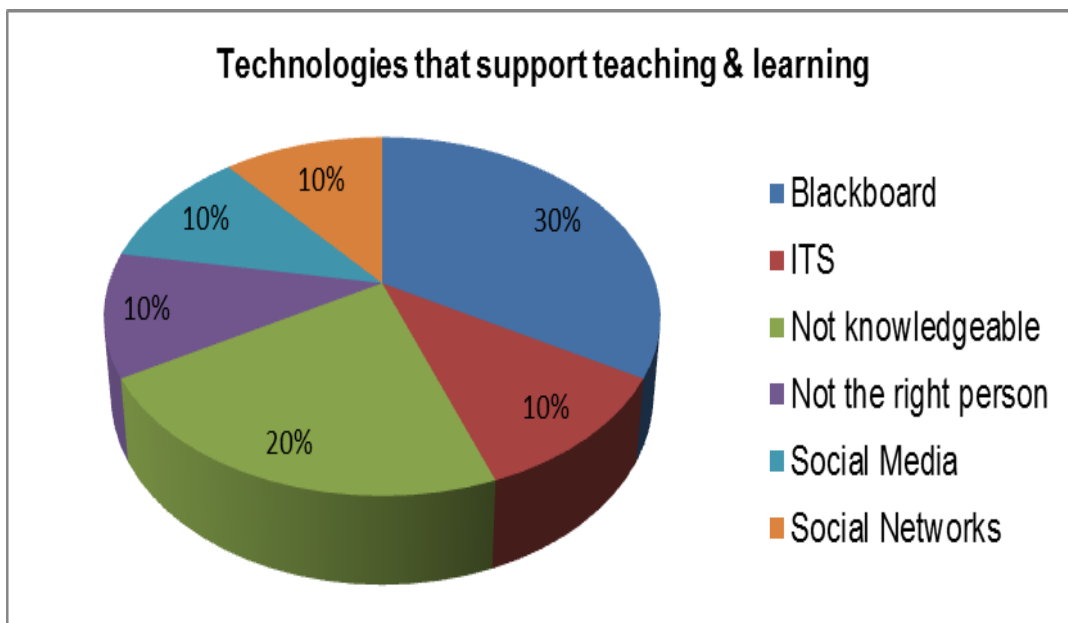


Figure 4.5: Technologies that support teaching & learning

The next section describes the successes and failures of IT investments.

4.8 SUCCESSES AND FAILURES OF IT INVESTMENTS

This question was to realise some of the successes and failures of adopting technology within a university. The question was: What factors contribute to the successes and failures of IT projects in a UoT? The respondents were expected to show some factors influencing successes and failures of IT investments. Half of the participants did not respond. On the other hand, half of the respondents indicated that IT projects are challenging, particularly in UoTs. The implications were that managing IT projects of IT investments is quite complex. Standing, Guilfoyle, Lin and Love (2006: 1148) confirm that some of the failures occur because intended benefits of IT investments are not delivered. The respondents observed the following:

Lecturer: *Microsoft Outlook is much better. Classrooms are not well equipped with necessary resources.*

ET2: *People, they don't think properly about why they want to use technology.*

HoD2: *I think the Library service with the Science catalogues works very well.*

HoD3: *Telephone systems work very well. Well! GroupWise system didn't always work well but that was something embarrassing. With Microsoft Outlook thus far works well, it's a much better product, it's more modern and seeks the way people work; I think it's much more than GroupWise was.*

Table 4.2: Comparisons of successes and failures of IT projects

Successes	Failures
Microsoft Outlook	GroupWise
Telephone system	Lack of infrastructure
Library service	Need to use technology

This table demonstrates a summary of successes and failures of IT projects in a selected university. This was done to determine the factors influencing IT investments in order to improve operations within an institution. As indicated in Chapter Two, Section 2.9, the successes and failures of IT projects influence IT investments within an organisation (Yeo, 2002: 243). Yeo (2002: 243) further explains the influencing factors of IT investments as: organisational culture; inadequate reporting structure; political pressures; vested interests; influences; and an improper level of management commitment.

On the other hand, Abukhzam and Lee (2010: 60) describe the factors that hinder successes and failures as: an absence of technology users' involvement during the adoption of new technologies; lack of an understanding of the potential benefits; technical difficulties to adopt effective technologies; lack of training to use of technology; insufficient support from top management; and a perceived complexity of using technology. The figure below shows responses from the participants.

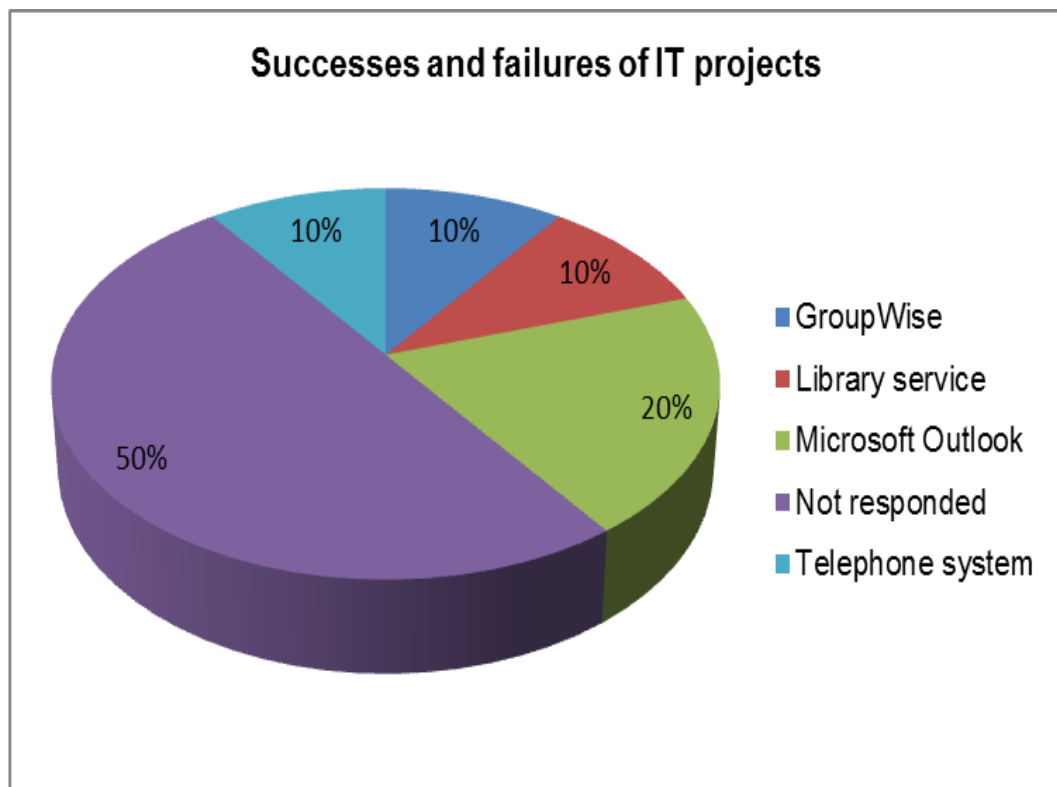


Figure 4.6: Successes and failures of IT projects

The section that follows discusses the steps needed to realise the benefits of IT investments.

4.9 STEPS TO REALISE THE BENEFITS OF IT INVESTMENTS

In this question respondents were requested to provide recommendations for action. This question was finding the ways in which the use of technologies can improve in order to realise the expected benefits from IT investments. The question was: What do we need to do differently in managing technology in UoT? The respondents were asked to recommend further steps for action. The results were very interesting; respondents provided a number of different recommendations that can be adopted to improve effective operations within a university. Ten percent (10%) of the respondents showed the need to invest in both technology and resources; 10% of the respondents indicated that second- and third-year students should be engaged in adopting technologies; 10% of the respondents indicated the need for more training in using technologies; and 10% of the respondents showed technology knowledge as a need.

Ten percent (10%) of the respondents indicated a need for a quick access to technology; 10% of the respondents indicated the need to invest in the right technology; 10% of the respondents indicated the need to develop Open Source software for the university; 10% of the respondents showed that technology users' also need to be knowledgeable about available technologies within an institution; 10% of the respondents indicated pedagogical content knowledge as a requirement; 10% of the respondents showed that technology users' should be involved in decision-making throughout the completion of technology adoption; and 10% of the participants demonstrated that the university should invest in mobile application. The assumptions are that the university needs to perform a number of functions to improve technology adoption. This is remarked by their responses:

Technologist: *Firstly, we need support; somebody who just trains the lecturers on how to effectively use technology in the classroom. Secondly, we need readily available support when something goes wrong when you are using technology.*

Director: *We should be at the cutting edge of information technology; that we should have things like a mobile application.*

Researcher: *I feel like it's better to develop your own software like Open Source Software and it may reduce costs.*

Lecturer: *I think that we need to begin to get the right technology in place first, okay, "thing" ... before the management issue become too much of a problem. I don't think we even have enough to manage here; so that's my view.*

ET1: We need to invest in technology and resources to enable proper technology.

ET3: We should make use of the second- and third-year students.

ET4: More training needed.

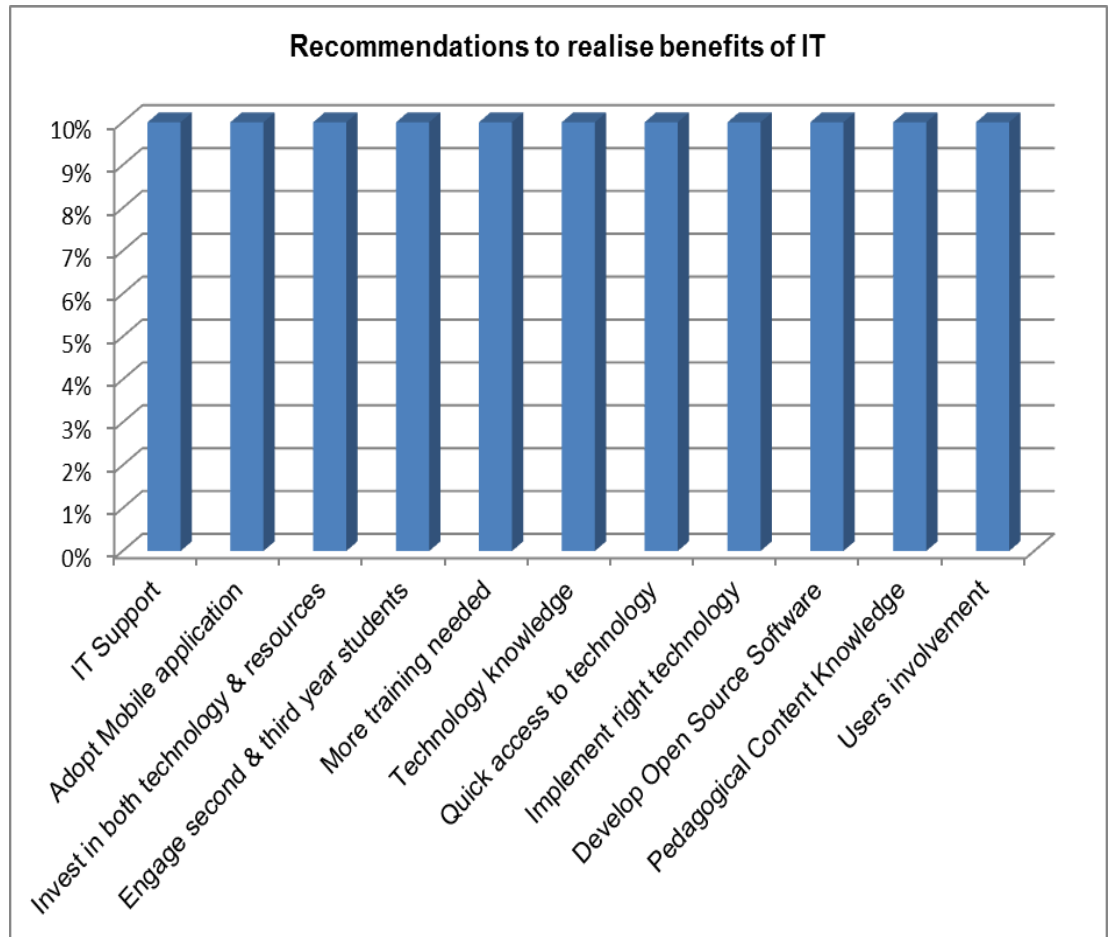


Figure 4.7: Recommendations to realise the benefits of IT

The following paragraph indicates the status core of a selected UoT.

4.10 STATUS CORE

This question was to understand our positioning in using technologies. The question was: How well do you think UoTs are doing? The respondents were asked to give their views for the above. The respondents might be exhausted because only 20% of respondents responded to this question. Eighty percent (80%) of the respondents did not answer this question or indicate their reasons. A positive feedback was received from the respondents who answered this question. The implication is the university uses technology. From their responses:

Researcher: *As far as [...], I feel like they are doing well.*

Lecturer: *I think you may find that [...] has a lot of technology in place. I mean ICT; we are not doing too bad.*

The figure below shows a summary of the university in using technologies.

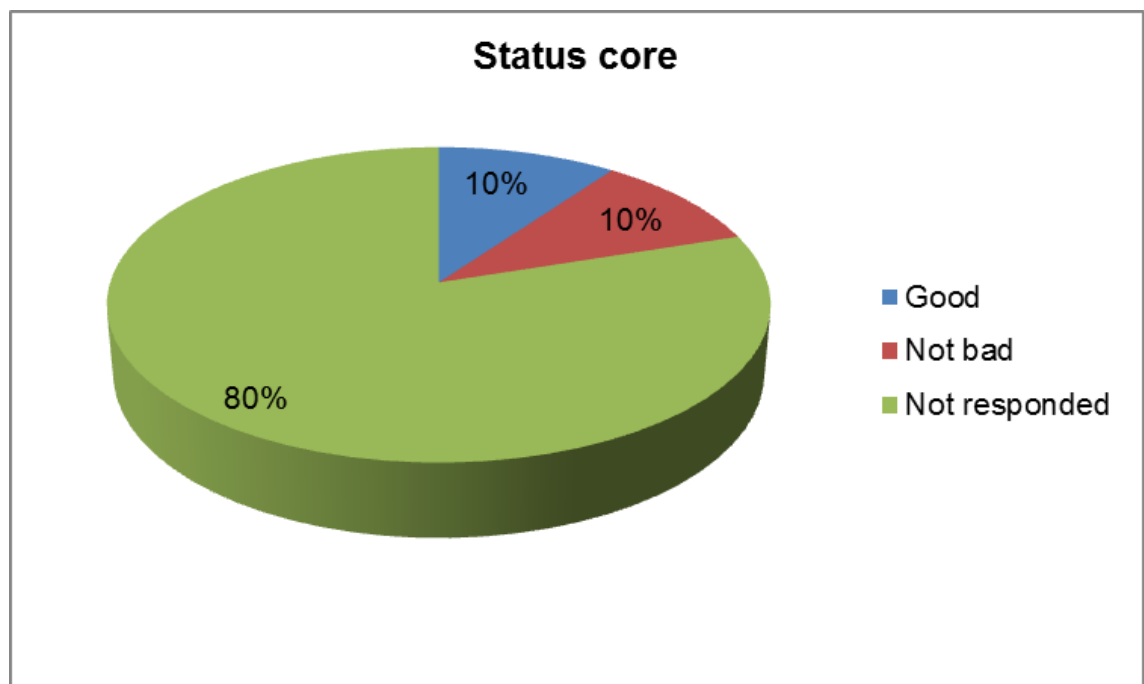


Figure 4.8: Status core

The next section explains the importance of benefits of IT investments.

4.11 IMPORTANCE OF BENEFITS OF IT INVESTMENTS

This question looked at the importance of the benefits for adopting technologies of IT investments. The question was: Why do you think benefits are important in IT investments? The respondents were asked to indicate the reasons for the importance of benefits of investing in IT. From the respondents, it is clear that technology is very important and we cannot live without it, so it needs to be upgraded from time to time in order to realise the benefits of IT investments. Approximately 60% of the respondents did not answer this question. On the other hand, 30% of the respondents indicated the need to access technology because they depend on it; 10% of the respondents showed the need to be knowledgeable in using technologies. The implication was that most UoT stakeholders have not realised the benefits of IT investments. From their responses:

***HoD2:** IT must work and it must be available all the time because it brings everything to a halt if the networks are down; so, but it can make everything faster when it's working sufficiently.*

***ET4:** Technology is one of the biggest attributes you know when a graduate finishes here. I mean the world is technology; you can't be walking out here not knowing, you know how to use technology, not understanding, it's one of the biggest or key attributes for a graduate because I mean in the twenty-first century it's just the top skill to be able to use technology.*

***HoD3:** Yes very much; so I think most academics, many of them settle, "thing" ... the technology is as important as water and oxygen. I have to have access to the Internet; I have to have a machine that is fast and reliable both here and at home.*

***HoD1:** I think it's obvious; if you want to be, you know, an excellent university; if you want staff to be, you know, productive; if you want students to be successful it's good, you know, for all those reasons; it's so obvious.*

The table that follow illustrates responses from the participants concerning the importance of the benefits of IT investments.

Table 4.3: Importance of benefits of IT investments

Responses	Percentages
Not responded	60%
Need technology access	30%
Need knowledge of using technology	10%

The section that follows shows a summary table of research and findings of the study.

4.12 A SUMMARY OF RESEARCH AND FINDINGS

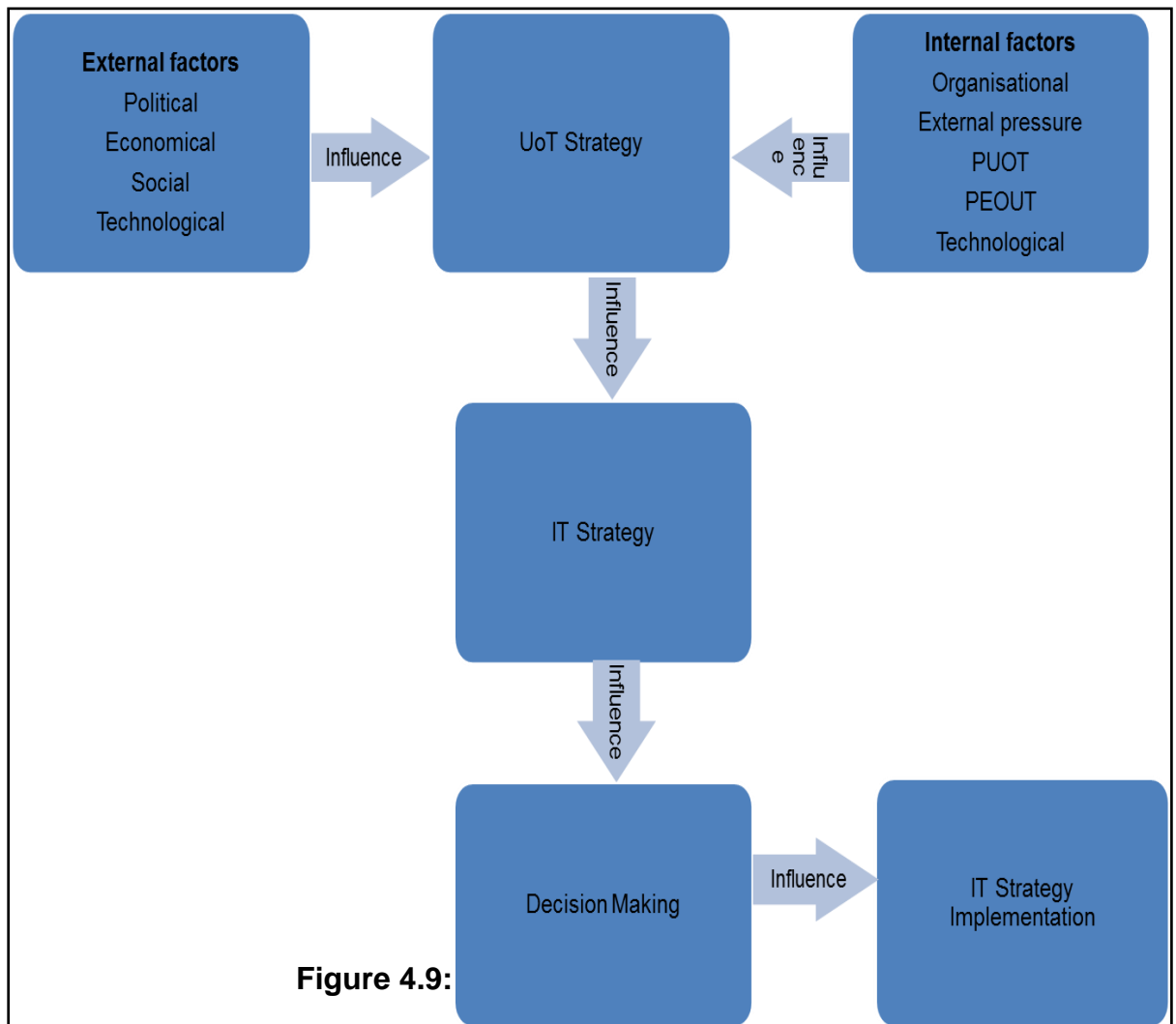
After careful analysis of all the responses from the participants, a summary of research and findings has been developed.

Research	Findings
IT-related challenges	Lack of infrastructure Lack of IT support
Technologies in education	Learning Management System Information Technology System Social Media Social Networks
Benefits of IT investments	Computer Skills Microsoft Outlook Social Media

Table 4.4: A summary of research & findings

The next section illustrates a proposed general framework that has been developed for an understanding of IT investments. It will also help the UoTs and other universities to invest in IT within an institution.

4.13 GENERAL FRAMEWORK



The proposed figure illustrates some factors that directly influence IT investments within a university. These factors include external factors such as political, economical, social and technological factors. This also involves internal factors like organisational, external pressure, PUOT, PEOUT and technological factors. Both factors have been discussed at length in Chapter Two, Sections 2.6.1 and 2.6.2. As alluded to in this section, the external factors impact the UoT strategy in adopting new technologies of IT investments. This means universities need to recognise these factors before making IT-investment decisions. These two are related because the university needs the UoT strategy and also needs to look to African, developing and developed countries prior to IT-investment decisions. As mentioned and illustrated in this figure, the internal factors influence the UoT strategy in implementing effective technologies and ascertaining the university stakeholders. The UoT strategy also shows in Chapter Two, in the conceptual framework, which guides the design of the study. The relationship between internal factors, UoT strategy and external factors was that the UoT strategy obtains direct influence from both factors and the UoT strategy needs to consider these factors before making a decision to invest in IT. Thereafter, the UoT strategy intends to

influence IT strategy before adoption of technologies within a university. The IT strategy needs the UoT strategy in order to implement appropriate technologies and smooth operations.

These two strategies relate to one another because they need to be aligned with each in order to adopt appropriate technologies within an institution. This has been confirmed in Chapter One, Section 1.2. The IT strategy influences the decision making of IT investments in adopting technologies. The relation between IT strategy and decision making, the university needs to have IT strategy in place before making a decision to invest in IT. Thereafter, decision making influences the IT strategy implementation of IT investments. These two are related because the university should make a decision first before implementing an IT strategy for IT investments. The next section concludes with a short summary of this chapter.

4.14 SUMMARY

This chapter presented the results of the data analysis gathered from semi-structured interviews within a selected UoT. Findings for the study were discussed, interpreted and presented in figures and tables. This chapter also illustrated a proposed framework that can be used by the UoTs and other universities around the world. The next chapter provides a conclusion, contribution, recommendations, and further research of the study. This concludes with the final words of the study.

CHAPTER FIVE: CONCLUSION

5.1 INTRODUCTION

To reiterate, the previous section presented the findings and interpretation of the data analysis gathered from semi-structured interviews within a selected UoT. The findings of the study were discussed, interpreted and presented in figures and tables. The previous chapter also illustrated a proposed general framework that can be used by the UoTs and other universities around the world. This chapter provides a conclusion, contribution, recommendations and further research for the study. This concludes with the final words of the study.

This chapter provided a brief view of the entire study, which was drawn from the views of previous studies and findings gathered from the data of semi-structured interviews. The study investigated factors influencing IT investments in a selected UoT. It was envisaged that IT investments are complex and some organisations have already invested heavily in IT. Nevertheless, IT investments involve both internal and external factors which need to be carefully considered when an organisation makes decisions to invest. The next section provides a summary of individual chapters from Chapter One to Chapter Five.

Chapter One introduced the study and discussed the problem. This chapter indicated clearly that the study was about investigating the factors influencing IT investments in a selected UoT. The objectives and research questions that guided the study were discussed. This chapter also discussed the procedures followed to ensure that research ethics were maintained. The study was conducted in a selected UoT and participants were drawn from people working directly with or closely with IT-related functions within an institution. The study focused on factors influencing IT investments within a selected university.

Chapter Two discussed details of the literature review identified from the research literatures alluded to and related to the study under investigation. A particular consideration was given to the South African context in investigating factors influencing IT investments in a higher learning institutions (HLIs) environment in adopting new technologies. It began by discussing an overview of education in South Africa and an overview of education globally. This was followed by information technology in HEIs in South Africa. This chapter also discussed innovation, technology adoption and the technology acceptance model.

This also looked at the factors influencing IT investments, both internal and external. This also described managing benefits of IT investments, effective management of IT investments, successes and failures of IT investments, challenges versus opportunities of IT

investments and integrated solutions of IT investments in HEIs. The conceptual framework guided the design and implementation of the data collection instrument has been illustrated in this chapter. This concludes by a summary of this chapter which enlightens the title of next chapter.

Chapter Three discussed the research design and methodology adopted for this study. It then discussed the research approach, research paradigm, the case, historical background of the university, the University 2020 Vision, unit and object of analysis, population of the study, sampling technique, sampling size, methods of data collection, methods of data analysis, reliability, validity, ethical consideration and summary of this chapter. Finally, this chapter also discussed the data analysis that was used for Chapter Four.

Chapter Four presented the findings and interpretation of the data analysis gathered from semi-structured interviews within a selected UoT. Findings of the study were discussed, interpreted and presented in figures and tables. This chapter also illustrates a proposed general framework that will assist UoTs and universities to invest in IT effectively.

Chapter Five discussed the contribution, conclusion, recommendations, further research and final words. This also summarised the key points that were discussed in this study. As mentioned in the previous section, the section that follows discusses the contribution of the study.

5.2 CONTRIBUTION

The above section provided a summary of all chapters enclosed in this study. To reiterate, the study sought to investigate the factors influencing IT investments in a selected UoT. Most studies related to this study area have been conducted in the United States and United Kingdom. Limited studies have been undertaken in other countries like Australia, Mexico, Singapore and Canada, but none has been done in South Africa. So there is still a lot to be learned in this area about factors influencing IT investments, managing IT investments and the benefits-realisation principle in HEIs in South Africa. This section discusses a three-fold contribution to this research, such as methodological, theoretical and practical contributions. This begins by discussing brief methodological contributions that were used for the research.

5.2.1 Methodological Contributions

The methodological contribution was explained at length in Chapter Three. As alluded to in Chapter Three, Section 3.2 the study adopted a mixed method approach. A selected UoT was used as a single case study. The unit and object of analysis were selected stakeholders

from a selected UoT using a purposeful sampling technique. The semi-structured interviews were used as a method of gathering data with individuals who work with or are closely related to IT. In Chapter Four, the findings of this study were analysed, discussed and interpreted using content analysis and Excel. In addition, figures and tables were also used to present data and a summary of the research and findings as indicated in Chapter Four. As illustrated in Chapter Four, general framework has been proposed as a guideline to adopt appropriate new technologies. This was developed based on the findings of the study. The general framework contributes towards methodological contribution of the study. The next section discusses the theoretical contributions of the study.

5.2.2 Theoretical Contributions

The theoretical contribution of this study is a general framework recommended to assist UoTs and other universities, including traditional universities, to invest in IT and adopt appropriate technologies. This framework serves as a guideline for the adoption of new technologies in HEIs. Beside the above contribution, the study also contributes to literature and other studies that provide an understanding of the complexity of investing in IT. Furthermore, the conceptual framework which was developed from the reviewed literature contributes theoretically to the research by providing an illustrated understanding and interpretation of the phenomenon. It was also used to guide the design and implementation of the data collection instrument. The next paragraph discusses the practical contributions of the study.

5.2.3 Practical Contributions

The practical contribution of this study is the application of the proposed general framework indicated in Chapter Four (Section 4.14; Figure 4.6). TAM was used as a means to understand technology users' perceptions, behaviours and attitudes towards the deployed technology. The proposed general framework will help UoTs and other universities to invest in appropriate technologies within a university. This will also assist the management of technology and management of transformation in IT-investment decisions and towards IT-strategy implementation. This will not necessarily resolve the problem but will serve as a guide to navigate the adoption of new technologies in order to run effective operations within an institution. As mentioned earlier, the next section discusses the conclusion driven from the view of other literatures related to the study.

5.3 CONCLUSION

Some research literatures argue that technology adoption is very important in any organisation because it eliminates the risk of committing to IT investments. Furthermore, it has been argued that many managers, practitioners and scholars propose various methods of IT investments, but there seems to be a negative aspect to making IT-investment decisions. Earlier literature claims that technology adoption needs clear and specific objectives, guidelines and time-bound targets, the mobilisation of needed resources and political commitment at all levels to ensure the initiative succeeds.

IT investments have proven to be increasingly more complex. IT investments can bring positive results but the benefits are relatively difficult. Various factors influencing IT investments have been identified and discussed in depth in Chapter Two, in Section 2.6. However, several frameworks and methodologies on how to make IT-investment decisions have been proposed by various HEIs but the assumption was no single or simple framework or methodologies were found to be consistent, reliable and provide an optimum solution to management who are faced with the difficulties of making IT-investment decisions.

Furthermore, managing IT investments still remains complicated and the implications of IT-investment decisions are often not well understood. Some studies show that some organisations continuously consider social sub-system concerns when making IT-investment decisions. Some organisations do not understand the benefits of IT investments and the context of making IT-investment decisions has changed significantly in the past few years. Despite the complications experienced in IT investments, some organisations have been spending more on IT investments but IT expenditures have also been a challenge over the past years and remain so. Furthermore, more time, money, effort and opportunities have been spent on IT investments and are unsuccessful in delivering the considerable benefits of IT investments. The level of unsuccessful IT projects shows a high rate for the past few years.

Although organisations continue to make extensive IT investments, the successful realisation of benefits has been reported as a challenge that institutions are facing at present. It has been noted that most organisations focus on managing investment objectives and the successful implementation of technologies rather than realise the expected business benefits of IT investments. This means the implementation of technologies can be successful “in terms of timeframe and budget” but not necessarily realise the benefits.

Most importantly, the absence of technology users’ involvement, lack of understanding, technical difficulties, lack of training, and the insufficient support from top management, the

perceived complexity of the use of technologies, influences, political pressure and organisational culture have been perceived as factors that contribute to the success and failure of IT projects. It has been noted that the benefits and costs are the major constraints of justifying IT investments and this has been an ongoing challenge because most organisations have spent a huge amount of money in IT investments.

On the other hand, the adopted technology has turned out to be a successful option for an ever-increasing number of opportunities. The findings indicate that respondents are challenged by a lack of infrastructure, lack of IT support, lack of knowledge and the way it is used. The findings also show that technology can improve if the university adopts the right technology and uses it effectively. However, Microsoft Outlook has been proven to be working for the university community. Recommendations to improve technology have been suggested. Moreover, it has been shown that the university has invested in Blackboard, Social Media and Social Networks to support teaching and learning. To reiterate, the next section discusses recommendations and further research based on the understanding of IT investments and responses from the participants selected for this study.

5.4 RECOMMENDATIONS AND FURTHER RESEARCH

5.4.1 Recommendations

Before approaching the recommendations, it was important to highlight that the study was done not to prompt whether the management of technology and management of transformation have adopted the right or wrong technology. This study investigated the factors influencing IT investments in a selected UoT, particularly in HEIs in the Western Cape. Most importantly, a few recommendations for improving the current technology have been identified as follows:

Firstly, lecturers need support or training on how to use technology effectively in the classroom. Secondly, there is a need for readily available support when something goes wrong when using technology. Thirdly, UoTs should be at the cutting edge of technology and implement a mobile application. Fourthly, there is a need to reduce the cost of adopting technologies and developing software like Open Source Software. Fifthly, it has been suggested that the UoT need to begin and get the right technology in place. Sixthly, the university needs to invest in both technology and resources to enable appropriate technologies. Seventhly, it was suggested that second and third year students should be engaged in the implementation of new technologies. Finally, more training is needed in order to use technologies effectively and realise the benefits of IT investments. The next section discusses further research.

5.4.2 Further Research

This study was guided by a conceptual framework that was developed based on the reviewed literature. Two influential theories were used for this study such as TAM and TRA. TAM was used to check the perceptions of technology users' behavioural intention and attitudes towards the use of technology. TRA described the relationship of attitudes towards adopted technology, the intention to innovate, technology adoption and usage of innovation. Besides the above theories, a general framework has been developed to understand IT-investment decisions and guide UoTs and traditional universities to invest appropriately in IT and improve the adoption of technologies.

As indicated above, these theories can be used to create a model that will evaluate the influence of IT investments within UoTs or universities. This study focused only on a single case study of a selected UoT. It is important that the evaluation of the influence of IT investments be tested in more than one UoT or university. It is necessary that the benefits of IT investments be realised by other institutions as well. The section that follows explains the final words.

5.5 FINAL WORDS

The participants (management, academics, non-academics and researchers) who opened up and shared their opinions and experiences during this study did so voluntarily. They were passionate about participating and prepared to re-schedule all other commitments for the day because they needed to know what factors were influencing IT investments, particularly in HEIs. The study inspired management to involve technology users' and consider an organisational culture within an organisation when making decisions to adopt technology in order to excel, understand the benefits of IT and invest in IT effectively within an institution.

It is hoped that other researchers, UoTs and universities that have vested interests to invest in IT will benefit from this study.

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APPENDICES

APPENDIX A: ETHICS MANAGEMENT PLAN

The study intended to identify factors influencing IT investments in adopting technology effectively in HEIs, at a time of transformation. This would lead to a better understanding of the benefits of IT investments in meeting the mission and vision of HEIs. The mixed method approach has been used in this study. The findings of this study will be useful to the management of technology and management of transformation in HEIs. This will also assist UoTs and other universities to invest more wisely, and thereby to derive real and useful benefits.

The study needs input from anyone who is (or has been) involved with information technology and willing to share their experiences. Participants' contribution will assist HEIs in South Africa and other Universities world-wide to make better use of technology, and to deliver improved benefits from IT investments in education. The next section describes the steps of ethics management plan that will be undertaken in this study.

Ethics Management Plan

This ethics management plan describes the steps that were taken to ensure ethical enactment of the Masters project "Factors influencing IT Investments in a selected University of Technology", a project to be managed by the undersigned.

Guidelines:

The available ethical guidelines of the University of Technology guided this project all times.

Participants:

No vulnerable persons were expected to be involved in this study. It involves interactions only with operational staff (both academic and non-academic) and management working with information technology or having an interest or dependency on information technology in their work.

Participants were advised by means of a letter of participation (see below) about:

- the purpose of the study,
- their right to withdraw,
- their right to anonymity and
- their right to see and review the output of the research, and about the way data and output from the project were managed.

Nature and structure of enquiry:

Participants were interviewed using semi-structured interviewing techniques, which mean that there were topics for discussion based on the set questions. Topics were related to the agreed and approved main and sub-research questions of the study.

APPENDIX B: PARTICIPATION LETTER

This letter was sent via e-mail direct to the managers, HoDs, directors and participants as follows:

Dear Sir / Madam

I hereby request your participation in the following study: Factors influencing IT investments in a selected University of Technology.

I have attached a letter of participation for your perusal. I hereby request that you endorse the participation letter as an indication of your consent to participate in this research.

I would also like to highlight that the interview will be in person. This will assist the researcher to record the interview and to have further discussion with the interviewee.

Your response in this regard would be highly appreciated.

Kind regards

Pumza Makaula

Research Directorate
Room 2.800
Administration Building
Cape Peninsula University of
Technology
Cape Town
8000

7th August 2012

To whom it may concern

FACTORS INFLUENCING IT INVESTMENTS IN A SELECTED UNIVERSITY OF TECHNOLOGY

Thank you for your willingness to assist us in this research project, which is being undertaken within the Faculty of Business Management & Sciences in a selected UoT. Plans for the study have been reviewed and approved by research management in a selected UoT, and progress is under periodic review by them.

The project investigated factors influencing IT investments in HEIs in South Africa. It intended to identify factors influencing IT investments in managing technology effectively in HEIs, at a time of transformation. This will lead to a better understanding of benefits of IT investments in meeting the mission and vision of HEIs. The findings of this study will be useful to the management of HEIs and will assist institutions to invest more wisely, and thereby to derive real and useful benefits of IT investments.

The project needs input from anyone who is (or has been) involved with information technology and is willing to share their experiences. Your contribution to the project is therefore valued. Your contribution will assist HEIs in South Africa to make better use of technology, and to deliver improved benefits from the national investment in education. This note explains how we will manage your involvement, and what we will and will not do with what you tell us.

Your involvement

The project team foresees no negative outcomes for any participants, however...

- your participation is entirely voluntary, and you may withdraw at any time,

- you can choose not to answer any question that you object to,
- you may see any output from the study that includes data that you provided, and
- you may ask us to remove any such information or data if you have reason to do so.

Our management of the research data

- All original data and information are kept confidential within the project team, including but not limited to: documents, completed questionnaires, voice recordings and transcripts.
- Data and information will be rendered anonymous before it is used, typically by means of coding, or aggregation into summary tables and graphs, or (in the case of verbatim quotations) by making no reference to your name, your job title or your organisation.
- Publically available printed or digital outputs from the project (which may include content derived from data or information that you have provided, as described above) may be included but is not limited to: presentations, working papers, conference papers, journal papers and books.

The project and the team

Those involved with the project are selected stakeholders such as: academics, management, non-academics and researchers in a selected UoT.

I shall be pleased to provide any further information that might be required. Please feel free to contact me at any time on details below. Thank you again.

Yours faithfully

Pumza Makaula (Ms)

Contact no: 021 460 3895

Cellphone no: 073 502 9270

Email: makaulap@cput.ac.za

APPENDIX C: INTERVIEW QUESTIONS AS A GUIDE FOR THE STUDY

The interviews are intended to identify factors influencing IT investments and realise the benefits from IT investments in HEIs. The feedback received from the respondents assisted in understanding the benefits of IT investments. Data collected during this period were analysed to obtain the findings of this study. Stakeholders were expected to participate in the interview process in their offices. The findings of this study assisted management of technology and management of transformation in realising the benefits of IT investments.

INTERVIEW QUESTIONS

What are the factors influencing IT investments in a selected UoT?

What are the IT-related challenges?

What do we have to do well to make the best use of information technology?

What are the benefits of IT investments in HEIs?

How can we deliver them?

How does the institutional strategy influence technology in supporting teaching and learning?

What are the factors contributing to the success and failure of IT investments?

How well do you think we are doing?

Why do you think benefits are important on IT investments?

Is there anything else you need to tell me?

Would you like to be further involved in this research?

Is there anybody else I should talk to?

Thank you very much for your participation. Should you have any further enquiries about the study, kindly forward an e-mail to makaulap@cput.ac.za or contact me on 021 460 3895 / 073 502 9270.