DEVELOPMENT OF E-GOVERNMENT DIFFUSION ASSESSMENT TOOL FOR SERVICE DELIVERY IN SOUTH AFRICA'S MUNICIPALITIES: TASK-TECHNOLOGY-FIT APPROACH

By

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DEDICATION

I would like to dedicate this thesis to my lovely wife Bella Mkhonto for her unwavering support throughout this gruelling journey. I would not have managed to do this without her. Her immense support physically, spiritually and mentally is next to none. We have done it my love.

I would also like to extend my dedication of this thesis to my three lovely kids Taelo (Hanyane), Mafanele and Kulani. The moral support they gave me, not forgetting the beautiful words of inspiration I received from them during my personal and academic challenges. Their presence in my life has been a great source of motivation and inspiration.

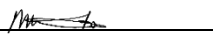
To the loving memory of my parents (Mafanele and Giyani Mkhonto), who began my education, motivated me to continue with it and they will always contribute to it, for they gave me invaluable educational opportunities.

DECLARATION

This research as presented in this thesis is my original work and has not been presented for any other university award. Knowledge derived from other sources has been clearly indicated, with acknowledgement and reference to the literature.

This study was conducted and completed under the guidance of and supervised by Professor Tranos Zuva, Department of ICT at Vaal University of Technology, South Africa, and Professor Muthoni Masinde, Department of Information Technology at Central University of Technology, Free State, South Africa.

Mkhonto Mkhonto,

Signature: 

Date: March 2020

In our capacity as the supervisors of this thesis, we certify that the above statements are true to the best of our knowledge.

Professor Tranos Zuva

Signature:_____

Date: _____

Professor Muthoni Masinde

Signature: _____

Date: _____

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I would like to take this opportunity to extend my sincere gratitude to my supervisors, Professor Muthoni Masinde at Central University of Technology and Professor Tranos Zuva at Vaal University of Technology for guiding me patiently throughout this thesis. It has to be noted that without their comments, suggestions and remarks I would not have made it this far. Their presence and availability gave me strength and confidence to push on during tough and challenging times as the journey was anything but smooth.

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I would also like to give special mention to the staff at Potchefstroom library. The welcome and support I received from them on every visit to the library was warm and tremendous. They assisted me greatly by availing the resources that would help to tackle my thesis.

I would also like to acknowledge fellow researchers on this particular topic. Their existing literature also formed part of my research and has been referenced accordingly.

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ABSTRACT

While e-Government has been in existence since the 1990s, with the intention of improving service delivery to citizens and improving efficiency within the government setup, it is safe to say that its implementation and success to date can be deemed mediocre at the least. The South African government entrusted the Department of Public Service and Administration (DPSA) with the responsibility of developing and coordination of e-Government strategy to address issues across all departments and sectors. Several Information and Communication Technology (ICT) initiatives have been sanctioned by the government at provincial and national level albeit at varying degrees of success. Prior to the appointment of DPSA, most of these initiatives had been uncoordinated and isolated which has probably led to little or no progress so far. In a quest to accelerate e-Government solutions, the DPSA has placed emphasis on government-to-government (G2G), government to business and citizen (G2BC), government to citizen (G2C) and the related infrastructure which helped these projects to take off smoothly. Some examples of the initiatives in place include e-filing, e-health and e-education. The South African Revenue Services (SARS) and the Companies and Intellectual Property Commission (CIPC) have had success with their respective e-filing initiatives. Although queues are still being seen at these departments, most taxpayers, tax practitioners and trademark and patent applicants have embraced this electronic technology and thus alleviating the challenge of queuing for long periods. However, the same cannot be said for other initiatives such as e-health and e-education. Consequently, a need to look into e-Government diffusion in South African municipalities was birthed. This research used a modified model derived and adopted from Task-Technology-Fit (TTF) Model and Fit-Viability Model. The new model e-Government Diffusion Assessment Model (EDAM) was proposed with 12 variables. It was tested for validity and reliability. Data was collected using Likert seven-point scale questionnaire, of which 100 responses were usable and was analysed quantitatively. The hypothesis of the research model was tested using the regression analysis technique. The findings in this study indicate that e-Government has been adopted and that it is at the advanced stages of development. The results in this research show that the rate of diffusion of e-Government in the three selected municipalities across South Africa is seventy-five percent(75%). This percentage suggests that strides have been taken to embrace ICT in local government. The results also indicate that social norms have strong influence on utilisation, utilisation has strong influence on organisational performance while task-technology-fit has strong influence on utilisation. The results also indicate that task-technology-fit, utilisation and viability had a very strong influence on organisational performance. In conclusion, the findings in this study indicate that the proposed model can be used to see whether the factors are favourable for diffusion of e-Government applications. The organisational performance in this study is in line with the mandate of the municipality in delivering service

to the community. This research contributed to the body of knowledge by providing an increased understanding of the information systems, diffusion, IT adoption and e-Government studies in South Africa's municipalities. In order to improve service delivery and minimise service delivery protest it is recommended that municipalities around South Africa adopt the model as outlined in this study.

LIST OF ABBREVIATIONS

ATMs	Automated Teller Machines
B2G	Business-to-Government
CA	Cronbach's Alphas
CR	Composite Reliability
D&M	Delone and McLean
DPSA	Department of Public Services and Administration
DOI	Diffusion of Innovation Theory
E-APPLICATION	Electronic Application
EAM	e-Government Assessment Framework
EDAM	e-Government Diffusion Assessment Model
EDM	Expectancy-Disconfirmation Model
EDGI	e-Government Development Index
EDMS	Electronic Document Management System
E-FILE	Electronic file
E-GOVERNMENT	Electronic Government
EGR	Electronic Government Readiness
ENaTis	Electronic National Traffic Information System
E-PARTICIPATION	Electronic Participation
E-READINESS	Electronic Readiness
G2C	Government-to-Citizens
G2E	Government-to-Employee
G2G	Government-to-Government
HCI	Human Capital Index
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
ID BOOK	Identity book
IEC	Independence Electoral Commission
IS	Information Systems
ISA	Information System Acceptance
IT INFRASTRUCTURE	Information Technology Infrastructure
KMO	Kaizer-Meyer-Olkin
LMS	Learning Management System
OECD	Organisation for Economic Cooperation and Development
OSI	Online Service Index
OTFPS	Online tax filing and payment system

PARTY ID	Party Identification
PCA	Principal Component Analysis
PLS	Partial Least Squires
RPM	Reference Process Model
SARS	South African Revenue Services
SERVQUAL	Service Quality
SMS	Short Message Services
SPSS	Statistical Package for the Social Science
TAM	Technology Acceptance Model
TII	Telecommunication Infrastructure Index
TPB	Theory of Planned Behaviour
TTF	Task-Technology-Fit
UN	United Nations
UTAUT	Unified Theory of Acceptance and Use of Technology

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LIST OF PUBLICATIONS

As an outcome of this research, the author of this thesis is the first author of the current published papers listed below.

Paper A: M k h o n t o, M. & Masinde, M. (2019, March). The Critical Success Factors for e-Government Implementation in South Africa's local government: Factoring in Apartheid Digital Divide. In 2019 IEEE 2nd International Conference on Information and Computer Technologies (ICICT).

Paper B: M k h o n t o, M. & Masinde, M. (2019, March). An e-Government Assessment Framework for Service Delivery in South Africa's Municipalities: Rational Choice Theory Approach. In IST-Africa 2019 Conference Proceedings, Paul Cunningham and Meriam Cunningham (Eds) IIMC International Information Management Corporation, 2019, ISBN: 978-1-905824-62-5.

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND INFORMATION

Research shows clear evidence that service delivery protests in South African municipalities are on the rise and have become more violent (Netswera & Kgalane, 2014; Matebesi & Botes, 2017). Invented in the 1990s, e-Government's main objective is to improve service delivery to citizens and in so doing, improve the efficiency of the government's activities (Singh & Travica, 2018). Although a correlation exists between service delivery protests and poor communication between metros and citizens, successful implementation of e-Government might not eradicate all the challenges that currently exist but simply be a part of the solution to ease tension between the two stakeholder groups (Citizens and Government).

The Department of Public Services and Administration (DPSA) drafted South Africa's e-Government policy in 2001. This was after an extensive consultation process which lasted for two years with various private sector representatives, community organisations and public services officials (Trusler, 2003). The policy outlines a ten year e-Government implementation plan. Consequent to the 2001 policy adoption, the progress with e-Government beyond the policy statement is reported to have been regrettable (Matebesi & Botes, 2017). The weak leadership has presented a serious obstacle to the implementation of e-Government combined with other structural and operational constraints (Mawela, Ochara & Twinomurinzi, 2017).

Substantial research relating to the challenges of e-Government within provincial and local government levels in South Africa is documented in literature (Matebesi & Botes, 2017; Mawela, Ochara & Twinomurinzi, 2017; Singh & Travica, 2018; Murenzi & Oliver, 2017; Joseph & Olugbara, 2018; Chemisto & Rivett, 2018). The challenges range from universal (to developing countries) ones such as lack of funding and poor access to ICT infrastructure (Joseph & Olugbara, 2018; Chemisto & Rivett, 2018), to political (Matebesi & Botes, 2017; Twum-Darko, 2013) and cultural (Singh & Travica, 2018). The bottom line is that the success of e-Government, especially in non-urban municipalities has been dismal (Twum-Darko, 2013).

In this study, we present a customised (to South African municipalities) e-Government model for assessing the 'fitness' of e-Government solutions and technologies to community members' tasks. In particular, the tasks that relate to delivery of basic services such as water, electricity and housing.

1.2 PROBLEM STATEMENT

Data from the Municipal-IQ (Allen & Heese, 2014) show clear evidence that service delivery protests in South African municipalities are on the rise. Although the reasons behind these protests are generally poorly understood, they are mostly galvanised by inadequate local services or tardy service delivery, the responsibility for which lies within a municipality. Most of these 'service delivery protests' occur in informal settlement of metros; very poor communication between representatives of the metros and communities is *the problem.* Despite being one of the economic giants of the continent, implementation of e-Government projects in South Africa "faces" numerous challenges especially the exclusive emphasis being placed on ICT projects, "at the expense of careful analysis and consideration of the broader economic, social, and political elements that interact to improve the lives of individuals" (Moodley, 2005). Despite the fertile grounds (e.g. high penetration of mobile phones usage and sustained growth in internet usage) most e-Government initiatives being adopted by many municipalities take a top-down approach and they fail to meet the needs of municipalities due to reasons such as mismatch of technology characteristics versus the municipalities and community members' tasks (Thakur & Singh, 2013). Other factors bogging down the implementation of e-Government projects, especially in the rural municipalities include ICT illiteracy, limited or lack of access to modern ICT devices, general (especially English) illiteracy,lack of awareness of e-Government services and limited funding to set up and maintain e-Government solutions (Murenzi & Oliver, 2017).

This research aims to develop a customised (to South African municipalities) e-Government assessment tool for assessing the 'fitness' of e-Government solutions and technologies to community members' tasks (Zhang, Guo, Wu, Hung Lai & Vogel, 2017; J. Cizikiene, 2018 & Kliemt, 2018). The concept of fit is now well accepted in the Information Systems (IS) domain, where Task-Technology-Fit (TTF) is examined to assess the extent to which technology provides functions that support user needs. The TTF model, based on rational choice theory, assumes users will adopt technology provided that it has the characteristics necessary to support their tasks.

1.3 MOTIVATION AND JUSTIFICATION

The constant tension and animosity between the citizens of South Africa and various municipalities is on the rise and has not gone unnoticed. In fact, it is well documented in the media that some of these protests have become violent, with senior government officials, councilors and municipality leaders being targeted. With little or no action being taken to improve

service delivery, at least in the eyes of the public, the citizens have decided to unleash their wrath on those in charge; “no form of service delivery since the dawn of democracy”. “Communication has also been very weak between the community, councilors and the municipality which never responded even after we raised our grievances on numerous occasions” (City Press, 2019).

Consequently, in light of these recent events, a need to look into e-Government diffusion which can be used as a mediating tool to address issues of communication among others, became imperative. Warning signs have been prevalent and after almost three decades since its introduction in 1990, a review of its diffusion is worth looking into to assess its success and limitations. In addition, the study could be useful in assisting those in charge of e-Government implementation to kick start a rebuilding phase to repair the damaged trust by improving service delivery to the citizens. The study included input from the general public and therefore their concerns were included in the research. This will help the government to come up with a roadmap which can be used to tailor their efforts towards the needs of the people.

1.4 RESEARCH QUESTIONS AND OBJECTIVES

To solve the research problem, the following set of research questions were taken into consideration:

a) What is the extent of e-Government diffusion within three selected/studied municipalities in South Africa?
b) What are the critical success factors that are intrinsic to the diffusion of e-Government in municipalities in South Africa?
c) How can Information systems/ICT Models be used to model these critical factors in order to ensure a direct link between successful e-Government and service delivery to community?

By addressing the above research questions, the main objective of this study was to develop a framework that municipalities in South Africa can use to evaluate the fitness of e-Government solutions. This will be achieved through the following specific objectives:

a) To analyse e-Government diffusion in selected (2 in each province) municipalities in South Africa.
b) To identify the salient critical success factors for e-Government diffusion for South African municipalities.
c) To model the factors above into a generic (can work for any municipality in South Africa) framework.

1.5 RESEARCH HYPOTHESIS

e-Government solutions that are implemented based on a relevant framework (that puts the community into consideration) have higher chances of succeeding in ensuring an acceptable level of service delivery.

1.6 THE SOLUTION APPROACH – A CASE STUDY

The research problem was addressed by using the case study approach (Yin, 2013) to develop a framework that municipalities in South Africa can use to evaluate the fitness of e-Government solutions. The case study was based on three government municipalities in South Africa: Mangaung Metro Municipality, Dr Kenneth Kaunda District Municipality and JB Marks Local Municipality. The solution was tested and validated at JB Marks Local Municipality in North West province. The framework that resulted from the above was assessed for validity and applicability; after which a modified framework was presented.

1.7 LIMITATION OF THE RESEARCH SCOPE

Like other research studies, this study is not without its limitations. Sample size is one of the limitations as the total participants equates to 120 that excludes generalisation to all municipalities in South Africa. However, further research is encouraged in this manner to get a wider audience. It would be advisable to increase the sample size to maximise the significance pertaining to the exactness and generalisation of the study.

The study was conducted in municipalities in the Free State and North West province in South Africa only, and as a result it excluded other provinces. The survey questionnaire was in English only; because of time constraints and selection of the participants, vernacular languages were not considered as they would have prolonged the research study as more resources would have been required. According to Delva *et al*. (2002), surveys that are distributed with time constraints are problematic as people who struggle with real or perceived time constraints are less likely to respond to surveys because these possible respondents feel overworked as they do not have time to complete the survey, hence the number of participants is only 120. Another limitation was that more research study or theory reviews could have been conducted in other languages that were not covered, as the researcher only concentrated on literature that was written in English.

1.8 SIGNIFICANCE AND CONTRIBUTION OF THE RESEARCH

This research will have some weight behind it and will contribute immensely to the diffusion of e-Government within South African municipalities and other government-run organisations. The outcome of the research will provide insight into the progress, challenges and above all steps to be taken to ensure the hype around technology brings the desired results of improved service delivery. One of the stakeholders to benefit from e-Government success is the government itself. Government employees will benefit from improved efficiency through use of modern technology to carry out daily tasks and in turn serve the citizens well. In addition, information gathered during the research will uncover benefits such as increased revenues and reduction of costs as a result of e-Government adoption.

The research will also be of benefit to scholars and can be used as a learning paradigm by future researchers on how to approach a study of this magnitude. There is already research done on this topic and there is no reason to suggest scholars are less interested in it anymore. This research will help to come up with a different perspective and take on the matter of e-Government which is not currently available.

At first glance, the value of this research might not be seen to be of significance or value to the general citizen. However, if e-Government yields results because of this study's contribution, it is fair to say it brings value to the citizens albeit at varying degrees compared to the aforementioned stakeholder groups.

The principal outcomes that result from this research are summarised as follows:

a) This study will provide new effective e-Government diffusion assessment tools for service delivery in municipalities in South Africa.

The results of the research will help decision makers in local government in South Africa to consider the factors relevant to e-Government diffusion use and increase the possibility of future success within existing e-Government initiatives.

b) The research result provides a base for future research to build on with respect to the proposed EDAM model and its application to other contexts.

1.9 EVALUATION CRITERIA

To evaluate this research, each objective was tested against the research outcomes. The case studies used were adopted to evaluate the research objectives as a measure of the quality and

reliability in the form of verification and validation. The verification involves evaluating the research project to ensure it satisfies the research objectives, and the validation involves using necessary validation metrics to quantify the research processes.

1.10 STRUCTURE OF THE THESIS

The thesis is divided into six chapters which are presented as follows:

a) **Chapter One** provides the introduction to the background of the study. It provides the research objectives and related questions along with the discussion of the importance and value of the study. In addition, a motivation to conduct this study is discussed.

b) **Chapter Two** presents a comprehensive literature review of the e-Government concepts and technologies relevant to this thesis. In addition, this chapter covers adoption and diffusion, and assessment models/tools/frameworks were discussed.

c) **Chapter Three** presents the different models to assess information systems and the usage of DeLone and McLean's model in measuring success models. In addition, the comparisons of the different information system success measurement models were discussed.

d) **Chapter Four** presents the methodology followed in executing this research; it also presents data collection, research strategy and the research instruments used in this study

e) **Chapter Five** presents the research findings and results of data analysis; in addition, the research model validation including reliability and validity of the research survey instrument. Furthermore, a detailed assessment of the measurement model and the assessment of the model are presented.

f) **Chapter Six** concludes the thesis by briefly summarising the contributions of the research work and evaluation of the research against the research objectives. The concluding remarks and future research direction were presented.

CHAPTER TWO

E-GOVERNMENT

2.1 INTRODUCTION

This chapter is presented as follows: the e-Government concept is explained in the next section followed by benefits of e-Government. The section that follows positions the study within the information system domain by presenting some information and models which have been applied to e-Government studies (i.e. what other researchers have done in e-Government regarding readiness, adoption, acceptance, impacts and successes). In addition, this chapter covers adoption and diffusion, assessment models/tools/frameworks, adoption models and frameworks and conceptual and contextual clarification. The chapter ends with a summary.

2.2 THE E-GOVERNMENT CONCEPT

e-Government is a very widely researched area. Given the myriad of definitions that exist (Wu & Bauer, 2010). In Nabafu & Maiga (2012), the concept of "enabling transactions between government departments and the private sector" is added in the definition of e-Government. e-Government takes various forms and ranges from simple e-information provision to advanced citizen participation online information systems.

The concept of e-Government, as used in this study, has a broad definition. Many researchers have defined e-Government in different ways. The concept of e-Government has no single common definition and this study has recognised various definitions of e-Government. The definitions of various e-Government are presented in Table 2.1. With regards to this study, the relevant working definition of e-Government is adopted from the UN e-Government definition as follows:

"Government's utilisation of ICTs to deliver information and public services to the people" (United Nations, 2018). In addition, this working definition is aligned with the definition provided by (Odat, 2012), who viewed e-Government as the capability of various government agencies to provide government information and services at any time to citizens using electronic means speedily and properly, resulting in less cost and effort via a single internet site.

Table 2.1: Selected Definition of e-Government as viewed by different researchers

Year	Source	Definition	Research Focus
2001	Mehrtens *et al.*	e-Government involves a paradigm shift where traditional methods of governance, of using paper-and-file approaches in managing government businesses, are transformed to using ICTs instead of paper.	Transformation
2002a	Heeks	The use of information and communications technologies (ICTs) to improve the activities of public sector organisations.	Improvement
2004	Ndou	The use of ICT tools to reinvent the public sector by transforming its internal and external way of doing things and its interrelationships with customers and the business community.	Transformation
2007	Kumar *et al.*	e-Government is the delivery of improved services to citizens, businesses, and other members of the society through drastically changing the way governments manage information.	Improvement
2010	Mutula & Mostert	e-Government is generally used to refer to the utilisation of IT technologies for delivering government information and services to citizens.	Use of technology to deliver information and service delivery.
2012	Novakouski & Lewis	Use of ICTs to enhance government business related to the provision or enhancement of public services or the management of internal operations of government.	Use of ICTs to enhance government business.

Year	Source	Definition	Research Focus
2014	The United Nations Department of Economic and Social Affairs	Use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, to enhance public service delivery.	The use of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information.
2017	Mawela, Ochara & Twinomurinzi	e-Government is the use of ICTs to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens.	Use of technology to promote efficient government.
2018	United Nations	"Government's utilisation of ICTs to deliver information and public services to the people".	Use of technology to improve delivery of service to citizens.

Most researchers and specialists agree to define e-Government as a use of ICT to offer citizens and businesses the opportunity to interact and conduct business with government through using various electronic media (Bwalya, 2009; Heeks, 2001, 2003; Lessa *et al*., 2012; Managa, 2012; Mnjama & Wamukoya, 2007; Stanforth, 2007).

The researcher is of the view that, although most definitions of e-Government focus on government service delivery, in general, e-Government is not only concerned with the provision of government services, but quite importantly, is inclusive of the use of ICT by citizens and public sector organisations such as municipalities. The e-Government concept is also part of broader e-Governance concepts. In view of that, the researcher views e-Government as a way of doing transactions of paying water and electricity bills without visiting or queuing at the municipality's offices. It also eliminates parking spaces at the municipal offices. The next section discusses the benefits of e-Government services.

2.3 THE BENEFITS OF E-GOVERNMENT SERVICES

Most developing countries expect massive benefits from the implementation of e-Government programs. Governments including municipalities are expected, through e-Government, to reach increasing numbers of citizens by efficiently delivering their services.

Table 2.2: Benefits of e-Government in terms of dimensions.

e-Government Dimension	Benefits	Reference
Government-to-Citizen (G2C)	-Providing efficient government management of information to the citizen.	Seifert & Petersen, 2002
Government-to-Employee (G2E)	-Cost saving -Improving productivity	Mofleh *et al*., 2009).
Government-to-Government (G2G)	-Improve government efficiency -Increase employee productivity -Better returns on ICT investment	Siau & Long, 2005; Mofleh *et al*., 2009.
Government -to-Business (G2B)	-Interaction with government organisations electronically. -Payments of services rendered can be processed online	Fang, 2002

In this study, the researcher is of the view that e-Government will make the municipality and other government institutions more efficient, transparent and enable government information and services to be delivered to citizens much easier and faster. It will no longer be necessary for citizens to go and make payment of water and electricity bills at the municipal offices. Moreover, citizens can do payment anywhere and anytime using gadgets such as Cell phones and Computers. This method of doing transactions online will also eliminate fraud and corruption which is currently a problem at municipalities. Furthermore, the researcher identifies e-Government benefits as follows:

a) Reduction of transport cost. For example, citizens who are residing far away from the municipal offices will save on transport cost.

b) Elimination of stress. For example, citizens will reduce time spent queuing at the municipal offices waiting to pay water and electricity bills.

c) Reduction of fraud and corruption. For example, payment will be deposited into the municipality's Bank Account instead of paying directly to the cashier at the municipal offices.

In view of that, all the benefits presented in this study make sense to the researcher and are important, however the researcher has selected the category of Government to Citizen (G2C) as the best or most important one and most suitable for this research because the research is targeted to citizens. The next section discusses the readiness, adoption, acceptance, impacts and successes of e-Government services.

2.4 READINESS

e-Government in South Africa has a particularly important historical and social context due to the legacy of apartheid (Trusler, 2003). Trusler (2003) and Chen (2006) identify a gap between the plan

and what the policy says should be happening. This gap could be attributed to lack of government capacity to meet the policy objectives. These could include a high level of inequality amongst the citizens; a weak ICT infrastructure (particularly in rural areas); a general lack of government ICT readiness; and other (apparently) more pressing demands in the public service which make ICT development a lower priority. The gaps in policy can be considered as inhibitors of success in e-Government implementation and as such, the government can be considered not ready for e-Government. E-readiness is addressed by improving IT infrastructure to support the country's economy; initiate e-Government, e-learning and e-health; improve productivity at low additional cost; set up standards and guidelines for national networks and develop a security framework to preserve the characteristics of Saudi society in a digital age. In light of this, in 2005, the Saudi government created 'Yesser', an e-Government program designed to achieve continuous growth and development within the government (Al-Smmary, 2005).

2.5 ADOPTION

Tung and Rieck (2005) used Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DOI) to study e-Government services adoption by business such as (G2B) in Singapore.The findings showed that increased awareness of e-Government services, security, and quality of services may lead to a higher adoption of e-Government services rate. So, it showed that the more effective and secure online transactions will encourage more customers to use e-Government systems to accomplish their business with government. Thereby understanding the motivation and benefits for citizens and business organisations in using e-Government service is important for the success of any e-Government initiative and will increase the usage of online government services. The results of this study can be used as a guideline for government to develop available services and to improve the potential of their e-Government systems.

According to Agarwal *et al*. (1999), the TAM seems to be the most widely used by IS researchers, perhaps because of its parsimony and the wealth of recent empirical support. The relevance of the TAM for e-Government has been emphasised in recent literature (Karavasilis *et al.,* 2010).

Carter and Belanger (2004) studied citizens' adoption of e-Government services based on an integrated model of the TAM and DOI using a questionnaire that was distributed to 140 undergraduate students in the US. The findings revealed that perceived usefulness, relative advantage, and compatibility were significant in increasing citizens' intention to use e-Government services.

2.6 ACCEPTANCE

Kanat and Ozkan (2009) developed a conceptual model based on the theory of planned behaviour (TPB) and trust factors to study the acceptance of e-Government services by 48 citizens in Turkey. The study explored the influences on citizens' adoption of government online services and it was found adoption is impeded by the lack of infrastructure, lack of understanding of citizen needs, and a lack of trust and privacy.

2.7 IMPACT

Hung, Chang and Yu (2006) investigated the public's acceptance of an online tax filing and payment system (OTFPS), an e-Government service in Taiwan. Based on TPB model the study found that perceived usefulness, ease of use, perceived risk, trust, compatibility, external influence, interpersonal influence, self-efficacy, and facilitating conditions were critical factors in the adoption of OTFPS.

In another study, Gilbert, Balestrini and Littleboy (2004) utilised a combination of (DOI), TAM, and service quality theories to study the reasons behind the use and adoption of e-Government services. They reported e-Government adoption barriers to be end users' attitudes towards online trust relationship establishment, security of financial data, and quality of information provided, and time and money as adoption benefits factors in predicting potential use of e-Government.

Schaupp, Carter and McBride (2010) studied US taxpayers' intentions to adopt e-file system and employed an amended UTAUT model with trust factor. The findings confirmed the significant role of trust which affected taxpayers' intentions to use the e-file system.

2.8 SUCCESS

e-Government successes in South Africa. The Independent Electoral Commission (IEC) successfully developed an e-procurement system that allows for open and transparent bidding of government tenders aimed at preventing corruption. Moreover, the IEC leverages tools of multi-access to promote free and fair elections. In 2004, for example, IEC, in partnership with cell phone service providers, enabled voters to short message service (SMS) their identity number, and in return receive a message back indicating their eligibility to vote and the voting station's details. Moreover, a satellite-enabled network made it possible for the commission to register voters; relay, collect and verify ballots and relay results across the country. Custom-designed handheld scanners captured information from bar-coded ID books and greatly streamlined the process of voter registration.

The other successful e-Government project is the South African Revenue Services' (SARS) e-filing system which provides a way to conduct transactions related to tax returns on the internet between government and business. The National Traffic Information System (ENaTis) an e-Government initiative that is used for the application for driving licenses and the registration and licensing of motor vehicles; notification of change of ownership/sale of motor vehicles and application for learners licenses has been a successful project. The transactions and services can be provided by most transport offices across the nine provinces in the country (National Traffic Information System, 2008).

In addition to the above, some of the most basic requirements for successful e-Government implementation include the following (Lenk & Traunmüller, 2001):

a) That there should be robust ICT infrastructure in place.

b) Informed and appropriate legal, institutional, and regulatory frameworks.

c) ICT-literate citizenry in order for them to engage in e-Applications (e-Participation – usage of ICTs to engage in various e-Applications).

d) Good political will be evidenced by the putting in place of relevant ICT policies.

e) The willingness of the different government departments to seamlessly integrate their public service delivery networks.

In this research study, overall, the six critical success factors were identified as:

a) implementation of some form of e-Government system that can ensure timely and effective processing of documents;

b) provision of basic ICT skills to employees of municipalities;

(c) implementation of ICT training programmes to support life-long reskilling;

(d) need for e-connectivity;

e) support for anytime and anywhere access to information;

(f) institutionalisation of a new paradigm of service delivery under the slogan; "improving service delivery through ICTs". To some extent, these critical success factors are aligned to the three sub-indices of the UN e-Government Development Index (EDGI), namely: the online service index (OSI), the telecommunication infrastructure or the human capital index (HCI). However, in the case of South Africa's local government, the Telecommunication Infrastructure Index (TII) should be viewed from the provision of basic internet connectivity, while for HCI, it is critical that the provision of ICT skills is contextualised and sustainable. There is evidence that past initiatives relating to ICT skilling have failed (Pillay, 2012).

2.9 E-GOVERNMENT ADOPTION AND DIFFUSION

e-Government adoption can be divided into individual and organisational factors. Warkentin, Gefen, Pavlou and Rose (2002) posit that data security, accessibility and perceived confidentiality greatly influence individual adoption of e-Government. Apart from organisational factors, individual beliefs of citizens have a significant influence on the adoptionof e-Government services (Titah & Barki, 2006). The different studies have identified different factors such as cultural, individual and organisational factors that may influence the adoption of a technology in any given area.

Warkentin *et al*. (2002) proposed a conceptual model of e-Government adoption with citizen trust as the underlying catalyst for adoption. By examining online tax services, one of the most widely uses of online services in various countries, the authors proposed a number of ways to enhance citizen trust in these e-Government services. Institution-based trust, such as on fair and independent judicial systems, is considered to be a major factor in building trust in e-Government. For new users of online government services, a lifelong social disposition to believe in the system and to trust others, along with the same set of expectations for all parties, can institute trust. The nature of previous experiences with e-Government will also be a major source of trust for experienced users. Other variables in the conceptual model that Warkentin *et al.* (2002) propose are perceived risk, perceived behavioural control, perceived usefulness, and perceived ease of use. Cultural variables such as power distance and uncertainty avoidance make up other variables in the model. In the study, perceived risk is defined as a fear of losing personal information and fear of being monitored on the internet. Perceived risk is negatively related to adoption.

Some of the notable e-Government initiatives that have been put in place in South Africa include e-Filing, a tax service used by the South African Revenue Service (SARS) (Kayseri & Pather, 2008); the Cape Gateway portal presented in three languages, namely English, Afrikaans and IsiXhosa, which offers government information online; and the Judicial Inspectorate of Prisons, the South African Department of Correctional Services and the Home Affairs National Information Systems (HANIS) where citizens can access birth and death registration forms online (E-Business Handbook, 2005).

2.10 E-GOVERNMENT ASSESSMENT MODELS/TOOLS/FRAMEWORKS

Accessing electronic government readiness (EGR) leads to the investigation of a country's overall e-Readiness (Kovacic, 2005). Defined broadly e-Readiness, is "the degree in which a community is qualified to participate in the networked world" (Budhiraja & Sachdeva, 2002).

A thorough investigationof 18 e-Readiness models identifies five key categories of assessment criteria: IT infrastructure,human resources, policies and regulations, environment and e-Government. E-Government depends on many factors such as Information Technology and Communication (ICT) access and availability, ICT affordability, ICT quality and reliability, electrical power supply and government public service delivery systems. E-Readiness provides an indication of whether a country is ready to participate in the networked and information society or not (Mutula & Van Brakel, 2006).

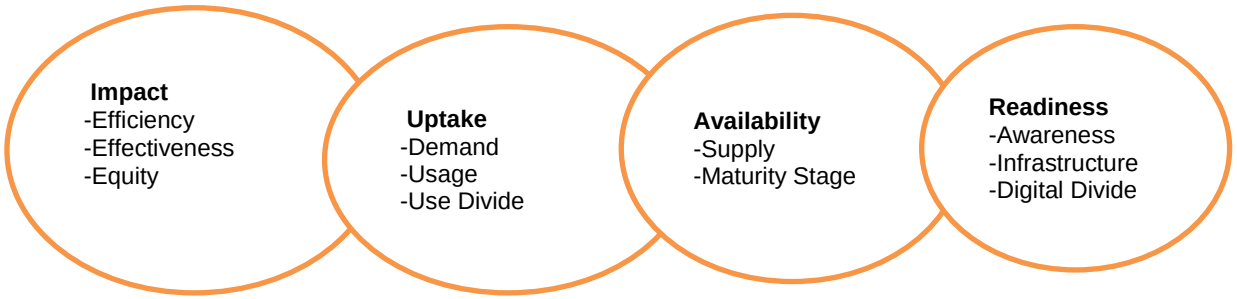


Figure 2.1: Changing e-Government Issues Over Time. Source: Heeks, 2006)

2.11 ADOPTION MODELS AND FRAMEWORKS

2.11.1 Rogers Diffusion of Innovation Theory

The diffusion of innovation theory (Rogers, 1983; Rogers, 1995) asserts that innovation adoption is influenced by:

a) Relative Advantage which is the degree to which an innovation is perceived better than the idea it supersedes,

b) Compatibility which is the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the needs of potential adopters.

c) Complexity referring to the degree to which an innovation is perceived as difficult to understand and use,

d) Trialability being the degree to which an innovation may be experimented with limited resources, and

e) Observability as the degree to which the results of an innovation are visible to others. The easier

it is for individuals to see the results, the more likely they are to adopt the change or innovation. The visibility is perceived to stimulate peer discussion of a new idea as friends and neighbours of an adopter often request innovation evaluation information about it.

It is emphasised that better perceptions of these innovation factors translate into better chances for a successful adoption (Rogers, 1995). An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. The Organisation for Economic Cooperation and Development (OECD) (2010) defines innovation in the public sector as "new or significantly improved deliverables, ways of working or other initiatives that seek to improve or create new public sector activities". Innovations in public services are widely viewed as necessary for improvement in performance and meeting the challenges of the budget constraints which many countries faced as a result of the economic downturn. e-Government is one type of innovation in the public sector, which gained supporters among national governments and spread across economies at various stages of development. It is not only a way to make public services less expensive and more accessible, but is now viewed as underpinning innovation and change (OECD, 2009a). The diffusion of innovation theory suggests that innovation-decision adoption follows a five step process (Rogers, 1995) of:

a) Knowledge; here the person becomes aware of an innovation and some ideas of how it functions but perhaps lacks complete information about it;

b) Interest; this is where persuasion takes place, a person becomes interested in the new idea and seeks additional information which may lead to a favourable or unfavourable attitude towards the innovation;

c) Decision; here, an individual mentally engages in the activities and applies the innovation to his/her present and anticipated future situations and then decides to adopt or reject the innovation;

d) Implementation: this is a trial stage where an individual takes a positive decision, adopts the new idea with a view to making full use of the innovation, and

e) Confirmation: here, an individual evaluates the results of the implementation and if acceptable then opts to continue the full use of the innovation.

2.11.2 Theory of Reasoned Action (TRA)

According to the TRA, a person's performance of a specific behaviour is determined by the person's behavioural intention to perform the behaviour, and behavioural intention is jointly determined by the person's attitude and subjective norm concerning the behaviour in question (Lippert & Davis, 2006). The TRA uses a two-step process to identify and measure relevant beliefs about an innovation. The first step involves identifying the beliefs around the behaviour towards the innovation, followed by

an assessment and weighted multiplicative scaling of the beliefs (Agarwal, 2000).

Ajzen (1991) identified the limitations of this model as including a significant risk of confounding between attitudes and norms since attitudes can often be reframed as norms and vice versa. Furthermore, the theory is based on the assumption that when someone forms an intention to act, they will be free to act without limitation irrespective of the person's freedom to act in accordance to the intentions.

2.11.3 Theory of Planned Behaviour (TPB)

This is an extension of the TRA model (Matheison, 1991; Taylor & Todd, 1995; Kumar *et al.*, 2006), developed by Ajzen and Madden (1986). In addition to TRA, the TPB model includes the variables of "perception behavioural control" which scales a person's perception of control over preferring a given behaviour, (the intention to adopt a specific technology is determined by users' attitude, their subjective norms, and perception behavioural control). TPB has been proved to be reliable in predicting and explaining user behaviour in several applications (Taylor & Todd, 1995; Housenblas *et al.*, 1997; Chang, 1998; Johnson *et al.*, 1999). However, Taylor and Todd (1995) extended this theory and created a decomposed TPB model.

2.11.4 Technology Acceptance Model (TAM)

e-Government can use ICT to improve their services to and relations with citizens, businesses and other arms of government. Many of these technologies can serve a variety of different goals, such as better service delivery to citizens, improved interactions with business and industry, citizen empowerment through accessibility of information and more efficiency in government management. The resulting benefits can be less corruption, increased transparency, and increased convenience for citizens, increased revenues as well as cost reductions. TAM was developed by Davis (Davis *et al.*, 1989). Just like the TRA, TAM has several attributes such as Perceived Usefulness (PU) which refers to the degree to which a person believes that using a particular system would result in enhanced job performance and Perceived Ease of Use (PEOU) which is the degree to which a person believes that using a particular system would be free of effort. TAM argues that users could choose to adopt a specific technology based on individual cost benefits considerations (Compeau *et al.*, 1999). Here the users' decision to use a particular system involves the beliefs that external variables (e.g. individual abilities) indirectly influence technology use through the impact on PEOU and PU. Both PU and PEOU affect the users' attitude towards technology, which in turn influences the intention to use the technology(Mathieson *et al*., 2001).

2.11.5 Technology Infusion Matrix

Technology Infusion Matrix (Bitner *et al.*, 2000) posit that technology when used by providers can make employees more effective and or efficient; similarly technology can be used by customers to drive services and counter substitution. In this instance technology supports customers who actually provide the service for themselves, for instance the use of automated teller machines (ATMs).

2.11.6 Information Technology innovations

Diffusion according to Rogers (1995) is a special type of communication concerned with the spread of messages perceived as new ideas. Diffusion study by Prescott and Conger (1995) reveal that factors affecting the diffusion process are centered on (a) innovation characteristics, (b) communication, (c) innovation diffusion process, (d) time and (e) social systems. The study assumes a process of innovation adoption within an organisation were decisions are made at an organisational management level to bring technology; hence primary adoption takes place which is then followed by the actual introduction of technology into the organisation where it is subsequently adopted by users. At this level, secondary adoption takes place, the adoption in this model is in threefold, namely:

a) Innovation adoption by all users is made mandatory;

b) The necessary infrastructural support for users to adopt the innovation is provided whilst allowing the innovation diffusion to take a voluntary course;

c) Innovation is targeted through specific pilot projects within the organisation, this affords implementers the opportunity to study the diffusion patterns, processes and outcomes as they unfold and decide whether to implement the innovation broadly or in a fragmented manner.

2.11.7 Innovation diffusion theory (IDT)

Innovation diffusion theory (IDT) was established by Rogers in 1962. There are two dimensions for judging the states of IT/IS diffusion in enterprises: width and depth. While studying the diffusion of software engineering technology the IDT also notes that technological innovation is communicated over time amongst different members of a social system or grouping. Rogers described “diffusion” as the process by which an innovation (new-idea, object or practice) is communicated over time amongst different members of a social system or grouping. Diffusion of innovation consists of four elements, namely: the innovation, communication channels, time and the social system (Roger, 2003).

2.11.8 Innovation-Diffusion Stages

The innovation-diffusion process takes the citizen (or a community of citizens) through five stages, beginning with the acquisition of background knowledge about an innovation, to the establishment of attitudes towards the innovation, accepting or rejecting the decision, implementation of the innovation, and confirmation of that decision (Rogers, 2003).

2.12 TASK-TECHNOLOGY-FIT (TTF)

Fuller and Dennis (2004) cited that the Task-Technology-Fit theory (TTF) model was originally developed in the context of organisational systems as a way to evaluate the overall information systems and services provided in an organisation (Goodhue, 1995). The technologies of interest in these studies were often large, transaction processing systems. Therefore, the technologies were somewhat limited in their malleability; flexibility was found to be a problematic factor in some studies of TTF (Goodhue, 1998). Although individuals probably had some degree of flexibility in their behaviours to perform work tasks, the technology features available to them were rather inflexible. Therefore, for performance in transaction oriented environments where the technology provides few options to support alternative methods of working on the task (i.e. limited malleability), the degree of fit will be very important for performance.

Task-Technology-Fit (TTF) is an established theoretical framework in information systems research that enables the investigation of issues of fit of technology to tasks as well as performance. One significant focus TTF has been on individuals to assess and explain information systems' success and impact on individual performance (Goodhue & Thompson, 1995). Goodhue and Thompson (1995) propose the technology-to-performance chain where characteristics of Information Technology (IT), tasks and individual users explain information system use and individual performance. From an education perspective, McGill, Klobas and Renzi (2011) used the TTF model to demonstrate that "the better the fit of learning management system (LMS) to the skills of an instructor and the tasks that the instructor must complete, the more positive its effect on their performance is likely to be". Raven, Leeds and Cho (2010) applied a TTF model to the use of digital video tools for oral presentation in the classroom; they found "a significant fit between digital tools (technology) and improvement of oral presentation skills (task)".

Goodhue (1997) defines Task-Technology-Fit as the degree to which a technology assists an individual in performing his or her tasks. More specifically, it is the fit among task requirements,

individual abilities and the functionality and interface of the technology (Goodhue, 1997). TTF is an excellent model for developing a diagnostic tool for information systems and services. A variety of studies have confirmed the validity of the TTF in evaluating information systems in general (Goodhue, 1992; Goodhue, 1995; Goodhue, 1998; Goodhue & Thompson, 1995), for mobile technologies (Gebauer, Shaw & Gribbins, 2005).

According to York University (2010), Task-Technology-Fit theory holds that IT is more likely to have a positive impact on individual performance and be used if the capabilities of the IT match the tasks that the user must perform (Goodhue & Thompson, 1995). Goodhue and Thompson (1995) developed a measure of Task-Technology-Fit that consists of 8 factors: quality, locatability, authorisation, compatibility, ease of use/training, production timeliness, systems reliability and relationship with users. Each factor is measured using between two and ten questions with responses on a seven point scale ranging from strongly disagree to strongly agree. Although the Goodhue and Thompson (1995) model operates at the individual level of analysis, Zigurs and Buckland (1998) present an analogous model operating at the group level. Since the initial work, TTF has been applied in the context of a diverse range of information systems including electronic commerce systems and combined with or used as an extension of other models related to IS outcomes such as the technology acceptance model (TAM). The TTF measure presented by Goodhue and Thompson (1995) has undergone numerous modifications to suit the purposes of the particular study. Zigurs and Buckland (1998) proposed a theory of Task-Technology-Fit in the context of group support system effectiveness and found empirical support for this theory (Zigurs *et al.*, 1999).

The TTF is graphically presented in Figure 2.2 below.

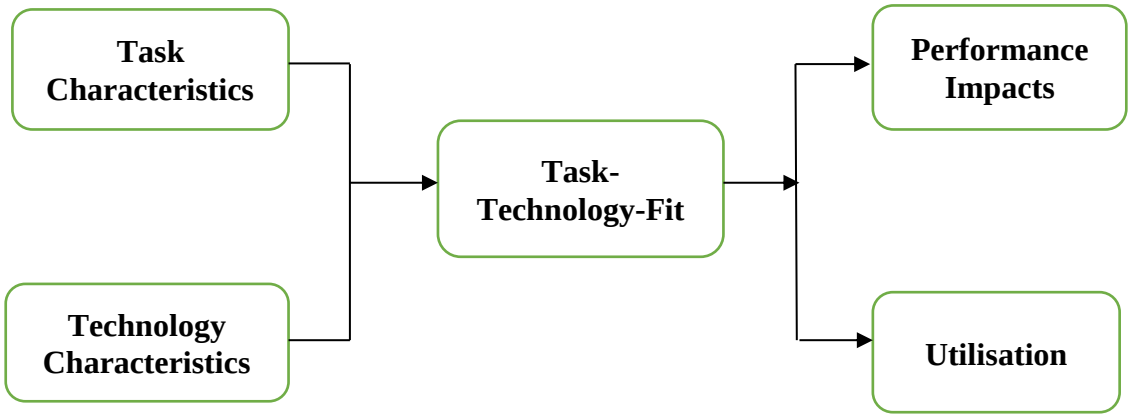


Figure 2.2: The TTF model. Source: Goodhue and Thompson (1995)

Goodhue and Thompson (1995) explain the determinants of the TTF model as follows:

a) *Task characteristics*. These are activities carried out by individuals in turning inputs into outputs.

b) *Technology characteristics.* These are the tools used by individuals in carrying out their tasks.

c) *Performance impacts.* This relates to the accomplishment of a portfolio of tasks by an individual.

2.13 LOCAL GOVERNMENT: CONCEPTUAL AND CONTEXTUAL CLARIFICATION

Local government could be described as public organisations authorised to manage and govern the affairs of a given territory or area of jurisdiction (Nyamukachi, 2004). Horak (2006) emphasises that local government is the link between communities and the broader government structure. It is an open system within the larger supra-system of national and provincial government. She further indicates that local government utilises a number of subsystems to accomplish its mandate and is strategically placed in communities to build relationships necessary for service delivery and feedback to broader government.

Local government is a governing institution with authority over a sub-national territorially defined area. Local government is where the majority of interaction between government and civil society occurs (Flak *et al.*, 2005). It only acts within powers delegated to it by directives of the higher level of government and each country has a kind of local government which differ from those of other countries (Ntambirweki, 1998).

Local government as a sphere of government is closest to the people and therefore it must be responsive, responsible and accountable to citizens as governors (in democratic sense), taxpayers, and consumers of public service. According to Atkinson (2002) the importance of local government is based on several key factors. Firstly, local government is intrinsically multisectoral. It is the only sphere of government that has the mandate to bring together the variety of sectoral issues within developmental policies, programmes and projects. Secondly, local government, as mentioned, is closest to the people. This often-used phrase has several aspects. Municipal offices are often simply geographically closer to residents than other spheres of government such as the provincial and national sphere and, especially for poor people, such offices are often easier to reach. People participate most in their locality and around local issues and therefore, local government is an ideal space for the extension of public participation.

Local government also plays a critical role in improving the lives of the communities and therefore there must be a system in place that clarifies roles and responsibilities of all structures that deal with public participation. According to Shah and Shah (2006), good local governance is not just providing

a range of local services but also about preserving the life and liberty of residents, creating space for democratic participation and civic dialogue, supporting market-led and environmentally sustainable local development, and facilitating outcomes that enrich the quality of life of residents. Community participation is therefore the most important part of effective and accountable governance at local level. It is also clear that public participation is not a top-down phenomenon, as one cannot determine the participation programme at national level, plan it all the way to the bottom, and then tell the community what to do. Public participation is a community-driven process.

2.14 CHAPTER SUMMARY

This chapter defined the e-Government concept as e-Government has become a popular focus of government efforts in many developing countries around the world. More and more governments around the world have implemented and introduced e-Government systems as a means of decreasing costs, improving services, saving time and increasing efficiency and effectiveness in the public sector. The benefits and e-Government models has been explained. The next chapter 3 will discuss the success measurement of technology in organisations.

CHAPTER THREE

SUCCESS MEASUREMENT OF INFORMATION SYSTEMS/TECHNOLOGY IN ORGANISATIONS

3.1 INTRODUCTION

Chapter 2 thoroughly discussed the e-Government concepts and benefits. This chapter present the information system/technology success measurement models, comparisons of the different information system success measurement models, existing e-Government assessment approaches. The chapter further discusses the different information system models that are relevant to the study and drill down to the dimensions of the DeLone and McLean's model in order to justify the application of the model on information system success as relevant for this particular study.

3.2 INFORMATION SYSTEM (IS) SUCCESS MEASUREMENT MODELS

Numerous models relating to information system or technology success have been proposed along with those elements that influence information system success. To measure the success of these various IS, organisations are moving beyond traditional financial measures, such as return on investment (Rubin, 2004).

3.2.1 The 1992 DeLone and McLean's Information Systems success model

The initial model that was published in 1992 was developed because of a collection of previous studies conducted on information systems success. The usage of the model has advantages as it can be used to measure the success of the entire information system. The dimensions contained in the original model are as follows:

a) System quality: which measures information processing system;
b) Information quality: which measures information system output;
c) Use: users' usage of an information system;
d) User satisfaction: the use of the productivity of an information system;
e) Individual impact: measuring the impact of information system on an individual's behaviour; and organisational impact: measuring the impact of information systems on organisational performance.

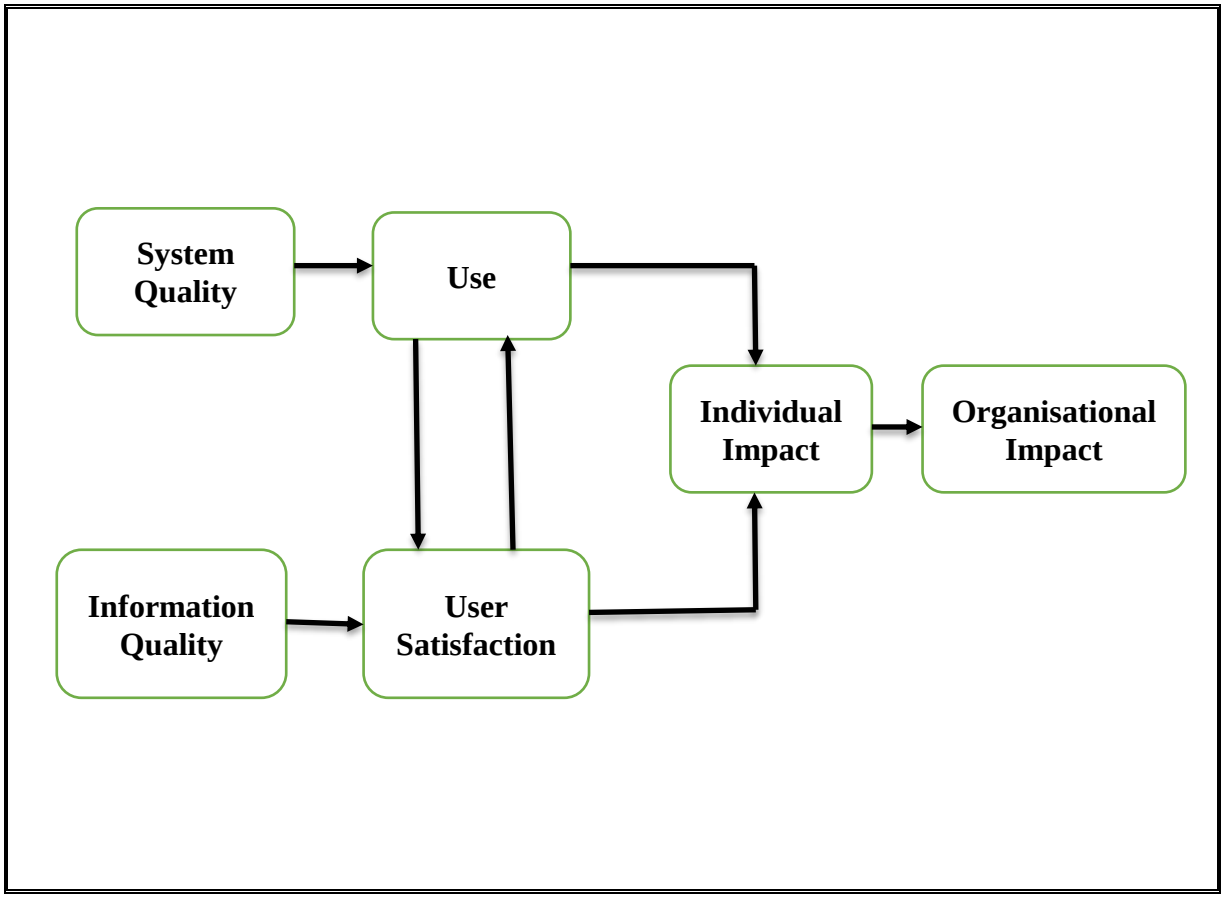


Figure 3.1: DeLone & McLean's IS Success Model (adapted from DeLone & McLean (1992)

According to DeLone and McLean (D&M) (1992), these six dimensions of IS success should be incorporated into any model of IS success. The D&M model can be interpreted as follows: system quality and information quality singularly and jointly influence both use and user satisfaction; the frequency of use can influence the extent of user satisfaction (positively and negatively). Furthermore, use and user satisfaction are direct antecedents of individual impact; lastly, this impact on individual performance will eventually have an impact at organisational level.

3.2.2 Re-specified model of IS success (adapted from Seddon (1997)

Seddon (1997) is one of the first researchers to critique D&M IS success model and propose an alternative model. A related model, as shown in Figure 3.2 below, proposed by Seddon (1997) consists of the following categories of measures of IS success: system quality, information quality, perceived usefulness, user satisfaction and IS use. Seddon (1997) views IS use to be a behaviour and not a measure of IS success. This definition of IS use means it is seen as an outcome of IS success rather than part of success.

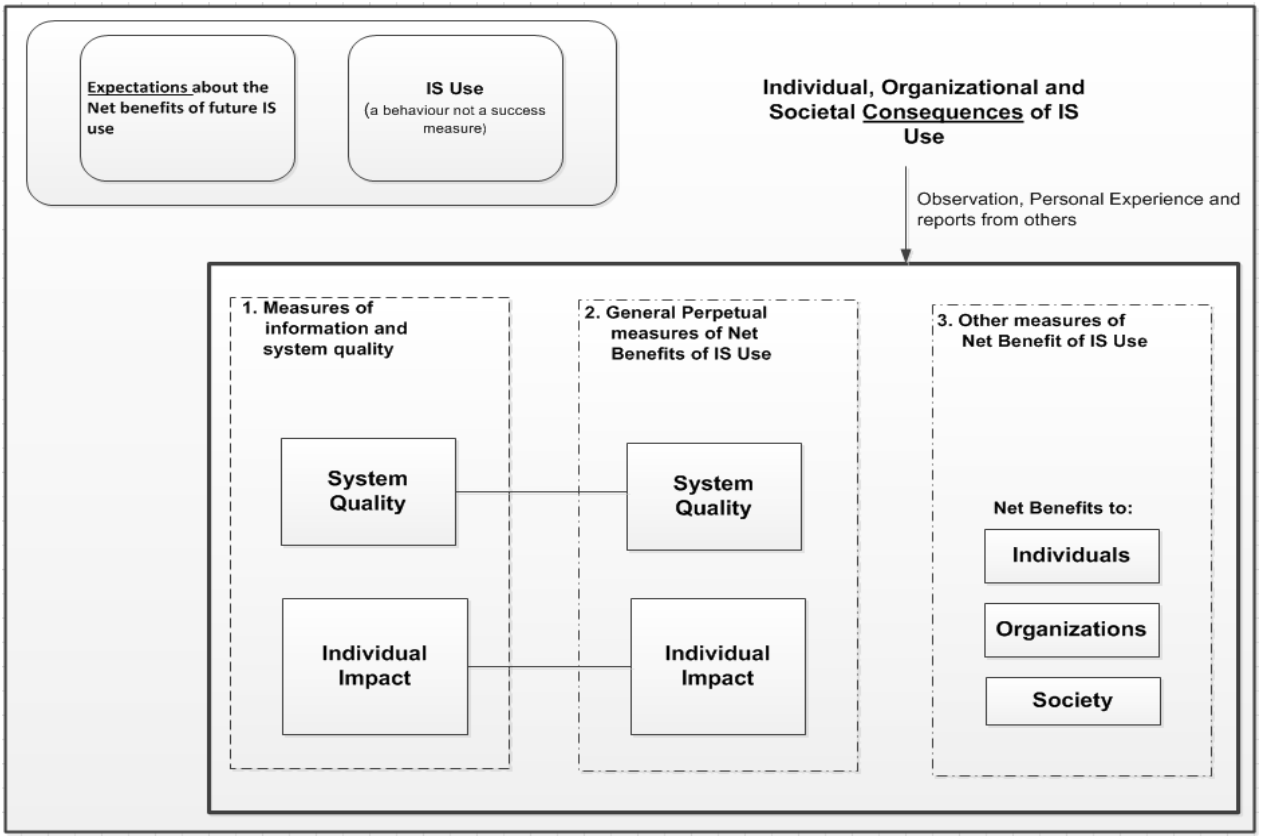


Figure 3.2: Re-specified model of IS success (adapted from Seddon (1997)

Rai, Lang and Welker (2002) conducted a study to theoretically and empirically assess Delone and McLean's (1992) and Seddon's (1997) models of IS success. Their study validated the importance of using integrated and multiple construct for measuring IS success. Rai *et al.* (2002) concluded that both models are valid and have merit for evaluating IS Success.

3.2.3 Delone & Mclean's updated IS success model (adapted from Delone & Mclean 2003)

A decade later after developing the original model of IS success, D&M (2003) proposed an updated model to extend, validate and strengthen the original one. The updated model described the relationship between the six dimensions. In this study, the DeLone and McLean's model was considered to measure the success of information systems in an organisation. According to Heo and Han (2003), DeLone and McLean have been cited in over 300 publications worldwide. This proves that their model is reliable and successful. The updated DeLone and McLean's model identified six interdependent variables used to measure information systems' success, namely; system quality, information quality, service quality, use or intention to use, user satisfaction and net benefits.The updated model is presented in Figure 3.3 below.

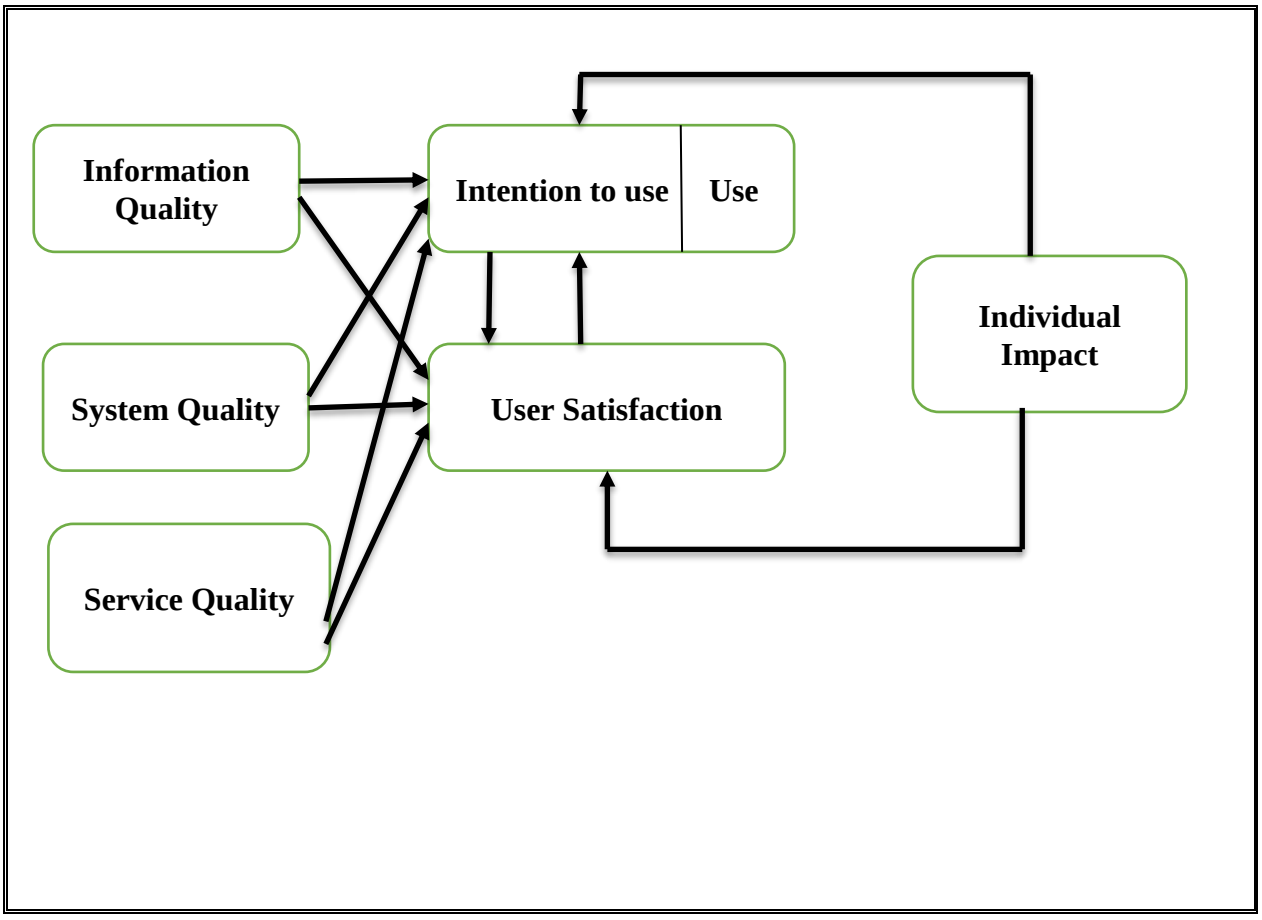


Figure 3.3: Delone & Mclean's updated IS success model (adapted from Delone & Mclean 2003)

3.2.3.1 Information quality

Information on its own is useful. However, with the increase in the quantity of information produced, the quality of the same information becomes very crucial. Information quality is one concept that has been thoroughly researched in the fields of information science and information systems (Arazy & Kopak, 2011). The definitions of information quality depend on how the concept is used as there is no generally agreed upon definition from different authors. Prior discussions on the issue of information quality focused on the underlying attributes such as accuracy, completeness, presentation and objectivity. Emphasis is put on the user or individual's judgment of how good and useful the information is (Hilligoss & Rieh, 2008). The perception of users or information consumers on the quality of information differs and it is also viewed in the order of importance. According to Wang and Strong (1996), information quality is defined as the fitness for use of information. The quality of the information residing in an information system is determined by whether it is fit for the intended purpose or not. These sentiments are shared by Eppler (2006) who further explored the duality of the concept by defining it as the point at which the information meets the expectations of a user.

The definition of *fitness for use* will be used due to its relevance to this particular research. The process of ensuring that the information is of good quality is beneficial for organisations. Information quality is a very important component that is seen to encourage user satisfaction. Accuracy, completeness, relevancy, timeliness and format of the information are the most recognisable components of information quality (Petter, DeLone & McLean, 2008).

Accuracy as an information quality component relates to the correctness of the information provided by an information system and the impact it has on user satisfaction. Most importantly, the information residing in an information system should be precise to ensure that a user is able to make correct decisions or complete tasks. Information completeness is equally important as it demonstrates the comprehensiveness of the information located in an information system. Information needs to be relevant at all times as this shows that the information required by the users is exactly the same as what the information system provides. Another important element of information quality is timeliness, which reflects that the information in the information system is up to date.

3.2.3.2 System quality

System's quality is the anticipated characteristics of a particular system to create information that should be utilised by users and decision makers (DeLone & McLean, 2003). The quality measure of a system plays a significant role in the internal efficiency and has strategic benefits in an organisation. Most researchers in the information system field measured system quality according to the accessibility of the system, accuracy of the data, ease of use, response time, reliability, contents of a database, response time and the extent to which the system is reliable. Systems quality can also be measured according to the extent to which users find: the system to be reliable, easy to learn and use and easy to understand the interface of the system. System quality is concerned with the overall performance of a system.

3.2.3.3 Service quality

Quality issues in organisations are becoming strategic issues in management and decision making. Service quality can be measured according to the service performance and the level of the expected service. SERVQUAL is an instrument that was developed to measure service quality in the marketing field. The instrument focused on measuring service quality of Information Technology Departments and neglected to measure the user expectations and their perceptions of the IT Department. Researchers who evaluated the DeLone and McLean's model suggested that service quality should be included in the model (Pitt, Watson & Kavan, 1995).

Jiang *et al*. (2000) validated the suggestion to add the service quality dimension to the DeLone and McLean's model. The sentiments are shared by Pitt *et al*. (1995) arguing that the research on IS success is product focused and not on measuring service. The focus was mainly on measuring the information technology applications and not on the actual service. According to Petter *et al*. (2008) literature revealed four main dimensions of service quality, namely: assurance, responsiveness empathy and reliability. Assurance relates to how a user perceived knowledge of being able to solve own problems. Responsiveness reflects the fast responses provided by the system when prompted to do so. An empathetic system provides a service according to the user's needs and a reliable system is dependable at all times.

3.2.3.4 Intention to use

The adoption of Use as a means to measure success or effectiveness requires consideration and a response to the following questions: to what extent is the system used; what is the nature and quality of the system being used and lastly is the system appropriate to use?. The full functionalities of the system should be interrogated to ensure that it is used for the intended purpose. Certain constructs of the IS success model were evaluated by another author and highlighted that usefulness is not used as stated on the DeLone and McLean's model (Seddon, 1996). The concept of usefulness is viewed the same way as how the TAM views perceived usefulness. DeLone and McLean maintain that the construct of use should still be maintained as an appropriate measure and not usefulness.

3.2.3.5 User satisfaction

User satisfaction refers to user's attitude towards an information system. Satisfaction in any given condition is how an individual feels or the kind of attitude displayed towards varied factors affecting that particular condition or situation. The attitudes displayed by users as they interact with the EDMS are pivotal in measuring its success or failure to satisfy the expected results. Measuring user attitudes would eliminate any element of preference when measuring the effectiveness of a system (Özkan, Hackney & Bilgen, 2007). However, Davis *et al.* (1989) who believe that user satisfaction is a weak predictor of system usage, do not share the same sentiments. This is due to the fact that beliefs and attitudes about items such as information systems are poor predictors of behaviours. The TAM model predicted usage by connecting behaviours to attitudes and beliefs (ease of use and usefulness). The relationship between user participation and user satisfaction has been a discussion point for some time (Özkan, Hackney & Bilgen, 2007). The contention is that involvement or participation of a user

influences their satisfaction with the system. User participation covers many factors, namely:

assessment of user information, providing expertise support, evading development of improper and insignificant features, developing genuine expectations and fostering system ownership by users. The research on the factors has been marred with more confusion disputed by many researchers. The confusion is caused by flawed methodology and poorly grounded theory. Doll and Torkzadeh (1998); Klenke, K., Tait and Vessey (1988) argue that there is huge confusion between the construct of user involvement, participation and influence.

3.2.3.6 Net benefits

DeLone and McLean's 1992 model included individual as well as organisational impact which addressed the immediate user. The reviewed DeLone and McLean's 2003 model replaced the two dimensions with net benefit to measure the effectiveness of a system beyond the immediate user. The question is whether the net benefits are for an organisation or for an individual. The collapse of the individual impact and the organisation impact from the earlier model of DeLone and McLean to the updated one does not provide a solution to the question. The constructs of user satisfaction, use and net benefits are interlinked in the sense that the anticipated net benefit provided by the system encourages the use of the system and therefore user satisfaction will be realised (DeLone & McLean, 2003). In the updated model, the associations of the three constructs are hypothesised as that high use leads to user satisfaction that leads to positive net benefits. There is a link between system quality, information quality and net benefits measurements. More research needs to be conducted to measure the net benefit construct of the model. The user satisfaction and the intention to use constructs are not adequate substitutes for measuring net benefits (Yuthas & Young, 1998).

3.2.4 Wixom and Todd's IS conceptual model (adapted from Wixom & Todd (2005)

Wixom and Todd (2005) proposed another model to evaluate IS success. The model is an integration of two streams of research that measure IS success: user satisfaction literature and user acceptance literature. The model distinguished beliefs and attitudes about the system from those beliefs and attitudes of using the system. The proposed model bridged a gap between user satisfaction and technology acceptance, by integrating these two parallel streams of research. The model as presented in Figure 3.4 below shows the integration of user satisfaction and technology acceptance literature. By combining these two streams of research, Wixom and Todd's model results in the following categories of IS success: information quality, system quality, information satisfaction, system satisfaction, usefulness, ease of use, attitude and intention.

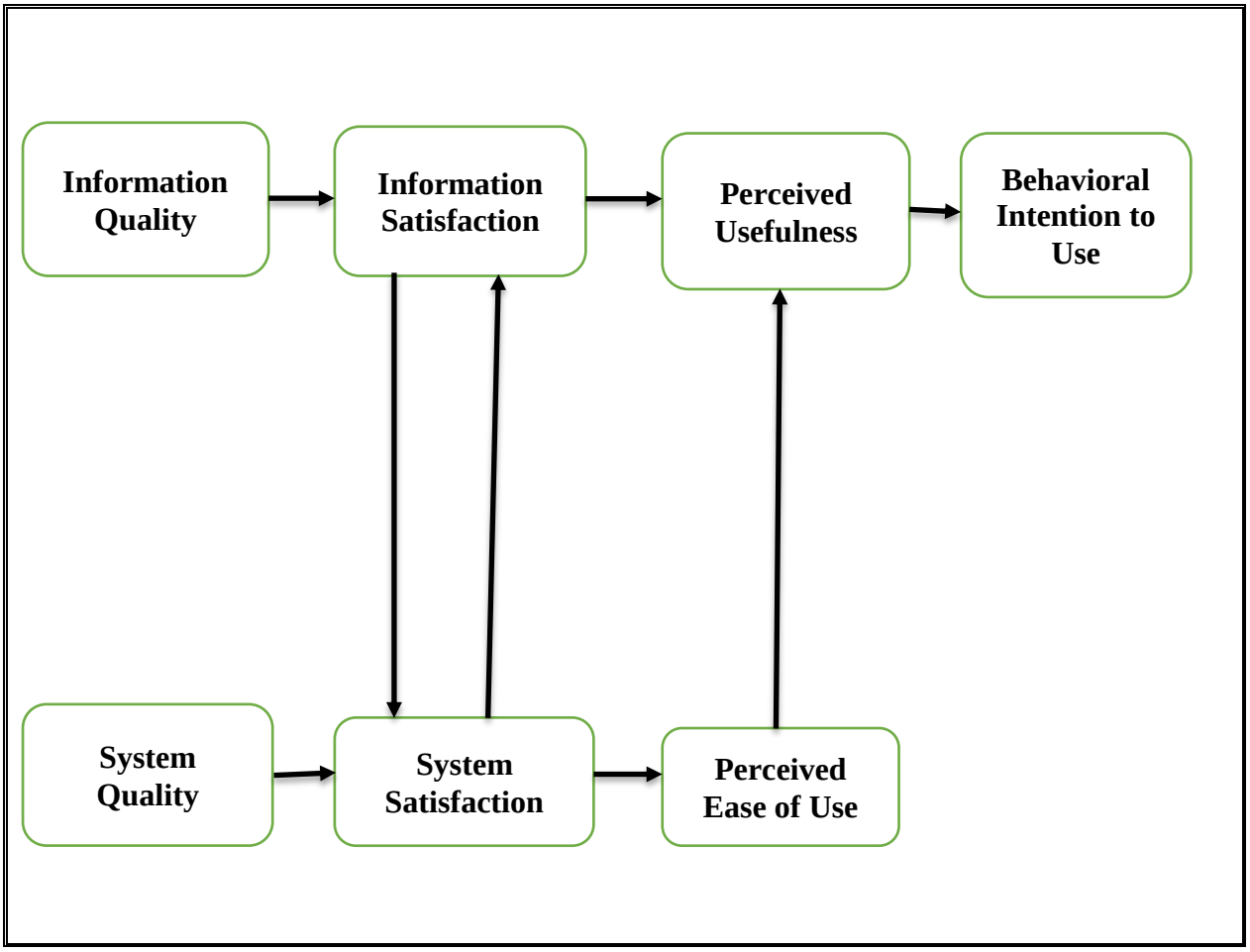


Figure 3.4: Wixom and Todd's IS conceptual model (adapted from Wixom & Todd (2005)

3.2.5 Elpez and Fink's IS success model (adapted from Elpez & Fink (2006)

Elpez and Fink (2006) proposed another model for evaluation of IS success in the public sector. According to Elpez and Fink (2006), evaluation of IS success has mainly been performed in the private sector while IS success in the public sector has been neglected. When designing an IS success model for the public sector, researchers need to take into account public sector characteristics like expenditure control, accountability and long term perspective (Elpez & Fink 2006).

Elpez and Fink (2006) identified the following variables of IS success in order of importance: meeting user requirements, system usability and performance, information quality, use, user acceptance and IS ownership and interaction with IT infrastructure. Public sector characteristics include expenditure control, accountability and long term perspective. The model as presented in Figure 3.5 below, aligns IS success variables with public sector characteristics.

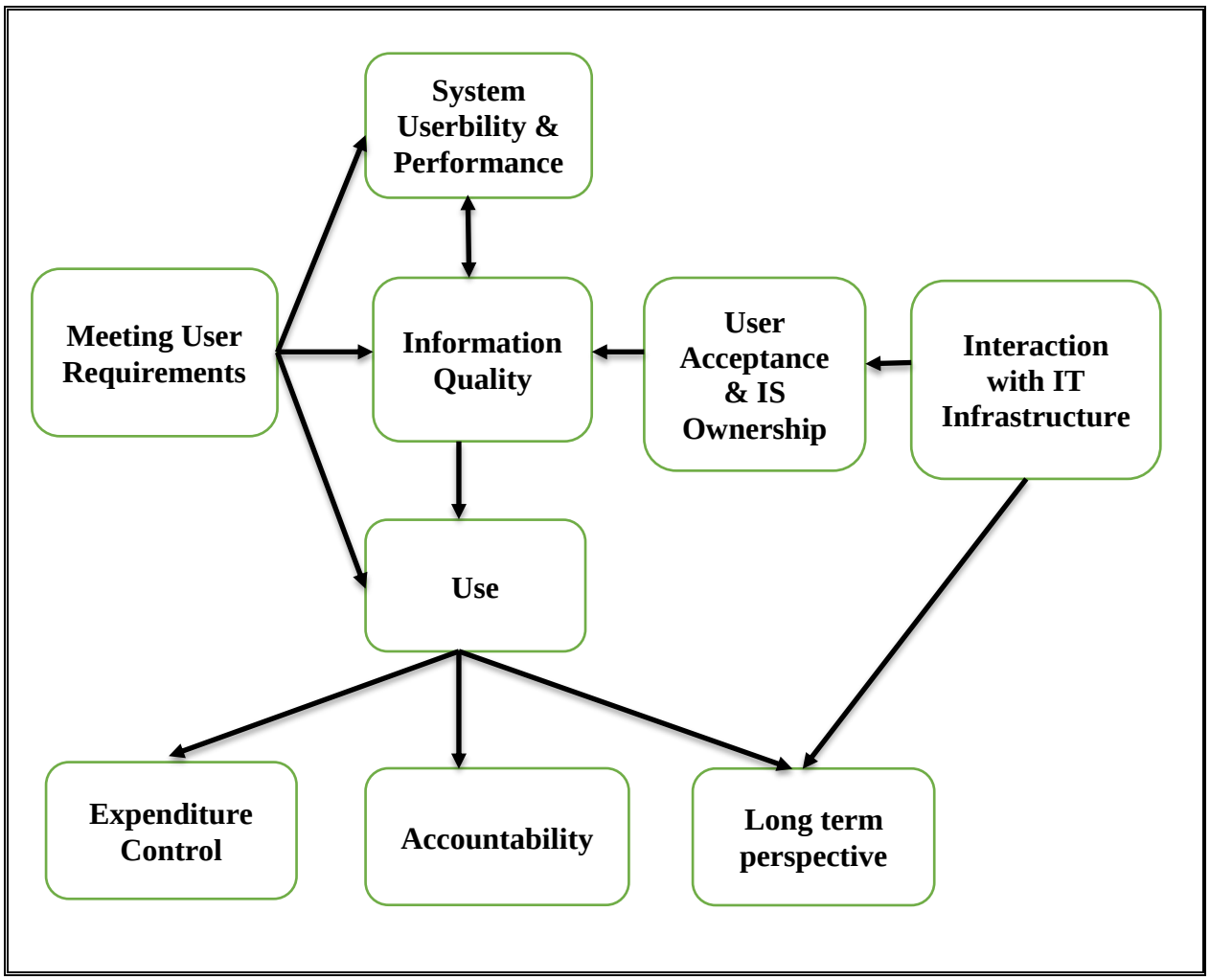


Figure 3.5: Elpez and Fink's IS success model (adapted from Elpez & Fink (2006)

The model for IS success evaluation in the public sector is critical, since the public sector depends on IS to increase its efficiency and effectiveness of delivery of public services (Elpez & Fink 2006). The public sector is heavily reliant on IS to stay efficient and effective and therefore is a major investor in IS (Elpez & Fink, 2006).

3.3 ASSESSMENT OF INFORMATION SYSTEM SUCCESS MODELS

There is a myriad of measurement tools used to measure and assess information system success models. Most of the models namely, use system quality and information quality are used as measure of system success. Various underlying variables of these models are tabulated in Table 3.1 below.

Table 3.1: Summary of Information Systems success models

No	Model	Author	Year	Proposed area of application	Variables included in model
1	DeLone & McLean's IS Success Model	DeLone & McLean	1992	Information Systems	1.System quality, 2.Information quality 3. Use, 4. User satisfaction, 5. Individual impact and 6. Organisational impact.
2	Re-specified model of IS success	Seddon	1997	Information Systems	1.System quality, 2.Information quality, 3.Perceived usefulness, 4. User satisfaction and IS 5. Use.
3	Updated DeLone McLean(D and M)	DeLone &McLean	2003	Information Systems	1. System quality, 2. Information quality, 3. Service quality, 4. User satisfaction, 5. Intention to use and use, 6. Net benefits
4	Wixom and Todd's IS conceptual model	Wixom & Todd	2005	Information Systems	1. Information quality, 2. System quality, 3. Information satisfaction, 4. System satisfaction, 5. Usefulness, 6. Ease of use, and 7. Attitude and intention.
5	Elpez and Fink's IS success model	Elpez & Fink	2006	Information Systems	1. Meeting user requirements, 2. System usability and performance, 3. Information quality, 4. Use, user acceptance 5. IS ownership and 6. Interaction with IT infrastructure.

The following are the common variables identified by the researcher from the IS success models, as depicted in Figure 3.6.

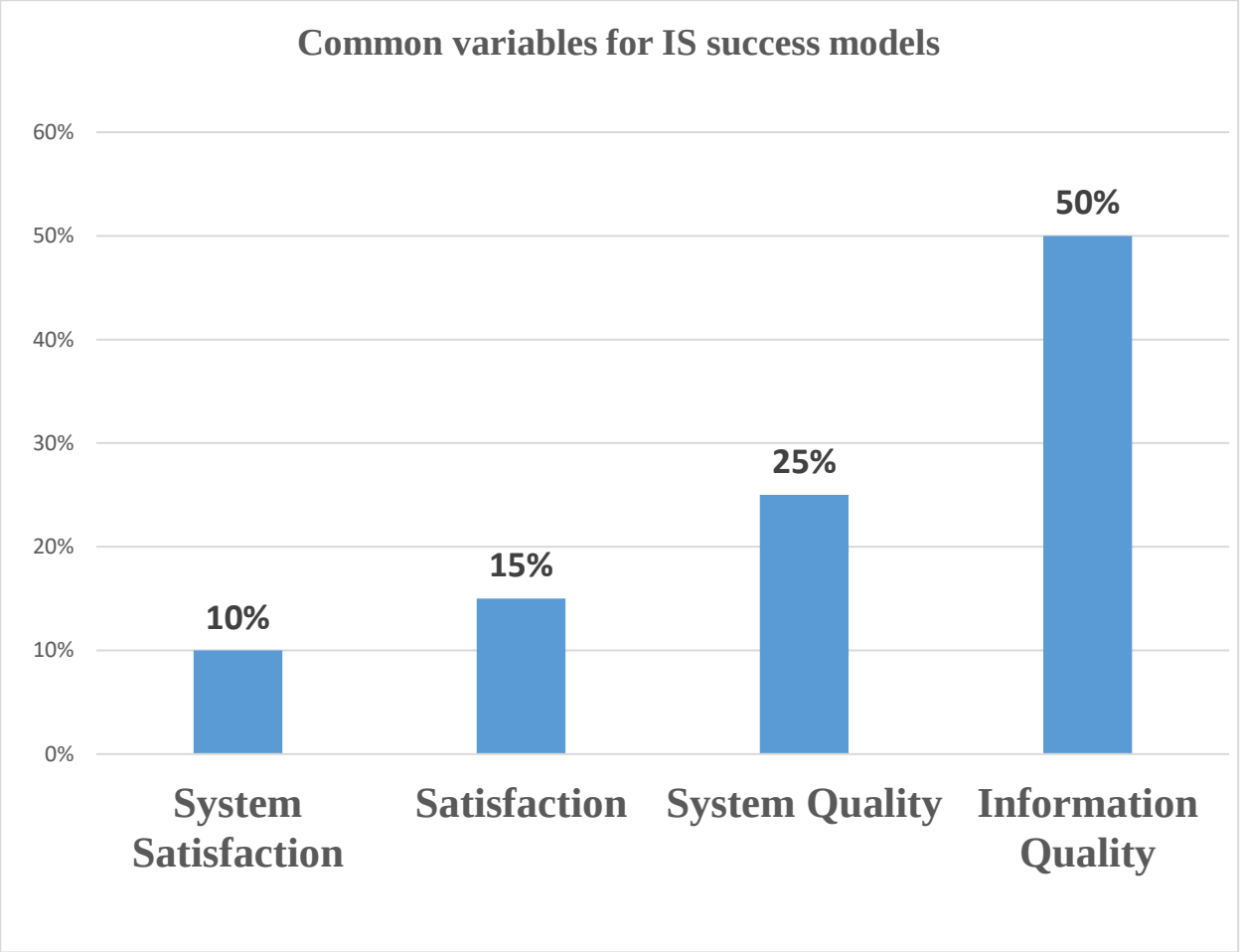


Figure 3.6: Common variables for IS success models

After conducting the literature review, common variables for IS success models were identified. The findings, as shown in Figure 3.6, revealed that 50% of the variables (information quality) is the most important variables used in IS success models.

Information quality and system quality are the main influential elements in the success of any information system. The actual use of the system constitutes a response that affects both individuals and organisation. Information quality is measured based on accuracy, timelines, completeness, relevance, and consistence. Meanwhile, system quality is measured according to ease-of-use, functionality, reliability, and flexibility. It is revealed that 25% of the variables (system quality) is the second used variable in IS success models, 15% is user satisfaction while 10% is system satisfaction. The next section presents comparisons of different information system success measurement models.

3.4 COMPARISON OF THE DIFFERENT INFORMATION SYSTEM SUCCESS MEASUREMENT MODELS

The X's in Table 3.2 indicate the variables of the system success models, respectively where it reside in the table. In this study, system quality and information quality are the common variables found in most of the IS success models. The researcher is of the view that this models can be used to measure success of the technology in any organisation.

Table 3.2: Comparison of the different success measurement models assessment of IS /Technology in organisations.

MODEL/ VARIABLE	DeLone & McLean's IS Success Model, (1992)	Re-Specified model of IS success (Seddon, 1997)	The updated IS Success Model (DeLone & McLean, 2003)	System Success Model (Wixom & Todd,2005)	System Success Model (Elpez & Fink, 2006)
System quality,	X	X	X	X	-
Information quality	X	X	X	X	X
Use	X	X	-	-	X
User satisfaction	X	X	X	-	-
Individual impact	X	-	-	-	-
Organisational impact.	X	-	-	-	-
Perceived usefulness	-	X	-	-	-
The organisation	-	-	-	-	-
Users	-	-	-	-	-
IS	-	-	-	-	-
Service quality	-	-	X	-	-
Intention to use	-	-	X	-	-
Net benefits	-	-	X	-	-
Information satisfaction	-	-	-	X	-

MODEL/ VARIABLE	DeLone & McLean's IS Success Model, (1992)	Re-Specified model of IS success (Seddon, 1997)	The updated IS Success Model (DeLone & McLean, 2003)	System Success Model (Wixom & Todd,2005)	System Success Model (Elpez & Fink, 2006)
Systems satisfaction	-	-	-	X	-
Usefulness	-	-	-	X	-
Ease of use	-	-	-	X	-
Attitude and intention	-	-	-	X	-
System usability and performance	-	-	-	-	X
Meeting user requirements	-	-	-	-	X
User acceptance & IS ownership	-	-	-	-	X
Interaction with IT Infrastructure	-	-	-	-	X
Expenditure control	-	-	-	-	X
Performance expectancy	-	-	-	-	-

In this study, the researcher opted for the DeLone and McLean's model to measure information system success. According to the researcher, the model is sufficiently comprehensive to cover the issues that the study sought to address. Review of all popular models suggests that there are noticeable differences in the variables which are used for system success measurement. Most of the models namely, use system quality and information quality are used as measure of system success.

3.5 GABLE ET AL (IS IMPACT) MODEL

Previous authors who attempted to measure information systems success raised several concerns. One of the concerns was a poor measurement that could be because the measurement is incomplete and not suitable. A model to measure IS-impact was developed by Gable, Sedera and Chan (2008). The IS-impact of an information system is a measure at a point in time of the stream of net benefits from

the information system at a time and as anticipated and as perceived by key users of such a system (Gable, Sedera & Chan, 2008). The model is one of those based on the DeLone and McLean's model and the purpose of its development was an attempt to overcome issues of uncertainties discovered in related past research. The model contains four dimensions in two halves, namely; impact that measures the impact of the system to date, quality that measures future impacts of the information system, individual and organisation half, and lastly the system information half as depicted in Figure 3.7 below.

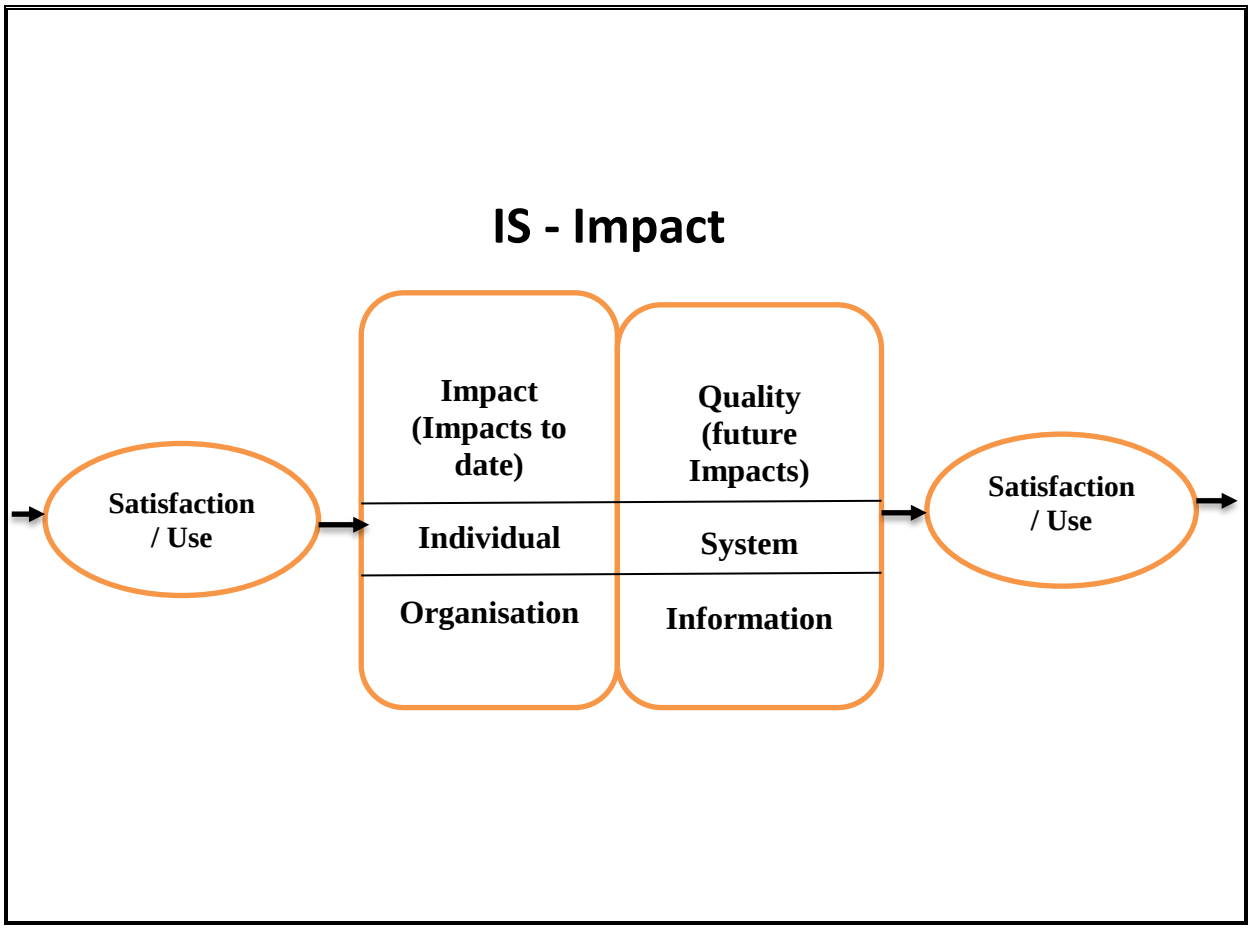


Figure 3.7: Gable *et al.*'s IS-impact model 2008

3.6 CHAPTER SUMMARY

This chapter defined different success measurement models and comparisons of the models were discussed. Studies on IS success models by other researchers were also covered in this chapter. The next chapter (chapter 4) covers the research methodology that will be used in this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter outlines the research methodology used to determine the relevant research approach for this study. It begins by defining the research philosophy behind the study, the research approaches, and various research strategies in order to develop consistency on the selected research methods and design. The chapter also gives the reasons why a particular method was used. In order to understand the key concepts of research, and how they fit into the research methodology, this study applied Wilson's (2014) 'honeycomb of research methodology' as illustrated in Figure 4.1.

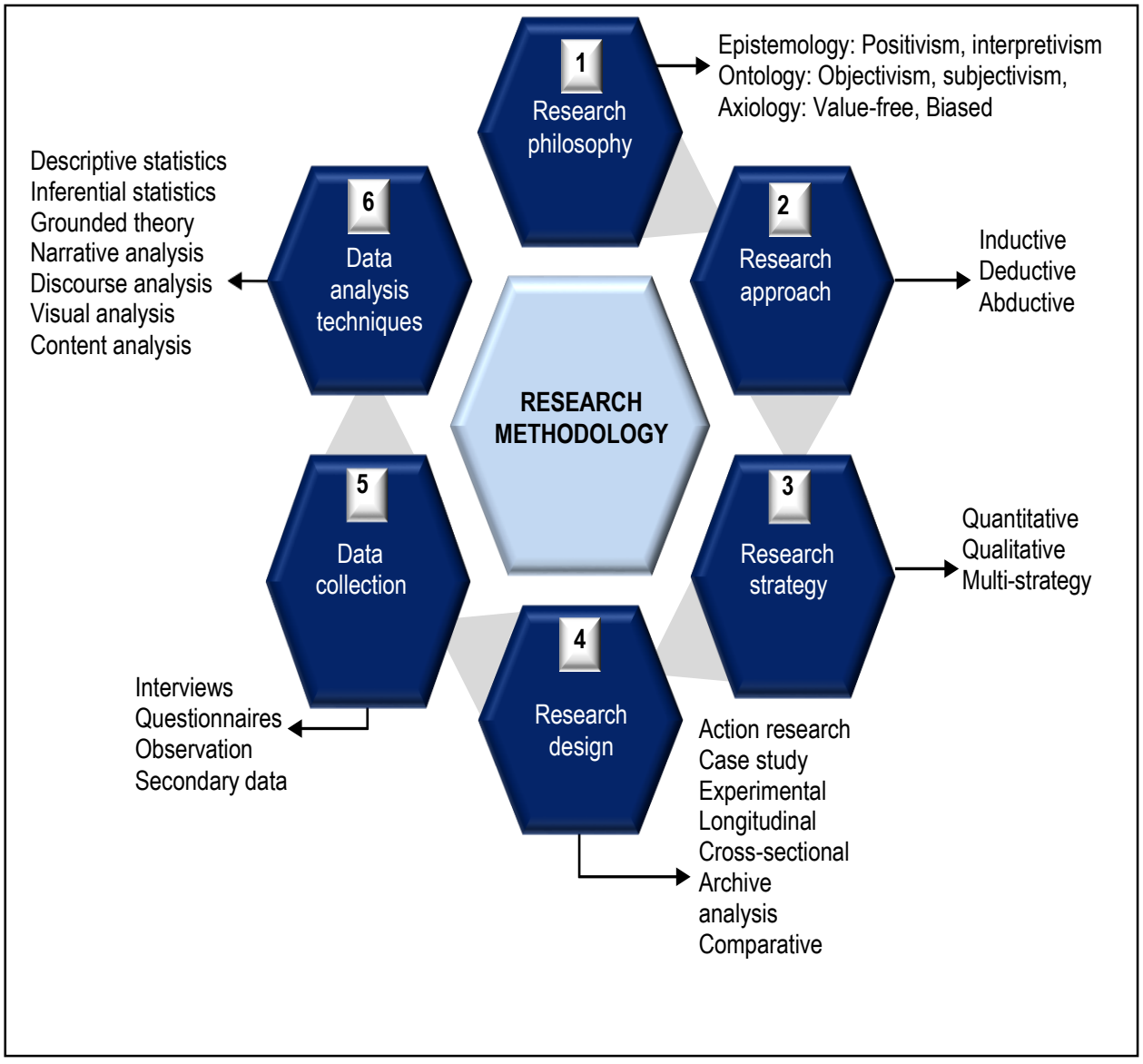


Figure 4.1: The honeycomb of research methodology. Source: Adopted from Wilson (2014).

4.2 RESEARCH PHILOSOPHY

"The term philosophy is sometimes used in a very wide sense to describe any viewpoint, value or belief" (Kroeze, 2011). Research philosophy relates to "the development of knowledge and the nature of that knowledge" (Saunders *et al.,* 2009). This research is aiming to develop a framework that municipalities in South Africa can use to evaluate the fitness of e-Government solutions. Therefore, knowledge will be developed at the end of this research.

The research philosophy adopted for this study is not only the source of its theoretical ideas but also of its ontological and epistemological assumptions. The differences in ontological and epistemological assumptions are as contentious as their definitions (Bates & Jenkins, 2007). Ontological assumption describes the nature of reality or the world as it actually exists. It questions whether reality exists only through experience of it (subjectivism), or it exists independently of those who live it (objectivism) (Goertz & Mahoney, 2012). Ontological studies therefore provide understanding of knowledge (Hirst, 1989).

Epistemological assumptions on the other hand concern the question of what is or what should be regarded as acceptable knowledge in a discipline (Höijer, 2008). Epistemology therefore, questions the quality or nature of knowledge and the optimal process of knowledge acquisition (Goertz & Mahoney, 2012).

In this research study, two philosophical epistemologies (positivist) and ontologies (objectivism) were chosen. The following subsection presents the discussion of research paradigms that were adopted in this study.

4.2.1 Positivist paradigm

This study followed a positivism approach. This is a philosophy that follows the view that only "truthful" information obtained by means of observation and measurements, is trustworthy (Aliyu *et al.*, 2014). When following this approach, the role of the researcher is limited to data gathering and interpretation in an objective way. In this type of study, the findings are observable and quantifiable (Stage & Manning, 2015).

4.2.2 Objectivism paradigm

Another paradigm adopted in this study is objectivism. Objectivism is based on the ontological assumption that social phenomena and their meanings exist independently of social actors while constructivism argues that such social phenomena and their meanings are continually being accomplished by their actors (Corbetta, 2003).

In order to best achieve the main aims of this research which was mentioned in chapter one section 1.4 of this study, the positivist and objectivism paradigm were used. The assumption behind the investigation of this research is that innovation of technology (EDMS) in an e-Government service context in municipalities is a social science construct.

4.3 RESEARCH APPROACH

A research approach guides the researcher to make inferences about the findings and to draw meaning from the results (Saunders *et al.*, 2009). Saunders *et al.* (2009) identify two methods of reasoning: the deductive and the inductive approaches.

Inductive and deductive are two different approaches used in research. “With deduction a theory and hypotheses are developed and a research strategy designed to test the hypotheses. With induction, data are collected and a theory developed as a result of the data analysis” (Saunders *et al.*, 2009). Inductive approach helps to “understand the nature of the problem” (Saunders *et al.*, 2009). Furthermore, Saunders *et al*. (2009) have also stated that “if you are particularly interested in understanding why something is happening, rather than being able to describe what is happening, it may be more appropriate to undertake your research inductively rather than deductively”.

Considering the research philosophy and approach, it is noted that “deduction owes more to positivism and induction to interpretivism” (Saunders *et al.*, 2009). Furthermore, in some research a combination of both inductive and deductive were used. This allows the researcher to choose whatever approach that is more suitable for their study.

Based on the above discussions, research questions and aims, this research used the deductive approach. The deductive approach is used to form propositions and theoretical framework from the literature review.

A summary of the different phases that are followed in both the deductive and inductive research study are presented in Figure 4.2 below.

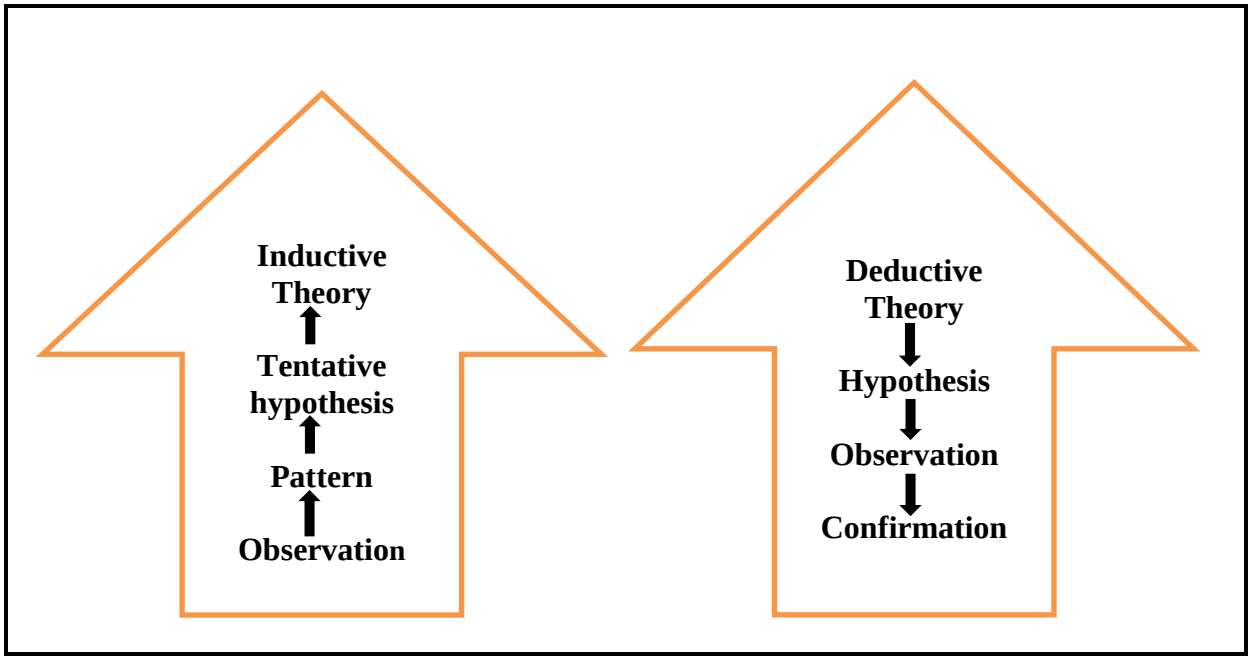


Figure 4.2: Deductive and Inductive logic phases (Heit & Rotello, 2010)

Figure 4.2 above shows that deductive reasoning creates a hypothesis in order to test a theory against the data. Unlike deductive reasoning, inductive reasoning involves the discovery of a pattern or a dataset in order to generate a theory. The differences between the deductive and the inductive approaches are summarised in Table 4.1 below.

Table 4.1: Deductive and Inductive approach (Saunders et al., 2009)

Deductive	Inductive
It is a top-down approach	It is a bottom-up approach
It usually collects quantitative data	It usually collects qualitative data
It tests the theory against the data	It generates theory from the data
A researcher is independent of what is being researched	The researcher becomes part of the research process
It attempts to explain the causal relationships between the variables	It emphasises the close understanding of the context under study
It is a highly structured approach	It has a more flexible structure, which allow changes as the research process progresses

The next section therefore, attempts to explain a selected number of research strategies that were applied to this study.

4.4 RESEARCH STRATEGY

Saunders *et al.* (2009) defined research strategy as "the general plan of how the researcher will go about answering the research questions". On a similar note, Bryman (2008) identified research strategy as "a general orientation to the conduct of research". There are three types of research strategies (quantitative, qualitative and mixed method) that are commonly used by researchers. The strategy used in this study was quantitative. This was informed primarily by the positivism research paradigm, which was the paradigm to test a theory or describe experiments for the study.Quantitative approach is characterised by its concern for objective data collection, emphasis on researcher control, and development of systematic and standardised procedures. The quantitative approach was used since it was considered to be the best approach in order to effectively address the objectives of the study. The advantages of this strategy is that it is easy to use, cost efficient,promotes anonymity, flexible, saves time and it is more convenient for the respondents.

Furthermore the approach was considered to be the best as the study was conducted in three categories of municipalities in South Africa. Furthermore, quantitative approach is considered by the researcher to be the best fit for this study as it caters for greater accuracy and objectivity of results and totally eliminates bias thus producing real and unbiased results. Quantitative study is constructed in such a way that other researchers get similar results when repeating certain analysis as it uses mathematical and statistical methods for measuring data. Taking into consideration the voluminous data that was collected, the quantitative approach makes it easier to summarise large volumes of information and make comparisons across different categories (Galt *et al.*, 2008). The qualitative approach was not appropriate for the present study. The reasons are simply that, the data collection method used for the present study was closed-ended questionnaire. Qualitative approach is difficult to analyse and needs high level of interpretative skills. The complexity and richness of data can obscure the analysis process. More significantly it leaves the data open to interpretation; both interviewee and researcher bias become a real threat. Qualitative and quantitative research strategies are incommensurable according to their paradigm and worldview and reflect epistemological and ontological assumptions (Bahari, 2010). The different assumptions and research strategies are depicted in Table 4.2.

Table 4.2: Fundamental differences between qualitative and quantitative research

Assumptions	Qualitative	Quantitative
Principle orientation to the role oftheory in relation to research	Inductive; generation of theory	Deductive; testing of theory
Epistemological assumptions	Interpretivist	Positivism
Ontological assumptions	Subjectivism or constructivism	Objectivism

Source: Adapted from Bryman (2012).

4.5 RESEARCH DESIGN

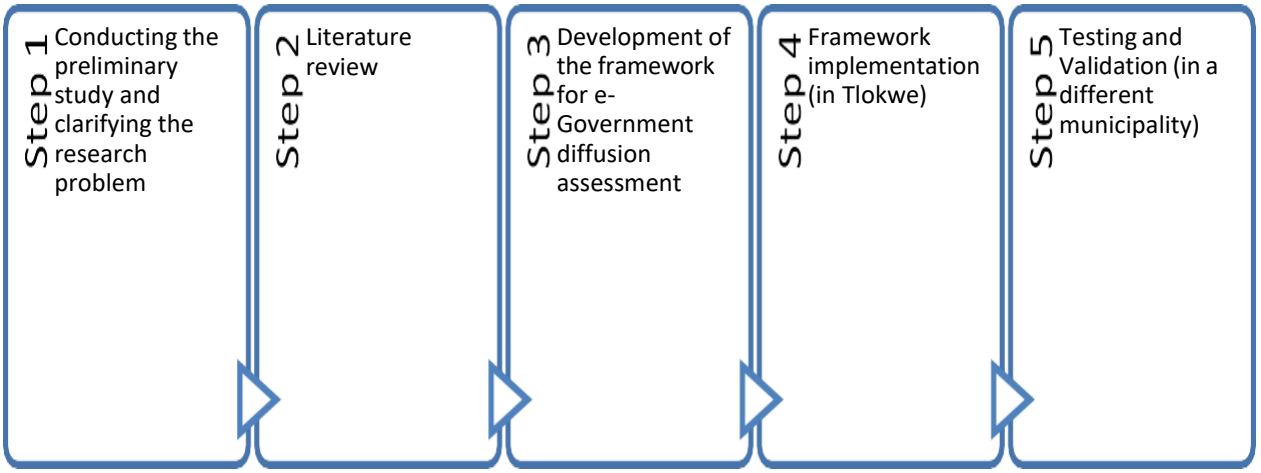
Yin (2009) explains that research design is a comprehensive plan for data collection in an empirical research project. A descriptive research design was used in this research study whereby the participant's feedback and opinions were collected, accumulated and deliberated or analysed in order to understand the types of participants within the research area. The usage of the chosen design was justified for the research study as it considered the present perspectives or viewpoints and existing connections as well as the scrutiny of the variables included in the research. The focal benefit and purpose of utilising descriptive research design was to transform information and data into a statistical format. The structured questionnaire was used for data collection to ensure that the formality of response is adhered to. Research information was assessed by means of the Statistical Software Package for Social Sciences (SPSS) version 25. The beta value (β) was used as a measurement of how strong the individual independent variable influences the dependent variable, it was also used in previous research like Jafari *et al.* (2010).

4.5.1 Case Study

Guided by the empirical aim of this study, the case study method was applied in the research. The case study was based on three government municipalities in South Africa: Mangaung Metro municipality, Dr Kenneth Kaunda District municipality and JB Marks Local municipality. Case studies are usually used to produce detailed descriptions of a phenomenon, develop a possible explanation of the phenomenon and to evaluate the phenomenon. The adoption and diffusion of an Electronic Document Management System (EDMS) by JB Marks Local municipality in Dr Kenneth Kaunda District, North West province, were used to test and evaluate the framework. There are three reasons why the study chose these three municipalities as a case study:

Firstly, the community members had raised their concerns regarding lack of service delivery and the municipalities had expressed their interest in improving the services to the community members. Secondly, the municipalities were selected based on proximity and access purposes. Thirdly, once we have evaluated the framework in the municipality environment, it can be generalised beyond local government.

In executing the case study, the following steps were followed:



4.5.2 Cross-Sectional

This research uses a cross-sectional study method since the researcher has limited budget and time to conduct the study. The advantage of cross-sectional is that it is relatively less expensive and saves time.

4.6 DATA COLLECTION

Data collection is the process of obtaining data for a research (Driscoll *et al.*, 2007). There are many methods of collecting primary data, but the choice of the method to use is influenced by the nature of the problem and the availability of time and money (Cooper & Schindler, 2008).Data was collected with the help of the students from Central University of Technology. In this study, different methods and tools were utilised to collect primary and secondary data as follows:

4.6.1 Secondary data

The secondary data was collected by means of published theses, papers, articles, similar previous studies, books and references.

4.6.2 Primary Data

The primary data was collected by means of a questionnaire that was derived from previous research and was adapted to suit the case of the current research. The questionnaire was developed and piloted before distribution in order to validate the content of the questionnaire in terms of logic, accuracy, validity and reliability. The final version of the questionnaire was distributed to all participants. Data was collected over a period of three months between June 2017 and August 2017.

4.6.3 Developing the questionnaire

A questionnaire is a procedure for getting data from the participants by utilising a sequence of questions pertaining to the specific subject matter. A questionnaire was designed and prepared for this study based on the proposed study model and it was derived from the measurement instruments used in the previous research and from the definitions provided in the literature of information systems. These measurement scales were adapted to suit the situation of the current study; the questionnaire was then piloted before distribution in order to test it for reliability and validity.

The final version of the questionnaire consisted of two parts. The first part is designed to identify the demographic characteristics of the respondents such as gender, age, education, experience and skills. In the second part, all research variables were measured using multi-item scales. Likert seven-point scale that comprises the following options: (1, 2 and 3) signifying “Strongly disagree”; (4 and 5) signifying “Neither agree nor disagree”; and (6 and 7) signifying “Stronglyagree” was used for all questions in the second part. This research questionnaire is comprised of 43 items that were used to measure variables. The e-Government Diffusion Assessment Model (EDAM) comprises the following variables: task characteristics with 3 items, technology characteristics with 4 items, individual characteristics with 3 items, the collaboration was measured using 4 items, social norms also with 4 items, utilisation also with 4 items and task-technology-fit also with 4 items, IT infrastructure with 5 items, economic with 3 items,organisation with 2 items, viability with 1 item and organisational performance with 6 items. Questionnaires and items were adapted from the previously published research papers to align with the current research paper.

In this study, close-ended questionnaires were used as they were considered to be the best method to enable the researcher to meet the research objectives. Closed-ended questions have the advantage over open-ended ones in that they are quicker and easier to answer. The advantage for this type of questionnaires is that they are more objective and are easy to code and analyse using statistical

packages such as Statistical Software Package for Social Sciences (SPSS). Generally,questionnaires are cost effective and easy to complete. They speed up the process of collecting data and save time compared to other methods such as interviews, focus groups and observations. The final version of the questionnaire is included in Appendix A and Appendix B in English. Table 4.3 below shows where the questionnaires were adapted from the previous research papers.

Table 4.3: Sources of statements used to measure each construct

Construct	Item codes	Statement / Items	Source
Task-Characteristics	TAS1	I need to work on the move or in different places regularly on Electronic Document Management System.	D'Ambra & Wilson (2004a, 2004b).
	TAS2	Information delay significantly affects the performance of my tasks on Electronic Document Management System.	
	TAS3	The performance of the task will be substantially poorer if it is performed in a different place or at a different time on Electronic Document Management System.	
Construct	**Item Codes**	**Statement / Items**	**Source**
Technology Characteristics	TEC1	Learning to operate Electronic Document Management System is easy for me.	Irick (2008); Dishaw and Strong (2003);Gebauer, Shaw and Gribbins (2010)
	TECC2	I find it easy to get Electronic Document Management System to do what I want it to do	
	TECC3	It is easy for me to become skilful at using Electronic Document Management System.	
	TECC4	I find Electronic Document Management System easy to use.	

Construct	Item Codes	Statement / Items	Source
Individual Characteristics	IND1	I would use the Electronic Document Management System to monitor documents if I could learn the process easily	Lai and Hung (2009)
	IND2	Mark the highest education level reached	
	IND3	I feel comfortable generating unique computer reports.	
Construct	**Item Codes**	**Statement / Items**	**Source**
Collaboration	COL1	Interaction with colleagues is easy through Electronic Document Management System	Campion *et al.* (1993).
	COL2	When I use Electronic Document Management System, I can communicate with colleagues	
	COL3	Through Electronic Document Management System I can collaboratewith colleagues	
	COL4	Communication between my colleagues has been improved thanks to the use of Electronic Document Management System	
Construct	**Item Codes**	**Statement / Items**	**Source**
Social Norms	SOCN1	People close to me would think it is important to monitor my documents usingthis Electronic Document Management System	McGill and Klobas (2009).
	SOCN2	My colleagues think it is important for me to use Electronic Document Management System	
	SOCN3	People respect you if you use Electronic Document Management System	
	SOCN4	The Municipality thinks it is important for me to use Electronic Document Management System	

Construct	Item Codes	Statement / Items	Source
Utilisation	UTI1	I am frequently using Electronic Document Management System to perform my tasks	Junglas, Abraham and Ives (2009)
	UTI2	I am very dependent on Electronic Document Management System toperform tasks.	
	UTI3	My work is dependent on using Electronic Document Management System to perform tasks.	
	UTI4	Using Electronic Document Management System allows me to do more than would be possible without it.	
Construct	**Item Codes**	**Statement / Items**	**Source**
Task-Technology-Fit	TTF1	Using Electronic Document Management System fits well with the way I like to work.	Strong, D.M., Dishaw, M.T. & Bandy, D.B. (2006).
	TTF2	Electronic Document Management System is compatible with all aspects of my work.	
	TTF3	Using Electronic Document Management System is completely compatible withmy current situation.	
	TTF4	Using Electronic Document Management System fits into my work style.	

Construct	Item Codes	Statement / Items	Source
IT Infrastructure	ITINFR1	The organisation have adequate hardware for operating the system.	Liang et al. (2007). Singh *et al. (2007)*
	ITINFR2	The organisation are mature in using the internet and related technology.	
	ITINFR3	The organisation have qualified network management system.	
	ITINFR4	The organisation have integrated databases or datawarehouse.	
	ITINFR5	The organisation have necessary software for implementing Electronic Document Management System.	
Construct	**Item Codes**	**Statement / Items**	**Source**
Economic	ECO1	The organisation provide adequate budget for developing the system.	Liang *et al.*(2007).
	ECO2	The organisation provide adequate budget for maintaining the system.	
	ECO3	Implementation of Electronic Document Management System demands great start-up investments	
Construct	**Item Codes**	**Statement / Items**	**Source**
Organisation	ORG1	Top Management in the corporate headquarter do participate in the project decision.	Singh *et al.* (2007)
	ORG2	Top Management in the corporate headquarter do assigned members into the project team.	

Construct	Item Codes	Statement / Items	Source
Viability	VIA	Viability is measured by the economic feasibility, maturity of the IT infrastructure, and organisational support of an organisation.	Liang *et al.*(2007).
Construct	**Item Codes**	**Statement / Items**	**Source**
Organisational Performance	ORGPER1	Using the Electronic Document Management System enables me to accomplish tasks more quickly.	Venkatesh, *et al.* (2003 and D'Ambra, *et al*. (2013)
	ORGPER2	Using the Electronic Document Management System improves the quality of the work I do.	
	ORGPER3	Using the Electronic Document Management System makes it easier to do my job.	
	ORGPER4	Using the Electronic Document Management System enhances my effectiveness on the job.	
	ORGPER5	IS/IT computer systems and services are an important and valuable aid to me in the performance of my job	
	ORGPER6	Using the Electronic Document Management System increases my productivity.	

4.6.4 Research Sample

According to Cramer and Howitt (2004), a sample is a set of entities drawn from a population with the aim of estimating characteristics of the population. In this research, sampling was adopted because it is cost effective, has greater accuracy of results and speed of data collection.

This study used the following formulas to calculate the sample size n (Yamane, 1967); Yamane formula for determining the sample size n is given by:

$$n = \frac{N}{1 + N * e^2}$$

Where n= corrected sample size, N = population size, and e = Margin of error (MoE).The following formulae were used for confirmation:

$$x = Z\left(\frac{c}{100}\right)^2 r(100 - r)$$

$$n = \frac{Nx}{((N-1)E^2 + x)}$$

$$E = Sqrt\left[\frac{(N-n)x}{n(N-1)}\right]$$

where E is margin of error and r is the fraction of responses interested in, N is the population size, and Z(c/100) is the critical value for the confidence level c.

An investigation on effect of bias on determination of sample size on the basis of data related to the students of schools of Guwahati was published in the International Journal of Applied Mathematics and Statistical Sciences Vol. 2, Issue 1, 2013.

After the calculations it was decided to send a total number of 200 questionnaires; 120 responses were received of which 20 were non-usable hence, 100 responses were used for data analysis. A sample size of 100 individuals from different municipalities in South Africa was used. Though it does not represent all the municipalities in South Africa, the number of respondents was enough to get a sense of the population of interest viewpoints. The sample size of 100 participants made it manageable because of time and resources constraints. It also provided critical analysis of the contents under study.

4.7 STATISTICAL ANALYSIS TOOLS AND STATISTICAL TESTS

The researcher has used both descriptive and quantitative data analysis methods. To examine research hypotheses and to answer research questions, the researcher has applied the following statistical tools and methods:

1. Statistical Package for the Social Science (SPSS) version 25.

2. Reliability test was carried out using Cronbach's Alphas (CA) and Composite Reliability (CR).

3. A validity test was carried out to assess if the study instrument (survey) definitely measures what it was intended to measure using the following instruments:

3.1 Kaizer-Meyer-Olkin (KMO), Bartlett's test of sphericity and the Principal Component Analysis (PCA) using the Varimax rotation.

3.2 Factor Analysis was used within the convergent and discriminant validity to determine if the scales are measuring the construct appropriately. The Principal Components Analysis (PCA) which is a data reduction technique that minimises a larger set of measures to a smaller and more manageable set, was utilised to confirm convergent and discriminant validity.

4. Percentages of the demographic information results, (Section A of the questionnaire) using figures were presented. Subsequent to that, the hypotheses of the research study was tested using the regression analysis technique.

4.8 PROPOSED RESEARCH MODEL

The research framework used within this study was derived and adopted from TTF Model (Goodhue, 1995) and Fit-Viability Model (Liang and Wei, 2004) (See figure 4.3 below). The below model was widely used by researchers for the adoption of ICT innovation hence it has been adopted in this study to evaluate the fitness of e-Government solutions within municipalitiesin South Africa.

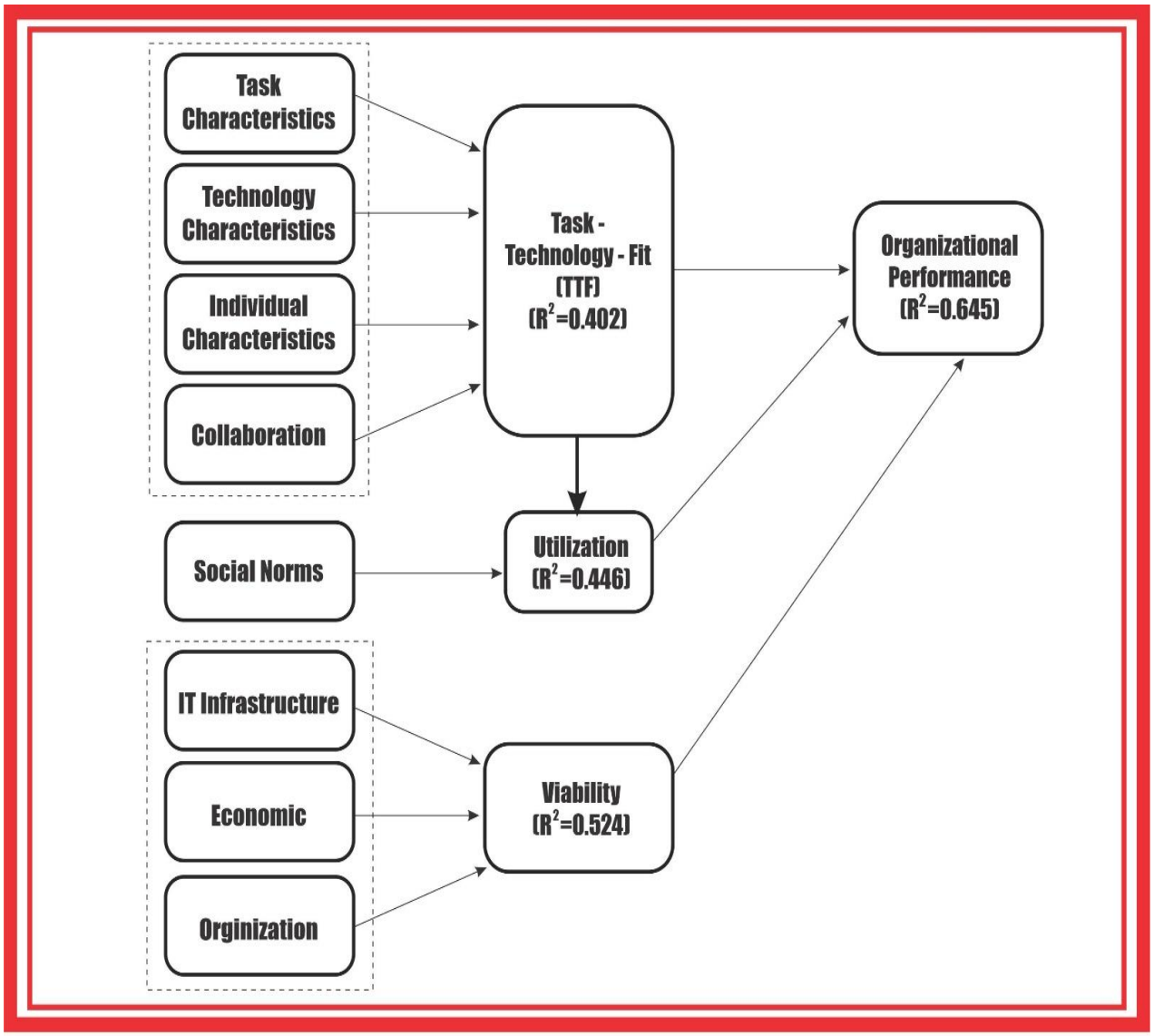


Figure 4.3: Proposed e-Government Diffusion Assessment Model (EDAM).
(Derived from TTF Model, Goodhue, 1995; and Fit-Viability Model, Liang & Mei, 2004)

Figure 4.3: Proposed e-Government Diffusion Assessment Model (EDAM)

4.9 ETHICAL CONSIDERATIONS

Given (2008) describes ethics as "the part of human philosophy concerned with appropriate conduct and virtuous living". The concept of ethical consideration is related to moral standards that should be reflected by the researcher in all of the research phases. Within this research study, ethical considerations has been a top priority to adhere to.

All participants in this research were conscious that they do so on voluntary basis. With regards to confidentiality, all correspondences were treated with high confidentiality to guarantee the cooperation of the respondents. To adhere to an individual's privacy and anonymity, all the files

containing personal identifiable information were password protected. To make sure that all participants understood the objectives and aims of the research study the consent letters were distributed to them in an effort for them to comprehend the outcomes of the research study.

4.10 CHAPTER SUMMARY

This chapter discussed the philosophical and paradigmatic theory that underpins this study. The research approach, the strategy, the choice, as well as the tools, techniques and methods used for data collection and analysis were comprehensively discussed.

A summary of the research design chosen is presented. It illustrates research aspects that have been discussed in this chapter, as well as the respective choice selected. Finally, research proposed model variables and question items were discussed. The next chapter (chapter 5) presents the data analysis methods used in this research study.

CHAPTER FIVE

RESULTS AND ANALYSIS

5.1 INTRODUCTION

Chapter five presents analysis of the results and findings consolidated based on the survey questionnaire in relation to the research questions that were presented in chapter one. To do the data analysis, the Statistical Package for the Social Science (SPSS) version 25 was utilised for quantitative breakdown. The survey structure was in two sections. Firstly, the initial portion, Section A, included the demographic information that entails respondents ages, qualification and experience status.

Secondly, section B was used for research purposes and to ensure that the research question was answered, and the objectives met.

Section 5.2 defines the background information that highlights the rate of responses coupled with the demographical data pertaining to the participants.

5.2 RESPONSE RATE

The response rate is the number of participants who actually complete a survey out of all the invited survey takers (Privitera, 2013). In this study, a response rate was calculated on the basis of the primary data collection instrument i.e. the number of questionnaires distributed. A total number of 120 responses were received of which 20 were non-usable or incomplete and subsequent to that, 100 feedbacks were used for data analysis. The usable questionnaires represent a response rate of 83.3% (100/120 * 100). 100 (83.3%) out of 120 questionnaires were duly completed and returned as shown in Table 5.1. The response rates were considered admissible given the recommendations by Mugenda and Mugenda (2012) that a response rate of 50% is adequate for analysis and reporting, a rate of 60% is generally good while a response rate of above 70% is excellent. This is also the same position taken by Kothari (2011) who adds that a response rate of above 70% is deemed to be very good. Manfreda *et al.* (2016) asserts that, if the response rate is below 30 percent of the expected response then the validity, methods used and results will be questionable. In this research study, the percentage of 83% was above the proposed threshold. The sample size of 120 participants made it manageable with regards to time and resource constraints and it also provided critical analysis of the contents under study. Based on these assertions, this implies that the response rate for this study was adequate and increased confidence for generalisation.

Table 5.1: Number of Usable Responses (n=100)

Sample size	Returned Questionnaires	No. of Usable Responses	% of Usable Responses
120	120	100	83%

5.3 DEMOGRAPHIC SUMMARY ON RESPONDENTS

In this section, the researcher/the questionnaire focused on the biographical details of the respondents. These included gender, age group, educational level, years of experience in the municipality and skills in using the system. The following section presents the demographic results.

5.3.1 Table 5.2: Gender of the respondents

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	39	39.0	39.0	39.0
	Male	61	61.0	61.0	100.0
	Total	100	100.0	100.0	

Gender: The study sample was heterogeneous as it was made up of both males and females. Of the 100 completed and usable questionnaire results, 39% were females, and 61% were male, probably showing that the local government sector and in particular the municipalities are dominated by males.

5.3.2 Table 5.3: Ages of research participants

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 25 years	19	19.0	19.0	19.0
	25 – 34 years	39	39.0	39.0	58.0
	35 – 44 years	25	25.0	25.0	83.0
	45 – 54 years	16	16.0	16.0	99.0
	55 – 64 years	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

The table above demonstrated that 19% of the participants were below the age of 25. Those that indicated that they are between the ages of 25 and 34 made up 39% of the respondents. 25% of the participants were between the ages of 35 and 44, 16% of the participants were between the ages of 45 and 54 while 1% of the participants were between the ages of 55 and 64. The statistics demonstrated that younger people are using technology in their working environment than older people, which is the expectations that young people, who are more accustomed to digital technologies, (4th Industrial revolution) would be on the forefront. Overall, Morris and Venkatesh (2000) found that younger workers, when compared to older workers, were more inclined to use the technology. This is further supported by the claim that older workers generally have a more difficult time in adapting to a new work environment (Myers & Conner, 1992). The statistics again demonstrated that the major influencer within the current research study was the age group between 25 and 34.

5.3.3 Table 5.4: Level of education of respondents

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grade 12	74	74.0	74.0	74.0
	Diploma	26	26.0	26.0	100.0
	Total	100	100	100	

Regarding the respondents' level of education, the majority of the respondents had Grade 12 (74%) while 26% of the respondents reported to be in possession of a diploma qualification in their respective areas of employment. This shows that a significant number of participants have solid knowledge to answer the questionnaires.

5.3.4 Table 5.5: Years of experience in the Municipality of research participants

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	19	19.0	19.0	19.0
	6-10 years	29	29.0	29.0	48.0
	11-15 years	17	17.0	17.0	65.0
	16-20 years	35	35.0	35.0	100.0
	Total	100	100.0	100.0	

Table 5.5 above demonstrated that the majority of the participant's years of experience in the municipality was 35%. Those that indicate that their experience is between 1 and 5 years made up 19%. Those that indicate that their experience is between 6 and 10 years made up 29%. Those that indicate that their experience is between 11 and 15 years made up 17%.

5.3.5 Table 5.6: Technology Skills Level of using technology (EDMS)

Skills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Beginner	19	19.0	19.0	19.0
	Novice	6	6.0	6.0	6.0
	Competent	23	23.0	23.0	23.0
	Proficient	23	23.0	23.0	48.0
	Expert	29	29.0	29.0	100.0
	Total	100	100.0	100.0	

The results of the Table 5.6 shows that the majority (29%) of the respondents were experts in using technologies (EDMS) which imply that participants are ready for the 4th industrial revolution and to adopt new technologies. Those that rated themselves as beginners in using the technology made up 19%. Those that rated themselves as novices in using the technology madeup 6%, while 23% considered themselves as competent and proficient. This could be attributed to the years of using technology.

5.4. RELIABILITY TEST RESULTS

Reliability is an assessment of the internal consistency of the measurement instrument, a measure of the degree of homogeneity among the measurement items in a given construct. It is the assessment of whether the study instrument would give similar results in different situations or under the same circumstances but at a different time such that the results remain consistent over repeated testing.

Internal consistency (Construct Reliability) is used to assess the consistency of results across items within a test. In this research study, to determine the internal consistency of multiple variables, the Cronbach's Alpha and Composite Reliability was utilised to assess construct reliabilities. Cronbach's Alpha and Composite Reliability is frequently utilised by researchers to assess the internal reliability and consistency of a survey when it consists of multiple Likert-type questions. Composite Reliability and Cronbach's Alpha indicates how well a set of manifest variables appraises a single latent construct. The interpretation of Composite Reliability score and Cronbach's Alpha are similar. It is suggested that the value of Cronbach Alpha should be higher than 0.70 and also for Composite Reliability the value should be 0.70 or higher (Memon& Rahman, 2014). In the current study all constructs met the minimum requirements; hence, no constructs were dropped. Table 5.7 shows that Composite Reliability and Cronbach Alpha values of all variables are acceptable because all exceed the minimum requirement of 0.70. Collaboration and economic constructs have the highest estimates while viability construct has the least.

Table 5.7: Internal consistency evaluation (Composite Reliability and Cronbach's Alpha)

Constructs	Composite reliability	Cronbach'salpha
Task Characteristics (TAS)	0.865	0.705
Technology Characteristics (TEC)	0.858	0.768
Individual Characteristics (IND)	0.836	0.774
Collaboration (COL)	0.902	0.767
Social Norms (SOCN)	0.799	0.712
Utilisation (UTIL)	0.823	0.766
Task-Technology-Fit (TTF)	0.877	0.728
IT Infrastructure (ITINFR)	0.788	0.953
Economic (ECO)	0.897	0.786
Organisation (ORG)	0.782	0.816
Viability (VIA)	0.752	0.703
Org Performance (ORG PER)	0.884	0.834

Legends

TAS = Task Characteristics
TEC = Technology Characteristics
IND = Individual Characteristics
COL = Collaboration
UTIL = Utilisation
TTF = Task-Technology-Fit
ITINFR = IT Infrastructure
ECO = Economic
VIA = Viability
ORG PER = Organisation Performance

5.5 VALIDITY TEST RESULTS

In this research, factor analysis was utilised through the principal component analysis (PCA) to determine the fundamental variable of the research study. Principal component analysis was chosen because it allows for an assessment to both the discriminant and convergent validity.

Before conducting the factor analysis, a Kaiser-Meyer-Olkin test of sampling adequacy and a Bartlett test was assessed to make sure that the sample size is acceptable to support factor analysis as a result of the number of variables.

As depicted in Table 5-8 below, the chi-square is at 3945.645 with 946 degrees of freedom that is significant at 0.000 level of significance coupled with a Kaiser- Meyer-Olkin of 0.746 that justifies the factor analysis in this research as it is above 0.50. Based on the above breakdown of KMO sampling adequacy and Bartlett's test, the factor analysis is regarded as a suitable technique for further data analysis.

Table 5.8: Kaizer-Meyer-Olkin and Bartlett's test

KMO and barlett's test		**Results**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.746
Bartlett's Test of Sphericity	Approx. Chi-Square	3945.645
	Df	946
	Sig.	0.000

Table 5.9 below depicts the factor loading of the principal components. In order to interpret the factor loading, the research followed the recommendation from Anderson *et al.* (2010). According to these recommendations, any items are viewed as practically significant if their load values are more than 0.5. Based on their recommendations, a cut-off value of less than 0.5 was consequently implemented in this research study. According to Palvia and Aladwani (2002) any value that did not load strongly (any factor less than 0.5) must be eliminated, therefore this principle was applied in this research paper. According to this research study all factors loaded above the recommended threshold and are therefore all accepted. The loadings ranged from 0.622 to 0.897, exceeding the recommended figures, an indication of adequate convergent validity.

Table 5.9: Principal Components Analysis (Factor loading)

Construct	Questionnaire construct	Factor loading
Task Characteristics(TAS)	I need to work on the move or in different places regularly on *Electronic Document Management System*.	0.819
	Information delay significantly affects the performance of my tasks on *Electronic Document Management System*.	0.831
	The performance of the task will be substantially poorer if it is performed in a different place or at a different time on *Electronic Document Management System.*	0.825
Technology Characteristics(TEC)	Learning to operate *Electronic Document Management System* is easy for me.	0.753
	I find it easy to get *Electronic Document Management System* to do what I want it to do	0.642
	It is easy for me to become skilful at using *Electronic Document Management System*.	0.897
	I find *Electronic Document Management System* easy to use.	0.796
Individual Characteristics(IND)	I would use the *Electronic Document Management System* to monitor documents if l could learn the process easily	0.794
	Mark the highest education level reached	0.713
	I feel comfortable generating unique computer reports.	0.869
Collaboration (COL)	Interaction with colleagues is easy through *Electronic Document Management System*	0.842
	When I use *Electronic Document Management System*, I can communicate with colleagues	0.797
	Through *Electronic Document Management System* I can collaborate with colleagues	0.862
	Communication between my colleagues has been improved thanks to the use of *Electronic Document Management System*	0.839

Construct	Questionnaire construct	Factor loading
Social Norms (SOCN)	People close to me would think it is important to monitor my documents using this *Electronic Document Management System*	0.700
	My colleagues think it is important for me to use *Electronic Document Management System*	0.746
	People respect you if you use *Electronic Document Management System*	0.587
	The municipality thinks it is important for me to use *Electronic Document Management System*	0.765
Utilisation (UTI)	I am frequently using *Electronic Document Management System* to perform my tasks	0.633
	I am very dependent on *Electronic Document Management System* to perform tasks.	0.802
	My work is dependent on using *Electronic Document Management System* to perform tasks.	0.693
	Using *Electronic Document Management System* allows me to do more than would be possible without it.	0.798
Task-Technology-Fit (TTF)	Using s Electronic Document Management System fits well with the way I like to work.	0.761
	Electronic Document Management System is compatible with all aspects of my work.	0.776
	Using Electronic Document Management System is completely compatible with my current situation.	0.849
	Using Electronic Document Management System fits into my work style.	0.814
IT Infrastructure (IT INFR)	The organisation have adequate hardware for operating the system.	0.691
	The organisation are mature in using the Internet and related technology.	0.647

Construct	Questionnaire construct	Factor loading
IT Infrastructure (IT INFR)	The organisation have qualified network management system.	0.622
	The organisation have integrated databases or data warehouse.	0.751
	The organisation have necessary software for implementing *Electronic Document Management System*.	0.689
Construct	**Questionnaire construct**	**Factor loading**
Economic (ECO)	The organisation provide adequate budget for developing the system.	0.804
	The organisation provide adequate budget for maintaining the system.	0.838
	Implementation of *Electronic Document Management System* demands great start-up investments	0.688
Organisation (ORG)	Top Management in the corporate headquarter do participate in the project decision.	0.825
	Top Management in the corporate headquarter do assigned members into the project team.	0.750
Viability (VIA)	Viability is measured by the economic feasibility, maturity of the IT infrastructure, and organisational support of an organisation.	0.689
Org Performance (ORG PER)	Using the *Electronic Document Management System* enables me to accomplish tasks more quickly.	0.730
	Using the *Electronic Document Management System* improves the quality of the work I do.	0.891
	Using the *Electronic Document Management System* makes it easier to do my job.	0.695
	Using the *Electronic Document Management System* enhances my effectiveness on the job.	0.744

Construct	Questionnaire construct	Factor loading
Org Performance (ORG PER)	IS/IT computer systems and services are an important and valuable aid to me in the performance of my job	0.715
	Using the *Electronic Document Management System* increases my productivity.	0.703

Legends

TAS = Task Characteristics
TEC = Technology Characteristics
IND = Individual Characteristics
COL = Collaboration
UTIL = Utilisation
TTF = Task-Technology-Fit
ITINFR = IT Infrastructure
ECO = Economic
VIA = Viability
ORG PER = Organisation Performance

Table 5.10 presents the initial numbers of indicators for each construct, and the final numbers after assessment process of the indicator reliability. The results indicate that all items were retained.

Table 5.10: Initial and final number of items

Construct	Initial number of items	Final number of items
Task Characteristics(TAS)	3	3
Technology Characteristics (TEC)	4	4
Individual Characteristics (IND)	3	3
Collaboration (COL)	4	4
Social Norms (SOCN)	4	4
Utilisation (UTIL)	4	4
Task-Technology-Fit (TTF)	4	4
IT Infrastructure (ITINFR)	5	5
Economic (ECO)	3	3
Organisation (ORG)	2	2
Viability (VIA)	1	1
Org Performance (ORG PER)	6	6

5.5.1 Convergent and Discriminant Validity Assessment

To ensure that the variables have been correctly measured or validated, the construct validity was determined. Construct validity is the extent to which an instrument is actually measuring what it claims to be measuring. Two types of construct validity were used in this research study,namely convergent and discriminant validity.

5.5.1.1 Convergent Validity

Convergent validity denotes the extent to which scores on a particular test correlate with scores on another test that are intended to measure the same construct. As suggested by Hair *et al*. (2014), support is provided for convergent validity when each item has outer loadings above 0.70 and when each construct's average variance extracted (AVE) is 0.50 or higher. Average variance extracted (AVE) measures the overall amount of variance in the indicators accounted for by the latent variable. Higher variances occur when the indicators are truly representative of the latent construct (Hussein, 2009).

In the current study, AVE values of all constructs are higher than 0.5, which is the minimum accepted AVE value. Table 5.11 shows that the AVE values of all constructs range between 0.524 and 0.796. Furthermore, as it was depicted in Table 5.11, the reliability of all items are above the recommendations.

Table 5.11: Convergent Validity – Average Variance Extracted (AVE)

Construct	Average variance extracted
Task Characteristics(TAS)	0.681
Technology Characteristics(TEC)	0.605
Individual Characteristics(IND)	0.631
Collaboration (COL)	0.698

Construct	Average variance extracted
Social Norms (SOCN)	0.524
Utilisation (UTI)	0.540
Task-Technology-Fit (TTF)	0.641
IT Infrastructure (IT INFR)	0.538
Economic (ECO)	0.711
Organisation (ORG)	0.689
Viability (VIA)	0.796
Org Performance (ORG PER)	0.561

5.5.1.2 Discriminant Validity

Discriminant validity denotes the extent to which the construct measures what it is intended to measure. A construct is considered to be discriminant valid if it shares more variance with its indicators than with any other construct. To test this requirement, the AVE of each construct should be higher than the highest squared correlation with any other construct (Hair, Sarstedt, *et al.*, 2014). If the AVE for a given latent variable exceeds the squared correlation with the other latent variables, then the variable can be said to display discriminant validity.

As depicted in Table 5.12, the study compared the square root of the AVE with the correlations. Therefore, the validity shown in diagonal was examined and the variables satisfied the necessary conditions and all constructs exhibit the discriminant validity.

Table 5.12: Discriminant Validity

	TAS	TEC	IND	COL	SOCN	UTI	TTF	IT INFR	ECO	ORG	VIA	ORG PER
TAS	**0.825**											
TEC	0.164	**0.642**										
IND	0.105	0.013	**0.713**									
COL	0.310	0.034	0.251	**0.862**								
SOCN	0.027	0.048	0.342	0.027	**0.746**							
UTI	0.008	0.210	0.033	0.103	0.335	**0.693**						
TTF	0.006	0.035	0.027	0.019	0.420	0.218	**0.796**					
IT INFR	0.138	0.016	0.103	0.136	0.014	0.000	0.321	**0.691**				
ECO	0.037	0.043	0.049	0.397	0.107	0.274	0.006	0.100	**0.804**			
ORG	0.038	0.036	0.192	0.040	0.198	0.172	0.016	0.012	0.057	**0.825**		
VIA	0.337	0.023	0.171	0.024	0.156	0.035	0.127	0.304	0.327	0.039	**0.689**	
ORG PER	0.014	0.017	0.102	0.153	0.323	0.177	0.373	0.041	0.072	0.158	0.382	**0.730**

Legends

TAS = Task Characteristics
TEC = Technology Characteristics
IND = Individual Characteristics
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ORG PER = Organisation Performance

Note: Diagonal elements represent the square root of the AVE values while the off-diagonal elements represent the correlations.

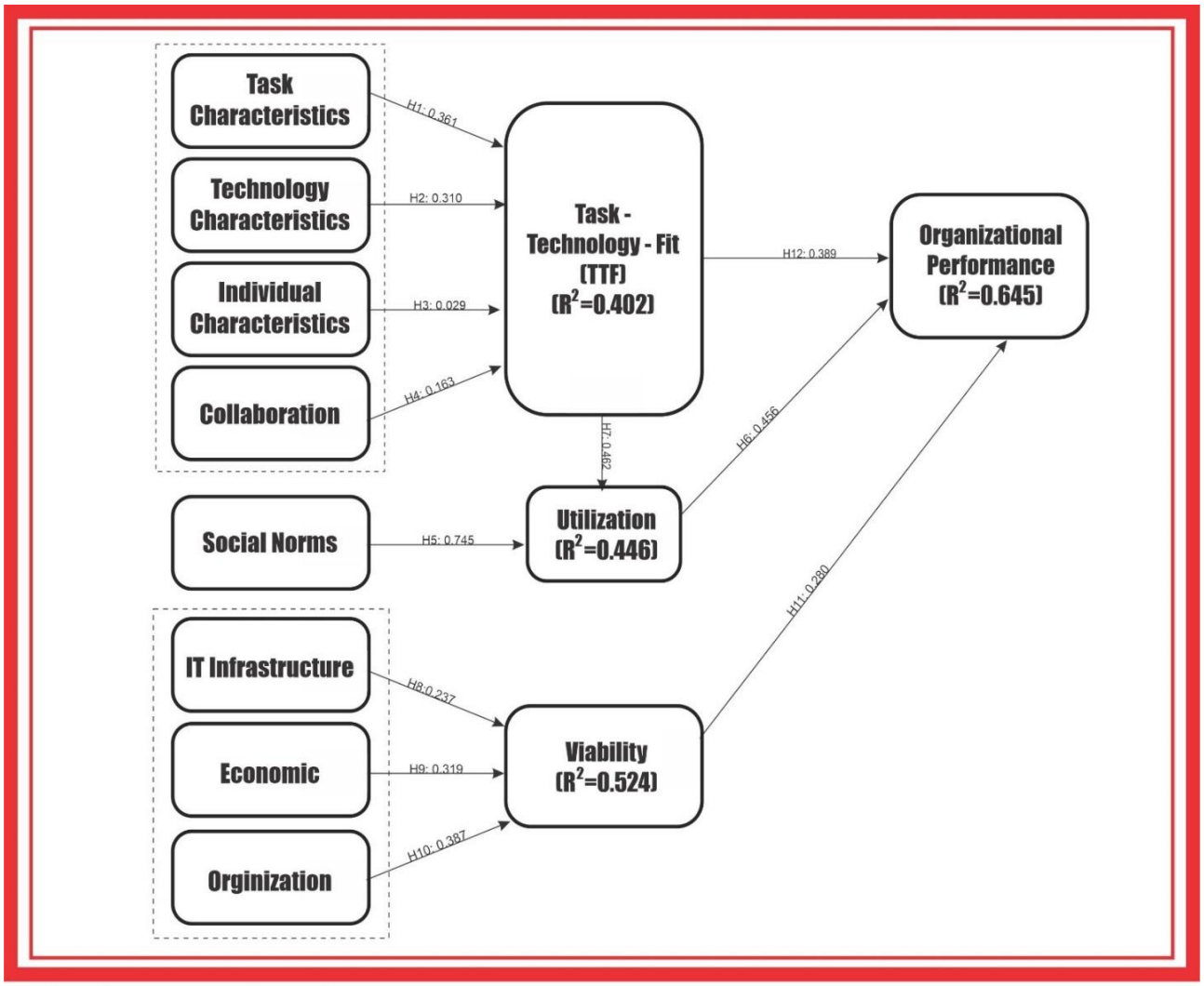
5.6. COEFFICIENT OF DETERMINATION (R^2)

The R square (R^2) is a measure of the model's predictive accuracy. It represents the independent (exogenous) variables' combined effect on the dependent (endogenous) variables. This effect ranges from 0 to 1 with 1 representing complete predictive accuracy. R^2 with 0.75, 0.50, 0.25, respectively, describing substantial, moderate, and weak levels of predictive accuracy (Hair, Sarstedt, *et al.*, 2014). For a good model, the R^2 value of each dependent latent variable in the model should be more than 0.26 (Memon & Rahman, 2014).

The predictive power of the model is summarised by R^2 values on the dependent variables in Figure 5.1. R^2 values are between 0.402 and 0.645 which are higher than the suggested value. It can be concluded from the R^2 values that the model predicts 40.2% of task-technology-fit, 44.6% of utilisation, 52.4% of viability, and 64.5% of organisational performance construct.

The values of R^2 represent the percentages with which the independent variables explain the variation in the dependent variable. According to partial least squires (PLS) analysis, the value of R^2 is highest in organisational performance followed by viability, utilisation, and finally by task-technology-fit. This suggests that the model mainly provides explanation of the variation of organisational performance on the largest degree, followed by explanation of the variation of viability, on a less degree, then explanation of the variation of utilisation, and finally explanation of the variation of the task-technology-fit on the lowest degree.

In addition to R^2, the research model was evaluated by looking at path coefficients (β) which indicate the strength of the relationships between the independent and dependent variables. Thus, research hypotheses are tested based on the values of path coefficients (β), and coefficients of determination (R^2) as will be mentioned in the next section.



* p < 0.05; *** p < 0.001 (2 tailed test)

Figure 5.1: Final Research Model (EDAM)

5.7 PATH COEFFICIENTS (β)

In the current study, a *βeta* was used**.** Path coefficient values are standardised on a range from -1 to +1, with coefficients closer to +1 representing strong positive relationships and coefficients closer to -1 indicating strong negative relationships. The significance levels of *β* values throught-value were tested. As it is suggested, the acceptable t-values for a two-tailed test are 1.65 (significance level = 10 percent), 1.96 (significance level = 5 percent), and 2.58 (significance level = 1 percent) (Memon & Rahman, 2014).

In the current study, the t-statistic values were used. The results, presented in Table (5.13), show that all t- statistics exceed the minimum suggested values and, hence, all twelve hypothesised relationships were supported.

Table 5.13: Summary of Hypothesis results

Hypothesis / Variables	Path Coefficient / *βeta*	T-Statistics	P-Value	Remarks
H1:Task-Characteristics → Task-Technology-Fit	0.361	3.205	0.002	Supported
H2:Technology Characteristics → Task-Technology-Fit	0.310	2.073	0.041	Supported
H3:Individual Characteristics → Task-Technology-Fit	0.029	3.927	0.000	Supported
H4:Collaboration →Task-Technology-Fit	0.163	2.310	0.023	Supported
H5:Social Norms → Utilisation	0.745	4.472	0.000	Supported
H6:Utilisation → Organisational Performance	0.456	3.613	0.001	Supported
H7:Task-Technology-Fit → Utilisation	0.462	3.092	0.003	Supported
H8:IT Infrastructure → Viability	0.237	3.071	0.003	Supported
H9:Economic → Viability	0.319	2.944	0.004	Supported
H10:Organisation → Viability	0.387	2.426	0.017	Supported
H11:Viability → Organisational Performance	0.280	2.712	0.008	Supported
H12:Task-Technology-Fit → Organisational Performance	0.389	4.734	0.000	Supported

5.8 RESULTS OF HYPOTHESIS TESTING

A hypothesis is a prediction based on limited or no evidence, with the intention of expanding on it for further investigation. A hypothesis usually comes after the research question. A hypothesis normally starts with "if", followed by a "then" or "else" statement, e.g. if inbound links are increasing, then the reliability of variables increases. The null hypothesis would be "inbound links decrease the reliability of the variables". Once the null hypothesis is rejected, then the alternative hypothesis holds.

As depicted in Figure 5.1, Table 5.13**,** the results analysis present support for Hypotheses H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11 and H12.

The path H1: Task characteristics → Task-Technology-Fit (β= 0.361, p< 0.003) indicate that Task Characteristics have a positive significant effect on Task-Technology-Fit.

The path H2: Technology characteristics → Task-Technology-Fit (β= 0.310, p< 0.05) indicate that Technology characteristics have a positive significant effect on Task-Technology-Fit.

The path H3: Individual characteristics → Task-Technology-Fit (β= 0.029, p< 0.001) indicate that Individual characteristics have a positive significant effect on Task-Technology-Fit.

The path H4: Collaboration → Task-Technology-Fit (β= 0.163, p< 0.024) indicate that Collaboration has a positive significant effect on Task-Technology-Fit.

The path H5: Social Norm → Utilisation (β= 0.745, p< 0.001) indicate that Social Norm has a positive significant effect on Utilisation.

The path H6: Utilisation → Organisational Performance β= 0.456, p< 0.002) indicate that Utilisation has a positive significant effect on Organisational Performance.

The path H7: Task-Technology-Fit → Utilisation β= 0.462, p< 0.004) indicate that Task-Technology-Fit has a positive significant effect on Utilisation.

The path H8: IT Infrastructure → Viability β= 0.237, p< 0.004) indicate that IT Infrastructure has a positive significant effect on Viability.

The path H9: Economic → Viability β= 0.319, p< 0.005) indicate that Economic has a positive significant effect on Viability.

The path H10: Organisation → Viability β= 0.387, p< 0.018) indicate that Organisation has a positive significant effect on Viability.

The path H11: Viability → Organisational Performance β= 0.280, p< 0.009) indicate that Viability has a positive significant effect on Organisational Performance.

The path H12: Task-Technology-Fit → Organisational Performance β= 0.389, p< 0.001) indicate that Task-Technology-Fit has a positive significant effect on Organisational Performance.

5.9 DISCUSSION OF HYPOTHESIS TESTING RESULTS

The study's main findings that are summarised in Table 5.13 will be discussed in detail in this section comparing them with the findings of the similar previous studies.

1. ***Hypothesis 1: "Task Characteristics" has a significant impact on Task-Technology-Fit.*** The path H1: Task Characteristics ⟶ Task-Technology-Fit (β= 0.361, p< 0.05) indicates a positive relationship between Task Characteristics and Task-Technology-Fit. The results of the study show that Task Characteristics had a very strong influence on Task-Technology-Fit. This implies that higher results in higher Task Characteristics positively affect fitness. Therefore increasing Task Characteristics increases Task-Technology-Fit. The positive relationship agrees with results of previous research (Schrier *et al.,* 2010; Ma *et al.,* 2013). This could be due to the nature of the tasks where these studies were applied, or due to the degree of fit of used technologies. According to Goodhue & Thompson (1995) and Luarn & Huang (2009), the relationship between Task Characteristics and Task-Technology-Fit should be positive if technology can truly support the task.

2. ***Hypothesis 2: "Technology Characteristics" has a significant impact on Task- Technology-Fit.*** The path H2: Technology Characteristics ⟶ Task-Technology-Fit (β= 0.310, p< 0.05) indicates a positive relationship between Technology Characteristics and Task-Technology-Fit. The resultsof the study show that Technology Characteristics had a very strong influence on Task-Technology-Fit. This implies that higher Technology Characteristics result in higher fitness.

   Therefore increasing Technology Characteristics increases Task-Technology-Fit. This result suggests that the greater the Technology Characteristics, the more fitness will be achieved when EDMS technologies are used for implementing an e-Government Diffusion Assessment Model (EDAM). This result was also supported by Goodhue and Thompson (1995) who found support for the link between Technology Characteristics and Task-Technology-Fit. However, they found that Technology Characteristics affect the factors of Task-Technology-Fit differently.

3. ***Hypothesis 3: "Individual Characteristics" has a significant impact on Task-Technology-Fit.*** Based on the results of the path analysis, the path H3: Individual Characteristics ⟶ Task-Technology-Fit (β= 0.029, p< 0.005) refers to a strong positive relationship between Individual Characteristics and Task-Technology-Fit. The results of the study show that Individual Characteristics had a very strong influence on Task-Technology-Fit. This implies that higher results in higher Individual Characteristics positively affects Task-Technology-Fit. Therefore

increasing Individual Characteristics increases Task-Technology-Fit. This result was also supported by Lee *et al.* (2007) who found support for computer self-efficacy and education on influencing Task-Technology-Fit.

4. Hypothesis 4: "Collaboration" has a significant impact on Task- Technology Fit.

The path H4: Collaboration ⟶ Task-Technology-Fit (β= 0.163, p< 0.05) indicates a positive relationship between Collaboration and Task-Technology-Fit. The results of the study show that Collaboration had a very strong influence on Task-Technology-Fit. This implies that higher results in Collaboration positively affects fitness. Therefore increasing Collaboration increases Task-Technology-Fit. This result was also supported by Campion *et al.* (1993) who found support for the link between Collaboration and Task-Technology-Fit.

5. Hypothesis 5: "Social Norms" has a significant impact on Utilisation.

As expected, the path H5: Social Norms ⟶ Utilisation (β= 0.745, p< 0.005) refers to a strong positive relationship between Social Norms and Utilisation. The results of the study show that Social Norms had a very strong influence on Utilisation. This implies that higher Social Norms results in higher Utilisation as Social Norms positively affects Utilisation. Therefore increasing Social Norms increases Utilisation. The study results point out that the path coefficient for Social influence is higher than all the variables in the study. This result is also supported by the findings of Taylor and Todd (1995) that found support for the relationship between Social Norms and Utilisation.

6. Hypothesis 6: "Utilisation" has a significant impact on Organisational Performance.

The path H6: Utilisation ⟶ Organisational Performance (β= 0.456, p< 0.005) refers to a strong positive relationship between Utilisation and Organisational Performance**.** The results of the study show that Utilisation had a very strong influence on Organisational Performance. The results imply that Utilisation can be used to improve overall Organisational Performance. Therefore increasing Utilisation increases Performance. This result suggests that the more a particular user uses the EDMS technologies, the more the Organisational Performance will be achieved. This result is also supported by the findings of Goodhue and Thompson (1995) that purported the positive association between Utilisation and Performance impacts when technology use is voluntary. The result is also supported by Hsiao and Chen (2012) who found that the use of mobile IS in a hospital setting enhances the effectiveness and efficiency of nurses in patient care performance.

7. *Hypothesis 7: "Task-Technology-Fit " has a significant impact on Utilisation.*

The path H7: Task-Technology-Fit → Utilisation (β= 0.462, p< 0.005) refers to a strong positive relationship between Task-Technology-Fit and Utilisation. The results of the study showthat Task-Technology-Fit had a very strong influence on Utilisation. This result suggests that thegreater the fit, the more use of EDMS technologies to implement an e-Government Diffusion Assessment Model (EDAM) in South African municipalities. Therefore increasing Task-Technology-Fit increases utilisation; an indication that Task-Technology-Fit is a critical usage factor. This result is consistent with most of the other previous studies of fit at organisational such as those of Tornatzky and Klein (1982) and Cooper and Zmud (1990). This suggests that any technology will be used if it provides the features that fit the requirements of municipal task.

8. *Hypothesis 8: "IT Infrastructure" has a significant impact on Viability.*

The path H8: IT Infrastructure → Viability (β= 0.237, p< 0.005) refers to a strong positive relationship between IT Infrastructure and Viability**.** The results of the study show that IT Infrastructure had a very strong influence on Viability. This implies that higher IT Infrastructure results in higher Viability as IT Infrastructure positively affects Viability. Therefore increasing IT Infrastructure increases Viability. This result is also supported by the findings of Taylor and Todd (1995) that found support for the relationship between Social Norms and Utilisation.

9. *Hypothesis 9: "Economic" has a significant impact on Viability*

The path H9: Economic → Viability (β= 0.319, p< 0.005) refers to a strong positive relationship between Economic and Viability**.** The results of the study show that Economic had a very strong influence on Viability. This implies that higher results in higher Economical positively affects Viability. Therefore increasing Economy of South Africa increases Viability of the Organisation. This result is also supported by the findings of Liang and Wei (2004) that found support for the relationship between Economic and Viability in assessing m-commerce applications.

10. *Hypothesis 10: "Organisation" has a significant impact on Viability*

The path H10**:** Organisation → Viability (β= 0.387, p< 0.005) refers to a strong positive relationship between Organisation Performance and Viability**.** The results of the study show that Organisation had a very strong influence on Viability. This implies that higher Organisation results in higher Viability. Therefore increasing Organisation Performance increases Viability. This result suggests that the greater the Organisation Performance, the more Viability will be achieved. This result is also supported by the findings of Liang and Wei (2004) that found supportfor the relationship between Organisation Performance and Viability.

11. Hypothesis 11: "Viability" has a significant impact on Organisational Performance

The path H11: Viability ⟶ Organisational Performance (β= 0.280, p< 0.005) refers to a strong positive relationship between Viability and Organisational Performance. The results of the study show that Viability had a very strong influence on Organisational Performance. The results imply that Viability can be used to improve overall Organisational Performance.Therefore increasing Viability increases Organisational Performance. This result is also supported by the findings of Liang *et al.* (2007) that found support for the relationship betweenViability and Organisational Performance in assessing m-commerce applications.

Hypothesis 12: "Task-Technology-fit" has a significant impact on Organisational Performance.

Finally, the path H12: Task-Technology-Fit ⟶ Organisational Performance (β= 0.389, p< 0.005) refers to a strong positive relationship between Task-Technology-Fit and Organisational Performance. The results of the study show that Task-Technology-Fit had a very strong influence on Organisational Performance. This implies that higher Task-Technology-Fit results in higher Organisational Performance as Task-Technology-Fit positively affects performance. The result also implies that Task-Technology-Fit can be used to improve overall organisational performance. Therefore increasing Task-Technology-Fit increases performance. This result suggests that the greater the fit, the more Organisational Performance will be achieved when EDMS technologies are used for implementing an e-Government Diffusion Assessment Model (EDAM) in South African municipalities. Therefore, a better Task-Technology-Fit causes higher positive organisational performance impacts as users find EDMS technologies more relevant to their requirements. This result is also supported by the findings of McGill and Klobas (2009) that found support for the relationship between Task-Technology-Fit and performance in learning management system.

5.10 CHAPTER SUMMARY

This chapter, Chapter 5, presented the results of the data analysis process. In addition, this chapter showed the hypotheses testing procedures which were adopted by this study. The chapter presented the findings of the analysis and the logic behind using the statistical techniques. Finally, the findings and the significant results of the data analysis have been discussed in detail.To determine which factor has influence on other variables, the path coefficient was analysed for the extent of their influence. The confirmed proposed research model was also highlighted. The next chapter, Chapter 6, will present the conclusions and the recommendations of the study.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

The previous chapters dealt with the results of the research study and were displayed both in tabular and figure format. To ensure that there was no ambiguity or misunderstanding of the results, the findings were discussed in detail. This chapter analyses the findings of the study and explores the answers to the research questions. Furthermore, this chapter presents a summary of the study, interpretation of the updated model and research presentation. Finally, the chapter presents the practical contribution of the study, discusses future research, states recommendations and concluding remarks.

6.2 SUMMARY OF THE RESEARCH

The primary research objective of this research was to develop a framework that municipalities in South Africa can use to evaluate the fitness of e-Government solutions. The research study used the adapted EDAM model to answer the research questions and achieve the study objectives.The research study was only conducted within three selected municipalities in South Africa. The study was guided by three research questions and research objectives. The findings of the study relating to each of the three questions and objectives are discussed in this section.

Research Questions:

a) What is the extent of e-Government diffusion within three selected/studied municipalities in South Africa?

b) What are the critical success factors that are intrinsic to the diffusion of e-Government in municipalities in South Africa?

c) How can Information systems/ICT Models be used to model these critical factors in order to ensure a direct link between successful e-Government and service delivery to a community?

Objective a: To analyse e-Government diffusion in selected (2 in each province) municipalities in South Africa.

Research question a) and its objective was answered in section 5.3.5 Table 5.6. The question was measuring e-Government diffusion in selected three municipalities in South Africa. The study results points out that the majority (29%) of the respondents were experts in using technologies (EDMS) which imply that participants are ready for the 4th industrial revolution and to adopt new technologies. Those that rated themselves as beginners in using the technology made up 19%. Those that rated themselves as novices in using the technology made up 6%, while 23% considered themselves as competent and proficient. These participants are comfortable using e-Government platform. With this usage it was seen in terms of service delivering information received through notifying or informing communities regarding cutting of electricity and repair of water pipes. Although there is room for improvement, the findings in this study show encouraging signs pertaining to e-Government uptake and implementation in South Africa. Based on these results collected across the specific municipalities it is shown that South Africa has taken giant strides with its e-Government diffusion strategy. According to the results gathered from certain municipalities, it shows that e-Government diffusion is currently in the third stage of the technology adoption life cycle (Moore, 2001) and starting to encroach into the fourth stage of late majority.

Objective b: To identify the salient critical success factors for e-Government diffusion for South African municipalities.

The critical success factors that this research study found to be task characteristics are: Technology characteristics; individual characteristics; collaboration; social norms, utilisation, task-technology-fit, performance, viability, IT infrastructure, economic, organisational performance. This objective was reached in section 5.7 Table 5.13. The proposed model (EDAM) was tested and the results show that all 12 variables were supported.

Objective c: To model the factors above into a generic (can work for any municipality in South Africa) framework.

The model EDAM was used to model the critical factors discussed to ensure a direct link between success e-Government and service delivery to community. Using the model, the organisational performance was seen to be the correct tool for improving service delivery in municipalities. The result of the study in 5.13 show that task-technology-fit, utilisation and viability had a very strong influence

on organisational performance. The organisational performance in this study is in line with the mandate of the municipality in delivering service to the community. Information systems/ICT can be used for effective communication such as alerting citizens of impending power cuts or water shortages via modern tools such as e-Government applications.

6.3 CONTRIBUTION OF THE STUDY

This study is an important effort towards a deeper understanding of the e-Government diffusion in South African municipalities.

This study has a number of contributions to the body of knowledge in information systems, diffusion, IT adoption, and e-Government studies in particular. First and foremost, based on the available and updated literature review on e-Government studies in South Africa, this is the first study to utilise and apply the EDAM model in the context of the local government (municipalities) in South Africa. The study relies on an integrated TTF model derived from Goodhue (1995); and Fit-Viability model, derived from Liang & Wei (2004).

This study succeeded in validating the proposed research EDAM model and the supporting relationships among the key variables within the local government context.

In this study, all EDAM variables displayed a sufficient and acceptable degree of convergence, validity and reliability, through all the research stages. These results support the use of EDAM as a predictor of intention to use e-Government services in South African context. Therefore, this study contributes to the literature by examining the viability and validity of the EDAM model, which was established in a western culture.

6.4 LIMITATIONS OF THE STUDY

Like other research studies, this study is not without its limitations. Sample size is one of the limitations as the total participants equates to 120 that excludes generalisation to all municipalities in South Africa. However, further research is encouraged in this manner to get a wider audience. It would be advisable to increase the sample size to maximise the significance pertaining the exactness and generalisation of the study.

The study was conducted in municipalities in the Free State and North West province in SouthAfrica only, and as a result it excluded other provinces. The survey questionnaire was in English only; because

of the time constraints and selection of the participants, vernacular languages were not considered as they would have prolonged the research study as more resources would have been required. According to Delva *et al.* (2002), surveys that are distributed with time constraints are problematic as people who struggle with real or perceived time constraints are less likely to respond to surveys because these possible respondents feel overworked as they do not have time to complete the survey, hence the number of participants is only 120. Another limitation was that more research study or theory reviews could have been conducted in other languages that were not covered as the researcher only concentrated on literature that was written in English.

6.5 RECOMMENDATIONS FOR FUTURE WORKS

According to the literature reviews, not much has been researched to determine the readiness of the adoption of the e-Government diffusion in the municipalities in South Africa. Future work must be undertaken to determine other determinant that have effects on the diffusion of e-Government in local government.

6.5.1 Future research should focus on further testing and refinement of the new EDAM model to establish its external validity as well as testing whether the study findings' results can be replicated in other developing countries such as Japan, South Korea and Germany. It is currently unknown how well the model and its findings will generalise beyond the specific conditions of this study. Future research should include a thorough testing of the proposed research model variables to determine whether the conceptual model proposed receives further empirical support. The analysis could also be extended to include a comparison based on different organisation sizes such as municipalities in urban and rural areas to see whether organisation size has any significant impact on utilisation.

6.5.2 To improve service delivery and minimise service delivery protest in the municipalities it is recommended that municipalities around South Africa adopt the framework as outlined in this research study.

6.6 CONCLUSION

The debate surrounding e-Government diffusion and its success in South Africa for the past 30 years has been realised. The results in this research show that the rate of diffusion/utilisation of e-Government in the three selected municipalities across South Africa is 75%. These percentages suggest that great strides have been taken to embrace ICT in local Government.

The main objective of this research was to come up with a research tool/framework that can be used to assess the progress of e-Government diffusion in the public sector. South Africa has understood the need and importance of ICT infrastructure within its municipalities. However, the transition has not been smooth. The results in this study identified task characteristics, technology characteristics, individual characteristics, collaboration, social norms, task-technology-fit, utilisation, IT infrastructure, economic, organisation, viability and organisational performance as the critical success factors that make up the proposed e-Government Diffusion Assessment Model(EDAM). The proposed model acts as a guideline of the factors that should be present in each municipality to ensure full implementation and a long-lasting solution to existing procedures.

The research results met the objectives of developing a tool/framework that municipalities in South Africa can use to evaluate the level of e-Government diffusion. The proposed model corroborates findings in existing literature about conditions which are necessary for ICT success such as consideration of the political context, culture and business processes, environment and organisational setting (Mawela, Ochara & Twinomurinzi, 2017). From the analysis of the variables in the proposed model, it is encouraging that municipality employees are not resisting change but rather see the importance of using ICT in day to day activities. Technological innovation has permeated every sphere of life, work, leisure, health, society, culture, education and media. It is getting more advanced every day, meaning that, every day, something from the old days loses its relevance. Humans need to prepare for and adjust to these changing times.

A user-friendly experience of ICT technology is key to the gradual transition from existing procedures to a successful adoption of e-Government. This is evidenced by the proposed e-Government Diffusion Assessment Model (EDAM) which rendered technology characteristics and individual characteristics as important variables of ascertaining the extent of e-Government diffusion within municipalities. Although the statistics from the results obtained during the research are encouraging, it is clear the government needs to invest more time and resources for training municipality employees. The employees have shown an understanding and willingness to further improve on the current knowledge that they possess.

Like any other research, this particular one had its fair share of limitations. One of the major ones was the focus on input provided by government employees of different municipalities across South Africa. It could be argued that the employee's perspective is biased to portray a good picture of their employers and their own personal egos. This argument could be substantiated by the fact that service protests are on the rise due to poor service delivery despite the research results showing a steady

improvement in e-Government diffusion within the public sector. Therefore, there is need for further research to be carried out on this topic to get a different and more balanced assessment of e-Government diffusion in South African municipalities.

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APPENDIX A: QUESTIONNAIRE

DEVELOPMENT OF E-GOVERNMENT DIFFUSION ASSESSMENT TOOL FORSERVICE DELIVERY IN SOUTH AFRICA'S MUNICIPALITIES: TASK-TECHNOLOGY-FIT APPROACH

PART A: PARTICIPANTS' DEMOGRAPHICS

Q1. Your Names: _____

(Optional)

Q2. Please indicate your gender by ticking the appropriate box.

Male

Female

Q3. Please indicate your age by ticking the appropriate box.

Below 25 years	45 – 54 years
25 – 34 years	55 – 64 years
35 – 44 years	65 years and above

Q4. Please indicate your highest level of education by ticking the appropriate box.

Below Grade 12	Degree
Grade 12	Masters
Diploma	Doctorate

Q5. Please indicate years of experience in the Municipality.

Less than 1 year	11 – 15 years
1 – 5 years	16 – 20 years
6 – 10 years	More than 20 years

Q6. How would you rate your skills in using the EDMS technology?

Beginner	Proficient
Novice	Experts
Competent	

PART B: THE CONSTRUCTS OF THE COMBINATION OF TASK-TECHNOLOGYFIT AND FIT-VIABILITY MODEL

Please circle the number that reflects the extent to which you agree with the following statements

		Strongly disagree			Neither		Strongly agree	
	Task Characteristic							
1	I need to work on the move or in different places regularly on *Electronic Document Management System*.	1	2	3	4	5	6	7
2	Information delay significantly affects the performance of my tasks on *Electronic Document Management System*.	1	2	3	4	5	6	7
3	The performance of the task will be substantially poorer if it is performed in a different place or at a different time on *Electronic Document Management System.*	1	2	3	4	5	6	7
	Technology Characteristics							
4	Learning to operate *Electronic Document Management System* is easy for me.	1	2	3	4	5	6	7
5	I find it easy to get *Electronic Document Management System* to do what I want it to do	1	2	3	4	5	6	7
6	It is easy for me to become skilful at using *Electronic Document Management System*.	1	2	3	4	5	6	7
7	I find *Electronic Document Management System* easy to use.	1	2	3	4	5	6	7
	Individual Characteristics							
8	I would use the *Electronic Document Management System* to monitor documents if l could learn the process easily	1	2	3	4	5	6	7
9	Mark the highest education level reached	1	2	3	4	5	6	7
10	I feel comfortable generating unique computer reports.	1	2	3	4	5	6	7
	Collaboration							
11	Interaction with colleagues is easy through *Electronic Document Management System*	1	2	3	4	5	6	7
12	When I use *Electronic Document Management System*, I can communicate with colleagues	1	2	3	4	5	6	7
13	Through *Electronic Document Management System* I can collaborate with colleagues	1	2	3	4	5	6	7
14	Communication between my colleagues has been improved thanks to the use of *Electronic Document Management System*	1	2	3	4	5	6	7

	Social Norms							
15	People close to me would think it is important to monitor my documents using this *Electronic Document Management System*	1	2	3	4	5	6	7
16	My colleagues think it is important for me to use *Electronic Document Management System*	1	2	3	4	5	6	7
17	People respect you if you use *Electronic Document Management System*	1	2	3	4	5	6	7
18	The Municipality thinks it is important for me to use *Electronic Document Management System*	1	2	3	4	5	6	7
	Utilisation							
19	I am frequently using *Electronic Document Management System* to perform my tasks	1	2	3	4	5	6	7
20	I am very dependent on *Electronic Document Management System* to perform tasks.	1	2	3	4	5	6	7
21	My work is dependent on using *Electronic Document Management System* to perform tasks.	1	2	3	4	5	6	7
22	Using *Electronic Document Management System* allows me to do more than would be possible without it.	1	2	3	4	5	6	7
	Task-Technology Fit (Fit)							
23	Using *Electronic Document Management System* fits well with the way I like to work.	1	2	3	4	5	6	7
24	*Electronic Document Management System* is compatible with all aspects of my work.	1	2	3	4	5	6	7
25	Using *Electronic Document Management System* is completely compatible with my current situation.	1	2	3	4	5	6	7
26	Using *Electronic Document Management System* fits into my work style.	1	2	3	4	5	6	7
	IT Infrastructure (Software and hardware)							
27	The organisation have adequate hardware for operating the system.	1	2	3	4	5	6	7
28	The organisation are mature in using the Internet and related technology.	1	2	3	4	5	6	7
29	The organisation have qualified network management system.	1	2	3	4	5	6	7
30	The organisation have integrated databases or data warehouse.	1	2	3	4	5	6	7
31	The organisation have necessary software for implementing *Electronic Document Management System*.	1	2	3	4	5	6	7

	Economic: Project budget:							
32	The organisation provide adequate budget for developing the system.	1	2	3	4	5	6	7
33	The organisation provide adequate budget for maintaining the system.	1	2	3	4	5	6	7
34	Implementation of Electronic Document Management System demands great start-up investments	1	2	3	4	5	6	7
	Organisation							
35	Top Management in the corporate headquarter do participate in the project decision.	1	2	3	4	5	6	7
36	Top Management in the corporate headquarter do assign members into the project team.	1	2	3	4	5	6	7
	Viability							
37	Viability is measured by the economic feasibility, maturity of the IT infrastructure, and organisational support of an organisation.	1	2	3	4	5	6	7
	Organisational Performance							
38	Using the *Electronic Document Management System* enables me to accomplish tasks more quickly.	1	2	3	4	5	6	7
39	Using the *Electronic Document Management System* improves the quality of the work I do.	1	2	3	4	5	6	7
40	Using the *Electronic Document Management System* makes it easier to do my job.	1	2	3	4	5	6	7
41	Using the *Electronic Document Management System* enhances my effectiveness on the job.	1	2	3	4	5	6	7
42	IS/IT computer systems and services are an important and valuable aid to me in the performance of my job	1	2	3	4	5	6	7
43	Using the *Electronic Document Management System* increases my productivity.	1	2	3	4	5	6	7

Thank you for taking the time to complete the questionnaire

APPENDIX B: QUESTIONNAIRE

A seven point Likert scale was used, with seven and six for strongly agree, five and four for neither, and one, two and three for strongly disagree.

Questionnaire Task-characteristics items

Q No.	Question	Source
1	I need to work on the move or in different places regularly on *Electronic Document Management System.*	D'Ambra & Wilson (2004a, 2004b).
2	Information delay significantly affects the performance of mytasks on *Electronic Document Management System*.	
3	The performance of the task will be substantially poorer if it is performed in a different place or at a different time on *Electronic Document Management System.*	

Questionnaire Technology characteristics items

Q No.	Question	Source
4	Learning to operate *Electronic Document Management System* is easy for me.	Irick (2008); Dishaw and Strong (2003);, Gebauer, Shaw and Gribbins (2010); Sun, H. & Zhang, P. (2006)
5	I find it easy to get *Electronic Document Management System* to do what I want it to do	
6	It is easy for me to become skilful at using *Electronic Document Management System.*	
7	I find Electronic *Document Management System* easy to use.	

Questionnaire Individual characteristics items

Q No.	Question	Source
8	I would use the *Electronic Document Management System* to monitor documents if l could learn the process easily	Lai and Hung (2009)
9	Mark the highest education level reached	
10	I feel comfortable generating unique computer reports.	

Questionnaire Collaboration items

Q No.	Question	Source
11	Interaction with colleagues is easy through *ElectronicDocument Management System*	Campion *et al.* (1993).
12	When I use *Electronic Document Management System*, I can communicate with colleagues	
13	Through *Electronic Document Management System* I can collaborate with colleagues	
14	Communication between my colleagues has been improved thanks to the use of *Electronic Document Management System*	

Questionnaire Social Norms items

Q No.	Question	Source
15	People close to me would think it is important to monitor my documents using this *Electronic Document Management System*	McGill and Klobas (2009).
16	My colleagues think it is important for me to use *Electronic Document Management System*	
17	People respect you if you use *Electronic Document Management System*	
18	The Municipality thinks it is important for me to use *Electronic Document Management System*	

Questionnaire Utilisation items

Q No.	Question	Source
19	I am frequently using *Electronic Document Management System* to perform my tasks	Junglas, Abraham and Ives (2009)
20	I am very dependent on *Electronic Document Management System* to perform tasks.	
21	My work is dependent on using *Electronic Document Management System* to perform tasks.	
22	Using *Electronic Document Management System* allows me to do more than would be possible without it.	

Questionnaire Task-Technology-Fit items

Q No.	Question	Source
23	Using *Electronic Document Management System* fits well with the way I like to work.	Dishaw & Bandy (2006)
24	*Electronic Document Management System* is compatible with all aspects of my work.	
25	Using *Electronic Document Management System* is completely compatible with my current situation.	
26	Using *Electronic Document Management System* fits into my work style.	

Questionnaire IT Infrastructure items

Q No.	Question	Source
27	The organisation have adequate hardware for operating the system.	Liang *et al.* (2007); Singh (2007)
28	The organisation are mature in using the Internet and related technology.	

Q No.	Question	Source
29	The organisation have a qualified network management system.	
30	The organisation have integrated databases or datawarehouse.	
31	The organisation have necessary software for implementing *Electronic Document Management System.*	

Questionnaire Economic items

Q No.	Question	Source
32	The organisation provide adequate budget for developing the system.	Liang *et al.* (2007).
33	The organisation provide adequate budget for maintaining the system.	
34	Implementation of *Electronic Document Management System* demands great start-up investments	

Questionnaire Organisation items

Q No.	Question	Source
35	Top Management in the corporate headquarter doparticipate in the project decision.	Singh *et al.* (2007)
36	Top Management in the corporate headquarter do assign members into the project team.	

Questionnaire Viability items

Q No.	Question	Source
37	Viability is measured by the economic feasibility, maturity of the IT infrastructure, and organisational support of an organisation.	Liang *et al.*, 2007).

Questionnaire Organisational Performance items

Q No.	Question	Source
38	Using the *Electronic Document Management System* enables me to accomplish tasks more quickly.	Venkatesh *et al.* (2003) and D'Ambra et al. (2013)
39	Using the *Electronic Document Management System* improves the quality of the work I do.	
40	Using the *Electronic Document Management System* makes it easier to do my job.	
41	Using the *Electronic Document Management System* enhances my effectiveness on the job.	
42	IS/IT computer systems and services are an important and valuable aid to me in the performance of my job	
43	Using the *Electronic Document Management System* increases my productivity.	

APPENDIX C: INVITATION LETTER

DEVELOPMENT OF E-GOVERNMENT DIFFUSION ASSESSMENT TOOL FOR SERVICE DELIVERY IN SOUTH AFRICA'S MUNICIPALITIES: TASK-TECHNOLOGY- FIT APPROACH

RESEARCH INVITATION LETTER

Dear_____,

I am pleased to invite you to participate in research aimed at identifying the critical success factors towards the development of an e-Government Diffusion Assessment Tool for Service Delivery in South Africa's Municipalities.

No more than **fifteen minutes** would be required to complete the questionnaire.

Be assured that any information you provide will be treated in the strictest confidence and your participation will not be identifiable in the resulting report. You are entirely free to discontinue your participation at any time or to decline to answer particular questions.

I will seek your consent, on the attached form on which I commit to ensure that your name or identity is **not** revealed.

Thank you for your assistance.

Mr. M.Mkhonto, Researcher, (email: mkhontom@jbmarks.gov.za, Cell: 082 7557 535

Central University of Technology, Free State, South Africa

APPENDIX D: CONSENT FORM

DEVELOPMENT OF E-GOVERNMENT DIFFUSION ASSESSMENT TOOL FOR SERVICE DELIVERY IN SOUTH AFRICA'S MUNICIPALITIES: TASK-TECHNOLOGY - FIT APPROACH

CONSENT FORM		
I, the undersigned, confirm that (please tick box as appropriate):		
[1]	I have read and understood the information about the research,	☐
[2]	I have been given the opportunity to ask questions about the research and my participation.	☐
[3]	I voluntarily agree to participate in the research.	☐
[4]	I understand I can withdraw at any time without giving reasons and that I will not be penalized for withdrawing	☐
[5]	The procedures regarding confidentiality have been clearly explained to me.	☐
[6]	If applicable, separate terms of consent for forms of data collection have been explained and provided to me.	☐
[7]	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
[8]	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree tothe terms I have specified in this form.	☐
[9]	Select only **ONE** of the following:	
	• I would like my name used and understand that what I have said or written as part of this research will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised.	☐
	• I do not want my name used in this research.	☐
[10]	I agree to sign and date this informed consent, along with the Researcher.	☐

Name of Respondent	**Signature**	**Date**
Mr. M Mkhonto, Researcher	 **Signature**	**18 March 2020** **Date**