The role of Information Communication and Technology (ICT) in enabling eGovernment in a metropolitan area

I Mofikoe
11777818

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Supervisor: Mr JC Coetzee

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NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
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ABSTRACT

The study examines the role that Information and Communication Technology (ICT) can play in order to make e-government possible in the metropolitan areas of the Republic of South Africa.

The primary objective of the study was to investigate the current state of e-government in the metropolitan areas and any challenges that are encountered in rolling out e-government. Recommendations are made on how the challenges encountered can be addressed to speed up the implementation of e-government.

The literature review on e-government focused on the definition of e-government and related terminology and examined the role it plays in the ordinary life of the citizens. Challenges facing e-government in South Africa and Africa in general were addressed through the literature review and the study also looked at how other technologically advanced countries have dealt the issues of e-governance to formulate the recommendations and any lessons to be learned.

The study focused on ICT officials across eight metropolitan municipalities in the country. From a total of 160 questionnaires sent out to the different municipalities; 130 were returned of which103 were returned fully completed, 27 were rejected and the remaining 30 questionnaires were not returned by the participants. The completed questionnaires were then sent for statistical analysis to the North-West University, Potchefstroom Campus where they were tested for reliability of the data by using the Cronbach alpha technique. The mean and standard deviations of the responses were tested as well.

The conclusions are based on literature, data analysis and interpretation. Recommendations are made from information gathered across the different topics associated with e-government in the study. In the recommendations, it is proposed that a base framework for e-government be crafted. This framework should include all key factors required for standardised, successful implementations.

Keywords: e-government, ICT, technology and metropolitan areas

OPSOMMING

Hierdie studie fokus op die rol wat Inligtings- en Kommunikasietegnologie (IKT) kan speel in 'n poging om e-regering in die metropolitaanse gebiede in die Republiek van Suid-Afrika moontlik te maak.

Die hoofdoelwit van die studie was om die huidige stand van e-regering in die metropolitaanse gebiede te ondersoek en te kyk na enige moontlike uitdagings wat in die uitrol van e-regering bestaan. Aanbevelings word gemaak oor hoe hierdie uitdagings aangespreek kan word om die implementering van e-regering te versnel.

Ons het begin deur die literatuur wat met e-regering te doen het, te bestudeer, om 'n definisie daar te stel van e-regering en verwante terminologie, en 'n ontleding te maak van die rol wat dit speel in die gewone lewe van burgers. Uitdagings wat Suid-Afrika en Afrika in die algemeen in die gesig staar is geïdentifiseer en ons het ook gekyk na hoe ander tegnologies-ontwikkelde lande e-regering hanteer om ons te help om aanbevelings te formuleer and lesse te leer.

Die studie het gefokus op IKT-amptenare in agt metropolitaanse munisipaliteite in die land. 'n Totaal van 160 vraelyste is uitgestuur na die verskillende munisipaliteite. Hondred and drie wat volledig voltooi is, is terugontvang, 27 moes verwerp word en die oorblywende 30 vraelyste is nie deur die deelnemers teruggestuur nie. Die voltooide vraelyste is toe vir statistiese analise na die Noordwes-Universiteit se Potchefstroomkampus gestuur vir ontleding. Die lyste is getoets vir betroubaarheid deur die gebruik van die Cronbach-alfa tegniek. Die gemiddelde en standaardafwyings van die reaksies is ook getoets.

Die gevolgtrekking is gebaseer op die data-analise en die literatooroorsig wat in die eerste twee hoofstukke hanteer is. Aanbevelings is gemaak op grond van die inligting wat verkry is uit die verskillende aspekte wat met e-regering verband hou.

Die aanbevelings stel voor dat 'n omvattende riglyn oor e-regering, wat al die betrokke faktore aangespreek, ontwikkel behoort te word. Dit sal 'n bydra kan lewer ten einde die suksesvolle implementering van e-regering te onrdersteun.

Sleutelterme: e-regering, IKT, tegnologie en metropolitaanse gebiede

ACKNOWLEDGEMENTS

DEFINITIONS OF TERMS

E-government – referred to as a new addition to the expanding vocabulary of a number of e-prefixed terms which reflect a range of ICT applications in organisations and societies (Oyomno, 2003:78).

ICT – according to Reddi (2011:175) ICT refers to tools that are used to handle information and this can be in the form of goods, applications and services that are used to produce, store, process, distribute and exchange information.

Public service – consists of governments and all publicly controlled or publicly funded agencies, enterprises, and other entities that deliver public programs, goods or services (Dube & Danescu:2011).

Metropolitan area – a stand-alone area of jurisdiction of the third sphere of government, after the national and provincial spheres (Statistics South Africa, 2004:13).

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1.1 INTRODUCTION

E-government refers to how government agencies 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 (World Bank, 2014).

The concept of a "Smart City" can be defined as a city that uses Information and Communication Technology (ICT) as an enabler, to merge dimensions of smart utilities, smart mobility, smart economy, smart environment, smart education, smart people, smart living, smart health, smart planning and smart governance" (City of Johannesburg, 2011). Therefore, it is important for municipalities to invest in technologies that would enable them to better service their residents.

Smart City is a concept that is designed to assist municipalities to cope with the increase in urbanisation. It can be seen that "the world is undergoing the largest wave of urban growth in history" (United Nations Population Fund, 2007). Currently seen in the IT global trends is the emergence of the Smart City concept, whereby e-Government is used for improved public service offerings to citizens by making use of the different technologies.

In South Africa, a metropolitan municipality is described as a municipality that is able to execute all the functions of local government for a city (Statistics SA, 2004:11). With the hosting of the 2010 FIFA Soccer World Cup, South Africa invested a lot of money in infrastructure which benefited a lot of municipalities. A greater challenge is how e-government taps into this infrastructure to make it better serve the needs of the people.

The challenge globally has been for Information Technology and Communications organisations to anticipate the role that Governments are going to play in this already competitive market. South Africa is struggling to develop smart cities because the private and public sectors are driven by conflicting policies (Moyo, 2012). The agendas of the

private and public sector are different with the latter being a social one and the former mainly a profit-driven one.

The main challenge for leading telecommunications organisations locally and internationally will be the ability to forge partnerships between Government departments and private sector players. Traditionally in South Africa, there has been very little partnerships between Government bodies and the private sector. A good example is the entity known as Telkom, a provider of telecommunications services.

According to Mcleod (2012), the Government's interference in Telkom is destabilising the company by not letting the company get on with its business without government influence and interference. This echoes the business community's sentiments on the matter as a stable telecommunications platform is a basic requirement of e-government.

Elfrink (2012) argues that leading cities have a plan of a period of up to 10 years that includes a master information and communication technology (ICT). Failure to anticipate and act by ICT organisations might result in a loss of market share by these municipalities.

Global communities will expand as through these types of initiatives smart cities can be connected to not only other local smart cities, but also to smart cities in other countries. Government hospitals could for example be connected to other foreign hospitals to share information while major towns and cities in the country can also collaborate and share expertise in the public service space.

1.2 CONTEXT

E-government is essential in improving service delivery and much of the news in the media recently has centred on service delivery issues in the municipalities. The majority of the issues relating to the protests are around housing, water, electricity, and sanitation and road infrastructure. Other municipalities have started making use of smart meters for water and electricity services while the City of Johannesburg Metropolitan Municipality's road agency division has developed a pothole application which enables residents to take a picture of a pothole and upload into the application with the location details.

This research project examines the role that technology can play in improving the service delivery issues that the municipalities face and how it can be used as an essential tool in bridging the communication gap between the municipalities and its residents.

The research will further contribute to the National Government Turnaround Plan for all municipalities by 2015, by making sure that there is constant communication between municipalities and its residents with a view to cutting out service delivery protests that have been on the rise in most provinces.

Most companies in the world make use of the dissemination of information through computers and information and communications technology to try and improve efficiency and competitive advantage in the business world. With the help of technology and the information at their disposal, they are better informed and are thus ahead of their competitors not only in making decisions but the speed at which this informed decisions can be made. Constant improvements and changes in technology provide important and critical implications for businesses.

1.3 SLOW IMPLEMENTATION OF ICT

Kroukamp (2005:55 - 59), identifies some of the causal factors that can be attributed to the slow implementation of ICT in public service offerings. These are briefly discussed below:

1.3.1 SCM processes and strict regulatory acts

Generally the flow of information between municipalities and agencies has always been designed to meet the needs of government and those agencies, not with the citizens in mind.

1.3.2 Security of information

Municipalities must ensure that their information and systems are protected from breaches which may threaten not only their integrity and service offerings, but also the confidence of the end-user citizens.

1.3.3 Privacy

The ability of municipalities to find new and challenging ways of protecting the privacy of the public.

1.3.4 The digital divide

South Africa has the potential for a large disparity in e-government resulting from differences in class, race, age and other factors which can inhibit some citizens.

1.3.5 Economic disparities

Even for countries that are generally considered wealthy, a matter of grave concern should be the lack of income in the poor sectors of society and how much of this technology can they afford.

1.3.6 Education

The level of use for the Internet generally rises with the increase in the standard of education. So as the population gets educated in the use of Internet, their buy-in for e-governments will also increase.

1.3.7 Accessibility

To ensure that all the members of the society are reached and serviced.

1.3.8 Prioritisation

With the current service delivery protests, e-governance should not be embraced at the expense of basic functions that the people have been complaining about, such as housing, water, jobs and basic education.

1.3.9 Awareness

The challenges posed by the introduction of e-governance are not only technological, but more about the collaboration of the public, organisations and businesses to become users of the system.

1.3.10 Resistance to change

Not only the public, but many public officials also fear change and are more comfortable with the old methods.

1.4 IMPORTANCE OF THIS STUDY

To provide insight into the importance of the introduction of e-Government programmes to improve service delivery, citizens' participation and internal government processes and management thereof. E-government will play an exciting role in linking the governments to their communities and thus provide access to government information that will assist in the delivery of better and improved public service delivery.

1.5 PROBLEM STATEMENT

E-government progress in South Africa is slow and the amount of service delivery protests that have been experienced in the country do not seem to be decreasing. Many government agencies have a huge challenge in ensuring that their processes are modernised by means of different forms of technologies to enable them to provide better and improved levels of services at the convenience of citizens.

This can be facilitated by making use of the different forms of technologies that can be beneficial to the public. This challenge comes from the fact that the majority of customers are fast becoming sophisticated as a result of their improving interactions with technology in their everyday lives. Smartphones, tablets and online presence are becoming more pervasive in societies at large.

The involvement of technology in service delivery must be investigated as well as how technology can be best leveraged through innovation towards providing the best possible public services to the citizens. Metropoles, as the biggest institutes of local government in municipalities, require improved accessibility of information by citizens which will enhance their decision making.

1.6 RESEARCH OBJECTIVES

The aim of this study is to understand and evaluate the different challenges that impede or slow down the progress in implementing e-government in the public service.

1.6.1 Primary objective

The primary objective of this research is to explore the extent to which metropoles are making use of e-government to improve public services and why there is a perception of slow delivery.

1.6.2 Secondary objective

In order to address the primary objective, the following secondary objectives were formulated:

- To gain insight around the topic of e-government and public service offerings, by means of a literature review.

- To define e-government in the South African context.

- To gain insight into the benefit of e-government and public service offering and explore examples of proven best practice implementations.

- To identify the different challenges that are faced in rolling out e-government.

- To define what the South African e-government roll-out still needs to achieve.

1.7 RESEARCH METHOD

The research on the objectives mentioned will be divided into a literature review as well as an empirical study. We are going to make use of Quantitative research methodology in the form of a questionnaire to ensure that we cover our wide area of research.

1.7.1 Phase 1: Literature review

Technology impacts on lives on a daily basis. Scholars, Politicians and academics are having discussions around the use and improvements of technology in their spaces. According to Nzimakwe (2012:56), current governments employ the most modern forms of ICT such as the use of Internet and satellites to deliver efficient and effective services to citizens. Throughout the world, public organisations are introducing e-government programmes to enable citizens to access government information in order to be able to file tax returns, renew licences and update their records from different locations via an Internet connection.

The South African government has undertaken a lot of initiatives to try and help many of its departments to improve and speed up the delivery of services to the public. Many ICT tools have been rolled out to the various government departments to assist in the process (Nthetha & Mostert, 2011:125).

Kroukamp (2005:53), describes the emergence of electronic government as having the potential to provide benefits that would not have been possible in the previous reforms of the public sector. He further describes some of the anticipated benefits such as client-centred government and improved levels of administration. However, he wonders whether the reality will be able to match the hype around the topic and whether the South African government will implement and adapt successfully.

In theory, e-government provides an opportunity for increased levels of effectiveness by government, as well as the ability to transform public management nature and governance. In practice though, the potential for better governance will have to go through quite a process before it can be fully realised (Cloete, 2012:128).

For the literature review phase, the data was collected by means of a literature search using secondary data such as:

- Databases.

- Textbooks.

- The Internet.

- Journal articles.

- Input from applicable metropoles in the field of e-government.

1.7.2 Phase 2: Empirical study

The empirical study follows the following process:

- Research design.

- Participants of the study.

- Statistical analysis.

1.7.2.1 Research design

The main purpose of research design is to provide the guidance needed for planning information about the use of ICT in a metropolitan area.

Cooper and Schindler (2008:140) describe the goal of formal research as the ability to test the hypothesis or to answer the question that is posed by the research. This is not just a plan of action, but rather a detailed plan of a set of sequences of activities that must be followed as per the research design. The research design provides guidance in the process of answering questions about the citizens living in metropolitan areas.

The study is divided into a literature review and an empirical study. The literature review provides an overview and background on ICT use in enabling e-government, specifically looking into the metropolitan municipalities in South Africa. In-depth knowledge and more understanding about a particular research problem and other information that guides the empirical part of the research are provided by the literature review. For reaching the particular research objectives, a Quantitative Research Methodology was used. Leedy and Ormond (2005:94) explain quantitative and qualitative research as follows:

a) **Quantitative research** - as a tool that is used to answer questions around relationships of the variables being measured with the aim and purpose of explaining, predicting and controlling phenomena.
b) **Qualitative research** – answers questions on the complexity of the phenomenon, with the aim of a description and further understanding of the phenomenon from the point of view of the participants.

This research can also be explorative with the focus on the details provided by participants; this investigation therefore provides in-depth information about e-government within the metropolitan areas. A questionnaire that is self-administered for data-collection purposes is used. All responses remain anonymous and all sources are treated with respect in this study. Further measures were put in place with municipalities or its entities to ensure that the anonymity remains highly confidential, where respondents were asked to state only the municipality that they represent and no further details regarding their job descriptions.

1.7.2.2 Participants

The target population of the study is government employees within the different metropoles in South Africa. The participants include both males and females of different races and ages.

1.7.2.3 Statistical analysis

For the quantitative data on the questionnaires, a statistical analysis package (Phstats) was used. This Package is used by the North-West University's statistical services department. With regard to comparative statistics, relevant statistical tools and correlation analysis were used to test hypothesis and to make statistical inferences. Further comparisons were undertaken on the different e-government initiatives within the City of Johannesburg. The validity of the questionnaire was assessed by applying factor analysis. Descriptive statistics was used to calculate the mean.

1.7.3 Limitations

This study is limited to literature that is available in South Africa and as a result the research is based on the use of the Internet, articles, journals and books available in relation to this topic.

1.8 CHAPTER LAYOUT

The breakdown of chapters on this mini-dissertation will be presented as follows:

Chapter 1: Introduction and the problem statement

The term e-government is introduced, identify the problem statement and review those causal factors that have slowed down the roll-out of e-government.

Chapter 2: Literature Review

The focus of this chapter is on the literature review in the field of ICT and e-Government. The two topics are defined and a brief overview of what each topic entails provided. The role that ICT can play in enabling e-government is discussed together with the different technologies that can be utilised.

Chapter 3: Empirical research

This chapter focuses on the tools that are used to conduct the empirical study to investigate the role of ICT in enabling e-government in metropolitan areas. The targeted population is ICT officials across the different metropolitan municipalities in the country. The data gathering, distribution and analysis process are explained.

Participants' responses, analysis and findings are discussed in this chapter. The reliability of the responses is tested by making of the Cronbach alpha technique and the data is also evaluated by making use of the mean values and standard deviations for the different variables being measured.

Chapter 4: Recommendations and conclusions

The research is concluded with recommendations on the use of ICT to enable e-government in metropolitan municipalities within the Republic of South Africa based on the connection between the problem statement, objectives (primary & secondary), literature review and the statistical analysis.

1.9   RESEARCH PROCESS FOR THE STUDY
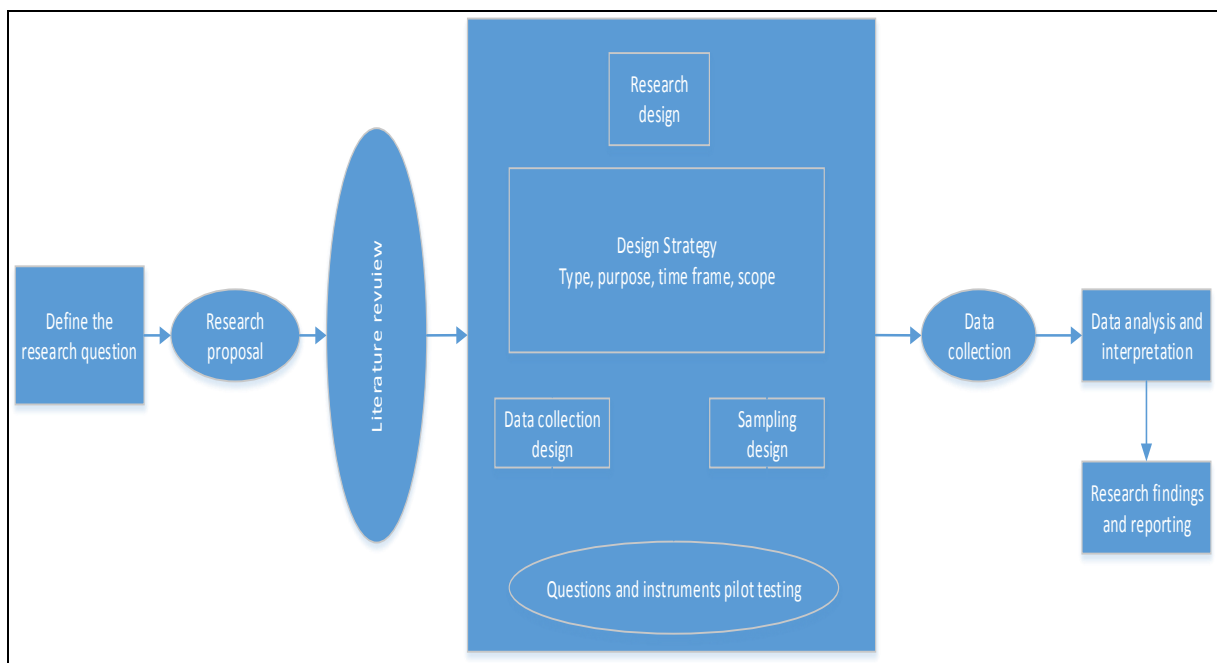
Figure 1.1: Research process for the study.

 Source: adapted from Cooper and Schindler (2008:65).

1.10 CONCLUSION

Even though the government in general has committed itself to the roll-out of effective services which are IT-driven to the public, and with further investments in both infrastructure and human capital, the general public has still not bought into the notion that they have benefited significantly from this interventions, as envisaged by the government (Ntetha & Mostert, 2011:136).

They further argue that with regard to training, the target focus should not only be provided for the front office staff but also to the managers who must remain informed at all times about the value to be gained through ICTs so that their decisions are better informed on the ICT journey's flight plan that they embark on.

1.11 SUMMARY

Chapter one provides an overview of the study as well as the detailed layout and approach used in the study. A brief overview of e-government is provided and a review given of the causal factors that impede or slow down the progress of e-government in South Africa.

The chapter further looks at the problem statement in the study, the research objectives and the research method used. Limitations of the study and the areas to be addressed are also covered in this chapter. The aim has been to examine how the use of ICT can enable e-government in the metropolitan areas in South Africa.

CHAPTER 2: LITERATURE REVIEW ON E-GOVERNMENT

2.1 INTRODUCTION

The aim of this chapter is to provide a broader understanding of the theoretical literature on e-government and how Information and Communication Technology can be used to enable e-government. E-government is not meant to eliminate or replace interactions with humans but is more about providing citizens, businesses and employees with cleaner and more efficient public services at their best possible conveniences. E-government provides everyone with equal access to relevant information and services to ensure that metropoles can become more accountable to its citizens (Patterson, 2013:1).

The dimensions of e-government and metropolitan performances are explored with regard to literature, to the extent of how the literature relates to the research topic: "The role of Information and Communication Technology (ICT) in enabling e-government in a metropolitan area", which simply translates to how technology can be utilised in the metropoles to improve service delivery to the citizens.

In Chapter 1, the summary of the definition of terms and the broad overview of e-government and improving service delivery was outlined. There is also a clear review of e-government theory, a focus on the technologies to be used and how they can be used to improve public service offerings by municipalities.

Governance is one of the benefits of the increased access to information in that it will ensure that the workings of government are more transparent in terms of increased production, reduction of costs and improvement of citizen welfare. The government will also effect savings as they cut down on the intermediaries between themselves and citizens (Singh, 2004:3).

Due to the number and frequency of the service delivery protests currently taking place in South Africa, it clearly demonstrates that the channels of communication between the government and its citizens are very poor or non-existent. The literature review focuses on the impact that ICT can have in enabling e-government in the public service and the different types of technologies that can be used to improve the public service offering to the citizens. We look at the challenges that inhibits the progress of e-governance in South Africa and what other countries have done and achieved in the e-government space.

2.2 OVERVIEW OF E-GOVERNMENT AND ICT

Schoeman (2007:184) describes e-government as a platform that builds effective information and communication technologies (ICT) that will ensure that policies are improved, higher quality of services effected, greater engagement and participation by citizens created as well as a government that is able to keep pace with growing customer expectations.

Oyomno (2003:78) defines the term e-government as a process that can be explained by means of the following three distinct phases:

(a)   1st phase – the term of e-government being used to explain the applications of advanced ICT to deliver effective public service.

(b)   2nd phase – emerged from a thought that electronic service delivery is the new way of doing business in government and as a result it is a catalyst for ongoing reforms and transformation of government.

(c)   3rd phase – locates the concept within the context of the emergence of information and the knowledge age.

Some parts of South Africa can be viewed as operating in the 3rd phase of the phases described.

According to Maumbe, Owei and Alexandre (2008:758), South Africa has in many cases demonstrated leadership in African e-government development by investing in and rolling out technological infrastructure. They argue, however, that what still remains unclear with regard to the technology and its roll-out is the pace and direction that must be followed to ensure success of e-government.

E-government consists of a number of defined categories relating to online interactions including Business to Business (B2B), Citizens to Government (C2G), Government to Government (G2G) as well as Business to Government (B2G). From all these interactions, e-governments connect people to people, to business and to the government itself. This means of communication relating to e-government raises a number of issues that relate to trust, such as system accessibility, usability of a service or system, data

protection, privacy, respect for human rights and many more (Mutula & Ocholla, 2010:130).

From the theory presented above, one can deduce that e-government is a very complex field which still requires much exploration to ensure that it is not only understood by the intended users, but by all role players in its implementation.

It is the responsibility of the citizens to ensure that they are empowered with the necessary technology skills and tools to understand how ICT can improve their daily lives and as a result rally behind their governments in the pursuit to introduce policies and legislation that will facilitate further development. Therefore citizens should not accept whatever is presented to them by their officials, as they need to voice their views and opinions on the type of governance they want, expect and deserve. Technology on its own will not solve all the problems, it is merely an enabler which yields the required results if it is underpinned by the correct processes and people, in this case both ICT officials and the public. ICT service should then be better, faster and more responsive and ensure that the 'Batho Pele' principles need to be driven harder and taken to heart by all public servants.

"Batho Pele" is an exact formulation that means putting the citizens first through the transformation of public service delivery in a changing South Africa (Mokhele & De Beer, 2007:61).

The Batho Pele concept is described as South Africa's constitutionally mandated public service delivery philosophy which has its essence in transforming the way public servants work. The lethargic style which was typical of the previous unpopular apartheid system of government needs to be turned into one that is inclusive and participatory and where citizens are able to hold public servants accountable for the levels of service they receive from government (Visser & Twinomurinzi, 2008:36).

A notable feature of the South African ICT policy landscape is the sheer number of major projects such as the Reconstruction and Development Programme (RDP) previously and currently the National Development Plan (NDP) that have been undertaken. This arises from the fact that South Africa is responding rapidly, like many developing countries, to the recent global focus of ICT as a vehicle for gaining a competitive advantage in the global economy and also as a tool for social upliftment and poverty alleviation, as ICT infrastructure can be used to facilitate the upgrading of education, health care, recreation

and other services by providing and improving the quality of information and ensuring that communities throughout the country have access to such information (Moodley, 2005:3).

It is now common for many technologically–centred agencies of new ICTs to emphasise the ways in which they are able to provide new kinds of actions to those that were previously costly, difficult or impossible and would therefore enable civil servants to reduce the communication restrictions of time and space, such as Internet & web, databases and video conferencing which are being used relatively less currently (Mbatha & Ocholla, 2011:197).

Information and Communication Technology reduces the traditional barriers of time and space by increasing the rate of growth in knowledge, faster transmission and increases in volumes which makes human endeavours across all spheres of life appear limitless. Information is the lifeblood of many organisations and this is nothing new, as technology has just revolutionised how this information is gathered, communicated and analysed (Kaisara & Pather, 2009:4). If one looks at the international trends, Australia is one of the leaders in how they gather, communicate and analyse their information.

However, Australia lacks a data-centre implementation plan for reserving long-term data information and as a result they require a data centre with high availability which would ensure government's business operation continuity. With service quality increasing gradually, it would then be an ideal opportunity to propose capacity in an integrated data centre. Currently the Australian government has an action plan to strengthen institutions with information capacities, career plans for employees in the information sector and communication capabilities in government institutions (Chou & Lin, 2012:331). Therefore, the South African government needs to ensure that the different ICT personnel in the different metropolitan areas are capacitated to ensure the successful planning and implementation of e-government services.

Ambitious government initiatives have been launched throughout the different countries across the globe. In December 2002, President George W. Bush signed and endorsed the e-government provisions into law which was a giant step in modernising public sector IT in the United States of America (USA). Prime Minister Tony Blair of the United Kingdom (UK), had set out a target of 100% of all government services to have been online by 2005 and generally across Europe one of the major goals of the European Union (EU)

eEurope plan 2005 was to have modern online public services in e-government (Lam, 2005:511).

Russia has a national information programme (E-Russia) that envisaged the widespread introduction of e-government at national, regional and local levels. With these programmes the government had spent $2.7 billion between 2005 – 2010 to double its Internet users and to also increase its post offices with Internet access from 3000 to about 12000 in the same period (McHenry & Borisov, 2005: 625).

Asogwa (2012:144) evaluated the prospects and challenges of e-government in Eastern Africa (Rwanda, Ethiopia and Mauritius) and found the following:

- Africa is a continent with 40% of the adult population being illiterate.

- PC penetration is the lowest in the world.

- There is a ratio of 2:2 computers per 100 inhabitants.

- Internet tariffs are amongst the highest in the entire world.

About 33 of the sub-Saharan African countries have web addresses and some of the governments in this region are finding ways to create platforms that can support the integration of information and knowledge management (KM) in government operations. It is hoped that the NEPAD peer review mechanism will be a great success with regard to unclogging the bottlenecks faced with the roll-out of e-government (Minishi-Manja & Ondari–Okemwa, 2009:18).

Adeyemo (2011:12) argues that when evaluating e-government in Nigeria, the following are listed as the reasons why e-government has not been successful:

- Reluctance of government to share information.

- Low information technology literacy in the country.

- Government faced with management challenges in the implementation of e-government.

- The uneven distribution of Internet facilities and high costs of connection.

- Insufficient allocation of financial resources due to financial constraints and mixed government policies.

- The digital divide experienced between the urban rich and poor, rural and urban citizens, the IT-literate and the IT-illiterate.

South Africa's overall online activity was estimated to be around 67% of the overall online activity in Africa while its population only accounted for about 5%. The uptake in international bandwidth is primarily being driven by the uptake of broadband and lowering of tariffs and this helps the country to supply up to 60% of Internet traffic to the entire African continent (Grobler & Dlamini, 2012:2).

Kroukamp (2005:56) identifies the following dimensions relating to e-government in the South African context:

- The digital divide.

- Public perceptions.

- Economic disparities/affordability.

- Involvement and types of technology.

The above dimensions will be discussed below to understand the effect that they have in the implementation of successful e-government initiatives. These dimensions will be viewed in line with the problem statement and objectives which focuses on how ICT can be used to enable e-government and improve the public offering services to the citizens of South Africa.

(i)   The digital divide

Baltzan and Phillips (2009:71) describe the digital divide as a situation where those with access to technology have a greater advantage over those that do not have access to the technology.

Pick and Nishida (2014) emphasise that the world in general is subject to a digital divide which represents differences in how countries participate in technology utilisation, technology accessibility, economic levels as well as government support. They further point to the importance of national technology differences as being evident in issues such

as political unrest, export capacity, provision of sourced technology services, platforms for e-commerce including structures which promote virtual collaborations.

Even though more than half of the world's citizens have access to ICT, its distribution resource has not been the same throughout the world. There is more communication fibre in Asia, North America and Europe than there is on the African continent. Even within the same continents, different ICT levels of access and distribution exist for countries and regions. While ICT is earmarked to play a key role in economic growth, the disparities have created many socio-economic imbalance problems throughout the entire world (Doong & Ho, 2012:518).

Adoption of the use of sophisticated ICT in government will result in little social value if the citizens are unable to use the services or interact in political processes in a meaningful way, therefore, parallels between e-government and the digital divide understanding are important to establish how policies, society, organisations and information technologies can be used together (Helbig, Gil-Garcia & Ferro, 2009:89). It is important to understand this concept in a South African context where high levels of computer illiteracy exist and the use of technology is mainly prominent among the youth of the country.

(ii)   Public perceptions

Traditionally the provision of government services to members of the public has been through face-to-face interaction but the developments in ICT, the Internet in particular, have brought about many changes in the way governments are able to provide services to its citizens. Any measures that are aimed at improving the adoption rates of e-government services can only be successful if they are based on a good understanding of factors such as computer literacy, Internet access and other skills related challenges, that may impede that adoption, as a result this understanding needs to take into consideration not only the perceptions of the service providers but most importantly the perspectives of the users (Mpinganjira, 2012:500).

ICT services in South Africa were up until 1990 the sole responsibility of the state. Communities which were previously disadvantaged consist of citizens with low incomes who cannot afford the costs associated with owning a personal computer. The post-apartheid government recognises such challenges and has taken a number of measures to ensure access to information and communication such as establishment of tele-centres

and public schools and libraries being equipped with facilities that can enable citizens to have access to Internet services (Mphidi, 2009:4).

While there is still a strong perception that mobile communication anytime and anywhere is crucial for improving performance, many government institutions face difficulties in ensuring constant communication with their users who are located in remote area users, are homebound, with low-computer literacy or chronic illness having a lot of challenges in utilising e-government services (Hung & Chang Kuo, 2013:33).

Heavy investments in funding are still required by the metropoles to ensure buy-in from its citizens on how the implementation of e-government will make a difference in their lives and ensure that they receive better service.

(iii) Economic disparities/Affordability

The government of South Africa has been in the forefront of innovative ways to facilitate public access to e-services. Even though the country is well advanced in the citizens' access to Internet and mobile services as compared to many other countries on the continent, extremely high levels of inequalities in access remain the biggest challenge. There is a huge gap that exists between urban and rural areas when it comes to ICT services in South Africa (Mpinganjira, 2013:320).

According to Ebbers and van Dijk (2007:554), there are many forces such as financial resources, planning, and top management involvement, among others, in different countries that resist e-government and as such they override those that support such initiatives. A crucial element would be to identify organisational processes of resistance and those that support e-government innovations. As a result of the above, there is a great possibility for e-government innovations and initiatives to face less or slow progress and even stagnation.

A clear relationship of collaboration, co-existence and mutual benefits exists between the ICT and local governance and it is not only underpinned by technology and capacity. Regular discussions on service delivery and governance issue should be held to ensure that government does not just roll-out plans to the citizens, but rather understand what the citizens require from them. There are other factors which may have an impact on this relationship, such as social pressures, community activism and capacity within the local

government' areas of jurisdiction. A critical element of this discussion would be to identify the actual role of government in the information age (Odendaal, 2003:587).

An example of an e-government initiative that has not gone well in South Africa at the moment is the e-toll project on the Gauteng highways. One of the potentially harmful effects of the Gauteng tolling project is the widening of inequity especially for low-income road users. By segregating the Gauteng road systems by way of affordability denies many citizens the basic right of free movement. The project has a negative impact and influence on the personal finances of many road users and the economy in general. Lack of transparency from the project has also put a dent in the trust relationship between the citizenry and the state (Naidoo, 2013:108).

(iv)   Involvement and types of technology

The South African public sector governments have undertaken to embark on major investments in ICT in the form of Internet technologies with a view to taking advantage of the benefits that can be derived from expanding the different channels that can be used to provide services to its citizens. As citizens become used to a customer-centric approach from the private sector, they are now beginning to demand the same type of services from government institutions (Kaisara & Pather, 2011:211).

In their efforts to fast-track development, South Africa has, since 1999, rolled out ICT in rural areas as part of what was referred to as multi-purpose community centres (MPCC). The MPPCs did not have much success and around 2007 they were re-invented, re-branded and re-technologised by means of additional and powerful computers, Internet bandwidth and then renamed Thusong Service Centres (TCS).

The primary objective of these TCSs is to accord citizens integrated services and information from the government in places that are closer to the communities as part of improving their lives and aligning to the Batho Pele principles and values (Twinomurinzi, Phahlamohlaka & Byrne, 2012:203).

As governments seek to engage their citizens, promote transparency and improve their public service offering, social media technologies have been introduced into governments' workplaces as effective tools to promote service delivery. These social media comprise a set of E-business technologies that will enable citizens and government

to communicate, collaborate and engage in all issues and matters relating to governance (Oliviera & Welch, 2013:397).

It is very critical as well for the providers of the services such as e-government to find, identify and understand the customer value that can be derived from a particular set of services to ensure maximum customer satisfaction and retention as well as how service delivery platforms and systems can exploit customer differences from their similarities (Venkatesh, Chan & Thong, 2012:116).

There are also technologies that assist in achieving economic development and human satisfaction in harmony with the environment. These sustainable technologies advance development by means of reducing risk, cost effectiveness, process efficiency and the creation of products or services that are environmentally friendly and benefits humans. They also encompass the three elements of the triple bottom line, i.e. the business imperative, environmental conservation and social benefit (Lochner, 2012:14).

Kjaer (2013) argues that the world has shifted from the traditional 3Ps and that real value in any business or organisation is measured by how well they navigate the new 4P bottom line, i.e. people, planet, purpose and then profit – in that order.

In addition to the challenges above, Nthetha and Mostert (2011:128) provide additional challenges on the implementation of e-government within the context of government:

(a)   A fragmented government service – two or three different departments in different locations being responsible for registering of companies.

(b)   Poor turnaround times – citizens having to wait for weeks or months before documents can be processed.

(c)   Access – not all citizens or government officials have access to ICT or even know how to operate them efficiently.

(d)   Power failures – regular disruptions in the power supply create problems for business with a heavy reliance on ICT for service delivery and communication.

2.3 CONCLUSIONS

For the South African government, one of the most important factors in ensuring that ICT is used in the fight against poverty alleviation is not to begin with ICT but rather to consider it an essential need in society. It would rather be useful to consider the impediments of poverty alleviation and reducing inequality in society and then be able to identify the information, communication and knowledge components of the particular impediments (Moodley, 2005:11).

Service quality is a very important component which ensures that customers continue to make use of services in general. Therefore, the ease with which people are able to navigate through e-government sites, support available, reliability and information that is up to date are factors that government institutions would need to carefully consider when they roll-out infrastructure that supports e-government (Wilson, Zeithaml, Bitner & Gremier, 2008:12).

Information and Communication Technology is fast becoming an important ingredient in the ways that municipalities manage and use their information for the purposes of decision-making. Service delivery is absolutely dependent on accurate information together with related infrastructure to capture, store and transmit that information. With better governance, the correct information can always be made available to the correct entities which in turn will result in better service delivery to citizens (Kaselowski, van Salms & van Salms, 2010:333).

The best way to ensure the success for e-governance is to determine how much of the citizens' buy-in the government can obtain. If citizens can be guaranteed that at a lesser cost they are likely through e-governance to receive a wider ICT access, accountability, transparency and a government that promptly responds to their needs, then half of the battle would have been won by custodians and implementers of e-government.

The literature review in this chapter has identified different forms of technologies that can be leveraged through innovative means towards an improved public service. These technologies can be used will ensure that access to information is enhanced and citizens will be able to improve their decision making from the information that will be at their disposal.

2.4 SUMMARY

In an analysis of service delivery (including providing access to water, electricity and sanitation) the City of Johannesburg, City of Tshwane, Ekurhuleni Metro, the eThekwini Metro and the City of Cape Town all feature among the top-20 metros and districts when it comes to service provision during the period 1996-2007. Citizens in this areas have been able to gain greater access to such services – well over the national average.

 However, as a result of increased population sizes (through both migration and growth) this very same metropolitan areas are listed on issues relating to metropoles/districts with the biggest backlogs in terms of those services (Van Huyssteen, Oranje & Coetzee, 2010:8).

The distinctions across the different departments in government relating to service delivery have resulted in excessive legislation, complex and rigid organisational structures and strategies that are unco-ordinated and may well be detrimental to effective service delivery. South African policy and regulatory frameworks seek to provide an environment that is enabling for e-government successes. Furthermore, the proposed deregulation of the telecoms market is envisaged to improve accessibility and reduce cost (Matavire, *et al*, 2010:153).

It is key to note that the end goal has to be clear with regard to the roll-out of e-governance. A government that attends to service delivery issues and concerns of its citizens should be the ultimate objective of e-governance, because ICT is not the end-product for e-government but rather a critical tool that can be leveraged to ensure a healthy interface between the government and its citizens. It must also be noted that there's limited literature and we will make use of our analysis of the empirical study in the next chapter to determine how we can improve on the research topic.

CHAPTER 3: EMPIRICAL STUDY

3.1 INTRODUCTION

Chapter 3 covers the research methodology used in this study. The chapter begins with the research design, sampling, instruments used and then complete the chapter with data analysis. The questionnaire is broken down into four different sections allowing this study to probe e-government issues from different angles and to obtain clarity and validity on the responses provided.

Section 1 provides an overview of the personal information and background on the e-government official and seeks to obtain details on their gender, age, employment level, experience and their qualification levels. Section 2 deals with the development of e-government, its progress and the question whether the progress can be seen across the different echelons of the government.

Section 3 of the questionnaire is the heartbeat of the research and delves into the core issues around e-government. In section 3 the focus is on the cost of implementing e-government and the benefits associated with them, the level of ICT skill amongst e-government officials, and the roll-out plan of e-government.

The remaining part of section 3 looks at a variety of challenges that may inhibit or slow down the progress of e-government such as support and administrative technology, strategy and service challenges associated with e-government. Follow-up questions are used for support and administrative, technology and strategy challenges questions to obtain more information on how some of these challenges can be addressed.

The last part of the questionnaire, section 4, looks at what informs the views/perceptions of e-government and where they emanate from, participants are also provided with an opportunity to list any other challenges which may be encountered with other than the ones that were addressed in section 3.

A copy of the questionnaire has been attached under the Annexures.

3.2 PURPOSE OF THE STUDY

The main objective in this study has been to examine the use of Information and Communication Technology to enable e-government in the municipalities, the perception of slow delivery of e-government and the causes for the underlying slow implementation of e-government activities. The study will finally put forward recommendations on how these causes can be overcome to improve service delivery to the citizens.

The research aims to contribute to an understanding of the current state of e-government in South Africa, the various challenges that are faced with in the rollout of e-government and the skills required to implement such services and to build a comprehensive e-government framework that talks to the needs of the consumers and promotes good governance within the municipalities.

This framework can be used to craft strategies within the different metropolitan municipalities, which will result in the use of the latest technologies available to implement value add e-government services over a period of time to increase accountability and transparency in government and provide better service delivery to the citizens.

3.3 RESEARCH DESIGN AND METHODOLOGY

Reeves (2006:58) outlines the research design principle by using three fundamentals:

- Addressing complex problems in real contexts with the help of practitioners.

- Integrating known and hypothetical design principles with technological advances to render solutions to problems that are complex.

- Conducting rigorous and reflective inquiry to test and refine innovative learning environments and to define new design principles.

Research methodology considers and explains the logic behind research methods and techniques and therefore has a much wider scope than research methods which in turn have a much wider scope than research techniques (Welman *et al.*, 2005:2).The study makes use of both qualitative and quantitative research methods and a brief literature review is provided on each of the methods below.

3.3.1 Quantitative research

According to Wu and Little (2011:287), research methods can be classified along a number of direct dimensions: qualitative-quantitative, exploratory-confirmatory, descriptive-inferential, manifest-latent, non-metrical-metrical and so on. Even though the qualitative/quantitative distinction is perhaps the most commonly referred to, there may be other techniques that would traditionally be considered and under the qualitative header.

In conducting the quantitative aspect of the research, the researcher prepared and distributed questionnaires to the e-government officials in the different metropolitan municipalities in South Africa.

In quantitative research, there are fundamentally two approaches to answering research questions, descriptive (observation of phenomena without interference) and experimental (manipulating of phenomena to observe the effect). The collection of data in the two approaches has many similarities which with the analysis of data was determined via the research aim and design of the study, data collected and characteristics of those data (Botti & Endacott, 2008:132).

3.3.2 Qualitative research

Flick (2007:1) explains that qualitative research is no longer just 'not quantitative research' but that it has developed an identity of its own. It is intended to approach the 'world out there' and to understand, describe and sometimes explain social phenomena 'from the inside' in the following ways:

- Analysing experiences of different groups – related to life histories or to practices and they may be addressed by analysing everyday accounts and stories.

- Analysing interactions and communications in the making – based on observing or recording practices of interacting and communication and analysing that material.

- Analysing documents or similar traces of experience or interactions.

3.3.3 Mixed methods

Even though qualitative case-based research was once understood as simply descriptive, recent decades have seen a strong emergence of a new form of epistemological reflection which indicates how thick description can support explanatory claims and theoretical generalisation. As these explanatory rationales for qualitative research are more widely discussed, there needs to be a consideration made on the purpose of quantification and the reasons for mixing qualitative and quantitative research strategies (Spillman, 2014:189).

3.4 POPULATION AND SAMPLE

3.4.1 Population

The research population in this study comprises of male and female employees in the e-government departments within the following metropolitan municipalities:

- Buffalo City Metropolitan Municipality (BUF)

- City of Cape Town Metropolitan Municipality (CPT)

- City of Johannesburg Metropolitan Municipality (CoJ)

- City of Tshwane Metropolitan Municipality (TSH)

- Ekurhuleni Metropolitan Municipality (ERK)

- eThekwini Metropolitan Municipality (ETH)

- Mangaung Metropolitan Municipality (MAN)

- Nelson Mandela Bay Metropolitan Municipality (NMB)

3.4.2 Sample and sampling method

Uprichard (2013:1) explains that sample design is a well-recognised issue in social research and as any research methods textbook will try to convey, the internal as well as the external validity of any empirical study rests to a large extent on the adequacy of the sample to be able to meet the research aims and objectives.

According to Schreuder *et al.* (2001:281) sampling may be probabilistic or not, it may be informative or uninformative with respect to the variable of interest, it may include response and self-selection bias and be subject to measurement error, and it may have a temporal or longitudinal structure combined with a spatial structure.

According to (Levine *et al.*, 2008:303), the sample size equation is depicted as below:

Equation 3.1: Sample size evaluation

$$n = \frac{Z^2 \pi \left(1 - \pi\right)}{e^2}$$

Where:

n = the sample size required for the given parameters

Z = the number of standard deviations for the given accuracy

π = the proportion of sample of interest (a value of 0.5 maximises the sample size, therefore minimising the error)

e = the error allowable, for instance, 10%

In this study, the research sample consisted of 160 participants (20 questionnaires per metropolitan area) which involved e-government officials in the different metropolitan municipalities in the country. 160 questionnaires were distributed to the participants and 103 completed questionnaire were received, **providing a 64.38% response rate**. The completed questionnaires were handed over to the Statistical Consultation Services at the North–West University, Potchefstroom Campus for analysis.

3.4.2.1 Probability sampling

According to Teddlie and Tashakori (2009:171) probability sampling techniques involve randomly selecting specific units or cases so that the probability inclusion for every member of the population can be determined. They explain three basic types of probability sampling and a category that involves multiple probability techniques:

- Random sampling – each sampling unit in a clearly defined population has an equal chance of being included in the sample.

- Stratified sampling – the researcher identifies the sub-groups in a population.

- Cluster sampling – sampling unit is not an individual but a group that occurs naturally in the population, e.g. Hospitals, schools.

- Multiple probability techniques – involve a combination of a least two of the probability techniques that have been described.

3.4.2.2 Non-probability sampling

Aoto *et al.* (2014:31) explain non-probability sampling as a recognized and powerful tool that affords significant time-savings in the acquisition of data by sampling only a percentage of the overall sample size.

In this study, three random sampling methods were used. The population comprises **e-government employees across the different metropolitan municipalities**. The study made use of a simple random sampling technique to select members of each metropolitan area to participate in the study. And since e-government officials comprise males and females, the sampling technique should take all the various staff members of the population into account so that representative samples can be selected.

Cluster sampling was used to select particular staff members in a particular town that would take part in the survey instead of trying to engage all the towns within a particular metropolitan municipality. Thus a simple random sampling technique was used to select the towns for the study.

3.5   DATA-COLLECTION INSTRUMENT

The common measuring instrument used in this research for the collection of raw data was a questionnaire. The questionnaires were distributed in the different offices and towns where the e-government officials of the different metropolitan municipalities are based.

The physical questionnaire was e-mailed and in some cases handed to ICT officials in the e-government space within the different metropolitan areas. Their participation was voluntary and completely anonymous. The questionnaires were returned over a period of 3 – 6 weeks and were handed over to the North-West University statistical consulting services for data capturing and analysis.

A total of 160 questionnaires were issued to the participants and 103 completed questionnaires were received, amounting to a response rate of 64.38%. The remaining 57 questionnaires comprised of 30 questionnaires that were not returned and another 27 which were rejected as they had not been correctly completed.

3.5.1 Questionnaires

Denscombe (2010:156), provides the following advantages and disadvantages of questionnaires:

Advantages

- Suitable for large numbers in many different locations.

- The required information is fairly straightforward – not controversial.

- Able to standardise data from questions without having face to face interactions.

- Irrespective of age, intellect, language and eyesight – respondents were expected to be able to read and understand questions.

- The environment is socially conducive to allow full and honest answers.

Disadvantages

- When questions are pre-coded they frustrate the respondent from answering.

- Questions that are biased towards the researcher's and not the respondent's way of doing things.

- Questions that do not offer the researcher an opportunity to check the information and truthfulness of the responses provided.

The study made use of an open-ended questionnaire with a 4-point scale to ensure that the respondents provided a definite answer and did not 'sit on the fence'. Questions which require respondents to further elaborate or provide examples or descriptions will provide further insight into the complexity of their views.

3.5.2 Interviews

An interview is a conversation between people where one or more participants take the responsibility for reporting what the substance is (Kvale, 2010:70-72). For additional clarity on some of the questions on the questionnaire and geographical challenges, interviews were conducted with a few ICT officials in the City of Johannesburg (CoJ) metropole.

An interview is defined as a conversation between people whereby one person assumes the role of a researcher. Interviews are most useful in cases where people really enjoy talking about their work instead of just completing tailor-made questions in the form of a questionnaire and also allows them the opportunity to reflect on events without actually having to confirm them in writing, especially where they feel that the information may be confidential (Gray, 2009:369).

According to Salkind (2012:198) interviews can take place in the form of a question and answer session in a relaxed environment or in the form of a detailed and structured interaction between the respondent and the researcher.

3.5.2.1 Structured interviews

According to Welman *et al.* (2005:165), a structured interview is where the interviewer puts a collection of questions from a previously-compiled questionnaire, known as an interview schedule, to a respondent face-to-face and then records the latter's responses.

3.5.2.2 Semi-structured interviews

Rabionet (2011:563) explains qualitative interviewing as a flexible and a powerful tool to capture the voices and the ways people make meaning of their experience. Conducting a semi-structured interview requires the following six stages:

(i)   Selecting the type of interview.

(ii) Establishing ethical guidelines.

(iii) Crafting the interview protocol.

(iv) Conducting the interview.

(v)   Crafting the reporting protocol.

(vi)   Reporting the findings.

3.5.2.3 Unstructured interviews

Welman *et al.* (2005:166) argue that unstructured interviews are informal and as such they are very useful to explore a general idea and obtain an in-depth view of the research matter at hand.

3.6 PROCEDURE FOR DATA COLLECTION

Data collection method of questionnaires was used to obtain the required information from the respondents. Interviews were utilised where possible to validate some of the points addressed on the questionnaire and obtain clarity on certain parts of the research process. The data was collected through the use of a questionnaire which was distributed to the ICT officials within the different metropoles in South Africa.

3.7 DATA ANALYSIS AND INTERPRETATION

Responses obtained from the participants were analysed and then interpreted to ensure a holistic view of what e-government employees in the different metropolitan municipalities in the country feel about e-government services.

3.8 LIMITATIONS OF THE STUDY

Based on the slow response rate of the questionnaires, incorrectly completed questionnaires and the responses to some of the strategy questions, the following limitations were encountered in the study:

- Employees not willing to participate regarding their area of work.

- Employees not providing a true reflection of the status quo with their answers.

- Obtaining responses from people located in different parts of the country.

- A lack of understanding from employees on the impact of their work on service delivery issues.

3.9 VALIDITY AND RELIABILITY

3.9.1 Validity

Validity signifies the level of quality and rigour of the research and has a significant impact on the quality of inferences that are generated from the study (Zachariadis *et al*., 2013:858).

Venkatesh *et al*. (2013:32) describe three distinct categories for validity which are widely used for quantitative and qualitative research. For qualitative research there are design validity, measurement (analytical) validity and inferential validity while in quantitative research, design validity broadly refers to internal (correlation observed is causation) and external (results can be generalised) validity.

3.9.2 Reliability

Reliability deals with the accuracy of the data. According to Leedy (1993:42) reliability asks one question above all the others: with what level of accuracy does the measure (test, instrument, inventory, and questionnaire) measure what it is intended to measure.

Kennedy-Clark (2012:1) argues that the criteria for reliability fall into two categories, viz. trustworthiness and the research design. She further states that there is a need and value for research students to contribute to the understanding of design studies which are guided by a trustworthy research design.

3.10 STATISTICAL ANALYSIS

The following techniques were used in this study:

- Frequency.
- Reliability (which includes the mean, standard deviation and Cronbach's alpha).
- T-test.

3.10.1 FREQUENCIES

We look at the numbers that have been used to summarize and describe the data obtained from our questionnaire.
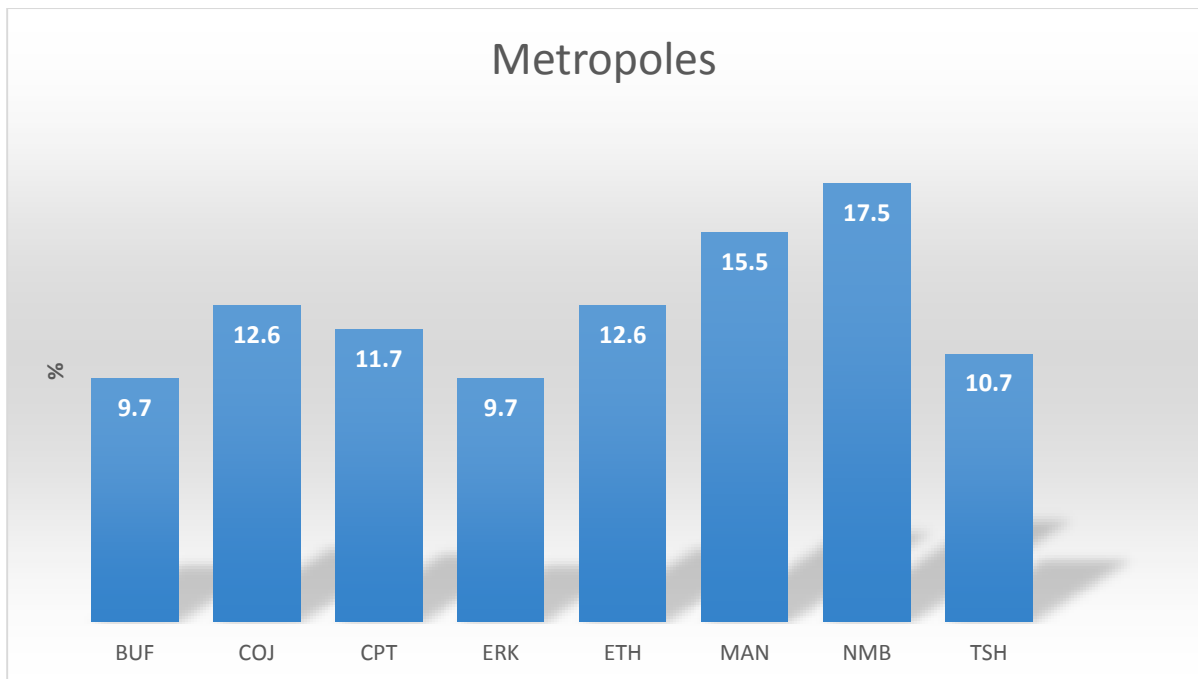
Figure 3.1: Metropoles

Figure 3.1 depicts the metropolitan areas that participated in the survey. The Nelson Mandela Municipality Bay (NMB) metro provided the biggest response of 17.5% followed by the Mangaung (MAN) with 15.5% and Ethekwini and Johannesburg (COJ) contributing 12.6 % each respectively.
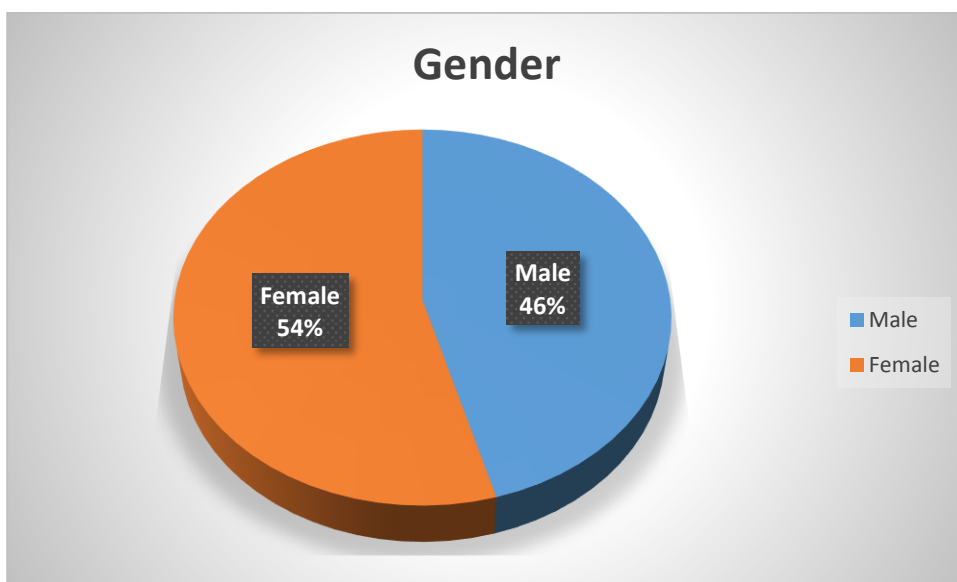
Figure 3.2: Gender statistics

Figure 3.2 shows that out of the overall sample, 54% of the participants were female while the remaining 46% percentage are males. It must be noted, however, that due to the sample size of our research population, the greater participation of women in this particular study cannot be extrapolated as the overall participation of women in all matters relating to ICT.
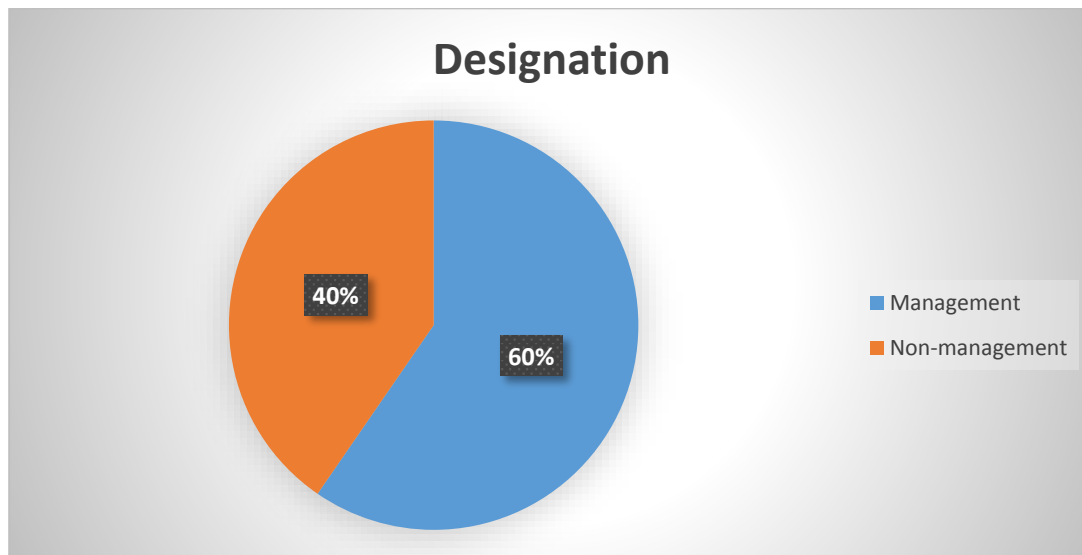
Figure 3.3: Designation statistics

Figure 3.3 shows the breakdown in percentages amongst participants on whether they are in management positions or not. 40% of the participants are not in management while 60% of them hold management positions in their different offices. This demonstrates that there's a representation of the different levels of management in e-government services, which will provide a balanced view of the planning done at higher levels versus what is actually being implemented.
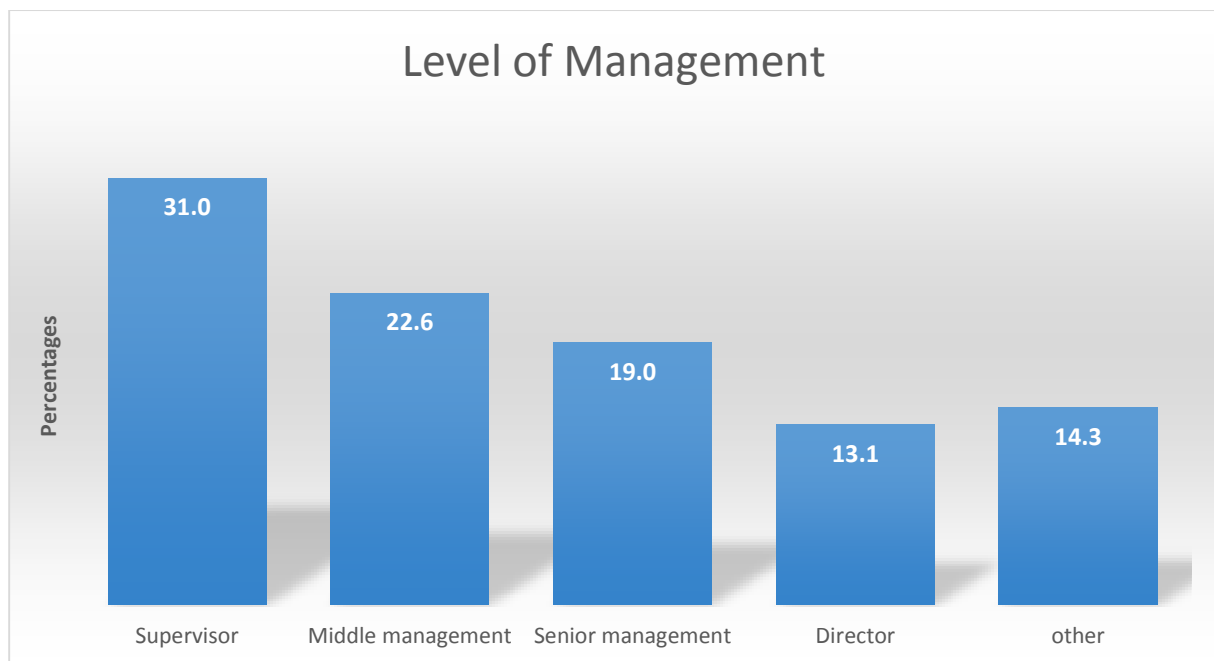
Figure 3.4: Level of management

Figure 3.4 looks into the different categories within management that the participants fit into. The highest number of people in management are people in supervisory positions with 31%. Middle management and senior management are 22.6 % and 19% respectively while people in directorship positions make up the smallest portion at 13.1%. 14.3% of the respondents indicated that they might be in some other position within the ICT structure other than the ones referred to in Figure 3.4.

The profile of the different management levels enables this study to determine the validity and reliability of the participation group on this research paper. The information provided by the respondent can be treated with a high level of validity and reliability as out t-tests suggest.

3.10.2 DESCRIPTIVES

This part of our analysis looks at the different responses from our participants and interpret the different responses in relation to our study.

- **Progress of e-government**

This part of the analysis is derived from section 2.1 of the questionnaire which reviews the opinions of the ICT officials with regard to the progress of e-government.

Table 3.1: Progress of e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
2.1 A	You have seen an improvement in the roll-out of e-government in your country	10.7	26.6	55.3	7.8	0	2.6	0.78
2.1 B	You have seen an improvement in the roll-out of e-government in your department	9.7	30.1	47.6	12.6	0	2.63	0.83
2.1 C	You have seen an improvement in the roll-out of e-government in your municipality/local government	12.6	21.4	54.4	11.7	0	2.65	0.85

Table 3.1 provides the percentage breakdown from the total responses received from the participants to the questions that are asked in sections 2 and 3 of the questionnaire.

The means for the three questions demonstrate that 60% of the respondents were in agreement and that there had been an improvement in the roll-out of e-government while the disagreement of the remaining 40% drive the public's perception about the slow rate of service delivery. The standard deviation suggests a bell shaped curve on the normal distribution further enhancing the reliability of the responses.

- **Costs of implementing e-government**

This part of the analysis is derived from section 3.1 of the questionnaire which reviews the opinions of the ICT officials with regard to the costs associated with e-government.

Table 3.2: Costs of implementing e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.1A	There are high costs involved in providing e-government services	1	22.5	53.9	22.5	1	2.98	0.7
3.1B	There are high costs involved in developing e-government services	1	14.7	61.8	22.5	1	3.06	0.64
3.1C	There are high costs relating to compliance with e-government regulations	3.9	25.5	54.9	15.7	1	2.82	0.74
3.1D	You are able to demonstrate cost v/s benefits of e-government	3	25.7	53.5	17.8	2	2.86	0.74

A larger percentage responding to section 3.1 (above 60% on all 4 questions) of the participants are in agreement over the high costs that are associated with e-government. Therefore, South African municipalities need to ensure that sufficient funding is made available to address the costs related to the successful implementation of e-government.

While the costs of introducing and maintaining e-services are perceived to be high, the responses demonstrate the belief that benefits for rolling out e-government are evident and easily demonstrable. In a country like ours where there high levels of unemployment, the cost of e-government services to the citizens might prove the most complex of all the challenges listed in this study.

- **Usage, skills and access to e-government**

This part of the analysis is derived from section 3.2 of the questionnaire which reviews the opinions of the ICT officials with regard to their usage, skill and access to e-government services.

Table 3.3: Usage, skills and access to e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.2A	The ICT skills levels of e-government officials are high	16.5	31.1	41.7	10.7	0	2.46	0.89
3.2B	There are a lot of concerns over online fraud and theft amongst e-government officials	9.7	26.2	33.0	31.1	0	2.85	0.97
3.2C	There's a strong motivation amongst e-government officials to use e-government	14.6	35.9	34.0	15.5	0	2.50	0.92
3.2D	E-government officials have access to all e-government services	16.5	30.1	40.8	12.6	0	2.49	0.91

The usage, skills and access part of the questionnaire highlighted concerns towards the high levels of skills and access to services by the e-government officials. There were also concerns around online fraud and theft but the biggest challenge that e-government officials have highlighted on this part of the questionnaire is the low levels of motivation amongst the officials to use e-government services.

There is a perception from the respondents that the levels of skills are not up to scratch and if the custodians of e-government believes this, then there is a likelihood that the public believe it too. The responses suggests that the skills levels amongst the ICT officials and the access to the e-government services may not be sufficiently available. This two factors may be the contributing factors to the low levels of motivation in e-government implementation.

South African companies experience more fraud and bribery than their counterparts elsewhere in the world, the PricewaterhouseCoopers Global Economic Crime Survey

2014 found earlier this year. They were being hit by a higher incidence in most categories of economic crime — bribery, corruption, asset misappropriation, procurement fraud, human resources fraud, money laundering, tax fraud, and financial statement fraud.

Much of this fraud is referred to as cybercrime, which is broadly defined as any form of criminal activity involving the use of computers and the Internet. The most common cybercrimes are identity theft, phishing and smishing (the SMS version of phishing), and the numerous guises of credit card fraud (Beetar, 2014).

Therefore, while the bigger challenge still remains getting the buy in from the citizens on the use of e-government services, it is imperative that the officials themselves have increased motivation which will enable them to 'sell' to the general citizens a concept that they fully understand and use.

- **Implementation and roll of e-government**

This part of the analysis is derived from section 3.3 of the questionnaire which reviews the opinions of the ICT officials with regard to the progress on the implementation/roll out of e-government services.

Table 3.4: Implementation and roll-out of e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.3A	Can e-government services be offered in different languages used in the country	11.7	22.3	49.6	19.4	0	2.73	0.90
3.3B	Is there provision for access to e-government services by people with disabilities	12.6	37.9	37.9	11.7	0	2.48	0.86
3.3C	Are e-government applications easy to use and understand	11.7	27.2	44.7	16.5	0	2.66	0.89
3.3D	Is there sufficient security on authentication and identification of e-government services	11.7	35.0	35.0	18.4	0	2.60	0.92

69% e-government officials are fairly positive about the implementation and roll-out of e-government services to the public using different languages and available e-government applications that are easy to use and understand. Great strides and improvement will be required in making this services available to people with disabilities and ensuring greater levels of security on the authentication and identification of users to also address the issue of fraud highlighted in the usage, access and skills part of the questionnaire.

The language barrier should be treated with caution as this may be the very same reason why people are not making use of the services, there may be additional cost implications associated with these but it may be costs that are well worth the associated spend.

 The metropoles would need to ensure that the translation processes are facilitated by people with a good knowledge of the subject matter (e-government) and the languages involved in translation. In line with the previously discussed concepts of the Batho-Pele principles, e-government services should be available to all the citizens of South Africa without any prejudice or discrimination.

- **Support and administrative challenges to e-government**

This part of the analysis is derived from section 3.4 of the questionnaire which reviews the opinions of the ICT officials with regard to the support and administrative challenges of e-government.

Table 3.5: Support and administrative challenges to e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.4A	Is there a lot of change resistance by e-government officials	8.2	24.5	38.8	28.6	5	2.88	0.92
3.4B	Do you have a list of suppliers that support e-government services	14.3	24.5	50	11.2	5	2.58	0.87
3.4C	Are you able to obtain more services providers that support e-government services	15.3	24.5	48	12.2	5	2.57	0.9
3.4D	Do you have enough policy support for e-government	15.5	32	38.1	14.4	5	2.52	0.93
3.4E	Your department forges partnerships with the private sector	18.4	25.5	45.9	10.2	5	2.48	0.91

Responses on section 3.4 of the questionnaire demonstrates that there are a number of critical aspects that needs to be addressed such as forging partnerships with private sectors, e-government policy support, suppliers and service providers of e-government.

It appears as though there's a strong preference not to implement e-government which may re-enforces previously mentioned points relating to motivation and the required skill levels. Access to suppliers and the ability to obtain more service providers does not appear to be a major concern as per the responses. The obstacles may be more internal than external with policy support and resistance to change the key factors to be addressed.

- **Technology challenges to e-government**

This part of the analysis is derived from section 3.5 of the questionnaire which reviews the opinions of the ICT officials with regard to the technological challenges of e-government.

Table 3.6: Technology challenges to e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.5A	Your department makes use of a variety of technologies	12.1	24.2	45.5	18.2	4	2.7	0.91
3.5B	Your department often taps into the infrastructure available in your metropolitan area	18.2	26.3	39.4	16.2	4	2.54	0.97

The results on section 3.5 of the questionnaire indicates that the participants' views on technologies used in their departments as an area for concern. The champions of e-government initiatives needs to ensure that they keep up to date with the changes and trends in the technological space and forms partnership with ICT service providers in their areas of operations and expertise. Three of the latest trends in e-government are cloud computing, collaboration and cooperation between government departments and large amounts of data to access information.

Additional research may be required to produce an architectural overview of existing technology and infrastructure readily available for e-government initiatives. This will enable the metropoles to identify whether they have technology available that they are not using efficiently, technology that can be used for different e-government services to what it was intended for or where there is no available/sufficient technology to drive e-government services.

- **Strategy challenges to e-government**

This part of the analysis is derived from section 3.6 of the questionnaire which reviews the opinions of the ICT officials with regard to the strategy challenges in e-government.

Table 3.7: Strategy challenges to e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.6A	Do you have a strategic e-governance plan for a minimum period of 6 years	28.4	24.2	36.8	10.5	8	2.29	0.95
3.6B	If there's a plan, is it regularly reviewed & updated	23.4	35.1	30.9	10.6	9	2.61	0.96
3.6C	Are you connected to other smart cities in the country	16.8	22.1	44.2	16.8	8	2.42	1
3.6D	Are there recent initiatives that you have undertaken on e-government	22.1	28.4	34.7	14.7	8	2.61	0.83

There is a 50/50 split on the strategy challenges presented by the responses presented on section 3.6 of the questionnaire. This can be attributed to an environment where an organisations' strategy is crafted but not shared with all the role players in the execution of that strategy. Perhaps one central planning and commitment centre is required to be responsible for all e-government services to be the custodians of all initiatives and strategies which will also help with improving collaboration between the different metropoles. Structured ad organised planning as well as innovative initiatives should be encouraged amongst ICT officials.

The responses must also be viewed in the context of the level of management of the ICT officials that participated in the study. Their responses are purely based on their views and experience related to their knowledge of the e-government strategies within their environment. Consideration should also be given to the momentum of the government initiatives regarding which services have been recently added.

The e-government officials which are responsible for mapping out and crafting of the different strategies need to ensure that such strategies are embedded in all organisational levels from bottom up to ensure that all stakeholders in the e-government value chain 'sing from the same hymn book'.

- **Service challenges to e-government**

This part of the analysis is derived from section 3.7 of the questionnaire which reviews the opinions of the ICT officials with regard to the service challenges in e-government.

Table 3.8: Service challenges to e-government

Section	Question/Statement	Strongly disagree	Disagree	Agree	Strongly agree	Number of Missing	Mean	Standard deviation
3.7A	A lot of e-government services are online	9.5	32.6	45.3	12.6	8	2.61	0.82
3.7B	Do you know and make use of any technology service centres	9.5	24.2	45.3	21.1	8	2.77	0.88
3.7C	E-government services are offered from a centralised department	6.3	31.6	49.5	12.6	8	2.68	0.77
3.7D	E-government services are provided to citizens with good turnaround times	17.9	28.4	37.9	15.8	8	2.51	0.96

Responses to the questions in section 3.7 of the questionnaire paints a positive picture in relation to the service challenges that exists within the e-government space. The positive areas as per the responses relate to the availability of e-government services online, the use of technological centres and a centralised department overseeing all e-government offerings. Improvement all round will be required in terms of the provision of this services with great emphasis required in ensuring greater turnaround times to the users of e-government services.

A rating of the services that are provided must be considered to enable ICT officials to obtain feedback from the citizens that they serve. It is one thing to build a relationship with users on the uptake of e-government services but the greater challenge is in ensuring that the users that makes use of the services are not lost due to unreliable uptimes on the systems as well as poor turnaround times in addressing their concerns around e-government services. An analysis would also needs to be conducted on which other e-government services can be further digitalised.

3.10.3 RELIABILITY

Cronbach's alpha was used to measure internal reliability or consistency of the questionnaire. The guideline value is 0.7 but 0.5 can also be used although its interpretation should be handled with caution (Field, 2009:821).

The formula for Cronbach's alpha is depicted as below:

Equation 3.2: Basic equation for alpha

Cronbach's basic equation for alpha:

$$a = \frac{n}{n-1}\left(1 - \frac{\sum Vi}{Vtest}\right)$$

n = number of questions

Vi = variance of scores on each question

Vtest = total variance of overall scores (not %'s) on the entire test

According to Tavakol and Dennick (2011:53), the Cronbach alpha is used to provide a measure of consistency of a test scale and it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and connected to the inter-relatedness of the items within the test.

Table 3.9: Cronbach's alphas and descriptive statistics of factors

Section	Cronbach Alpha	Mean	Std. Deviation
Progress of e-government	.88	2.63	.74
Cost of implementation	.78	2.93	.55
Usage, skills and access	.84	2.58	.76
Implementation of e-government	.78	2.62	.70
Support & administration challenges	.81	2.61	.68
Technology challenges	.84	2.62	.87
Strategy challenges	.89	2.40	.84
Services challenges	.86	2.65	.73

Table 3.9 shows the Cronbach Alpha, the mean and the standard deviation for each section of the questionnaire.

The Cronbach alpha values for all the sections in the questionnaire measure higher than 0.7 on the scale, which indicates reliability of the questions asked in each section. The mean for all the sections in the questionnaire, with the exception of strategy challenges shows that respondents general agreed with the statement or question in a particular section.

3.10.4 T-TEST

We look at whether the difference between the two groups (males & females) averages reflects a difference in the sampled population.

Table 3.10: Independent t-test with gender

N1.1		N	Mean	Std. Deviation	p-value	Effect size
Officials opinion on the progress of e-government	Male	47	2.62	0.74	0.96	0.01
	Female	56	2.63	0.75		
The cost of implementing e-government	Male	47	2.99	0.52	0.33	0.19
	Female	55	2.88	0.57		
Usage, skills and access	Male	47	2.62	0.80	0.61	0.10
	Female	56	2.54	0.73		
Implementation/roll-out of e-government	Male	47	2.52	0.79	0.18	0.23
	Female	56	2.71	0.60		
Support and Administrative challenges	Male	46	2.57	0.64	0.67	0.08
	Female	52	2.63	0.73		
Technology challenges	Male	46	2.60	0.94	0.85	0.04
	Female	53	2.63	0.82		
Strategy challenges	Male	45	2.32	0.85	0.39	0.18
	Female	50	2.48	0.85		
Services challenges	Male	45	2.72	0.74	0.38	0.18
	Female	50	2.59	0.72		

Note: P-values are reported for completeness sake but will not be interpreted since a convenience sample instead of a random sample was used.

Effect size is a measure which helps to describe the practical significance of the difference between the means of the two groups. According to Ellis and Steyn (2003:52) the guideline for the effect size is as follows:

- 0.2 small – no practically significant difference.

- 0.5 medium – practically visible difference.

- 0.8 large – practically significant difference.

Table 3.10 shows that there are no practically visible or practically significant differences between the means of males and females throughout the questionnaire as most of the effect sizes are 0.23 or lower. The small differences in responses of the employees is further explained by the table below which suggest a similar or familiar background from the respondents as far as their e-government experience is concerned.

Figure 3.5: Respondents Qualifications

Figure 3.5 provides the highest qualification for the ICT officials that took part in the study. Out of the 103 employees that responded there is about 17 with matric or low as their highest level of qualification which displays an above average level of competency amount the officials. The p-value amount indicates whether there is a statistically significant difference between the means (use equal variance and not assumed). The general guideline is a p-value < 0.05, with a statistically significant difference between the means.

3.11 CONCLUSION

Based upon the responses from the questionnaire the most apparent obstacle towards improved implementation is the attitude of the government towards e-government. Motivation to implement e-government is lacking, driven by the perceptions that there are skill shortages and access to central resources are lacking.

At a higher level there appears to be a lack of strategic direction and intent underpinned by the lack of shared strategic vision across the different levels of management, a clear belief that policy is not supporting the e-government movement and the apparent lack of planning with respect of infrastructure re-use and optimisation.

Further to this there appears to be a perception that the implementation of e-government is largely completed, underpinned by the respondents acknowledging that "a lot" of services are already implemented as well as the lack of current momentum indicated by the low number of respondents that have recently been involved in a new e-government initiative. Cost is seen as another inhibiting factor but is perhaps not as large a factor due to the perceived demonstrable benefits of e-services.

Online security and the threat of cyber fraud or identity theft is another factor which may slow down the implementation of e-government. These concerns are multi-pronged as they may slow down implementation efforts from within government as well as deadening the desire for further progress from the public at large. Areas that do not seem of immediate concern in slowing progress down are access to external suppliers and the perceived benefits of past implemented services.

The empirical study has demonstrated that focus should not only be on a single challenge but look at the various components across the different challenges. While the cost and technology available may be important in one area of government, the other department may be battling issues around drawing up their strategy for e-government or administrative challenges that comes with the implementation of e-government.

It must also be noted from the study that even though there are multiple challenges surrounding the implementation or progress of the e-government roll-out, a larger percentage of the ICT personnel within the different municipalities actually realises or notices an improvement in the progress of rolling-out e-government initiatives either at a national, provincial or local government.

Similarly challenges such as cost, security and services provided along with the skills levels amongst e-government officials can not be ignored and would need to be addressed in the quest for uptake in e-government provision to the citizens.

It is therefore important for the custodians of e-government in the country to collect information on a regular basis, to craft and maintain strategies that addresses the needs of their citizens while also ensuring that they equip their personnel with the necessary tools and skills to better service their customers.

Technology changes and evolves fairly quickly in the modern era, and as a custodian of e-government, ICT officials need to keep abreast of the latest developments in the technological space to ensure that the country is not left behind in the stone ages while the rest of the world progresses in the technological sphere.

There is a link between service delivery and how the government interacts with its people, and the biggest challenge the government faces is to ensure that the communication channels remain open and accessible to its citizens at any time, from any place and in any form available to the users.

3.12 SUMMARY

This chapter looked at the research design and methodology used, as well as the statistical analysis and descriptive statistics applied. The population and sample size of the study along with the procedure and collection instruments used in the study were also reviewed.

The main purpose of this study was to understand and evaluate the different challenges that impede or slow down the progress in implementing e-government in the public service.The study made use of a questionnaire which was divided into 4 sections (section 1 demographic information, section 2 the development of e-government, section 3 on the different challenges facing e-government and section 4 looking at the views of ICT staff members on where their views on e-government emanate from.

A 4-point scale was used requesting the ICT staff members across the different municipalities to answer each question by marking their preferred box: Strongly disagree, Disagree, Agree, and Strongly Agree.

Some of the techniques used in the statistical analysis are frequency, reliability (which includes the mean, standard deviation and Cronbach's alpha) and t-test. Frequency provides a summary of numerical values and totals them into a set of order classes while reliability validates the responses of the participants against the mean while the standard deviation shows the variation from the average (mean) and the t-tests provide a measure on the relationship between two variables.

CHAPTER 4: RECOMMENDATIONS AND CONCLUSIONS

4.1 INTRODUCTION

From Chapter 1 of the empirical study, the primary and secondary objectives have been identified. Chapter 4 begins with looking at how the results of the study have been able to assist in meeting the primary and secondary objectives. Once the primary and secondary objectives have been met, the study will enable this study to determine how ICT can enable e-government in the municipalities. A deeper understanding of the challenges that slow down the progress of e-government can assist in providing insight on how municipalities should go about setting and achieving their e-government objectives and goals. A further discussion on the limitations of the study is provided and supported by suggested recommendations.

A summary and subsequent recommendations of the study results provide a guide on what metropoles need to do, to ensure the successful use of ICT in enabling e-government service in the service delivery value chain. Challenges such as costs and skills levels amongst ICT officials must still be addressed to ensure successful implementation. A concrete strategy that covers services, technology and administrative issues must be crafted as a guide for e-government services in the municipalities.

Further studies may include the national and provincial government in its entirety in future research projects. Expanding the research will provide the key issues that drive e-government services and how technology can support those services for improved governance and service delivery to the citizens of the Republic.

4.2 PRIMARY AND SECONDARY OBJECTIVES

4.2.1 Primary objectives

The primary objective of this research is to explore the extent to which metropoles are making use of e-government to improve public services and why there is a perception of slow delivery.

The study has conclusively demonstrated that (by making use of a questionnaire on the successful roll-out of e-government) that the following challenges have to be adequately addressed to drive the successful implementation of e-government services in metropolitan areas:

- Lack of motivation amongst e-government officials to use e-government services.

- Security on authentication and identification of e-government services.

- Access to e-government services by people with disabilities.

- Policy support for all e-government initiatives.

- Partnerships with the private sector.

- Lack of a strategic e-government plan.

The above factors are critical in addressing the success or failure of using ICT to enable e-government services to improve the lives of the citizens.

4.2.2 Secondary objectives

The research results will hopefully contribute to an understanding of the relationship between e-government in the metropolitan areas in a South African context and public service offerings.

The research will enable this study to gather the views of the public around issues of service delivery and their attitudes towards governance on issues of accountability and transparency in changing the lives of the citizens for the better.

The study has also provided a basis for the different technologies that must be explored and evaluated in order to be utilised through e-government to the benefit of society at large.

The researcher also proposes the crafting of a baseline or framework on e-government that includes all the factors that need to be addressed when rolling-out e-government. This framework should be adopted at national level and cascaded down to the lowest levels of government services.

4.3 LIMITATIONS OF THE STUDY

ICT officials within the different metropoles have different objectives regarding e-government and this can be viewed as a limitation as they have different mandates or objectives that are set out for them in respect of their immediate surroundings.

A further limitation is that most senior ICT officials within the metropolitan areas delegated participation in this study to their subordinates which made it difficult to address key strategic issues on e-government.

4.4 SUMMARY OF THE STUDY RESULTS

The study has met the primary and secondary objectives that were set out in Chapter 1. As set out in the objectives, the factors that might have an influence on the slow progress of e-government have been identified and were addressed as challenges within the questionnaire.

The following components within the different challenges would still need to be analysed by the different metropoles as per the responses:

- Overall costs associated with provision of e-government services.
- Accessibility of e-government services in different languages and to people with disabilities.
- Policy support for e-government, collaboration between the different metropoles and partnerships with the private sector.
- Strategic planning and innovative initiatives.

The ICT officials who participated in the study also provided a positive response in relation to the progress of e-government where most of them 'agree' and 'strongly agree' that they have seen a lot of improvement in the rolling out of e-government services. The positive areas as per the responses relate to the availability of e-government services online, the use of technological centres and a centralised department overseeing all e-government offerings.

A high correlation existed between the different challenges that were identified as having an impact on the roll-out of e-government which demonstrated that even though each municipality may have to deal with different dynamics within their areas of governance,

there has to be great uplift in motivation from all ICT officials to act as champions on the roll-out and use of e-government services.

ICT officials across South Africa share the same concerns and pain points. As a result the researcher recommended the crafting of a national strategy/policy guideline which includes all factors that must be considered when e-government services are rolled out in the metropolitan municipalities.

4.5 RECOMMENDATIONS

ICT can be used to enable e-government in the municipal areas if recommendations are turned into proper action plans and implemented by the municipalities. These recommendation will addressing the below four dimensions relating to e-government in the South African context:

- The digital divide.

- Public perceptions.

- Economic disparities/affordability.

- Involvement and types of technology.

The following a list of recommendations that can be implemented to address the use of different technologies in the municipalities to ensure improved public service offering amongst the citizens:

- The South African metropoles have to implement and adapt a full programme for e-government while there is still excitement and hype going on around the topic of e-government.

- A skills assessment should be carried out to evaluate whether the necessary skills exist within government to optimally implement e-government, with the results being input into recruitment strategies.

- Metros have to make use of e-government to improve the quality of information in order to facilitate the upgrading of education, health care, recreation and other services.

- Reduce the cost of providing e-government services to the public.

- Authorities need to implement the use of e-books and e-readers in the school curriculum system from an early age to get the learner to make first contact with technology from an early age.

- The digital divide has to be bridged by putting more emphasis on areas of society that do not have access to technology and also put in place programmes to improve the technological literacy of the citizens.

- Authorities have to capacitate ICT departments in the municipalities with human resources that have an ICT background to implement e-government plans in the most successful way.

- They must position the objectives of e-governance reform against new possibilities of a digital systems.

- They must provide secured, private and reliable platforms for services to be rendered to the citizens with sufficient authentication and identification.

- They must adopt as many South African languages as possible when implementing e-government service offerings to the citizens and also accommodate users with disabilities.

- To address the internal resistance to e-government a change management programme should be introduced to further build upon this study in identifying and remediating the underlying causes for resistance within government.

- E-government strategy and tactical implementation plans need to be better communicated across the different levels of government.

- Provide easy to use technology that is free/cheap and maintains a regular interaction with the citizens. E.g. Free Wi-Fi at public transport hubs such as taxi ranks, bus stops and train stations.

- They must see to the crafting of a baseline or framework on e-government that includes all the factors that needs to be addressed when rolling-out e-government.

4.6 RECOMMENDATIONS FOR FUTURE RESEARCH

It is recommended that future research be extended to the national and provincial governments. With the inclusion of national and provincial government, local municipalities will be able to have an idea of what informs the views or opinions of senior ICT officials in addressing specific outcomes and value–added service delivery offerings that the citizens requires.

Additional research also on the available architectural overview and the technological landscape in the South African e-government space to enable the metropoles to identify technology that is available and not being used efficiently or technology that is required to drive e-government services.

4.7 CONCLUSIONS

Across the world, many countries have come to recognise e-government as a unique and powerful tool that can be used by governments. It provides an opportunity to make rendering services to the public more effective and efficient. It does not only foster partnerships between government and its citizens but also provides knowledge on how departments across the many levels of government can collectively take a different view on how they serve their citizens.

With the competencies and computer literacy of the population growing, along with the use of technology, e-government will provide the government with an opportunity to locate some parts of public development in the hands of the end users. Such involvement from users could change how e-government works currently and ensure that services offered are more in line with the personal tastes and needs of such users.

E-government in its essence is about providing a better way in which governments and its citizens can engage and for the authorities to be able to determine first-hand what it is that their citizens want, what they expect, and what it is that they do not want.

For this study to be able to say that e-government has been a success, will be determined by the efforts of the government in ensuring that the citizens participates in their service offerings by providing a wide range of ICT access, building more infrastructure and making sure that its activities and services are as close to the public as possible and as such promotes transparency and accountability.

After all, good governance and improved service delivery to the citizens of the Republic should be the key foundations of a fresh and vibrant democracy.

4.8 SUMMARY

The researcher is of the opinion that the primary and secondary objectives of the study have been met. The key factors that needed to be examined when rolling out e-government services have been identified.

The limitations of the study centred on the different metropoles in South Africa. Another limitation was access and the availability of the custodians of ICT within the metropolitan areas as participation was delegated to their subordinates.

A number of recommendations to be implemented are listed to speed up the progress and development of e-government.

REFERENCES

Adeyemo, A. 2011. E-government implementation in Nigeria: an assessment of Nigeria's global e-government ranking. *Journal of Internet and information system*, 2(1):11 - 19.

Aoto, P.C., Fenwick, R.B., Kroon, G.J.A. & Wright, P.E. 2014. Accurate scoring of non-uniform sampling schemes for quantitative NMR, e-Publications.

Asogwa, B.E. 2013. Electronic government as a paradigm shift for efficient public services. *Opportunities and challenges for Nigerian government*, 31(1):141 – 159.

Baltzan, P. & Phillips, A. 2009. Essentials of business driven Information systems. 1st edition. New York: McGraw-Hill Irwin.

Beetar, M. 2014. SA's companies' fraud stats lead the world. http://www.bdlive.co.za/business/2014/12/10/sa-comapnies-fraud-stats-lead-the-world. Date of access: 12 March 2015.

Botti, M. & Endacott, R. 2008. Clinical research 5: quantitative data collection and analysis. *International emergency nursing*, 16:132 - 137.

Chou, S. & Lin, J. 2012. The Australian e-government strategy development and outcome. *International journal of digital content technology and its applications*, 6(6): 322 – 332.

Cloete, F. 2012. E-Government lessons from South Africa 2001 -2011: Institutions, state of progress and measurement. *The African journal of information and communication*, 12:128 – 142.

Cooper, D.R. & Schindler, P.S. 2008. Business Research Methods. 10th edition. New York: McGraw-Hill.

City of Johannesburg, 2011. Preparing for a smart Joburg. http://www.joburg.org.za/index.php?option=com_content&id=7245&Itemid=266. Date of access: 16 January 2014.

Denscombe, M. 2010. The good research guide for small-scale social research projects. 4th edition. Maidenhead, England. Open University Press: McGraw-Hill Education.

Doong, S.H. & Ho, S. 2012. The impact of ICT development on the global digital divide. *Electronic commerce research and applications,* 11:518 – 533.

Dube, S. & Danescu, D. 2011. Supplemental guidance: Public sector definition. *The Institute of Internal Auditors*, 1:1 - 8.

Ebbers, W.E. & Van Dijk, J. A. G. M. 2007. Resistance and support to electronic government, building a model of innovation. *Government information quarterly,* 24: 554 – 575.

Elfrink, W. 2012. The smart-city solution*.*
http://www.mckinsey.com/insights/public_sector/the_smart-city_solution
Date of access: 16 January 2014.

Ellis, S.M. & Steyn, H.S. 2003. Practical significance (effect sizes) versus or in combination with statistical significance (p-values). *Management Dynamics*, 12(4): 51 - 53.

Field, A. 2009. Discovering statistics using SPSS. 3rd edition. London: Sage Publications.

Flick, U. 2007. Designing qualitative research. The SAGE qualitative research kit. London: Sage Publications.

Gray, D.E. 2009. Doing research in the real world*.* 2nd ed. London: SAGE Publications.

Grobler, M. & Dlamini, Z. 2012. Global cyber trends: A South African reality. Council for Scientific and Industrial Research, IST – Africa 2012 Conference proceedings. International Information Management Corporation:1 – 8.

Helbig, N., Gil-Garcia, J.R. & Ferro, E. 2009. Understanding the complexity of electronic government: Implications from the digital divide literature. *Government information quarterly,* 26:89 – 97.

Hung, S., Chang, C. & Kuo, S. 2013. User acceptance of mobile e-government services: An empirical study. *Government information quarterly,* 30:33 – 44.

Kaisara, G. & Pather, S. 2011. The e-government evaluation challenge: A South African Batho - Pele aligned service quality approach. *Government information quarterly,* 28:211 – 221.

Kaselowski, E., van Salms, B. & van Salms, R. 2010. Municipalities and information technology governance – towards a strategic planning framework, 45(2):333 – 342.

Kennedy-Clark, S. 2012. Design research and the solo higher degree research student: strategies to embed trustworthiness and validity into the research design. *Joint Aare Apera International Conference* 2 – 6 December: 1 -12.

Kroukamp, H. 2005. E-governance in South Africa: are we coping? *Acta Academica* 37(2) :52 – 59.

Kvale, S. 2010. Doing interviews*.* London: SAGE Publications.

Lam, W. 2005. Barriers to e-government integration. *The journal of enterprise information management,* 18(5):511 – 530.

Leedy, P.D. 1993. Practical research. Planning and design. 5th edition, New York, Macmillan Publishing Company.

Leedy, P.D. & Ormond, J.E. 2005. Practical research: Planning and Design. New Jersey: Merrill Prentice-Hall.

Levine, D.M., Stephan, D.F., Krehbiel, T.C. & Berenson, M.L. 2008. Statistics for managers: Using Microsoft Excel. 5th edition. Upper Saddle River, NJ: Pearson.

Lochner, F. 2012. Sustainable technologies: a council chamber perspective, IMFO Autumn 2012:14 – 18.

Maumbe, B.M., Owei, V. & Alexander, H. 2008. Questioning the pace and pathway of e-government development in Africa: A case study of South Africa's Gateway project. *Government Information quarterly*, 25:757 – 777.

Matavire, R., Chigona, W., Roode, D., Sewchurran, E., Davids, Z., Makudu, A. & Boamah-Abu, C. 2010. Challenges of e-government project implementation in a South African context. *The electronic journal information systems evaluation*, 13:153 – 164.

McHenry, W. & Borisov, A. 2005. E-government public-private partnerships: the "Gorod" payments system in Siberia. *The journal of enterprise information management,* 18(5):625 – 640.

McLeod, D. 2012. Technology & you*.*
http://www.financialmail.co.za/opinion/columnists/2012/11/01/bad-line-at-telkom. Date of access: 16 January 2014.

Minishi-Majanja, M. & Ondari-Okemwa, E. 2009. Enhancing government basic service delivery and performance effectiveness in sub-Saharan Africa through e-governance, *SA ePublications,* 27(2): 17 – 35.

Mokhele, I. & De Beer, K. J. 2007. The use of Information and Communications Technology (ICT) in e-service delivery and effective governance in South Africa, *SA ePublications*, 6(2):60 – 67.

Moodley, S. 2005. Deconstructing the South African government's Information and Communication Technologies for development discourse. *SA ePublications,* 35(3):3 -12.

Moyo, A. 2012. Conflicting interests hinder SA's smart city growth. ITWeb.
http://www.itweb.co.za/index.php?option=com_content&view=article&id=57348
Date of access: 16 January 2014.

Mphidi, H. 2009. Digital divide and e-governance in South Africa. *Research Innovations and partnerships,* 1:1 -18.

Mpinganjira, M. 2013. An empirical investigation of factors affecting the adoption of e-government services. *Journal of contemporary management*, 10:320 – 338.

Mpinganjira, M. 2012. Diffusion of e-government services: A citizen's perspective. *Journal of Public Administration*, 47(2):500 – 517.

Mutula, S. & Ocholla, D. 2010. Building trust in e-government: a proposal for an integrated model. *SA ePublications,* 28(1):128 – 148.

Naidoo, R. 2013. E-toll roads: analysing a case of collective moral disengagement in an e-government project: challenges in leadership of ICT policy and e-development *SA ePublications*, (13):108 – 122.

Ntetha, M.A. & Mostert, B.J. 2011. Availability and utilization of information and communication technologies for service delivery: a South African case study. *SA Journal of libraries and information science,* 77(2):125 -137.

Nzimakwe, T. 2012. Transforming the public service through e-government: Challenges for the future. *Africanus,* 42(1):56 – 68.

Odendaal, N. 2003. Information and communication technology and local governance: understanding the difference between cities in developed and emerging economies. *Computers, environment and urban systems,* 27:585 – 607.

Oliviera, G. H. M & Welch, E., W. 2013. Social media use in local government: Linkage of technology, task and organisational context. *Government information quarterly,* 30:397 – 405.

Oyomno, G. Z. 2003. Towards a framework for assessing the maturity of government capabilities for e-government. *The Southern African Journal of Information and Communication*, 4:77 – 92.

Patterson, J. 2013. A platform for change. *IT Web e- Government*, 1:12.

Pick, J.B. & Nishida, T. 2014. Digital divides in the world and its regions: A spatial and multivariate analysis of technological utilization. Technological forecasting and social change, *Science Direct*, 1:1 - 17.

Rabionet, S.E. 2011. How I learned to design and conduct semi-structured interviews: an ongoing and continuous journey. *The qualitative report,* 16:563 – 566.

Reddi, U. V. 2011. Role of ICTs in education and development: potential, pitfalls and challenges. www.unesco.org/education/aladin/paldin/pdf/course01/unit13.pdf:173 – 186. Date of access: 13 March 2014.

Reeves, T. 2006. Design research from a technology perspective. Educational design research. New York: Routledge.

Salkind, N.J. 2009. Exploring Research. 8th ed. London: Pearson.

Schoeman, L. 2007. Embracing e-government: in search of accountable and efficient governance objectives that improves service delivery in the South African health sector. *Journal of public administration,* 42(5):183 – 199.

Schreuder, H.T., Gregoire, T.G. & Weyer, J.P. 2001. For what applications can probability and non-probability sampling be used? *Environmental monitoring and assessment,* 66:281 – 291.

Singh, A. M. 2004. Bridging the digital divide: the role of universities in getting South Africa closer to global information society. *South African Journal of Information Management,* 6(2):2 – 9.

Spillman, L. 2014. Mixed methods and the logic of qualitative inference. *Qualitative sociology,* 37:189 – 205.

Statistics South Africa 2004. Census 2001: Concepts and definitions. Version 2 : 1 – 21.

Tavakol, M. & Dennick, R. 2011. Making sense of of Cronbach's alpha. *International journal of medical education,*2:53 – 55.

Teddlie, C. & Tashakori, A. 2009. Foundations of mixed methods research. Integrating quantitative and qualitative approaches in the social and behavioural sciences. London: Sage Publications.

The World Bank 2014. E-Government. www.worldbank.org. Date of access: 14 February 2014.

Twinomurinzi, H., Phahlamohlaka, J. & Byrne, E. 2012. The small group subtlety of using ICT for participatory governance: A South African experience. *Government information quarterly,* 29:203 – 211.

United Nations Population Fund. 2007. Linking population, poverty and development. http://www.unfpa.org/pds/urbanization.htm. Date of access: 16 January 2014.

Uprichard, E. 2013. Sampling: bridging probability and non-probability designs. *International journal of social research methodology*, 16:1 -11.

Van Huyssteen, E., Oranje, M. & Coetzee, M. 2010. South Africa's metropolitan regions post-1994: the good, the bad and the just plain ugly, Draft paper to be presented at the Planning Africa Conference, Durban, September 2010. Theme: Spatial trends and sustainable urbanisation:1 – 12.

Venkatesh, V., Chan, F. K. Y. & Thong, J. Y. L. 2012. Designing e-government services: key service attributes and citizens' preference structures. *Journal of operations management,* 30:116 – 133.

Venkatesh, V., Brown, S.A. & Bala, H. 2013. Bridging the qualitative and quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS quarterly,* 37(1):21 - 54.

Visser, W. & Twinomurinzi, H. 2008. E-government and public service delivery: Enabling ICT to put "People First" – A case study from South Africa. *Journal of Systematics, Cybernetics and Informatics*, 6(6):36 – 41.

Welman, C., Kruger, F. & Mitchell, B. 2005. Research methodology.3rd edition. Oxford: Oxford University Press.

Wilson, A., Zeithaml, V., Bitner, M. & Gremier, D. 2008. Services marketing: integrating customer focus across the firm. 1st European Edition. London: McGraw Hill.

Wu, W. & Little, T.D. 2011. Quantitative research methods. *Encyclopaedia of adolescence*, 1:287 – 297.

Kjaer, K. L. 2013Time to think new models. www.kjaer-global.com. Date of access: 01 July 2014.

Zachariadis, M., Scott, S. & Barrett, M. 2013. Methodological implications of critical realism for mixed-methods research. *MIS quarterly*, 37(3):855 - 879.

ANNEXURE A: QUESTIONNAIRE

5.1 E-GOVERNMENT SURVEY QUESTIONNAIRE

My name is Itumeleng Mofikoe and I am currently busy with my final year MBA studies at the North-West University, Potchefstroom Business School. I'm currently working for the City of Johannesburg's (CoJ) MOE called Pikitup which is responsible for waste management in the city. My current tittle is General Manager: Business Information Systems. This questionnaire is designed solely to fulfil my mini-dissertation requirements for my Master's Degree.

The title of my research is "The role of Information Communication and Technology (ICT) in enabling e-government – in a metropolitan area" and the research is only going to be used as a requirement for my mini-dissertation in the MBA programme in the North-West University, Potchefstroom Business School. The study is focused on e-government and how the different technologies can be applied to improve service delivery challenges in municipalities. There will also be some recommendations which can be shared with concerned authorities to assist in the improvement of rolling-out e-government initiatives.

This questionnaire is designed to collect information from IT officials in government. Your assistance and participation in this survey would be greatly appreciated and is completely voluntary. Any information you complete in this questionnaire is confidential and nothing that you say will be personally attributed to you in any reports that results from this survey. The questionnaire will be used for this study and will not be used for any other purposes.

If you may fully participate in the survey so that all stakeholders in this process are able to harness the information that we can obtain in improving service delivery to the citizens in the metropolitan areas. The questionnaire takes about 15 minutes to complete and you will hopefully enjoy filling in this questionnaire and provide responses to my questions.

For further information or clarification on any of the questions in the survey questionnaire or the entire research please don't hesitate to contact me on: itumeleng.mofikoe@gmail.com or   itumelengmofikoe@pikitup.co.za

Section 1: Personal background

(a)   Gender

Male	Female

(b)   DOB:

(c)   Are you in management?

Yes	No

(d)   Level of management

Supervisor	Middle management	Senior management	Director	Other

If you choose 'other', please specify briefly:

(e)   Years' experience working on e-government:

(f)   Office:

(g)   Designation:

(h)   How would you rate your experience with ICTs like the Internet?

Poor	
Fair	
Good	
Excellent	

(i)   What is your highest qualification?

(j)   Do you have an ICT qualification?

Yes	No

(k)   If you choose 'yes', please specify briefly:

Section 2: e-Government Development

Please mark below the appropriate number where the numbers indicates:

1= Strongly Disagree, 2= Disagree, 3= Agree, 4= Strongly Agree

(a)   Officials' opinion on the progress of e-government

		1	2	3	4
1)	You have seen an improvement in the roll-out of e-government in your country				
2)	You have seen an improvement in the roll-out of e-government in your department				
3)	You have seen an improvement in the roll-out of e-government in your Municipality/ City / Local Government				

Section 3: E-government challenges

(a) The cost of implementing e-government

		1	2	3	4
1)	There are high costs involved in providing e-government services				
2)	There are high costs involved in developing e-government services				
3)	There are high costs relating to compliance with e-government regulations				
4)	You are able to demonstrate cost v/s benefits of e-government				

(b) Usage, skills and access

		1	2	3	4
5)	The ICT skills levels of e-government officials are high				
6)	There are a lot of concerns over online fraud and theft amongst e-government officials				

7)	There's a strong motivation amongst e-government officials to use e-government	71			
8)	E-government officials have access to all e-government services				

(c) Implementation/roll-out of e-government

		1	2	3	4
9)	Can e-government services be offered in different languages used in the country?				
10)	Is there provision for access to e-government services by people with disabilities?				
11)	Are e-government applications easy to use and understand?				
12)	Is there sufficient security on authentication and identification of e-government services?				

(d)   Support & Administration Challenges

		1	2	3	4
13)	Is there a lot of change resistance by e-government officials?				
14)	Do you have a list of suppliers that support e-government services?				
15)	Are you able to obtain more services providers that support e-government services?				
16)	Do you have enough policy support for e-government?				
17)	Your department forges partnerships with the private sector				

Please provide the names of the private sector partners:

(e)   Technology Challenges

		1	2	3	4
18)	Your department makes use of a variety of technologies				
19)	Your department often taps into the infrastructure available in your metropolitan area				

Please list the different types of technologies used:

(f)   Strategy Challenges

		1	2	3	4
20)	Do you have a strategic e-governance plan for a minimum period of 6 years?				
21)	If there's a plan, is it regularly reviewed & updated?				
22)	Are you connected to other smart cities in the country?				
23)	Are there recent initiatives that you have undertaken on e-government?				

Briefly describe all the initiatives that have recently been undertaken:

(g)   Services Challenges

		1	2	3	4
24)	A lot of e-government services are online				
25)	Do you know and make use of any technology service centres?				
26)	E-government services are offered from a centralised department				
27)	E-government services are provided to citizens with good turnaround times				

Section 4:

(a)   What are your views on e-government built on (tick all that apply)

Global level experience	
Local government experience	
Regional government experience	
National government experience	
Working in the government sector	
An implementer of e-government	
Provide supply to e-government services	
User of e-government	
Citizen who uses e-government	
Researcher or student of e-government	
Consultation work on e-government	

(b)   Identify the primary sources of e-government (tick all appropriate ones)

National government	
Departmental agencies	
Local government	
Regional government	
NGOs	
Technology innovations	

Demands from citizens 75	
Private sector 	

Please state any other challenges that may be encountered with e-government:

Thank you for completing the Questionnaire.