An investigation into the effective use of Information and Communication Technology among public workers in the North West Provincial Government

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Mini-dissertation accepted in partial fulfilment of the requirements for the degree *Masters of Computer Science and Information Systems* at the North-West University

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Graduation Ceremony October 2018
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DECLARATION

I, Kooagile Lawrence Mosala, hereby declare that this dissertation submitted for the degree of Master of Commerce in Computer Science and Information Systems at the North-West University has not been submitted before at this university or other university. In addition, I declare that the study was fully carried out by me and only me. The literature used in this study has been appropriately acknowledged by means of references.

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Signature

Date   27 - 09 - 2018

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ACKNOWLEDGEMENTS

ABSTRACT

Information and communication technologies ICT use amongst public workers in government, simply has the potential to improve internal efficiency, speed up bureaucratic processes, reduce costs, capture economies of scale, bring all function areas closer and reach citizens within splits of seconds. North West Provincial Government has implementing information and communication technologies while concentrating on aspects such as human interaction with ICTs. This study aimed to investigate the effective use of ICT among public workers in the NWPG. It investigates the effect of certain hardware and software utilisation and the impact that the use of these ICTs have on the work of public workers. Several initiatives that are ICT-related have been constituted in the past for mere ICT use in government and to improve service delivery. However, some of public workers are still reluctant to use the implemented ICTs effectively when performing their functions and acknowledging NWPG initiatives of ICT implementation in order to disseminate information and provide fast efficient and effective service delivery to South African citizens.

The study was carried out using quantitative approach method through survey research. The results of the study then showed that public servants have access to ICT tools and applications to effectively process governmental work. The results further depicted the available ICT tools and applications were effectively used simply because public servants had good computer skills. However, some public servants experienced difficulties using windows 8 and 10 (operating systems) and indicated that they needed training on the use of Microsoft office and transversal systems. The recommendations of the study are presented in the final chapter.

KEYWORDS: effective use, Information and Communication Technology, Public workers and NWPG.

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CHAPTER ONE: BACKGROUND OF THE STUDY

1.1 Introduction and background

In the modern era we live in, ICT appears to be playing a significant role in nearly every aspect of our lives. And like any new development, it has changed our lives to some extent. The evolution of ICT has simply created new opportunities and not only within the private sector, but also in the public sector. The last few years have seen many organizations relying on information systems and as result achieving high level of performance and recognition through the use of technological devices (Alshehri *et al.*, 2012). Now all organizations have begun to invest heavily on ICT. The reality is that without the use of ICT in all function areas of any organization, completion of large complex operations would simply not be possible.

According to Akpan and Udoh (2010), ICT refers to the organization technologies such as telecommunication networks, hardware and software and computer systems that are used by users in organizations to collect, store, edit and distribute information in various forms. According to Ewuim and Nkomah (2016), governments in Europe spend billions a year on ICT alone. This is because ICT has the potential to enhance organizational processes. The North West Provincial Government, like other organizations, has embraced ICT, and their main aim in this regard is to process internal bureaucratic work in order to enhance services rendered to citizens by ensuring that public servants are equipped with the necessary ICT skills and knowledge (Ewuim & Nkomah, 2016). Maniam & Halimah, (2008) suggest that the NWPG understands the need to develop an information society and harness the power of ICTs for economic and social development, for the benefit of the country and its citizens.

In 1995, the South African government released the White Paper which stated that public services be transformed by tools such as technology; however, this initiative was not sufficient as quality services delivery to citizens remained a colossal challenge (DPSA, 2011). In 1997, another White Paper on Batho Pele was released. Batho Pele with 8 principles, i.e. consultation with citizens, setting service standards, increasing access to information, ensuring courtesy, providing information, openness and transparency, redress, and value for money is simply an initiative that encourages citizens to hold public servants accountable for the quality of service delivery which they receive (World Bank, 2011).

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All these initiatives applied also at provincial governments. From the above Batho Pele Principles emanated the emphasis of ICT use amongst public servants in bureaucratic processes for enhancing efficiency and increasing the level of citizens' empowerment (Ntetha & Mostert, 2013). Undoubtedly, the use of ICTs plays a huge role, especially with respect to access to information and creating openness and transparency.

1.2 Contextual setting

This study investigated the effective use of ICT among public servants in the North West Provincial Government. NWPG consists of 11 government departments scattered around North West Province. From the 11 government departments, only three departments were chosen to participate in this study. These three government departments represented the study population. From the population, a sample consisting of public servants was derived. Further details with regard to the contextual setting are explained in chapter 3 under sampling and population

1.3 Purpose of the study

Well organized bureaucratic processes and quality service delivery to citizens depends mostly on public servants using ICT effectively during working hours and relevant ICT infrastructure that correlates with government department's needs. All functions in government departments have realized improvements and efficiency through acknowledgement of ICT; however, the (ICT) usability by public servants remains a colossal challenge. The purpose of this study was, therefore, to investigate the effective use of ICT among public servants in NWPG and subsequently develop reliable ideas that would enable public servants working in NWPG to effectively use ICTs for processing public administrations operations more efficiently and deliver quality services to citizens without any delays.

1.4 Problem statement

When South Africa became a democratic country in 1994, various initiatives were devised to improve public administration operations and services delivery. These were included in the White Paper on Transformation of Public Service and in the Batho Pele Principles released in 1995 and 1997 respectively (Ntetha & Mostert, 2013). However these initiatives combined were not sufficient to improve public administration in government departments and service delivery to citizens.

Van Brakel and Chisenga (2003) stated that for the government of SA to disseminate information more efficiently and effectively across all citizens and also simplify bureaucratic procedures, ICTs needed to be adopted in all function areas of government. The South African government instituted several ICTs programs and also emphasized to public servants to make use of the implemented ICTs with regard to improving efficiency on disseminating information for better and faster service delivery (Van Brakel & Chisenga, 2003). ICTs in government were basically meant to enhance efficiency and transparency, improve information and service delivery to citizens (Ntetha & Mostert, 2013).

Despite the adoption and implementation of ICTs initiatives by the South African government, a survey conducted by the SA government revealed that ICT skills remained the greatest obstacle amongst public servants as ICTs were not utilized to their full potential (Ntetha & Mostert, 2013). In addition, this was reiterated in the State Information Technology Agency (2008) Annual Report which stated that the shortage of information technology skills in South Africa is a major challenge in the public sector. The report further stated that in order to transform business processes within government, the technology skills of public servants must be developed. This study therefore investigated the availability of ICTs, challenges experienced in using ICTs and level of ICT use among public servants with regard to streamlining work processes, and accelerating the distribution of information across all departments to enhance service delivery.

1.5 Research questions

This study seeks to find answers to the following questions:

a. What types of ICTs are available in NWPG departments?
b. For what purpose do public servants use these ICTs?
c. What is the level of ICT usage by public servants in NWPG departments?
d. What are the levels of computer skills amongst public servants?
e. What training needs do public servants in NWPG departments have?
f. What is the impact of ICT use amongst public servants in NWPG departments?
g. What challenges do public servants experience in using ICTs?

1.6 Research objectives

The objectives of this study are to:

  a. Discover the types of ICTs found in NWPG departments
  b. Determine the purposes for which the ICTs are used
  c. Explore the impact of ICTs amongst respondents in NWPG departments
  d. Explore the level of ICT use amongst respondents in NWPG departments
  e. Explore the levels of computer skills of respondents in NWPG departments
  f. Determine the computer skills training needs amongst respondents in NWPG departments
  g. Discover the challenges experienced by respondents when using ICTs

1.7 Research methodology

This study followed the quantitative approach, which describes the phenomena using numeric data. Subsequently study employed positivism which posits that the world exist externally and can be objectively measured (Oates, 2006). Because this study employed quantitative approach which emphasizes on gathering numeric data from a large group, survey methods were deemed appropriate for this study to answer the research questions. Survey methods enable researchers to gather the same kind of data in a consistent and organized manner from a representative sample of the population to subsequently search for patterns and trends to draw up conclusions and also make generalisations which extend to the wider population (Oates, 2006). From survey methods, a questionnaire was developed to address issues relating to the effective use of ICT by public servants in NWPG. According to Alshehri, Alhussain, and Alghamdi (2012), questionnaires are used to gather data in quantitative studies and are considered to be appropriate choices for gathering data from a large number of participants.

The sample investigated in this study consisted of 320 public servants selected from a population of 1900 within the three government departments namely department of Health, Finance and Public Works and Roads in North West Province. Participants for this study were selected based on the simple random technique, meaning that all 1900 public servants in the chosen government departments in NW Province had an equal probability of inclusion in the sample. However, Public servants working in the IT sections within the three chosen government departments for this study were excluded as their views were deemed irrelevant.

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The type of statistical analysis undertaken for this study was descriptive. Nenty (2009) defines descriptive statistics as a technique that is concerned with summarizing and describing data gathered and inferential statistics as a technique that assists the researcher in drawing conclusions through the use of descriptive statistics techniques. In addition, graphs and tables were incorporated in the study to perform categorical analysis and visually represent data and depict comparisons between categorical data or to represent the number of observations in a given category.

1.8 Dissertation layout

Chapter one: Introduction

This chapter introduces the study by presenting a general background and subsequently outlining the problem statement, research objectives and questions, a brief research methodology that was employed and purpose of the study.

Chapter two: Literature review

This chapter presents a detailed literature review in relation to the topic of the study with the aim of finding flaws and gaps in the existing body of knowledge on ICT use among public workers NWPG.

Chapter three: Research methodology

This chapter articulates the research methodology employed for this study in order to addresses the research problem and its related research objectives and questions. The chapter also outlines the research instruments and procedures utilized to gather data.

Chapter four: Research results analysis and discussions

This chapter unpacks and interprets the data obtained and subsequently discusses the findings through tables and graphs.

Chapter five: Conclusions and recommendations

This chapter is a summary of preceding chapters as well as the research findings. The chapter further highlights the data obtained in relation to the research questions and objectives of this study. Lastly, the chapter articulates the research contributions and limitations experienced throughout the study as well as recommendations for future studies.

1.9 Chapter summary

This chapter introduced the background of the study under investigation and subsequently outlined the research questions and objectives for resolving the acknowledged problem statement for this study. The chapter further highlighted the purpose, limitations and ethics of the study and briefly explained the research methodology guiding the research study. The next chapter presents a detailed literature review based on the research topic.

CHAPTER TWO: INFORMATION AND COMMUNICATION TECHNOLOGY: LITERATURE REVIEW

2.1 Introduction

In this chapter the literature which is relevant to the topic under investigation is discussed. The literature review is important for this study as it discovers various research, articles and journals related to the problem statement. The way in which government departments' process, retrieve stores data through public servants utilizing Information and Communication Technology is indeed significant in achieving operational excellence. This is realised through moving away from manual process to automation processes.

Expectations on government departments to adopt ICT continue to grow rapidly as it enables them to transform do more and better with less and presents new opportunities for public servants resulting in successful use of ICT for delivering quality public services. Using ICTs in government departments improves the manner in which public administrations processes are executed especially for effective and efficient service delivery to citizens. For public servants to use ICTs effectively, government departments need to adopt an overall plan on how to apply these technologies and administer their implementation.

This chapter, therefore, provides the theoretical foundation of the study. This has to do with reviewing concepts such as ICT conceptual analysis, importance of ICT in government, ICT infrastructure, ICT adoption and theoretical models, use and benefits of ICTs in government and challenges of ICT implementation, training needs for effective ICT use.

2.2 Information and Communication Technology conceptual analysis

The advent of the twenty-first century have seen various technological establishments which affect almost every aspect of our lives. At the core of this is the ever-growing use of ICT in all realms of life, from workplace to personal or social level (Mdlongwa, 2012). According to Mutula and Mostert (2010), different organizations have drafted numerous policies, regulatory frameworks and Information and Communication Technology infrastructure plans in order to help departments enhance service delivery. To achieve these plans, personnel have to be skilled with computer knowledge as ICT enables business operations to be executed effectively and efficiently (Maniam & Halimah, 2008). Expectations are that if organisations adopt or even

have ICT in place, they will be enabled to do more and better with less. Ntetha (2011) states that to achieve more and better with less, depends on the ICT skills of employees as it requires them (employees) to be computer literate.

Ever since the inception and adoption of technology, ICT has played an important role in the daily lives of citizens, by modernising work and changing the ways of doing business (Maniam & Halimah, 2008). Therefore, to establish an associated society simply requires organizations to use ICTs effectively and efficiently to delivery public information, services and transactions in a well-organised manner for the convenience of citizens and business organisations (Akpan & Udoh, 2010).

ICT incorporates various technologies that are used for broadcasting, telecommunications and all kinds of computer mediated communications to help organizations achieve their goals (Mdlongwa, 2012). Akpan and Udoh (2010) define ICT as the effective use of technological tools and programmes to access, store, convert, retrieve, organize, manipulate and present data. Ewuim and Nkomah (2016) define ICT as integrated systems which incorporates technologies and infrastructure required to store, manipulate, retrieve, transmit information and facilitate access to ICT infrastructure put in place. Holistically, ICTs improve numerous aspects which could have been processed manually. For example, before the introduction of computers, employees would store and access files in filing cabinets within organizations (Osman, 2014).

Having given the case in point above, the process is automated, meaning accessing and storing of information or files can be done electronically and with ease. Nowadays, computers and the Internet are regarded as the most influential communication media that play the greatest role in information and communication process as organizations seems to be leveraging from ICTs (Osman, 2014). In this study, the definition of ICTs focuses on the use of computers, printers, scanners, Internet, telephones and software, particularly on how they should be effectively used by public servants in North West Provincial Government to deliver public services to citizens.

2.2.1 Information and Communication Technology use

The use of ICT has become a fundamental business resource in organizations as it enables many organizations and personnel to function more effectively and efficiently. ICTs are used in function areas like public administration whereby public servants simply execute public

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administration work and also render service delivery to citizens. According to Jansen (2012), one of the mission and aims of the public sector is for public servants to use ICTs effectively and efficiently for strengthening democratic functions. Bhatnagar (2014) suggests that ICT can be used in government departments by public servants to accelerate information dissemination, improve efficiency of public services and also increase transparency and accountability of government administration.

Ewuim and Nkomah (2016) state that ICT is a tool which can be used effectively by public servants to support the work of governmental departments with the objective of delivering information and public services to citizens on a daily basis. Therefore, with the use of ICTs by public servants, it is possible to improve efficiency and effectiveness of internal administration within government and to re-locate government service from government offices to locations closer to the citizens. A study conducted on the Nigerian government indicates that the advent and deployment of ICT in Nigerian public services presented opportunities for use among public servants to facilitate effective service delivery as many countries have embraced it as a way forward (Ewuim & Nkomah, 2016).

Although ICT assists government departments with regard to providing public services to citizens and in enabling public servants to support government public administrations, there are still several challenges which include acceptance for effective use of ICT, stemming from public servants (Ntetha, 2011). To address such challenges requires extensive variety of means and measures. Day and Grewan (2006) posit that ICTs can also be used to deliver instructions interactively to people with input-processing-output capabilities which can be used to improve computer tutorials that support the reading and understanding of text. For public servants to effectively use ICTs for execution of public administration and service delivery, computer skills which allows them to use the available ICTs are necessary.

2.2.2 Information and Communication Technology benefits for government

With ICT making waves, improving manual processes and simplifying lives of the society, organizations such as the government have realized the benefits that it brings along in executing public administrations. Dasgupta and Gupta (2010) posit that government departments could benefit from ICTs in areas like public administrations where they improve and enhance the business operations for service delivery to citizens. A study conducted in Malaysia indicates

that ICTs offers plenteous benefits (efficiency in service delivery, improvements in services and business processes and better accessibility to services) for government, more especially with regard to socio-economic aspects (Bahaman *et al.*, 2016). However, for government departments to enjoy the seed of ICTs, public servants have to be computer competent and confident in effectively utilizing the available ICTs as government departments will then have an opportunity to realize their benefits.

The government of India has also acknowledged the economic boost it receives through ICT in delivering public services to its citizens. According to Barman (2009), the government of India benefits enormously from the effective use of ICT in government administration as it improves processes and increases transparency in the functioning of various departments. The study conducted in Indian indicates that citizenry benefits from ICT through simple application such as online form billing or multifaceted applications like detachment education tele-medicine (Barman, 2009). In May 2006, the Government of India approved the National e-Governance Plan (NeGP) with the vision: Make all Government services accessible to the common man in his locality, throughout common service delivery outlets and ensure efficiency, transparency and reliability of such services at affordable costs to realize the basic needs of the common man (Barman, 2009).

Ever since the government of South Africa had established various initiatives to enable departments to improve and speed up service delivery to citizens, ICT has been at the helm as one of the initiatives devised. ICT has been beneficial for SA government in a sense that, it enabled public servants to facilitate various public administrations processes more efficiently in less time and with ease (Ntetha & Mostert, 2013). Ntetha (2011) explains that the use of ICT by public servants is on a tremendous rise mainly because, implementation of ICT in government results in extreme benefits such as improved efficiency, clear accountability and transparency and greater empowerment to employees.

Other studies have examined the barriers which government departments experience with regard to benefiting from ICT. Ntetha (2011) reported that the public sector still has a lot of work to do in enabling public servants to use ICT effectively and efficiently in order for them to execute public administrations processes and produce quality service delivery. The problem is mainly because they lack ICT knowledge which impedes most public servants for effective use of ICTs and benefiting from ICT interaction. According to Geraldine Fraser-Moleketi, the

former Minister of Public Service and Administration, the reality in the public service with regard to information and communication technology (ICT) literacy is very sad" (Van Jaarsveldt, 2010). The Minister stated that government spends an estimated R3bn per annum on ICT goods and services, but that only 20 percent of public servants are computer users (Van Jaarsveldt, 2003).

Van Jaarsveldt (2003) posits that ICT can play a substantive role in government. ICT can for example, be used in the fight against poverty and to improve service delivery. According to Minister Geraldine Fraser-Moleketi's budget speech (2002), the public service is in need of new skills and education to develop the ability of public servants to use ICT to its full potential. In addition, some South African public servants work in outlying regions and in many cases in poor conditions (Van Jaarsveldt, 2003). Due to reasons such as distance, time and financial constraints, it is impossible for such public servants to travel to a university or even take the necessary three years to study for a Public Administration degree. Therefore, this study wishes to show the South African government how important ICT is towards public servants and government departments with regard to ensuring that the quality of public services is delivered to South African Citizens.

2.3 Importance of Information and Communication Technology in South Africa

ICT as a discipline has been growing at an exceptional rate during the last decades. In the fast globalizing world economy of today, government departments have recognized the importance of ICT (Maniam & Halimah, 2008). The South African government has embarked on a journey to improve services to citizens through the adoption and use of ICT. These improvements cannot be realized without introducing radical transformation and innovative changes which will eventually improve internal operations for better service delivery (Alshehri *et al.*, 2012). Osman (2014) explains that the introduction of computers, the Internet and printers within public service has significantly affected the work environment of employees as they are now expected to use these communication media devices to support government administrations work.

Van Jaarsveldt (2003) explains that the main objective of the government is to enhance service deliver to citizens as it strives for the economic and social transformation of the nation. Computers and the Internet were identified by President Mbeki, in recent studies conducted by department of Science and Technology, as key technological platforms that have a pervasive

impact on government service delivery in domains such as the economic development of the entire country (Farelo & Morris, 2006). To this end, ICTs are regarded as important tools that support the work of governmental institutions and agencies with the objective of delivering public services and information in a more convenient, citizen centric and cost effective manner (Ewuim & Nkomah, 2016).

ICTs, especially the Internet, computer, printers, telephone and scanners, transversal systems and Microsoft applications are related ICT tools gaining recognition in government and also becoming imperative tools towards effective use among public servants (Osman, 2014). Undoubtedly, ICTs progressively remain to play an important role with regard to transforming public administration operations executed by public servants in government. This study highlights the value of adopting ICTs in government departments as well as encouraging public servants to simply accept them for improving and executing business operations for quality service delivery to citizens, as inadequate computer skills among public servants hinder the effective use of ICT in government.

2.4 Global Information and Communication Technology infrastructure

ICT infrastructure is the heart of ICT applications in the work place of organizations. Kushida (2012) states that ICT infrastructure is the spine of all ICT applications inside the organizations and should at least on average contain hardware (computers, laptops, telecommunication equipment, workstations, telephones), software (system and application software), information structure (rules and regulations), carrier technology and wireless radio, television and support resources (training, support).

Massive investments with regard to ICT infrastructure in developing countries have made progressive advancement in the effective use of ICT both for internal business operations and service delivery. For example, a study conducted on the Russian public sector points out that more than 10 billion Euros was used to buy ICT products in the year 2008 and 2009. The private sector of Russia followed suit by investing enormously on technological computer systems (Pavlotsky, 2008). In Asia, the Japanese ICT industry extended its focus extremely further than the production of technology equipment to maintaining and managing the digital content (Kushida, 2012).

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Kushida (2012) further posits that Japan has more than 100 million mobile phone users, which is just about 80% of the country's population. In fact, Japan leads the race on third generation (3G Technology) mobile technology across the world. Kushida (2012) states that in 2006/2007, Japan adopted video conferencing and other technological platforms of visual communication as they improve internal and external operations in government for service delivery. A research conducted in the United State of America by Dimelis and Papaioannou (2010) indicated that the USA is still the world's technological authority, as the results were published by the Network Readiness Index (NRI) agency. The USA leads the way globally in the ICT industry through the quality of its marketplace environment for ICTs (Dimelis & Papaioannou, 2010). The country has done tremendously well with regard to improvements on its ICT infrastructure, ICT use among civil workers for e-government and ICT penetration. The United Kingdom (UK) Trade and Investment services (2008) regarded the UK as one of the leading countries around the world with the most sophisticated ICT infrastructure when compared to nations like Spain, Italy, France and Germany.

According to UK Trade and Investment Services (2008), the UK ranked amongst the top 10 countries on e-readiness rankings globally based on the results given by the Economist Intelligence Unit (EIU). The importance of these rankings basically to measure technological, political, infrastructural, economic and social factors surrounding the development of e-business. In addition, the UK Trade and Investment Services further states that the UK has penetrated the broadband technology at 24.9% rate, making it the highest percentage as compared to the European Union average of 20%.

2.5 Africa Information and Communication Technology infrastructure

ICTs such as computers, Internet, all in one printers, telephones are said to be important in the operations of organizations and declared to be vital for sustainability, survival and economic escalation of many countries (Mutula & Van Brakel, 2007). However, looking at the usage of ICT in Africa as compared to Asia and Europe, that make use of the Internet effectively for service delivery and business operations, there are barriers which hamper the use of ICT in the African continent (Ntetha & Mostert, 2013). According to Mutula and Van Brakel (2007), a study conducted in Egypt about e-readiness of the business sector established unskilled workers and lack of awareness on ICT usage as reasons for poor ICT usage in Egypt. Mutula and Van Brakel (2007) further posit that the Egyptian government encourages ICT/IT to be taught in schools and universities in order to shape and build a skilled based society.

It is now evident that the adoption and acceptance of ICT affects almost every aspect of the society and as a result boosts economic growth and reduce poverty in the African continent. Lisham (2008) elucidates that ICT in government increases effectiveness in business operation, devises new opportunities for economic growth, provides access to new markets and improves lives of citizens. Van Brakel and Chisenga (2003) explain that government as organizations need to have ICTs infrastructure such as telecommunications, system and application software, telephone, mobile phones, television, video cameras, video recorders, sound or tape recorders, overhead projectors, all in one printers, data projectors, computers, Laptops, etc. available to public servants to utilize them for service delivery and information dissemination purposes. Although Africa has shown improvements in ICTs due to the arrival of mobile telephony, Van Brakel and Chisenga (2003) believe that Africa is still behind with ICT infrastructure as compared to Asia and Europe.

A study conducted in Tanzania depicted major improvements in ICT implementation within its government, specifically in mobile telephony. The reason behind this is the success of regulatory policies and governance (Maitland & Van Gorp, 2008). Although Tanzania is seen as one of the smallest country in Africa, it has been classified as the pioneer in Sub-Saharan Africa because of the good governance and regulatory policies in as far as ICT market development is concerned (Maitland & Van Gorp, 2008). The figure below indicates the usage of the Internet in Africa. Although South Africa is regarded as the top country in terms of ICT infrastructure, the latest Internet statistics depict that it is number 4 on the list with 28.58% usage of the Internet.

AFRICA TOP 13 INTERNET USAGE COUNTRIES 2017

Country	Value
Nigeria	91.88
Egypt	34.8
Kenya	31.99
South Africa	28.58
Morocco	20.21
Algeria	15
Uganda	11.92
Sudan	10.89
Ghana	7.96
Tanzania	7.59
Senegal	7.26
Zimbabwe	6.76
Angola	5.95

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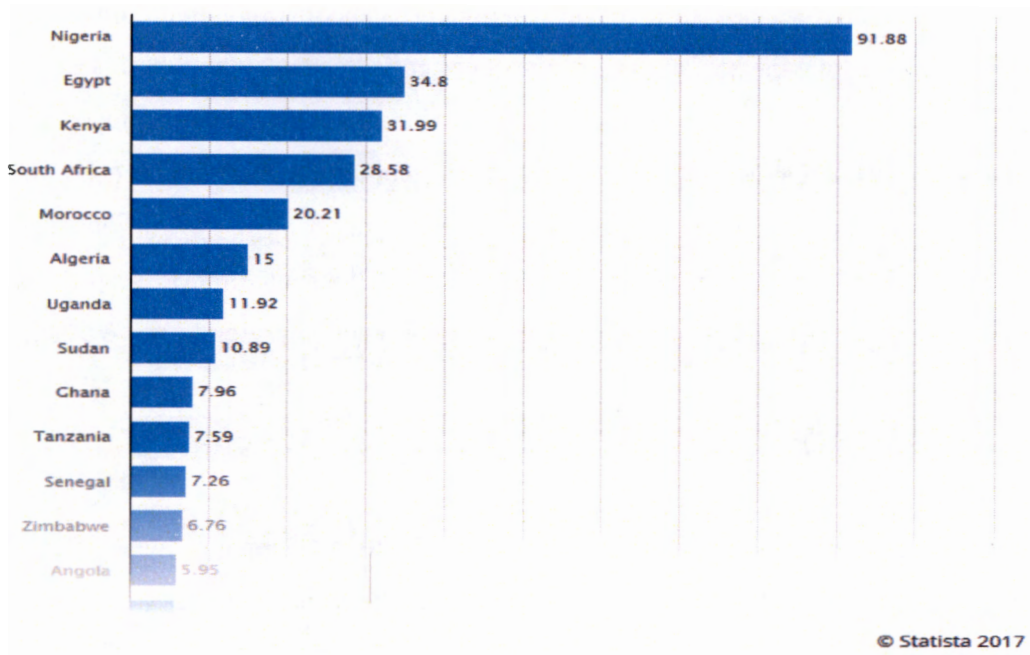
Figure 2.1: Adapted from the Statistics Portal (2017)

2.5.1 Desktop computers

A lot of people around the world use personal computers at their work places for processing business operations and service delivery; however, this is not the case in the African continent. In fact, the accessibility to PCs in Africa's government for e-governance is the lowest when compared to the rest of the world (Paul Budde Communications, 2007). According to Van Brakel and Chisenga (2003), statistics provided by the International Telecommunications Union (ITU) indicate that in 2002, 1.23% individuals used PCs for e-governance in Africa compared to 3.95% for Asia, 20.01% for Europe, 27.49% for the Americans, and 38.94% for Oceania. This dismal statistics results from inadequate ICT infrastructure and individuals lacking computer skills, in Africa (Paul Budde Communications, 2007). Another reason for the inability of governments in Africa to afford computers is the high import rates and sales tax imposed on computers, however computer prices in developed countries have gone down while remaining high in African countries (Van Brakel & Chisenga, 2003).

2.5.2 Telephone facilities

A research undertaken by Akpan & Udoh (2010) established that Africa has poor fixed-line infrastructure for e-governance. Consequently, Africa has experienced a high growth in mobile usage. Therefore, despite the bleak image of the continent's telecoms, the future is expected to be bright, with plentiful opportunities on offer for service providers, equipment vendors and investors. A study conducted the by International Telecommunication Union (ITU) in 2007 showed that, telephone subscription has grown by 90%, resulting in 35 million fixed-lines being available for use by government (Van Brakel and Chisenga, 2003). Despite the 90% significance growth, wireless technology solutions are slowly emerging to serve as substitute technology for inadequate fixed-line infrastructure within governments (Paul Budde Communications, 2007).

According to Van Brakel and Chisenga (2003), 93.3 % of telephone owners are mobile telephone users while 1.7 % are fixed-line telephone users. It has also been established that communication in government now relies on cellular phones public servants. The use of cell phone technology has become more useful because of value added services like data transmission, short message sending (SMS), WAP-based Internet access, and even financial transactions, anywhere and anytime (Jansen, 2012).

2.5.3 Internet

Ever since the introduction of the Internet, many organizations including the government have changed and improved enormously with regard to business operations for service delivery and survival. The Internet has become a powerful tool for sharing information and communication (Barman, 2009). In addition, Barman (2009) states that, the manner in which the Internet has been spread around is nearly similar to that of mobile telephone networks in African government departments. Although not as widespread, the Internet whose introduction preceded the mobile phone made an early foothold and impact at the top end of business, in wealthy families, primarily in the major urban areas (Barman, 2009).

A study conducted by Paul Budde Communications (2007) posits that several countries in Africa acquired access to international fibre bandwidth for the first time in their history through submarines cables in the year 2009 and 2010. The study further established other additional fibre bandwidth systems which brought competition to previously monopolised markets. This developments enabled governments in Africa to massively invest into terrestrial fibre backbone

infrastructure in order to take the new bandwidth to population centres in the interior and across the borders into landlocked countries. However, the rapid spread of mobile data and third-generation (3G) broadband services is changing this, with the mobile networks bringing Internet access to many areas outside of the main cities for the first time (Paul Budde Communications, 2007).

2.6 Information and Communication Technology infrastructure in South Africa

Over the last 20 years, the South African government has invested a lot into ICT infrastructure and the training of public servants in order to conduct their operations efficiently and in a more transparent manner to citizens (Ntetha & Mostert, 2013). Ever since the introduction of ICTs, computers and the Internet have played a significant role towards internal business operations of the South African government. They are declared to have contributed greatly in the economic growth of the country (Mutula & Brakel, 2007). The implementation and availability of ICTs such as computers, Internet, scanners, printers and telephones have impacted the way the South African government departments functions, thus requiring public servants to utilize ICTs for internal public administrations operations as well as for service delivery to citizens (Ntetha & Mostert, 2013). The South African government has developed several agencies, such as State Information Technology Agency, Universal Service Agency (USA) etc. to assist local, provincial and national government departments with ICT infrastructure (Ntetha & Mostert, 2013). These ICT infrastructure then enables public servants to provide services to citizens effectively and efficiently as ICT enhance public administration process (Dasgupta & Gupta, 2010).

A case study conducted by Bhatnagar (2014) indicated that the implementation of ICT can be used across South African government departments to accelerate information dissemination, improve efficiency of public services, increase transparency and accountability of government administration and facilitate citizen participation in local governance. However, the deployment of ICT within the South African government is still not recognized by public servants as they lack computer skills to effectively use the adopted ICT in place for them (State Information Technology Agency, 2008). As a result, this impacts government departments negatively because the implementation of ICT within the SA government becomes null for delivering services faster, cheaper, better and in a sustainable manner to citizens (Ntetha & Mostert, 2013).

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The South African government has policies that are related to ICT and reflect that: ICTs should be implemented across all departments to ensure that public services to the people are improved, delivered faster and in better manner. The government's policy is that ICT tools and information are key drivers of economic and societal development. This implies that the implementation of ICT should create a better life for South African citizens as public servants will now be expected to be computer literate in order to effectively use ICT for execution of business operations and improving service delivery.

2.7 Information and Communication Technology infrastructure in North West Provincial government

According to SITA (2008), the NWPG has ICT infrastructure capacity that is managed and facilitated by the office of the premier and also supported by the general ICT infrastructure offered through SITA. The following figure depicts the available ICTs found in NWPG between the year 2001 and 2009.
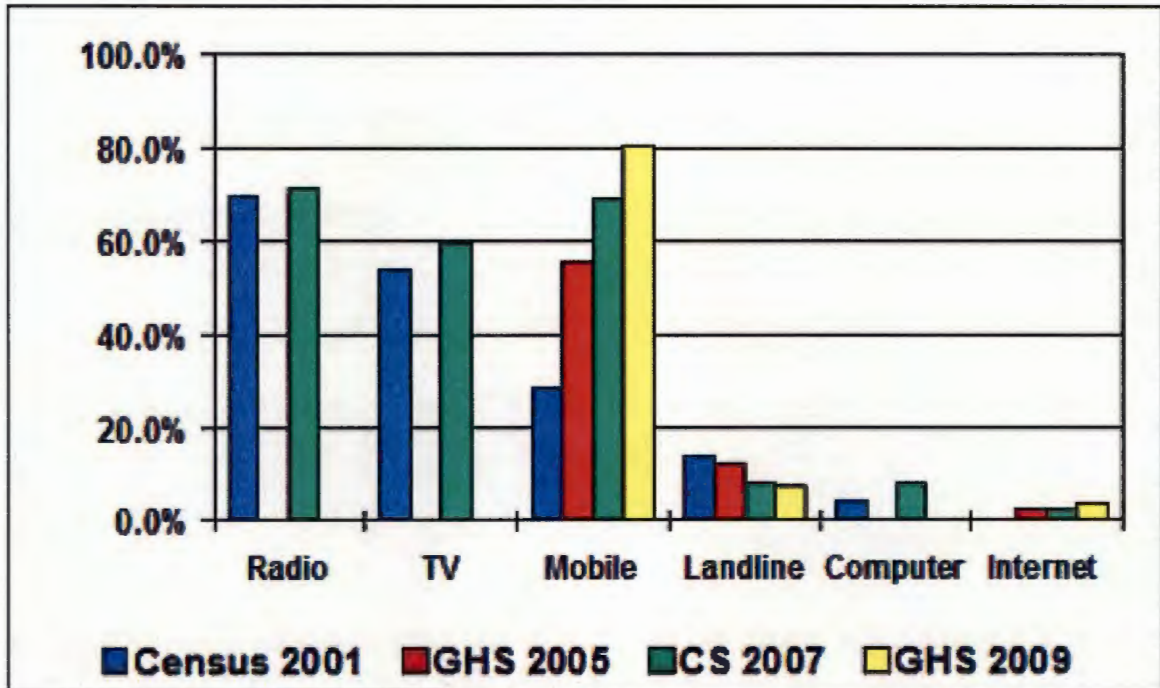
Figure 2.2: Adapted from SALGA

The above ICT infrastructure figure was provided by Statistics South Africa through Census 2001, the General Household Survey 2005 & 2009 and the Community Survey 2007 (SALGA). According to findings from Census 2001, the General Household Survey 2005 & 2009 and the Community Survey 2007, NWPG has a very high infrastructure with regard to Radio, TV and mobile technology (SITA, 2008). However, the findings on the other hand indicated that usage of computers and Internet was extremely low as many public servants lacked computer skills to effectively execute government internal operations for delivering public services to citizens. For the purpose of this study, ICTs such as personal computers, laptops and tablets, telephones, Internet, printers, scanners, mobile phones were investigated as they are assumed to be the modern technology used in NWPG departments by public servants for executing business operations and dissemination of information in the form of service delivery to citizens.

2.8 Training needs for Information and Communication Technology use
For public servants to effectively use adopted and implemented ICTs within their respective government departments, skills which enables them to use the ICTs are necessary. According to Paterson and Roodt (2008), ICT training for public servants is extremely significant,

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especially with regard to performing public administrations that supports government business processes. South African former President Thabo Mbeki stated that it is very important to train large number of people, so that if any immigrate to other countries, South Africa will still be left with enough skilled workers to maintain competition (Lotriet et al., 2012).

Lotriet et al. (2012) further state that South Africa is in dire need of ICT skills development for service delivery and as a result, the Presidential National Commission outlines 3 points which should be implemented and mastered by government departments:

- ICT skills for modern life outside the workplace;
- ICT skills in the work place to respond to changes in business processes; and
- Technical skills for the specialists required for ICT and related industries.

Lotriet et al (2012) insists that South Africa is trying to improve skills of public servants through ICT training. The country has inaugurated an e-skills Academy of South Africa with the aim of increasing the countries' ICT systems (Lotriet et al., 2012). In some quarters, there is criticism about challenges and problems which include lack of in-depth training of public servants, the particular need to skill public managers in the use of ICTs and the development of training models for ICT/e-governance for public managers in order to improve the services rendered by governments (Lotriet *et al., 2012*. The lack of adequately trained public managers in ICTs has also become a critical factor in African countries, including South Africa and its provinces.

2.9 Challenges for Information and Communication Technology implementation

The contribution of ICT with regard to economic growth has been a topic knocking on the door step of government institutions. ICTs enhance business processes within any form of organization resulting in improving individual creativity and also contributing to individual productivity (Paterson & Roodt, 2008). However, there is a significant shortage of skilled public servants in the SA government. This remains to be a huge threat in economic growth as a result of unskilled public servants (Paterson & Roodt, 2008). Although South Africa's government has invested intensely on the adoption of ICT across all government departments, public servants still struggle to use ICT effectively, as computer competency remains a big concern. Benton (2007) confirms that public servants within the public service are not skilled in terms of the using of technology. As a result, interacting with the adopted ICTs becomes more challenging.

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Ntetha and Mostert (2013) have also indicated various challenges which hinder lack of use on ICT by public servants. These include lack of skills, specifically appropriate computer literacy skills and inadequate ICT training workshops to public servants who have long served the government. Although the South African government has embraced ICT to assist in delivering services, the inability of public servants to utilize the available ICTs is mostly regarded as a major challenge which impedes implementation of ICTs (Dasgupta & Gupta, 2010). Arising from the above, the challenge of public servants ineffectively using ICTs results to lack of accountability and transparency in making services work for South African people who demand quality services.

2.10   Information and Communication Technology adoption

As a result of the rapidly changing world, shifts in technology together with shifts in people's expectations for Government services require new approaches to ICT in the Public Service. For governments to utilise ICTs for their own administrative functions, ICTs such as personal computers, laptops, telephone, mobile phones, sound or tape recorders, overhead projectors, fax machines, printers, scanners, data projectors and storage devices need to be available (Ntetha, 2011).

ICT in organizations and its usage has revolutionized the business operations of organizations across the globe. Organizations, including government institutions, are investing considerable amount of money to adopt ICT resources that meet their organizations business practices and needs. For government departments to render quality service delivery to citizens, work better and fast, adoption and acceptance of ICTs can be utilised to support government administration work (Ntetha, 2011). Therefore, the adopted technologies by government should be accepted by public servants in order to effectively improve public administration work which was in the past executed manually.

For ICT to be adopted and used effectively, the right skills and competencies must be in place at all levels (Department of Public Service and Administration. 2007). The strategy will provide direction and critical mass for R&D and innovation in ICT technology domains, which were identified during the foresight process. These include high-performance computing; human language technologies; information security; open source software; software engineering and software architecture; mobile, wireless and satellite technologies; future-web applications; geomatics and spatial technologies (Department of Public Service and Administration, 2011).

Alshehri et al (2012) indicate that ICT brings different dimension on how public servants used to work in the past. Therefore, it is imperative for public servants to accept implemented technologies so that they are effectively used in order to actualise their purpose. Alshehri et al (2012) state that ICTs must be fully explored as they reflect new approaches in the dissemination of information within government.

The South African government has different agencies such as State Information Technology Agency (SITA) that assist with providing ICT infrastructure (including telecommunications, personal computers etc.) with regard to improving service delivery to citizens (State Information Technology Agency, 2008). This implies that the adoption of ICTs should benefit the South African government and public servants as effective utilizations of ICT would speed up and improve public administration processes and deliver quality services to citizens in time.

2.11   Theoretical framework review

Technology Acceptance Model (TAM) developed by (Davis, Bagozzi & Warshaw, 1989) is famously known as TAM and has been broadly applied in information system studies to explain why users accept and use technology. Many studies have extended the model by identifying antecedents and have found that attitude to use and behavioural intention to use to be highly associated. This makes it harder to measure them as separate constructs, hence many researchers resorted to other models. The objective of the model is to provide a clear insight of determinants of computer acceptance that are holistically capable of describing user behaviour across broad range of end-user technology and user population (Dasgupta & Gupta, 2010).

Davis (1989) dropped the attitude variable, simply because of the limitations found in the original TAM and then reviewed the original TAM to include the constructs such as: perceived ease of use, perceived usefulness, behavioural intention to use, and actual system use (Dasgupta & Gupta, 2010). TAM uses two perceptions which are perceived usefulness and perceived-ease-of-use (PEOU). Perceived usefulness (PU) is the way a person believes that using a certain system could enhance her or his job performance (Alshehri *et al.*, 2012). Secondly, perceived-ease of use is described as a way of people believing that making use of a specific system would be free of effort (Alshehri *et al.*, 2012). The way computers are used is basically determined by intention, which is in turn seen as being jointly determined by the person's attitude towards using the system and its perceived usefulness.

The Unified Theory of Acceptance and Use of Technology (UTAUT) which was developed by Venkatesh is one of the known frameworks in the field of general technology acceptance models (Venkatesh *et al.*, 2003). The main purpose of UTAUT is to describe in detail users intentions to make use of information systems and further the usage behaviour. One of the latest technology acceptance models, UTAUT, blended elements across three well known technology acceptance models such as: the theory of reasoned action (TRA), the technology acceptance model (TAM), the theory of planned behaviour (TPB) (Dasgupta & Gupta, 2010).

The theory has four key concepts (performance expectancy, effort expectancy, social influence and facilitating conditions) that directly determine intention to use. Gender, age, experience and voluntariness of use are suggested to mediate the effect of the four key concepts on intention to use. The UTAUT was used in this study to assess the likelihood of acceptance of new ICTs within the NWPG among public servants. The model assisted the researcher to understand factors that drive acceptance of a new technology, so that appropriate features can be designed to facilitate acceptance of a new technology amongst public servants.

2.12 Chapter summary

This chapter started by discussing ICT in depth and its usefulness in organizations including the government with regard to achieving operational excellence, before discussing how important ICT is for the South African government with regard to delivering services effectively and efficiently to citizenry. The literature review brought insight as to why computers, the Internet, printers, scanners, telephones and mobile phones shapes government departments in delivering services much better, conveniently, faster and in an improved manner to citizens.

To this end, ICTs are regarded as tools that support the work of governmental institutions and agencies with the objective of delivering public services and information in a more convenient, citizen centric and cost effective manner. The South African government and the NPWG have an ICT infrastructure that supports their internal public administrations. However, ICT adoption in organisations, specifically government departments, still faces many challenges, most of them stemming from lack of ICT use among public servants. Other challenges includes, poor funding for proper infrastructure, inadequate computer skills and training among public servants. The South African government has already established and implemented several ICT programmes. Some have been a success and some less so. Nonetheless, several challenges still

hinder the proper implementation and acceptance of these programmes, stemming from both public servants and government in general.

The research methodology will be discussed in the next chapter (Chapter 3).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this chapter is to explore the research methodology used in this study. The research methodology identifies and discusses the plan employed to address the research problem which is related to research questions as well as research objectives. When choosing the research and design methodology for this study, the nature of the problem statement and data to be gathered was taken into consideration, mainly because applying a certain methodology which is aligned to the type of data to be collected is extremely significant as this will enable the researcher to gather accurate and authentic results for the study. Therefore, this chapter discusses the research methodology, sampling techniques, population, conceptual framework, data collection methods, data analysis ethical clearance, validity and reliability used in this study.

3.2 Research methods

Each and every study has an approach which guides the researcher on how to solve its research problem. Williams (2007) states that quantitative and qualitative approaches are usually used by researchers to gather solutions directed towards problem statements. These approaches entails how the research is supposed to be done on the entire study.

3.2.1 Research approach

This study followed the quantitative research methodology because of the nature of data obtained from the selected population (Public servants at NWPG). The nature of the data gathered from public servants working in the NPWG through the use of questionnaires allowed the researcher to make analysis and present those analysis based as numerical statistics. Yilzam (2013) describes quantitative research as the one which makes use of numerical data to describe the phenomena, determine relationships and provide findings.

The researcher reckoned that the quantitative methodology is relevant for this study as it has been proven in the past to be best in terms of obtaining large amount of data and soliciting numerous views about the use of ICT among public servants within the public sector. Quantitative methodology also enabled the researcher to be objectively separated from the subject matter (problem statement) with regard to seeking views about the effective use of ICTs at selected government departments in the North West Province. The researcher omitted the

qualitative as it is known for understanding certain aspect of social life and its methods which overall generate words, rather than numbers. According to Oates (2006), quantitative research is used by positivist researchers and it involves findings based on numbers gathered through the use of survey and experiment.

This study investigated the effective use of ICTs by public servants in NWPGF by assessing factors which have an effect on the use of ICT, utilizing quantitative methodology and using a survey research strategy. Survey is the most utilized research strategy for gathering data in social sciences (Neuman, 2014). The research questions for this study required the gathering of large amount of data that is scattered across the chosen three departments in the North West Provincial Government. The researcher assumed that the investigated group (public servants) make use of the same ICTs on daily basis for the execution of their day to day job descriptions; therefore, the views which they provided on surveys are assumed to be identical with regard to effective use of ICTs in the NWPG.

3.2.2 Research philosophy

This study aimed to investigate the effective use of ICT among public servants in the NWPG and observe relationships on adoption, use and acceptance of ICTs. Having launched an inquiry in social reality with regard to public servants effectively using ICT to execute internal public administrations and deliver public services to citizens, this study assumes positivism research philosophy to quantitatively and objectively discover the realities and issues that lingers around the effective use of ICT by public servants in NPWG. Bhattacherjee (2012) defines positivism as the reality that exists externally and can be objectively measured researchers.

3.2.3 Modes of reasoning

There are two distinctive research modes of reasoning used in research which carries a relation between research and theory; namely, inductive and deductive research approach. Flick (2015) states that inductive approach has no structure that initially informs the gathering of data, instead the research focus can be formulated later once data have been collected. Silverman (2013) defines deductive as an approach which is associated with scientific method that formulates findings from other premises. Deductive approach is associated with positivist research paradigm, which grants the development of hypothesis and statistical techniques testing of the expected results to a particular level of probability (Snieder & Larner, 2009).

Chapter 2 provided literature on Government ICTs in order to give insight with regard to whether public servants make use of ICTs effectively to execute their day to day job descriptions. These existing theories allowed hypotheses to be tested on the research questions raised in chapter 1 of this study. Information gathered from public servants which addressed the research questions, was analysed and then converted into meaningful data that approved hypotheses. Therefore deductive approach was employed as it was an appropriate approach with regard to agree or disapprove hypotheses based on the literature for this study.

3.3 Sampling and Population

Sampling enables the researcher to investigate a smaller amount of people from the initial population which will be analysed for research purposes such as drawing conclusions at the end of the study (Oates, 2006). Sampling was used to select the limited number of participants which represented the entire population for this study. This study investigated three government departments namely: Department of Public works and roads, Department of Health and Department of Finance and from the three departments, public servant participated excluding only those working in the IT section. It was assumed that the chosen public servants and departments provided enough evidence to test hypothesis. The following section outlines the targeted population, the sampling method used and the sample size for this study.

This study investigated public servants in the North West Provincial Government from the departments of Health, Public Works and Roads and Finance. It is assumed that the reason for choosing the mentioned departments is mainly because: department like Health provides services that directly affect the daily lives of most of the country's population and majority of those services are executed with the use of ICTs. As for public servants within Finance and Public Works and Roads, most of their day to day job descriptions are executed through the utilization of ICTs. Therefore the study opted for three departments as its population due to the fact that they gave direct indication of whether or not ICTs are being used effectively by public servants with regard to the execution of day to day operations.

According to Blackstone (2014), population consists of a bunch of people, events or other occurrences that the researcher might be interested in, for the purpose of making generalizations in the study. In addition, Neuman (2014) states that population is the abstract idea of a large group of many cases whereby the researcher pulls out a sample and onto which results from a sample are ultimately generalized.

3.3.1 Sampling method

In order to select the limited number of people to participate in the study, different sampling techniques can be employed to decide which sampling techniques is most appropriate for the study. Sampling techniques include non-probability and probability. Non-probability sampling states that people or events participating in the study are unlikely to be selected, while probability sampling suggest that each object, event or person has a chance to be chosen for representing the overall population being studied (Oates, 2006). Although the sample investigated could not represent other government departments in the NWPG, it was assumed that generalization of findings would apply to the entire population.

From probability sampling technique, simple random was used to determine probable public servants from the population to be included in the sample for this study, meaning public servants who participated in this study were derived from the selected government departments (Department of Public Works & Roads, Finance and Health). Bryman (2012) states that with simple random technique, each unit of the population has an equal probability of inclusion in the sample. Simple random used the table below to determine the sample size from a given population According to Sekaran & Bougie (2013) N = Population and S = Sample.

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	50	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	275	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Table 3.1 Source: Adapted Sekaran, 2013

There are approximately 1926 public servants working at the chosen government departments in the NWPG. All 1926 public servants represent the population. From the indicated population and sample technique used in this study, the table for determining the sample suggested that only 320 public servants can be included in the sample. However, public servants working in IT sections within the three chosen government departments for this study were excluded as their views were deemed irrelevant.

3.4 Research model

The research model applied in this study is based on the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh *et al*. (2003). The model is used as a theoretical driver for this study. The Original model was modified to suit the content of this study in order to realize the aim and objectives. In chapter 2 the researcher provided a review on the theoretical models that are used to comprehend user acceptance and use of ICTs. In this section the researcher modified the UTAUT which identified seven constructs that directly determine intention or usage of ICTs by one or more individuals. The seven constructs were performance expectancy, effort expectancy, social influence and facilitating condition, self-efficacy and anxiety.

In relation to this study, Alshehri *et al* (2012) provides definitions of these constructs as follows: Performance expectancy (PE) – is the degree which individuals belief that using any systems could help her or him obtain achievements in job performance, effort expectancy (EE) refers to easiness associated with the use of the system, social Influence (SI) refers to peer influence in using the system positively or negatively, and lastly facilitating conditions (FC) is the degree individuals belief that an organization and technical infrastructure does exists in order to support use of the system. A recent study conducted in Nigeria advocates among other things that necessary ICTs skills be injected in public servants as adoption, acceptance and use of new technology in government depends mostly in them (public servants) being computer competent (Akpan & Udoh, 2010).
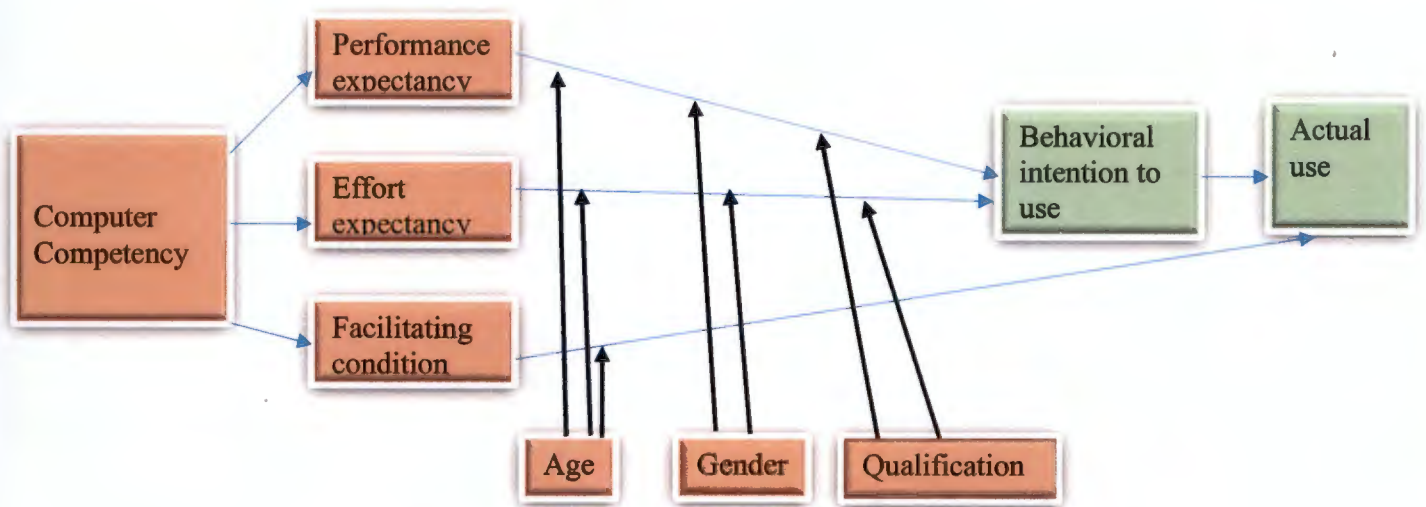
Figure 3.1: Modified UTAUT and associated hypotheses

The researcher suggested computer competency to be an important construct to the UTAUT. Figure 3 above depicts the modified research model and associated hypotheses formulated for this study. From the seven constructs in the UTAUT, only three constructs were used in the model as the researcher assumed the modified model to be useful in measuring intention to use of ICTs among public servants. The omitted constructs are not expected to influence intention to use of ICTs. In this study, intention to use is defined as the degree which public servants would like to use ICTs in the chosen government departments in NPWG for delivering public services to citizens. Gender, experience, age and voluntariness of use were use as moderating variables in the original UTAUT.

According to Akpan and Udoh (2010), computer competency in government refers to effective use of modern ICTs to execute public administration operations for the interest of citizenry. In this study, the researcher investigated effective use of ICTs among public servants in the NWPG. The researcher believes that computer competency will impact public servants perception of ease of use and usefulness of ICTs as it contributes to lack of effective use of ICTs in the NPWG.

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The following set of hypotheses on the relationship between constructs identified for this study are discussed as follows:

H1: Facilitating condition will positive effect on actual use.

H2: Computer competency will have positive effect on performance expectancy.

H3: Computer competency will have positive effect on effort expectancy.

The following set of hypotheses based on the original UTAUT model for this study are discussed as follows:

H4: The influence of performance expectancy on behavioural intention to use ICTs was moderated by age, gender and qualification.

H5: The influence of effort expectancy on behavioural intention to use ICTs was moderated by age, gender and qualification.

3.4.1   Variables measured in this study

For this research, quantitative research is conceptualized on UTAUT as explained above with all the variables described in detail. A variable is known as a measurable concept which symbolizes an idea, an object, and event, or a person (Venkatesh *et al.*, 2003). Variable types which determine or impact on something are called independent variables, while variables that are determined or influenced by the other variables in this study are referred to as dependent variable (Venkatesh *et al.*, 2003).   The original UTAUT model includes four direct independents of actual use (AU) and behavioural intention to use (BIU). For this study, facilitating condition was omitted as it did not provide any influence or impact with regard to public servants using ICT effectively. Therefore, only three independent variables were used which are PU, EE, SI, and CC. Dependent variables in this study are BIU and AC. Lastly, gender and age are referred to as moderators in this study.

3.5 Data collection method

This study used questionnaires to collect views from public servants working in the chosen government departments within the NWPG. The views of public servants were helpful in providing answers to the research questions and also allowed the researcher to have a clear understanding of potential factors that determines the adoption and acceptance of ICTs in NWPG.

Oates (2006) defines data collection methods as approaches which produces empirical evidence in research. According to Oates (2006), questionnaires are used in research studies as data collection instruments employed in quantitative studies and are considered to be appropriate choices for gathering data from large number of participants. The use of questionnaire in this study allowed public servants to complete it at their convenience time as they were many in numbers. Based on the research problem and questions, the researcher designed and developed a questionnaire instrument that is appropriate for this study.

3.5.1 Questionnaire design and development

It is extremely significant for the researcher to ensure that the data collection instrument used in the study, which is then distributed to respondents produces reliable and valid data. The questionnaire was developed based on the research questions and the proposed conceptual framework (UTAUT) for this study. The questionnaire was divided into several sections for ease understanding of the content and completion. Open-ended questions were included to allow public servants to express their views in brief manner and make suggestions if needed.

A five point Likert scale was used in the questionnaire where respondents had to decide how strongly they disagree or agree with certain questions. Nenty (2009) defines Likert scale as a series of statements that express attitude or behaviour which is either clearly unfavourable or clearly favorable. Likert scale is appropriate for this study to measure participant's attitude and behaviour towards constructs.

The questionnaire consists of three pages including the cover letter, which outlines the topic of the study, explains the objectives of the study, details of the researcher and also details of the two supervisors and directions on how to fill in the questionnaire. The questionnaire consists of five sections. Section A bases its focus on demographic information of public servants. Section B includes questions which focus on types and accessibility of ICTs tools used by public servants. Section C seeks information about the usage of ICTs by public servants. Section D focuses on the impact of ICTs on public servants. Section E looks at ICTs skills and training needs required for public servants. See (Appendix A).

A pilot study was used on a limited number of public servants in the NPWG to detect any flaws or errors. Nenty (2009) defines pilot testing as distributed data collection method directed to a small scale for the purpose of exploring areas which need more development and refinement.

Nenty (2009) further explains that pilot testing enables the researcher to notice difficulties which may arise during the subsequent data collection instrument that might have gone unnoticed.

In this study, the researcher circulated the questionnaire to five public servants in each selected government department within NPWG. They were asked to make recommendations and amendments in the layout and contents of the questionnaire. Pilot testing was used in this study for the purpose of ensuring that the every public servant within the sample not only understands questions asked in the questionnaire instrument, but understands them in the same way. In this manner, their feedback enabled the researcher to make changes on the questionnaire and also see if there were any questions which made them feel uncomfortable. Lastly, a statistician's assessment of whether the questionnaire design was feasible enough or not, was obtained.

3.6 Quantitative data analysis

Once data is gathered from respondents, it has to be analyzed and presented as empirical evidence for the study. This study is quantitative in nature and employed descriptive and inferential statistic methods to analyze data gathered from public servants in the NPWG. Quantitative data analysis is the process of using numeric statistical analysis tools to mine data from the sample to find meaning (Nenty, 2009). All numerical data gathered from public servants in the NWPG with regard to effective use of ICTs, was captured and analysed through the use of a Statistical Package for the Social Science (SPSS). The researcher interpreted and presented the results in chapter 4. The main aim of quantitative data analysis in this study was to seek patterns, discrepancies and relationships in the data obtained from public servants working in the chosen government departments of the NWPG.

3.7 Descriptive and inferential statistics

Descriptive statistics method was employed in this study to make numeric comparisons, search relationships, discrepancies and trends on the variables in order to draw conclusions on the findings gathered for this study. Nenty (2009) defines descriptive statistics as a technique that is concerned with summarizing and describing data gathered and inferential statistics as a technique that assists the researcher in drawing conclusions through the use of descriptive statistics techniques.

3.8 Ethical consideration

The importance of ethical considerations in this study was to treat public servants and NPWG with respect, fairness and honesty when conducting research at their premises. Anonymity and confidentiality was assured to public servants, so that their identities were not revealed to the public. The researcher was fully aware and understood that all public servants in this study were not obliged to partake in case of any adverse treatment from the researcher. In order to address ethical issues, an informed consent form, which describes the nature of the research project, as well as the nature of participation, was obtained used and complied with the North West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) (See Appendix B). An application was submitted on the 2015 -05-21 and clearance was granted by the NWU-IRERC.

3.9 Validity and reliability

Social science studies face threats and inconsistence to validity in results obtained from data collection methods (survey) within studies carried out by researchers. Osman (2014) states that regardless of the advantage survey questionnaire carries, the instrument still lacks validity and reliability. The leak usually occurs during data collection process as researchers administer questionnaires themselves and the data obtained can be easily manipulated (Osman, 2014). The following section discusses possible inconsistence and threats to validity and reliability for this study and measures taken to overcome them.

3.9.1   Validity

Osman (2014) states that validity refers to the degree whereby the data that is gathered correctly reflects to the social reality being studied. This is achieved through the ability of the research instrument (Questionnaire) to obtain accurate data and correctly measuring what the study intends to measure. Pilot testing was used to ensure content validity on few public servants in the NWPG as to its capability to gather data. Face and content validity in this study are defined as measuring how appropriate the items found on the data gathering instrument seem to fit for participants who have some knowledge of the subject under investigation (Osman, 2014).

The researcher ensured face and content validity through distribution of questionnaires to fewer public servants from the sample for this study. The main aim of face and content validity in this study was to refine and modify the questionnaire in order to suit the initial sample for this

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study so that public servants can complete the questionnaire without any difficulties. According to Osman (2014), findings of any studies would not always be 100% accurate, reliable and valid. Therefore, it is imperative to deal with reliability and validity of the context on data collection instruments, in order to indicate that efforts were made not to comprise the entire study.

Based on the above discussion, a well-orchestrated plan was devised to obtain correct and accurate data form the sample on this study.

3.9.2 Reliability

Reliability refers to the repeatability of the research. It basically tests how truthfully the response was from participants. Osman (2016) defines reliability as a technique that makes emphasis on consistency with regard to the research instrument that measures attributes. Cronbach's Alpha was used in this study to preform correct measures for reliability. Questions within the data collection instrument for this study were formulated carefully to ensure that they were not ambiguous. Cronbach's alpha is a test for a survey's internal consistency, called a scale reliability coefficient and it applies assessment on reliability for rating and summarizing survey answers which measure some underlying factor (Neuman, 2014).

Scores were computed from each test item and the cut-off point was 0.7, meaning all alpha value below 0.7 were not acceptable. Because this study used Likert scales on the research instrument (Questionnaire), the researcher calculated Cronbach's alpha coefficient for internal consistency reliability for any scales that was used. Sequential pilot testing was conducted to improve the research instruments with regard to making improvements. The researcher remained neutral on the research instrument completed by public servants. This was done to avoid any influence from the researcher on public servants on how to complete the questionnaire. Lastly, the researchers ensured that reliability exclude unclear questions when public servants complete the questionnaires.

3.10 Chapter summary

This chapter described the research methodology, which was indicated as quantitative in nature to gather findings for this study. This chapter further described the research philosophy (positivism) that was followed, together with the data collection method (Questionnaire) used. The researcher identified the population and also derived the sample using simple random

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technique to be included in the study. The proposed model (UTAUT) and variables measured were also discussed in detail to give a broader view of the factors that play a significant role in the adoption, acceptance and use of ICTs among public servants.

Reliability of the data gathering instrument was discussed together with the validity of data obtained from public servants in NWPG. Limitations encountered throughout the study were also discussed as well as ethical consideration of how the study was conducted when collecting data from respondents within NPWG. Chapter 4 will provide analysis on the data collected through SPSS which is a statistical computer software. This is then followed by the presentation of findings for the study.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF RESULTS

4.1 Introduction

The purpose of this chapter is to present the results of the research and to provide statistical analysis of the collected data by use of a questionnaire administered to public servants working at the department of Finance, Health and Public Works and Roads in the NWPG. The chapter also presents analysis of the results on demographic information of public servants, types of ICTs found in the three chosen government departments, the level of ICT use among public servants, impact of ICT on the work of public servants, computer skills public servants have to do office work and deliver services to citizens, and training needs required by public servants to effectively use ICT and lastly the challenges faced by public servants when using ICTs.

It also discusses the results of Chi-square on the relationship between computer competency performance expectancy, effort expectancy and facilitating conditions and also the relationship between performance expectancy, effort expectancy, facilitating conditions and demographic variables. These findings are presented from section 4.2 to 4.10

4.2 Response rate

A total number of 320 questionnaires were distributed to public servants within the three departments of the North West Provincial Government. Out of the total of 320 questionnaires distributed, 216 were completed and returned which is a 68% response rate.

4.3 Reliability test

The Cronbach's alpha was used to test reliability. The Cronbach's alpha ranges between 0 and 1 with higher numbers indicating greater reliability. The reliability analysis were computed per section and overall. The reliability results are presented in the table below.

Table 4. 1: Reliability test results

Data	Cronbach's Alpha	Items	Comments
Section B	0.726	19	Excellent and consistent
Section C	0.941	19	Excellent and consistent
Section D	0.879	19	Excellent and consistent
Section E	0.983	19	Excellent and consistent
Section F	0.883	19	Excellent and consistent
Section G	0.928	19	Excellent and consistent
Overall	0.901	114	Excellent and consistent

The reliability analysis results presented in Table 4.1 reveal that the overall Cronbach's alpha value is 0.901, which is consistent and reliable. The Cronbach's alpha for individual sections are all greater than the cut-off point of 0.7. Therefore, it is concluded that the data is excellent and consistent. The next section discusses the demographic information of the respondents.

4.4 Demographic information

This section presents the results on demographic information of the respondents.

Figure 4.1: Government Departments
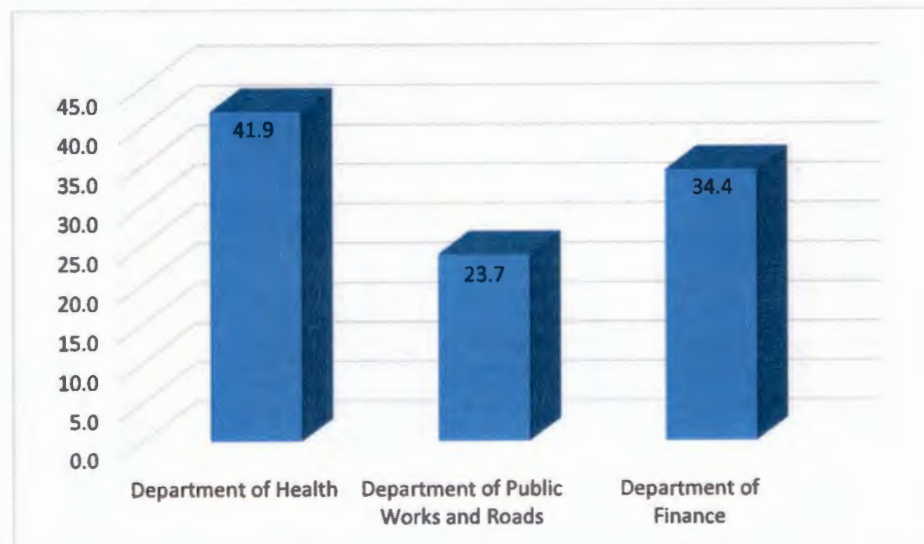
Figure 4.1 depicts that majority (41.9%) of the respondents were from the department of Health, followed by 34.4% of the respondents from department of Finance and 23.7% were from department of Public Works and Roads.

Figure 4.2: Current job title
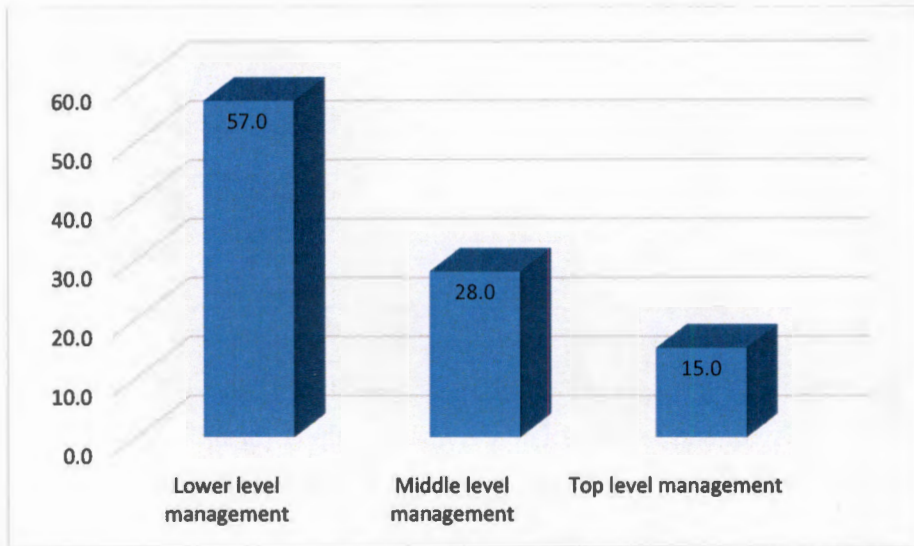
The results presented in Figure 4.3 depict that majority (57.0%) of the respondents are in the lower level management, 28.0% are in middle level management and lastly 15.0% are in top level management. This clearly shows that most of the respondents who participated in the study were in lower level management.

Figure 4.3: Highest level of qualification
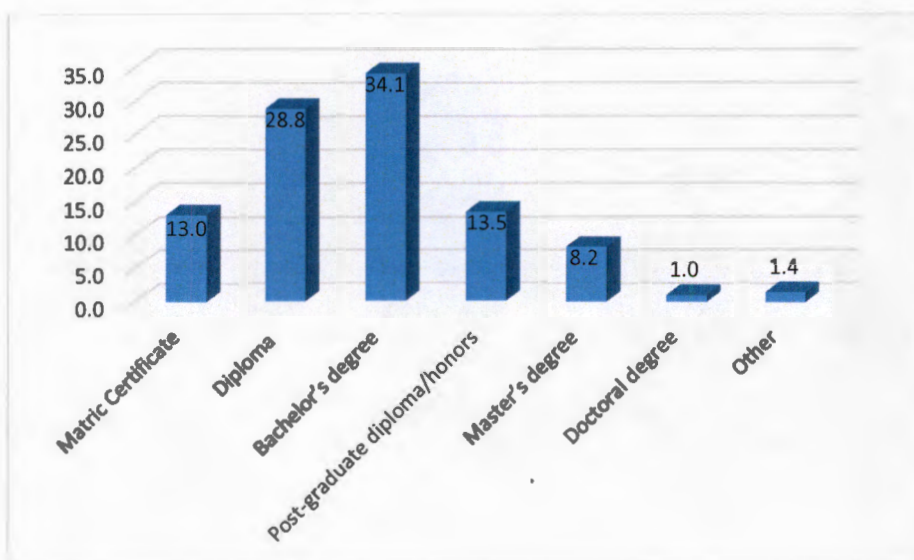
Figure 4.3 above depicts that majority (34.1%) of the respondents have Bachelor's degree as their highest qualification followed by 28.8% of the respondents with Diploma and the lowest number of respondents had Doctoral degree qualification (1.0%).

Figure 4.4: Age group
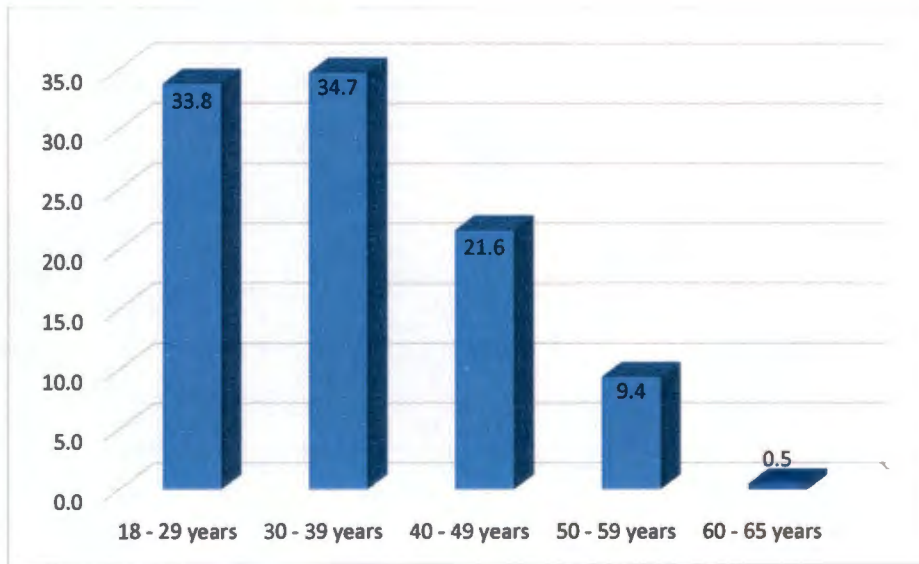
Figure 4.4 shows that the majority (34.7%) of the respondents falls between the age group of 30 - 39 category followed by 18 – 29 with 33.8%. The least respondents falls between the age group of 60 – 65 with 0.5%. This clearly shows that the age group of 30 – 39 year dominated the age category.

Figure 4.5: Gender
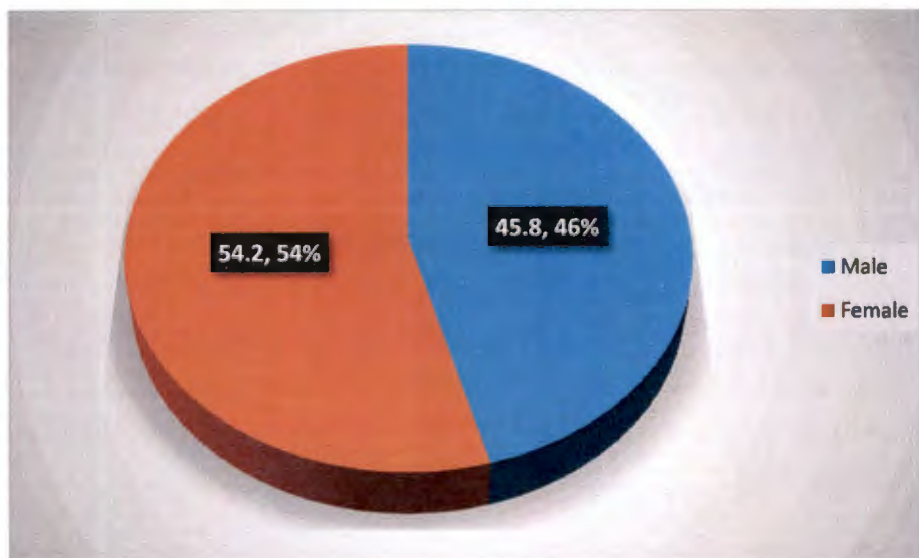
Figure 4.5 depicts that the majority (54.2%) of the respondents were females while 45.8% of the respondents were males. This means that the female participants dominated male participants.

4.5 Types of Information and Communication Technology application

Table 4. 2: which of the following ICTs are available in your department for office use and to serve citizens?

ICT tools and applications	For office use	For services to citizens	Total
	1	2	
Personal computer (PC)	108(75.0%)	36(25.0%)	144(100)
Laptop	92(58.6%)	65(41.4%)	157(100)
Tablet	37(92.5%)	3(7.5%)	40(100)
Internet	159(88.8%)	20(11.2%)	179(100)
Email	183(93.8%)	12(6.2%)	195(100)
Intranet	109(98.2%)	2(1.8%)	111(100)
Printers	193(99.5%)	1(0.5%)	194(100)
Scanners	154(100.0%)	0(0.0%)	154(100)
Fax machine	104(95.4%)	5(4.6%)	109(100)
Overhead projector	101(100.0%)	0(0.0%)	101(100)
Data projector	90(100.0%)	0(0.0%)	90(100)
Mobile phones	84(91.3%)	8(8.7%)	92(100)
Telephone	172(94.0%)	11(6.0%)	183(100)
USB	103(100.0%)	0(0.0%)	103(100)
External Hardrive	101(98.1%)	2(1.9%)	103(100)
Digital camera	64(94.1%)	4(5.9%)	68(100)
Copy machine	157(98.1%)	3(1.9%)	160(100)
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	93(78.8%)	25(21.2%)	118(100)
Microsoft office (Word, PowerPoint, Excel, Project management)	160(95.8%)	7(4.2%)	167(100)

For public workers to process bureaucratic work effectively and service citizenry quicker, ICTs must be available in departments. The question on the table above aimed to discover the types of ICTs that are available at three government department namely: Department of Health, Department of Finance and Department of Public Works and Roads for public workers to use on office work and deliver services. The respondents were requested to respond to a list of nineteen ICT tools. They were asked to choose them from the following description ranges (1 = for office use and 2 = to service citizens).

The results on table 4.2 above indicates that the availability of ICTs is not a problem in the three departments as respondents indicated that the following ICTs are available and used for

office work: personal computers (75%), laptops (58.6%), tablets (92.5%), Internet (88.8%), email (93.8%), intranet (98.2%), printers (99.5%), scanners (100%), fax machines (95.4%), overhead projectors (100%), data projectors (100%), mobile phones (91.3%), telephones (94.0%), usb (100%), external Hardrives (98.1%), digital cameras (94.1%), copy machines (98.1%), transversal systems (78.8%) and Microsoft office (95.8%). The results clearly show that all nineteen ICTs tools and applications are more readily available to process office work and deliver services to citizens.

Figure 4.6: For what purpose do you use the above chosen ICT for?
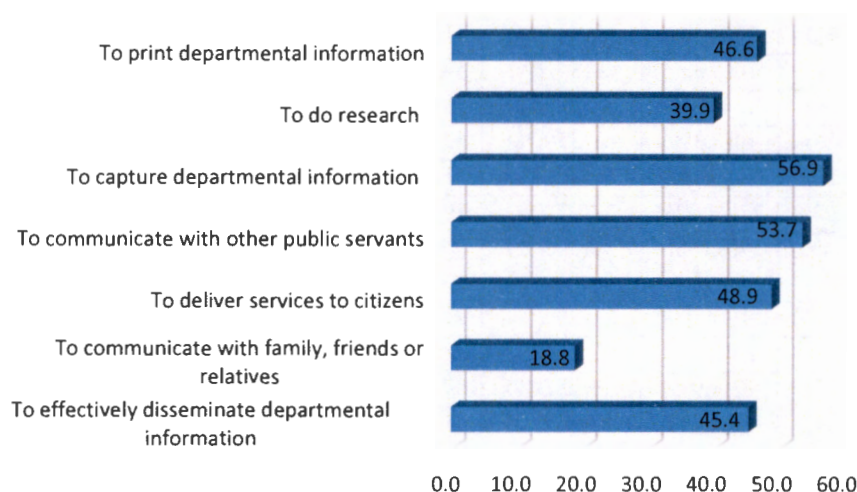
ICTs can be utilized for many purposes depending on the work environment and what output is expected. This question sought to determine the purposes for which the ICTs are used for by public servants for specific bureaucratic work in the three chosen government departments for this study.

According to the results, nineteen ICTs were indicated by public workers to be available and mostly used to capture departmental information. Figure 4.6 above shows that, 56.9% of the respondents used the available ICTs to capture departmental information and 53.7% respondents utilized the available ICTs to basically communicate with other colleagues.

The findings further revealed that, 46.6% and 45.5 % of respondents used the available ICTs to print departmental information and effectively disseminate departmental information while 39.9% and 18.8% respondents indicated to have used the available ICTs to do research and

communicate with family, friends or relative. The results clearly indicate that, ICTs were effectively used by public servants for work related matters such as processing bureaucratic work and delivering good services to citizens in the three departments.

4.6 The level of Information and Communication Technology use

Table 4.3: how is your level of ICT use for office work and public service?

ICT tools and applications	V-Low 1	Low 2	Satisfactory 3	High 4	V-High 5	Total	Mean
Personal computer (PC)	11(7.4%)	9(6.1%)	51(34.5%)	38(25.7%)	39(26.4%)	148(100)	3,57
Laptop	10(7.5%)	7(5.2%)	48(35.8%)	33(24.6%)	36(26.9%)	134(100)	3,58
Tablet	12(18.2%)	13(19.7%)	18(27.3%)	14(21.2%)	9(13.6%)	66(100)	2,92
Internet	5(2.9%)	16(9.4%)	59(34.7%)	51(30.0%)	39(22.9%)	170(100)	3,61
Email	4(2.1%)	10(5.3%)	64(34.2%)	54(28.9%)	55(29.4%)	187(100)	3,78
Intranet	8(6.1%)	15(11.5%)	38(29.0%)	38(29.0%)	32(24.4%)	131(100)	3,54
Printers	6(3.1%)	14(7.3%)	68(35.6%)	62(32.5%)	41(21.5%)	191(100)	3,62
Scanners	10(6.2%)	14(8.6%)	57(35.2%)	51(31.5%)	30(18.5%)	162(100)	3,48
Fax machine	25(21.2%)	25(21.2%)	32(27.1%)	20(16.9%)	16(13.6%)	118(100)	2,81
Overhead projector	11(10.4%)	9(8.5%)	40(37.7%)	30(28.3%)	16(15.1%)	106(100)	3,29
Data projector	11(11.7%)	11(11.7%)	27(28.7%)	27(28.7%)	18(19.1%)	94(100)	3,32
Mobile phones	8(7.5%)	10(9.3%)	28(26.2%)	28(26.2%)	33(30.8%)	107(100)	3,64
Telephone	4(2.3%)	12(6.9%)	49(28.3%)	57(32.9%)	51(29.5%)	173(100)	3,80
USB	8(16.8%)	11(9.4%)	42(35.9%)	41(35.0%)	15(12.8%)	117(100)	3,38
External Hardrive	15(14.6%)	22(21.4%)	31(30.1%)	28(27.2%)	7(6.8%)	103(100)	2,90
Digital camera	22(26.8%)	17(20.7%)	17(20.7%)	20(24.4%)	6(7.3%)	82(100)	2,65
Copy machine	12(7.7%)	8(5.2%)	50(32.3%)	50(32.3%)	35(22.6%)	155(100)	3,57
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	13(11.1%)	8(6.8%)	55(47.0%)	12(10.3%)	29(24.8%)	117(100)	3,31
Microsoft office (Word, PowerPoint, Excel, Project management)	4(2.3%)	1(0.6%)	62(35.4%)	37(21.1%)	71(40.6%)	175(100)	3,97
Overall mean of the level of ICT use							3,41

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This question sought to gain insight on the level of ICT use amongst public servants working at the following three government departments: Department of Health, Department of Finance and Department of Public Works and Roads. In relation to the question in table 4.3, respondents were requested to respond to nineteen ICTs thereof. They were asked to choose from the following description ranges (1 = very low; 2 = low; 3 = satisfactory; 4 = high and 5 = very high).

From table 4.3 above, respondents indicated that, their level of use on all most of the ICTs is high. For example: majority of the respondents 52.1% indicated that their level of usage on personal computers is high, 51.5% indicated that their level of usage on laptops is also high, similarly 52.9% indicated that their level of usage on Internet is high, 58.3% also indicated that their level of usage of email is high, 53.4% indicated that their level of usage of intranet is high, 54.0% indicated that their level of usage of printers is high and lastly 50.0% indicated that their level of usage of scanners is high.

The results further shown that, 57.0%, 62.4% and 61.7% respondents indicated that their level of usage on mobile phones, usb and Microsoft office applications is high. Similarly 47.8%, 47.5% and 47% respondents indicated their level of usage on data projector, copy machine and transversal systems to be high. Only 42.4%, 36.0% & 37.9% of respondents indicated their level of usage on fax machines, digital camera and tablets to be low. The table further reported the overall mean value of 3.41 for the level of ICT use and it is satisfactory. These results clearly depict that public servants used ICTs frequently for office work and service delivery as their level of ICT use was high.

Table 4.4: how much time do you spend per day using the following ICTs for office use and for service delivery?

ICT tools and applications	Less than 1 hour		1-5 hours		6-10 hours		11-12 hours		None		Total
	Office	Public	Office	Public	Office	Public	Office	Public	Office	Public	
Personal computer (PC)	9(6.0%)	6(4.0%)	27(17.9%)	3(2.0%)	97(64.2%)	0(0.0%)	5(3.3%)	0(0.0%)	3(2.0%)	1(0.7%)	151(100)
Laptop	14(12.5%)	3(2.7%)	20(17.9%)	3(2.7%)	52(46.4%)	2(1.8%)	9(8.0%)	0(0.0%)	9(8.0%)	0(0.0%)	112(100)
Tablet	26(31.0%)	2(2.4%)	15(17.9%)	5(6.0%)	17(20.2%)	4(4.8%)	3(3.6%)	0(0.0%)	12(14.3%)	0(0.0%)	84(100)
Internet	27(15.3%)	5(2.8%)	63(35.6%)	4(2.3%)	61(34.5%)	3(1.7%)	11(6.2%)	0(0.0%)	3(1.7%)	0(0.0%)	117(100)
Email	20(11.7%)	4(2.3%)	38(22.2%)	5(2.9%)	86(50.3%)	3(1.8%)	12(7.0%)	0(0.0%)	3(1.8%)	0(0.0%)	171(100)
Intranet	31(23.3%)	3(2.3%)	34(25.6%)	4(3.0%)	51(38.3%)	1(0.8%)	6(4.5%)	0(0.0%)	3(2.3%)	0(0.0%)	133(100)
Printers	52(28.9%)	5(2.8%)	45(25.0%)	3(1.7%)	55(30.6%)	2(1.1%)	13(7.2%)	0(0.0%)	5(2.8%)	0(0.0%)	180(100)
Scanners	53(33.8%)	7(4.5%)	38(24.2%)	2(1.3%)	45(28.7%)	1(0.6%)	6(3.8%)	0(0.0%)	5(3.2%)	0(0.0%)	157(100)
Fax machine	42(40.0%)	5(4.8%)	22(21.0%)	3(2.9%)	15(14.3%)	1(1.0%)	2(1.9%)	0(0.0%)	15(14.3%)	0(0.0%)	105(100)
Overhead projector	26(26.8%)	8(8.2%)	29(29.9%)	1(1.0%)	17(17.5%)	0(0.0%)	3(3.1%)	0(0.0%)	13(13.4%)	0(0.0%)	97(100)
Data projector	28(29.8%)	3(3.2%)	26(27.7%)	2(2.1%)	23(24.5%)	1(1.1%)	6(6.4%)	0(0.0%)	5(5.3%)	0(0.0%)	94(100)
Mobile phones	22(19.3%)	7(6.1%)	17(14.9%)	9(7.9%)	31(27.2%)	5(4.4%)	4(3.5%)	5(4.4%)	14(12.3%)	0(0.0%)	114(100)
Telephone	47(26.1%)	2(1.1%)	41(22.8%)	11(6.1%)	56(31.1%)	7(3.9%)	14(7.8%)	1(0.6%)	1(0.6%)	0(0.0%)	180(100)
USB	33(31.4%)	5(4.8%)	16(15.2%)	9(8.6%)	30(28.6%)	0(0.0%)	8(7.6%)	0(0.0%)	4(3.8%)	0(0.0%)	105(100)
External Hardrive	27(28.1%)	3(3.1%)	17(17.7%)	4(4.2%)	26(27.1%)	0(0.0%)	7(7.3%)	0(0.0%)	9(9.4%)	3(3.1%)	96(100)
Digital camera	18(25.0%)	3(4.2%)	14(19.4%)	4(5.6%)	15(20.8%)	0(0.0%)	2(2.8%)	0(0.0%)	14(19.4%)	2(2.8%)	72(100)
Copy machine	35(29.2%)	5(4.2%)	27(22.5%)	7(5.8%)	25(20.8%)	4(3.3%)	8(6.7%)	0(0.0%)	8(6.7%)	1(0.8%)	12(100)
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	23(19.7%)	4(3.4%)	22(18.8%)	5(4.3%)	32(27.4%)	1(0.9%)	10(8.5%)	0(0.0%)	14(12.0%)	6(5.1%)	117(100)
Microsoft office (Word, PowerPoint, Excel, Project management)	19(11.9%)	8(5.0%)	24(15.0%)	9(5.6%)	59(36.9%)	7(4.4%)	21(13.1%)	1(0.6%)	8(5.0%)	4(2.5%)	160(100)

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The question on table 4.4 above aimed to acquire views of public servants on the amount of time they spend per day using various ICT tools and applications that are available to do bureaucratic work and deliver services. Table 4.4 then presents responses to the questions relating to the time spent by public servants per day using the ICTs for office use and for service delivery. The respondents were requested to respond to nineteen ICTs thereof. They were asked to choose from the following description ranges (1 = Less than 1 hour; 2 = 1-5 hours; 3 = 6-10 hours; 4 = 11-12 hours and 5 = none).

From the following three government departments: Department of Health, Department of Finance and Department of Public Works and Roads, 64.2% respondents indicated that, they used personal computers for 6-10 hours per day, 46.4% respondents used laptops for 6-10 hours per day and 50.3% respondents used emails for up to 6-10 per day to do office work while 31% respondents, 33.8% respondents and 40% respondents spend less than 1 hour per day using tablets, scanners and fax machines to do office work.

In addition, 38.3% respondents, 30.6% respondents and 27.2% respondents spend up to 6-10 hours per day using intranet, printers and mobile phones to process office work. Only 35.6% respondents and 29.9% spend 1-5 hours per day on Internet and overhead projectors to do office work while 29.8% respondents, 31.4 % respondents, 28.1 % respondents, 25% respondents and 29.2% spend less than 1 hour per day using data projectors, usb, external hardrives, digital camera and copy machines to process office work.

Lastly, 31.1% respondents, 27.4% respondents and 36.9% respondents spend up 6-10 hours per day using telephones, transversal systems and Microsoft office applications to process office work.

Table 4.5: how long have you been using the following ICTs for office use and public service?

ICT tools and applications	Less than a year		1-2 years		2-5 years		5-10 years		More than 10 years		Total
	Office	Public	Office	Public	Office	Public	Office	Public	Office	Public	
Personal computer (PC)	34(21.1%)	3(1.9%)	12(7.5%)	4(2.5%)	35(21.7%)	12(7.5%)	38(23.6%)	3(1.9%)	16(9.9%)	4(2.5%)	161(100)
Laptop	19(15.4%)	2(1.6%)	7(5.7%)	4(3.3%)	38(30.9%)	8(6.5%)	17(13.8%)	6(4.9%)	20(16.3%)	2(1.6%)	123(100)
Tablet	15(23.4%)	2(3.1%)	2(3.1%)	3(4.7%)	17(26.6%)	7(10.9%)	10(15.6%)	1(1.6%)	7(10.9%)	0(0.0%)	64(100)
Internet	30(16.6%)	3(1.7%)	16(8.8%)	7(3.9%)	46(25.4%)	13(7.2%)	29(16.0%)	5(2.8%)	31(17.1%)	1(0.6%)	181(100)
Email	30(15.6%)	2(1.0%)	14(7.3%)	6(3.1%)	51(26.6%)	10(5.2%)	42(21.9%)	6(3.1%)	31(16.1%)	0(0.0%)	192(100)
Intranet	12(9.3%)	1(0.8%)	11(8.5%)	8(6.2%)	28(21.7%)	10(7.8%)	29(22.5%)	4(3.1%)	26(20.2%)	0(0.0%)	129(100)
Printers	35(19.2%)	3(1.6%)	13(7.1%)	2(1.1%)	46(25.3%)	10(5.5%)	32(17.6%)	6(3.3%)	35(19.2%)	0(0.0%)	182(100)
Scanners	28(18.9%)	3(2.0%)	8(5.4%)	3(2.0%)	38(25.7%)	9(6.1%)	28(18.9%)	6(4.1%)	25(16.9%)	0(0.0%)	148(100)
Fax machine	22(19.1%)	4(3.5%)	8(7.0%)	1(0.9%)	27(23.5%)	11(9.6%)	19(16.5%)	6(5.2%)	17(17.8%)	0(0.0%)	115(100)
Overhead projector	24(25.3%)	1(1.1%)	6(6.3%)	0(0.0%)	19(20.0%)	4(4.2%)	15(15.8%)	4(4.2%)	22(23.2%)	0(0.0%)	95(100)
Data projector	18(18.8%)	2(2.1%)	7(7.3%)	0(0.0%)	25(26.0%)	3(3.1%)	17(17.7%)	4(4.2%)	20(20.8%)	0(0.0%)	96(100)
Mobile phones	21(20.6%)	2(2.0%)	6(5.9%)	2(2.0%)	19(18.6%)	7(6.9%)	19(18.6%)	5(4.9%)	20(19.6%)	1(1.0%)	102(100)
Telephone	35(20.7%)	5(3.0%)	16(9.5%)	1(0.6%)	35(20.7%)	16(9.5%)	25(14.8%)	4(2.4%)	30(17.8%)	2(1.2%)	169(100)
USB	20(17.7%)	1(0.9%)	7(6.2%)	0(0.0%)	33(29.2%)	10(8.8%)	18(15.9%)	4(3.5%)	20(17.7%)	0(0.0%)	113(100)
External Hardrive	21(18.9%)	2(1.8%)	10(9.0%)	1(0.9%)	25(22.5%)	15(13.5%)	20(18.0%)	4(3.6%)	13(11.7%)	0(0.0%)	111(100)
Digital camera	16(23.5%)	1(1.5%)	4(5.9%)	4(5.9%)	13(19.1%)	3(4.4%)	10(14.7%)	4(5.9%)	12(17.6%)	1(1.5%)	68(100)
Copy machine	27(19.9%)	4(2.9%)	12(8.8%)	0(0.0%)	29(21.3%)	11(8.1%)	24(17.6%)	2(1.5%)	26(19.1%)	1(0.7%)	136(100)
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	29(25.0%)	0(0.0%)	8(6.9%)	6(5.2%)	26(22.4%)	8(6.9%)	28(24.1%)	4(3.4%)	6(5.2%)	1(0.9%)	116(100)
Microsoft office (Word, PowerPoint, Excel, Project management)	24(13.9%)	2(1.2%)	17(9.8%)	6(3.5%)	37(21.4%)	15(8.7%)	34(19.7%)	2(1.2%)	32(18.5%)	4(5.3%)	173(100)

Table 4.5 presents the responses to the questions relating to how long the public servants have been using the ICTs for office use and public service. The respondents were requested to respond to nineteen ICTs thereof. They were asked to choose from the following description ranges (1 = Less than a year; 2 = 1-2 years; 3 = 2-5 years; 4 = 5-10 years and 5 = More than 10 years).

As a result, 23.6% respondents, 22.5% respondents, 25.3% respondents and 25.7% respondents indicated that they, have been using personal computers, intranet, printers and scanners for office usage for 5-10 years while 30.9% respondents, 26.6% respondents, 25.4% respondents, 26.6% respondents and 23.5% respondents indicated that, they have been using laptops, tablets, Internet, emails and fax machines for 2-5 years to do office work. Only 25.3% respondents, 20.6% respondents, 23.5% respondents and 25% respondents indicated to have used overhead projectors, mobile phones, digital cameras and transversal systems for less than a year for office work.

Similarly, 26% respondents, 20.7% respondents, 29.2% respondents, 22.5% respondents, 21.3% respondents and 21.4% respondents indicated that, they have been using data projectors, telephones, usb, external hardrives, copy machines and Microsoft office applications for 2-5 years for office work.

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4.8 Impact of ICT

Table 4.6: which of the following ICTs do you consider effective relative to your work?

ICT tools and applications	Effective	Extremely effective	Not effective	Total	Mean
	1	2	3		
Personal computer (PC)	42(29.0%)	92(63.4%)	11(7.6%)	145(100)	1,79
Laptop	47(34.8%)	81(60.0%)	7(5.2%)	135(100)	1,70
Tablet	25(34.7%)	29(40.3%)	18(25.0%)	72(100)	1,90
Internet	67(38.3%)	97(55.4%)	11(6.3%)	175(100)	1,68
Email	56(29.5%)	126(66.3%)	8(4.2%)	190(100)	1,75
Intranet	50(41.3%)	62(51.2%)	9(7.4%)	121(100)	1,66
Printers	64(34.2%)	116(62.0%)	7(3.7%)	187(100)	1,71
Scanners	63(36.8%)	102(59.6%)	6(3.5%)	171(100)	1,67
Fax machine	42(34.7%)	49(40.5%)	30(24.8%)	121(100)	1,91
Overhead projector	47(42.7%)	42(38.2%)	21(19.1%)	110(100)	1,76
Data projector	39(39.8%)	48(49.0%)	11(11.2%)	98(100)	1,71
Mobile phones	39(32.2%)	69(57.0%)	13(10.7%)	121(100)	1,79
Telephone	59(34.3%)	102(59.3%)	11(6.4%)	172(100)	1,73
USB	60(50.8%)	49(41.5%)	9(7.6%)	118(100)	1,57
External Hardrive	55(52.4%)	42(40.0%)	8(7.6%)	105(100)	1,55
Digital camera	18(23.1%)	28(35.9%)	32(41.0%)	78(100)	2,18
Copy machine	51(36.2%)	69(48.9%)	21(14.9%)	141(100)	1,80
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	32(26.7%)	72(60.0%)	16(13.3%)	120(100)	1,87
Microsoft office (Word, PowerPoint, Excel, Project management)	48(27.6%)	121(69.5%)	5(2.9%)	174(100)	1,75
Overall mean of the impact of ICT					1,76

The questions in table 4.6 sought to explore the impact of ICTs amongst public servants working at the Department of Health, Department of Finance and Department of Public Works and Roads. The results in table 4.6 above subsequently showed that, ICTs identified by public servants to be accessible were regarded as effective in processing bureaucratic processes.

For example, personal computers (92.4%), laptops (94.8%), tablets (75%), Internet (73.7%), email (95.8%), intranet (92.5%), printers (96.2%), scanners (75.2%), overhead projectors (80.9%), data projectors (88.8%), mobile phones (89.2%), telephones (93.6%), usb (92.3%), external hardrives (92.4%), digital cameras, copy machines (85%), transversal systems (86.7%) and Microsoft office applications (97.1%) were indicated by respondents to be the most effective towards their work. The mean value score for the dimension is 1.76 which indicates that the impact of the listed ICTs is extremely effective.

4.7 Computer skills

Table 4.7: how do you rate your computer skills in the following ICTs with regard to your work and service delivery?

ICT tools and applications	Very Poor	Poor	Satisfactory	Good	Excellent	Total	Mean
	1	2	3	4	5		
Personal computer (PC)	1(0.6%)	4(2.5%)	40(24.5%)	67(41.1%)	51(31.3%)	163(100)	4,00
Laptop	0(0.0%)	6(4.2%)	27(18.9%)	62(43.4%)	48(33.6%)	143(100)	4,06
Tablet	1(1.1%)	7(7.5%)	29(31.2%)	42(45.2%)	14(15.1%)	93(100)	3,66
Internet	0(0.0%)	32(17.5%)	32(17.5%)	73(39.9%)	66(36.1%)	183(100)	4,05
Email	1(0.5%)	6(3.2%)	38(20.0%)	80(42.1%)	65(34.2%)	190(100)	4,06
Intranet	3(2.3%)	6(4.5%)	29(21.8%)	63(47.4%)	32(24.1%)	133(100)	3,86
Printers	3(1.6%)	6(3.3%)	41(22.3%)	73(39.7%)	61(33.2%)	184(100)	4,00
Scanners	2(1.2%)	7(4.1%)	32(18.9%)	70(41.4%)	58(34.3%)	169(100)	4,04
Fax machine	5(4.1%)	4(3.3%)	38(31.1%)	40(32.8%)	35(28.7%)	122(100)	3,79
Overhead projector	3(2.8%)	5(4.6%)	28(25.9%)	44(40.7%)	28(25.9%)	108(100)	3,82
Data projector	3(2.7%)	7(6.4%)	28(25.5%)	38(34.5%)	34(30.9%)	110(100)	3,85
Mobile phones	3(2.4%)	2(1.6%)	25(20.0%)	46(36.8%)	49(39.2%)	125(100)	4,09
Telephone	4(2.1%)	2(1.0%)	34(17.8%)	65(34.0%)	86(45.0%)	191(100)	4,22
USB	5(4.0%)	4(3.2%)	25(20.0%)	46(36.8%)	45(36.0%)	125(100)	3,98
External Hardrive	4(3.3%)	4(3.3%)	23(19.2%)	50(41.7%)	39(32.5%)	120(100)	3,97
Digital camera	3(3.8%)	4(5.1%)	24(30.4%)	33(41.8%)	15(19.0%)	79(100)	3,67
Copy machine	3(2.0%)	8(5.4%)	29(19.7%)	60(40.8%)	47(32.0%)	147(100)	3,95
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	14(11.4%)	11(8.9%)	34(27.6%)	48(39.0%)	16(13.0%)	123(100)	3,38
Microsoft office (Word, PowerPoint, Excel, Project management)	3(1.7%)	4(2.3%)	34(19.7%)	68(39.3%)	64(37.0%)	173(100)	4,11
Overall mean of computer skills							3,92

Table 4.6 presents the responses to the questions relating to computer skills in the ICTs with regard to their work and service delivery. The respondents were requested to respond to nineteen ICTs thereof. They were asked to choose from the following description ranges (1 = very poor; 2 = poor; 3 = satisfactory; 4 = good and 5 = excellent).

The computer skills dimension recorder the overall mean value of 3.92. All the ICTs listed have shown a mean score value above 3. Accordingly, the majority of respondents indicated that their computer skills are good on the use of personal computer (72.4%), Laptops (77%), tablets (60.3%), Internet (76%), emails (76.3%), intranet (71.5%), scanners (75.7%) and fax machines (61.5%). The results further revealed that, respondents indicated their computer skills to be good on the use of overhead projectors (66.6%), data projectors (65.4%), mobile phones (76%), telephone (79%), usb (72.8%) and external hardrives (74.2%). Lastly, respondents indicated their computer skills to be good on the use of digital cameras (60.8%), copy machine (72.8%), transversal systems (52%) and Microsoft office (76.3%).

4.8 Training needs and challenges

Table 4.8: which of the following ICTs do you require training in?

ICT tools and applications	Frequency	Percentage
Personal computer (PC)	41	8,4
Laptop	31	6,3
Tablet	14	2,9
Internet	12	2,5
Email	16	3,3
Intranet	20	4,1
Printers	23	4,7
Scanners	11	2,2
Fax machine	12	2,5
Overhead projector	25	5,1
Data projector	28	5,7
Mobile phones	5	1,0
Telephone	5	1,0
USB	8	1,6
External Hardrive	10	2,0
Digital camera	21	4,3
Copy machine	12	2,5
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	125	25,6
Microsoft office (Word, PowerPoint, Excel, Project management)	70	14,3
Total	489	100

Table 4.8 above presents ICTs which public servants require training on. Accordingly, majority (25.6% indicated that they require training on transversal system (Basic Accounting System [BAS], Financial Management System [FMS], Logis, Persal & Vulindlela), 8.4% require training on how to use personal computer (PC), 14.3% indicated that they require training on Microsoft office (Word, PowerPoint, Excel, Project management) and the least (1.0%) proportion of respondents indicated that they require training on mobile phone and telephone usage. It is clear from the table that respondents need more training on the usage of transversal system (Basic Accounting System [BAS], Financial Management System [FMS], Logis, Persal & Vulindlela).

4.9 Chi-square test

The next sections present the relationship between variables. The Chi-square test was used to determine the relationship between variables.

4.9.1 The relationship between performance expectancy and effort expectancy with Computer competency

Table 4.9: Relationship between constructs and computer competency

	χ^2(Chi-square)	p-value
Performance expectancy: Level of ICT use	98.626	0.000
Performance expectancy: Impact of ICT	17.021	0.048
Effort expectancy	56.113	0.000

The data presented in table 4.9 revealed a statistically significant difference in construct and computer competency. The construct of a respondent affects the manner in which they responded to the above statement at a significance level of 0.05 or 5%. The manner in which respondents responded to the different constructs was very significant. This implies that the respondents who are computer competent tend to satisfied with the level of ICT use as compared to those who are not competent. The results also revealed that the respondents who are computer competent tend to be extremely effective with the impact of ICT relative to their work as compared to those who are not competent. The results also show that computer competent respondents are more likely to spend more time of between 1 to 10 hours a day on the computer.

4.9.2 The relationship between performance expectancy, effort expectancy and social influence construct and demographic variables

Table 4.10: Relationship between constructs and demographic variables

Qualification		
Statements	**χ^2(Chi-square)**	**p-value**
Performance expectancy: Impact of ICT use	23.037	0.518
Effort expectancy: Levels of computer skills	70.735	0.018
Facilitating condition : Availability of ICTs	48.067	0.020
Age group		
Performance expectancy: Impact of ICT use	17.485	0.355
Effort expectancy: Levels of computer skills	61.921	0.001
Facilitating condition: Availability of ICTs	46.593	0.001
Gender		
Performance expectancy: Level of ICTs use	2.314	0.678
Effort expectancy : Levels of computer skills	11.207	0.190
Facilitating condition: Availability of ICTs	14.436	0.013

The data presented in Table 4.10 reveal a statistically significant difference in qualification of respondents and the effort expectancy. The qualification of a respondent affects the manner in which people responded to the above statement at a significance level of 0.05 or 5%. There is a significant difference in the way the qualified responded to the said construct. The more qualified spend 1 to 10 hours on effort expectancy of their ICT use. The data presented in Table 4.10 also revealed a statistically significant difference in qualification of respondents and the social influence. The qualification of a respondent affects the manner in which people responded to the above statement at a significance level of 0.05 or 5%. There is a significant difference in the way the qualified respond to the said construct. The more qualified spend 1 to 10 hours on facilitating condition variable.

The data presented in Table 4.10 revealed a statistically significant difference in age group of respondents and the effort expectancy. The age group of a respondents affect the manner in which people responded to the above statement at a significance level of 0.05 or 5%. There is a significant difference in the way the young group (18 to 39 years old) respond to the said construct. The younger age group as stated above spend 1 to 10 hours on effort expectancy of their ICT use. The data presented in Table 4.10 also revealed a statistically significant difference in age group of respondents and the facilitating condition.

The age group of a respondents affects the manner in which they responded to the above statement at a significance level of 0.05 or 5%. There is a significant difference in the way the young group responded to the said construct.

The data presented in table 4.10 further revealed a statistically significant difference in gender and performance expectancy (impact of ICT). The gender of a respondents affects the manner in which the employees responded to the performance expectancy (impact of ICT) at a significance level of 0.05 or 5%. This implies that the female respondents on performance expectancy (impact of ICT) tend see the effectiveness of ICT use more than the male counterparts. The results revealed a statistically significant difference in the gender of respondents and the facilitating condition. The gender of a respondent affects the manner in which people responded to the above statement at a significance level of 0.05 or 5%. There is a significant difference in the way the females respond to the said construct as opposed to male counterparts.

4.10   Summary

This chapter presented empirical data results of the study. The data was analysed in order to answer the research questions presented earlier in chapter 1. The raw data had been processed through the SPSS (Statistical Packaging for Social Science) system and the SPSS output was input into the graphs and tables. The next chapter discusses the results, conclusion and the recommendations.

CHAPTER FIVE: DISCUSSION OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter five presents conclusion and recommendations of the results findings of the study. The discussion is based on the results obtained on each of the research objectives presented in chapter 1 earlier. The conclusions and recommendations are based on the discussions. Finally, areas that need further research are proposed. This study was guided by UTAUT framework which assessed the likelihood of acceptance of new ICTs among public servants in the three government departments chosen for this study. The model assisted the researcher to understand factors that drive acceptance of a new technology, so that appropriate features can be designed to facilitate acceptance of a new technology amongst public servants.

5.2 Research objectives and hypotheses

The North West Provincial Government, just like other private / public organizations, executes its bureaucratic processes and service delivery to citizens through utilization of information and communication technologies while concentrating on aspects such as human interaction with ICTs, the effect of certain hardware and software utilisation and the impact that the use of ICTs have on the daily lives of people society. For governments to use ICTs for their own administrative functions, as well as, for information dissemination purposes, these tools (Internet, databases online, telephones, mobile phones, personal computers, laptops, tablets, software, sound or tape recorders, overhead projectors, fax machines, printers, scanners, data projectors, etc.) need to be available at all times to government workers to use them effectively for easier information processing (Ntetha & Mostert, 2013). However, despite the fact that there's existence of ICTs infrastructure in government for use amongst government workers, computer skills remains a colossal obstacles for effective use of ICTs with regard to executing bureaucratic process and service delivery (Ntetha, 2011).

Research has shown that lack of computer skills holds back most respondents to execute day to day administration functions of government departments (Paterson & Roodt, 2008). This study aimed to investigate the effective use of ICT among public workers in the NWPG and subsequently examine relationships between computer competency and the level of ICT use among respondents and explore the challenges that hinders respondents to use ICTs for bureaucratic processes.

The study was conducted with the objectives to:

a. Discover the types of ICTs found in NWPG departments
b. Determine the purposes for which the ICTs are used
c. Explore the impact of ICTs amongst respondents in NWPG departments
d. Explore the level of ICT use amongst respondents in NWPG departments
e. Explore the levels of computer skills of respondents in NWPG departments
f. Determine the computer skills training needs amongst respondents in NWPG departments
g. Discover the challenges experienced by respondents when using ICTs

In relation to the research objectives of this study, various resources in the topic were studied and the following five hypotheses were constituted based on the findings from the literature review:

H1: Facilitating condition will positive effect on actual use.

H2: Computer competency will have positive effect on performance expectancy.

H3: Computer competency will have positive effect on effort expectancy.

H4: The influence of performance expectancy on behavioural intention to use ICTs was moderated by age, gender and qualification.

H5: The influence of effort expectancy on behavioural intention to use ICTs was moderated by age, gender and qualification.

The findings of this study are discussed below with reference to the suggested hypotheses and research objectives and for this study.

5.3 Available Information and Communication Technologies and challenges experienced

The study aimed to discover the types of ICTs tools and applications that are available at the Department of Health, Department of Finance and Department of Public Works and Roads and challenges experienced using the available ICTs. The study in relation to research objective 1 discovered that there was considerable various ICT tools and applications available in the three departments. The results revealed that all nineteen ICTs mentioned in table 4.2 were available at the three departments and used by public servants to process bureaucratic work. The results show colossal improvements on the availability of ICTs, especially on tools such as personal computers and access to the Internet simply because in 2009 only 15% of computers were available with 10% access of the Internet in the NWPG (SITA, 2008).

The results in relation to research objective 7 further showed that, although public servants indicated that ICTs were available in their three departments, some female public servants between the ages of 40-49 had challenges using computers or laptops which came with operating systems of windows 8 & 10. The main issue was the interface of those two operating systems as they indicated to be more familiar with windows XP and windows 7. In addition, other female public servants experienced challenges of connecting to the Internet and intranet when they arrived in at their respective departments resulting in unsuccessful logins into emails and delays with regard to flow of information and communication within the departments. These findings are in agreement with Benton's (2007) study conducted in Nigeria which showed that, although ICTs could be made available in government some public servants still struggles to adapt to newly technology and use it to deliver improved and quality services to citizens and also process bureaucratic work.

Hypothesis H1 aimed to support the findings of research objective 1 and 7. Chi-square then revealed a statistical significance resulting in accepting H1 for research objective 1 and leading to a conclusion that, facilitating condition had a positive effect on actual use of any system amongst public servants as all the nineteen ICTs mentioned in table 4.2 were available at the department of Health, Finance and Public Works and Roads and used for office use and service delivery. However H1 was rejected for research objective 7 as some female public servants had challenges to adapt to newly technology such as using operating systems of windows 8 and 10.

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5.5 Purpose for using ICTs and ICT impact

According to the findings of the study with regard to research objective 2, public servants indicated that all ICTs indicated to be available at the departments of Health, Finance and Public Works and Roads were mostly used for office use and service delivery. Only 18% of respondents indicated to be using the available ICTs for non-governmental work such as communicating with friends, family or relatives. This implies that all the available ICTs in three chosen government departments were effectively used to process bureaucratic processes and deliver services to citizens. The finding of this study is in line with current world trends where governments use variety of ICTs tools and applications to process governmental work and deliver services to citizens. (Ntetha & Mostert, 2013).

The results in relation to objective 6 found that the available ICTs tools and applications had huge impact on public servants with regard to processing office work delivering services to citizens. This is evident as the results showed that personal computers, laptops, tablets, Internet, email, printers, scanners, overhead projectors, telephones, USB, fax machines, data projectors, mobile phones, external hardrives, digital cameras, copy machines, Microsoft office tools and transversal systems were very effective amongst public servants doing governmental work. This finding agrees with a study done by Ewuim and Nkomah (2016) in Nigeria which states that, ICTs has a positive impact on public servants work to simply streamline work processes, speed up dissemination of information across all function areas in government and also assist in providing better services to citizens.

Hypothesis H2 aimed to support the results of research objective 2 and 6. Chi-square then revealed a statistical significance resulting in H2 being accepted for research objective 2 and 6, which led to a conclusion that, performance expectancy had a positive effect on behavioural intention of public servants to actually use ICTs effectively to process bureaucratic work and deliver services to citizenry.

5.6 Information and Communication Technologies use and levels of computer skills

The study aimed to explore the levels of computer skills amongst public servants working in the three departments. The results in line with objective 3 revealed that, the level of ICT use among public servants was high, especially on ICTs tools like personal computers, laptops, Internet, E-mail, printers, scanners, mobile phones, telephones, copy machine, transversal systems and Microsoft office applications. This is because most public servants spend at least 6-10 hours per day using personal computers, laptops and email. Experience of public servants on the use of ICT also contributed to high level of ICT use, as most public servants indicated to have spent 2-5 years using personal computers, laptops, Internet, email, transversal systems and Microsoft office applications to process bureaucratic work and deliver services to citizens. The results are in agreement with the Australian findings by Khan *et al.* (2013) which depict that for civil servants to effectively utilize ICTs for office work, their level of ICT use and experience on the use of any system should be high so that they can be utilize working hours given to them to process bureaucratic work and delivering services to citizens. This enables an aspect of ease of use for any systems among public servants.

The findings further revealed with regard to objective 4, that majority of respondents had good computer skills in all the nineteen ICTs to process office work and deliver services. This indicates that public servants working in the three departments were computer competent as they interacted easily with ICTs available to them. This finding agrees with a study by Department of Public Service and Administration (2011) which states that public servants working in national and provincial departments are required to acquire proper computer skills when being employed in the public sector so that they can be able to use ICTs effectively to process governmental and enhance service delivery to citizens.

Hypothesis H3 aimed to support the results of research objective 3 and 4. Chi-square revealed a statistical significance on the results and hypothesis H3 was accepted leading to a conclusion that, effort expectancy had positive effect on behavioural intention of public servants as they applied their computer skills experience and ultimately spending long hours using the available ICTs to process bureaucratic work and deliver services to citizens.

5.7 Training needs on computer skills

The study aimed to determine the computer skills training needs amongst public servants working at the departments of Health, Finance and Public Works and Roads. The results of the study revealed that, public servants required training on transversal systems and Microsoft office applications. This result concurs with Ntetha and Mostert (2013) findings on a study conducted in South Africa which alludes that, most public servants lack computer skills on the use of Microsoft office application such as excel and PowerPoint and on transversal systems to effectively process bureaucratic work for enhancing service delivery. This indicates a very serious concern as the mentioned ICTs identified for training are regarded as the driving wheel of day to day operations in government departments.

Hypothesis H4 and H5 were accepted leading to the conclusion that, performance and effort expectancy amongst public servants to effectively use available ICTs, was influenced by age, gender and qualification. Training on the use transversal systems and Microsoft office was required by public servants.

5.8 Recommendations

The findings of the study revealed that, ICTs that were expected to be available in the chosen three government department, were indeed accessible and effectively used for governmental work and slightly for service delivery. Although the findings indicates that most public servants have good computer skills on most ICTs and also feel confident in using those made available to them, some public servants still lack computer skills to effectively use newly technology, transversal systems and Microsoft applications to process bureaucratic work in order to enhance service delivery to citizens.

Therefore, the study recommends that the Department of Health, Department of Finance and Department of Public Works in NWPG send newly, current and long serving public servants to training on effective utilisation of ICTs applications such as excel, PowerPoint, operating systems (windows 8/10), BAS, Persal and Vulindlela and on new technologies that affect their work. Computer competency workshops and training should be offered on a continual basis in order to uplift the level of ICT use among public servants.

5.9 Contribution of the study

This study shed light on the effective use of ICT among public workers in NWPG. The study was conducted on three government departments namely: Department of Health, Department of Finance and Department of Public Works targeting specifically public servants within those departments. This departments capture, process data on a daily basis and provides services that directly affect citizenry of South Africa. Though the findings do not actually depict the reality on the topic in other departments in NWPG and other provincial governments, the study can give an insight on the ICT infrastructure and computer skills needed to streamline work processes, speed up dissemination of information across all departments included and excluded in NWPG and also assist in providing better services to citizens.

5.10 Limitations and future research

This study only focused on three government departments in the NWPG, which made the findings not to be transferable to different contexts such as other provincial governments in South Africa. Therefore, it is necessary in future research to investigate other provinces and possibly all government departments in order to find out how they make use of ICTs to process bureaucratic work and improve services rendered to citizens.

5.11 Conclusion

This chapter has deliberated in the research findings, conclusions drawn and recommendations made with reference to the six objectives of the study. The study demonstrated that public servants had access to ICTs needed to effectively process governmental work. ICTs were used for good purpose such as doing government work and service delivery, public servants felt confident is using ICTs made available to them. However, most public servants indicated to be needing training on transversal system and Microsoft office applications as they are used more frequently to process internal governmental work and help citizens of South Africa.

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APPENDIX A: QUESTIONNAIRE

QUESTIONNAIRE FOR THE EFFECTIVE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY AMONG PUBLIC WORKERS IN NORTH WEST PROVINCIAL GOVERNMEN

Dear Public servant

My name is Kooagile Lawrence Mosala, a Masters student registered with the North-West University Mafikeng Campus in the department of Information Systems conducting an **INVESTIGATION ON THE EFFECTIVE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY AMONG PUBLIC WORKERS IN NORTH WEST PROVINCIAL GOVERNMENT.**

As part of completing my postgraduate degree, I am expected to conduct a study in your department. The questionnaire is designed into five parts, has 14 questions and will take approximately 10 minutes of your time. Most questions require you to tick the answers. No names should be provided. Anonymity and confidentiality are promised and maintained in order for your identity not to be revealed. In order to address ethical issues, you are assured rights which includes right of consent, protection from disclosure of information and respect for your privacy.

Thank you for your cooperation

SECTION A: DEMOGRPHIC INFORMATION

1. Please select the department currently working at (Tick ✓ the appropriate box)

Department of Health ☐ 1   Department of Public Works and Roads ☐ 2

Department of Finance ☐ 3

2. Please specify your current job title within the chosen department above (e.g. Secretary, Receptionist etc.)

....

3. Please select your highest level of qualification (Tick ✓ the appropriate box)

Matric Certificate ☐ 1   Diploma ☐ 2

Bachelor's degree ☐ 3   Post-graduate diploma/honors ☐ 4

Master's degree ☐ 5   Doctoral degree ☐ 6

If other, please specify...

4. Please select your age group (Tick ✓ the appropriate box)

18-29 ☐ 1   30-39 ☐ 2

40-49 ☐ 3   50-59 ☐ 4

60-65 ☐ 5

5. Please select your gender with a tick ✓

Male ☐ 1   Female ☐ 2

SECTION B: TYPES OF ICT APPLICATION

6. Which of the following ICTs are available in your department for office use and to serve citizens? (Answer with a tick ✓)

ICT tools and applications	For office use	For services to citizens
Personal computer (PC)		
Laptop		
Tablet		
Internet		
Email		
Intranet		
Printers		
Scanners		
Fax machine		
Overhead projector		
Data projector		
Mobile phones		
Telephone		
USB		
External Hardrive		
Digital camera		
Copy machine		
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)		
Microsoft office (Word, PowerPoint, Excel, Project management)		

7. For what purpose do you use the above chosen ICT for? (You may select more than you)

To effectively disseminate departmental information	[ ] 1
To communicate with family, friends or relatives	[ ] 2
To deliver services to citizens	[ ] 3
To communicate with other public servants	[ ] 4
To capture departmental information	[ ] 5
To do research	[ ] 6
To print departmental information	[ ] 7

If other, please specify..
....
....
....
....

SECTION C: THE LEVEL OF ICT USE

8. How is your level of ICT use for office work and public service? (Tick ✓ the appropriate box)

ICT tools and applications	1. V-Low	2. Low	3. Satisfactory	4. High	5. V-High
Personal computer (PC)					
Laptop					
Tablet					
Internet					
Email					
Intranet					
Printers					
Scanners					
Fax machine					
Overhead projector					
Data projector					
Mobile phones					
Telephone					
USB					
External Hardrive					
Digital camera					
Copy machine					
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)					
Microsoft office (Word, PowerPoint, Excel, Project management)					

9. How much time do you spend per day using the following ICTs for office use and for service delivery?

O = Office   P = Public

ICT tools and applications	Less than 1 hour		1-5 hours		6-10 hours		11-12 hours		None	
	O	P	O	P	O	P	O	P	O	P
Persona computer (PC)										
Laptop										
Tablet										
Internet										
Email										
Intranet										
Printers										
Scanners										
Fax machine										
Overhead projector										
Data projector										
Mobile phones										
Telephone										
USB										
External Hardrive										
Digital camera										
Copy machine										
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)										
Microsoft office (Word, PowerPoint, Excel, Project management)										

10. How long have you been using the following ICTs for office use and public service?

O = Office　　　　　　　　**P= Public**

ICT tools and applications	Less than a year		1-2 years		2-5 years		5-10 years		More than 10 years	
	O	P	O	P	O	P	O	P	O	P
Personal computer (PC)										
Laptop										
Tablet										
Internet										
Email										
Intranet										
Printers										
Scanners										
Fax machine										
Overhead projector										
Data projector										
Mobile phones										
Telephone										
USB										
External Hardrive										
Digital camera										
Copy machine										
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)										
Microsoft office (Word, PowerPoint, Excel, Project management)										

SECTION D: IMPACT OF ICT

11. Which of the following ICTs do you consider effective relative to your work? (Answer with a tick ✓)

ICT tools and applications	Effective	Extremely effective	Not effective
Personal computer (PC)			
Laptop			
Tablet			
Internet			
Email			
Intranet			
Printers			
Scanners			
Fax machine			
Overhead projector			
Data projector			
Mobile phones			
Telephone			
USB			
External Hardrive			
Digital camera			
Copy machine			
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)			
Microsoft office (Word, PowerPoint, Excel, Project management)			

SECTION E: COMPUTER SKILLS, TRAINING NEEDS AND CHALLENGES

12. How do you rate your computer skills in the following ICTs with regard to your work and service delivery? (Tick ✓ the appropriate box and you may select more than one ICT)

ICT tools and applications	Very Poor	Poor	Satisfactory	Good	Excellent
Personal computer (PC)					
Laptop					
Tablet					
Internet					
Email					
Intranet					
Printers					
Scanners					
Fax machine					
Overhead projector					
Data projector					
Mobile phones					
Telephone					
USB					
External Hardrive					
Digital camera					
Copy machine					
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)					
Microsoft office (Word, PowerPoint, Excel, Project management)					

13. Which of the following ICTs do your require training in (You may select more than one ICT by ticking ✓ the appropriate box)?

ICT tools and applications	Training needed
Personal computer (PC)	
Laptop	
Tablet	
Internet	
Email	
Intranet	
Printers	
Scanners	
Fax machine	
Overhead projector	
Data projector	
Mobile phones	
Telephone	
USB	
External Hardrive	
Digital camera	
Copy machine	
Transversal system (Basic Accounting System[BAS], Financial Management System [FMS], Logis, Persal & Vulindlela)	
Microsoft office (Word, PowerPoint, Excel, Project management)	

14. What challenges have you experienced in using ICT for office work and service delivery?

    I. ....

    II. ....

    III. ....

    IV. ....

    V. ....

    VI. ....

    VII. ....

    VIII. ....

THANK YOU VERY MUCH FOR TAKING YOUR TIME TO COMPLETE THE QUESTIONNAIRE

APPENDIX B: LIST OF ACRONYMS

ACRONYM	NAME
ICT	Information and Communication Technology
NWPG	North West Provincial Government
RSA	Republic of South Africa
SITA	State Information Technology Agency
TAM	Technology Acceptance Model
PU	Perceived Usefulness
PEOU	Perceived-Ease Of Use
BI	Behavioural Intention
UTAUT	Unified Theory of Acceptance and Use of Technology
EE	Effort expectancy
PE	Performance expectancy
SI	Social Influence
FC	Facilitating conditions
TRA	Theory of reasoned action
TPB	Theory of planned behaviour
USA	Universal Service Agency
SPSS	Statistical Package for the Social Science