Perceived effectiveness of emerging technologies among administrative employees of selected government departments.

PERCEIVED EFFECTIVENESS OF EMERGING TECHNOLOGIES AMONG ADMINISTRATIVE EMPLOYEES OF SELECTED GOVERNMENT DEPARTMENTS

by

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DECLARATION

I Rabi Jackson Mogale, hereby declare that this dissertation submitted for the MTech degree: Organisational Leadership at Tshwane University of Technology is my own original work and has not previously been submitted to any other institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

RABI JACKSON MOGALE

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Student signature

DEDICATION

Thanks to the Almighty for all the blessings, unconditional love, guidance, courage and strength bestowed upon me.

To my family

This dissertation is dedicated to my beloved parents for understanding the importance of education. To my late father, Isaac Kgano Mogale (Phahle wa Phahle), thank you for teaching me what is wrong and right, respect, proper etiquette, caring, but also thank you for instilling in me a strong passion for learning now your seed is blossoming, I miss you father now and will do so forever. My beloved mother, Naume Mogale, thank you for teaching me with prayer and hard work everything is possible, supporting, confidence, believing in me and made me understand the importance of life. Thank you for your presence throughout my university experience and for giving me (Mphela) the chance to come to this university of technology to explore my unique knowledge, skills and talents. I owe my success to both of you.

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Abstract

The research examined the perceived effectiveness of emerging technologies among government department administrative employees. This involved a greater understanding of the factors that influenced the perceived usefulness of emerging technologies in an administrative environment in the South African government departments. The study was conducted in two (2) government departments. The analysis and interpretation of the empirical data revealed that technology expertise, office equipment, training and accessibility are important components for the successful implementation and utilisation of emerging technologies across government departments.

Different research methods, techniques and approaches were adopted to realise the objectives of this research study. Triangulation of the data was applied and a qualitative, case study research method was used. The Technology acceptance method (TAM) was also adopted which allowed the researcher to make sense of the quantitative and qualitative data.

In this study, it was found that, emerging technologies can either enable or constrain individuals with regard to performing their roles and responsibilities in the workplace. However, different employees perceived the introduction of technology in their workplace differently. This resulted in some employees taking a stance against technological developments within the organisation; accordingly, the individual's effectiveness was affected. Organisations are able to meet their obligations through technology that allows for a paradigm shift in the business vision. Furthermore technology has enabled organisations to initiate innovations, and many scientific endeavours have become possible through technologies that assist organisations to

work faster, improve and provide excellent services to their potential customers and also develop efficient communication in the business environment.

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LIST OF ABBREVIATION AND ACRONYMS

ASU -	Actual system use
BI -	Behavioural intentions
ICT –	Information and communication technology
IT -	Information technology
MD –	Mobile devices
PA -	Personal assistant
PC -	Personal computers
PEoU -	Perceived ease of use
PU -	Perceived usefulness
TAM -	Technology Acceptance Model
TRA -	Theory of Reasoned Action

CHAPTER ONE

BACKGROUND

1.1 Introduction

Information and Communication Technology (ICT) are machines and tools that people use to share, distribute and gather information and to communicate with one another through the use of computers and interconnected networks (Kushwaha, 2011:37). ICT have been adopted rapidly by different organisations for competitive advantage as well as a vehicle to achieve their strategic goals. According to Abbas, Muzaffar, Mahmood, Muhammad and Rizvi (2014:271), to meet customer needs organisations have to adopt the use of new technologies in order to remain competitive. Zafar, Ishaque and Javaid (2014:1) further assert that ICT forces organisations to find new ways of expanding their business markets in which businesses compete, to attract and to retain their customers and by providing more effective and efficient service delivery. Based on these arguments, this study regard ICT as the heartbeat of every organisation which can be seen as the thread that holds an organisation together. ICT role in the sustainability and strategic development of the organisation has a major influence on how roles and responsibilities are carried out to improve service delivery.

Although technology is embraced by the majority of organisations globally for different strategic goals, technology changes very fast. Organisations and government departments are challenged to keep up with the emerging technologies that can enable them to survive in this digital society. As presented by Dauda and Akingbade (2011b:32), emerging technologies have an effect on the relationship between the employer and employee in the

sense that emerging technologies can enable or constrain individuals in performing their roles and responsibilities in the workplace. Nwaokwa and Okoli (2012:94) further attest that new technologies have enabled the discharge of office functions more rapidly and efficiently. However, on the other hand they acknowledged the challenges posed by these technologies on the occupational skills of the employees. Accordingly, the focus of this study was to investigate how emerging technologies are perceived by government administrative employees in terms of ease to use and how they enable or constrain employees in carrying out their roles and responsibilities with the organisation. The study was conducted at two government departments (Gauteng Department of Education and the National Department of Transport) in Gauteng province, South Africa.

1.2 Problem Statement

Different types of technologies in business and government departments play fundamental roles in every aspect in the 21st century. According to Lee (2011:1), the evolution of new technologies since the 21st century has dramatically changed organisational operational processes. This has driven organisations and government departments to undergo remarkable transformations. This transformation has been characterised by the advancement of telephones, notebooks, computers, laptops, printers and other office machines, which changed the job specification and job description of administrator's positions. However, organisations are faced with the challenge of ensuring that factors such as connectivity, power and adaptability

to these technologies do not hamper their performance. Due to advanced technologies organisations are encountering different types of challenges that they never faced before (Imran, Maqbool & Shafique, 2014:58). They further assert that employee's performance is closely aligned with technological advancement. Managing this type of a problem is a challenge for many organisations as it is not an easily accomplished task.

1.3 Research objectives

In order to address the problem statement, primary and secondary objectives were set. The primary objective of the study was to determine the perception of administrative employees on the effectiveness and efficiency of emerging technologies in terms of ease of use and how they enable or constrain employees in carrying out their roles and responsibilities within the South African government departments. Based on the primary objective, the following secondary objectives were set as follows:

- To investigate the factors that influences the adoption of new technologies in government departments.
- To understand how emerging technologies contribute to the effective functioning of administrative employees in government departments.
- To determine the general perceptions of government administrators concerning the use of emerging technologies?

1.4 Research questions

In order to achieve the research objectives, the following research question was addressed:

- To what extent do administrative employees perceive the effectiveness and efficiency of emerging technologies within the government departments in South Africa?

The following sub-questions were addressed to clarify and support the main research question further:

- What are the factors that influence the adoption of emerging technologies in government departments?
- How can emerging technologies contribute to the effective functioning of administrative employees in government departments
- What are the general perceptions of government administrators concerning the use of emerging technologies?

1.5 Literature review

The literature review focusses on the key areas related to the study. These include the government administrators' role, emerging technologies and Technology Acceptance Model (TAM). The areas are discussed below briefly.

1.5.1 Government administrators' role

The role of the government in any country is to provide effective and efficient services to its citizens. The effectiveness of any organisation, (the government included), is the notion pertaining to how effectual an organisation is with regard to accomplishing its strategic objectives (Shukla, 2012:432). However, no government can achieve these objectives without the role of administrators that play a major role in driving the government initiatives. Their role depends on the government departments for which they work.

Although general skills that apply to most administrators differ across varied government departments, one of the primary duties of an administrator is to ensure the effective implementation and control of operational activities. In this process, they are exposed to office automation (modern office equipment), because of the continuous demands for innovative processes with regard to performing their roles and responsibilities more effectively. Aliata and Hawa (2014:52) assert that the innovation of technological machines and gadgets transform how organisations operate to enable their survival in this fast growing world of technology.

1.5.2 Emerging technologies

In this digital age, technology is a crucial resource in the provision of good quality technology and service delivery (Ngalawa, Mosha & Josephat, 2012:219). According to Ogbonna and Ebimobowei (2013:202), technology provides substantial developments with facilities such as word processing,

communication facilities in the form of electronic mail, databases to improve business efficiency and effectiveness, eliminating unnecessary delays in communication between routine filing and correspondence. In the government sectors, different types of technologies such as network printers, telephones and computers with the Internet and email play a major role in accelerating service delivery. However, the use of technology has affected organisations, governments and individuals differently in one way or another (Mhlanga, 2006:71). Different people perceive the introduction of technology in their line of duty differently, and this is influenced by factors such as resistance to change and the comfort zone syndrome. This perception is highlighted by Knani (2013:92), who points out that employees tend to be prone to experience technology-related stress. Therefore, this study argues that emerging technologies can enable or constrain individuals with regard to performing their roles and responsibilities in the workplace.

1.5.3 Technology Acceptance Model

One of the well-known models related to technology acceptance and use is the technology acceptance model (TAM) developed by Davis in 1986 as shown in Figure 1.1 below. According to Park (2009:151), this model has proven to be a theoretical model used to explain and predict the user behaviour of information technology. According to TAM, the two cognitive beliefs as posited by Park (2009:153) are perceived usefulness and perceived ease of use. Importantly, one's actual use of technology is influenced by factors such as behavioural intentions, attitude, perceived usefulness of the system, and perceived ease of use (Davis, 1989).

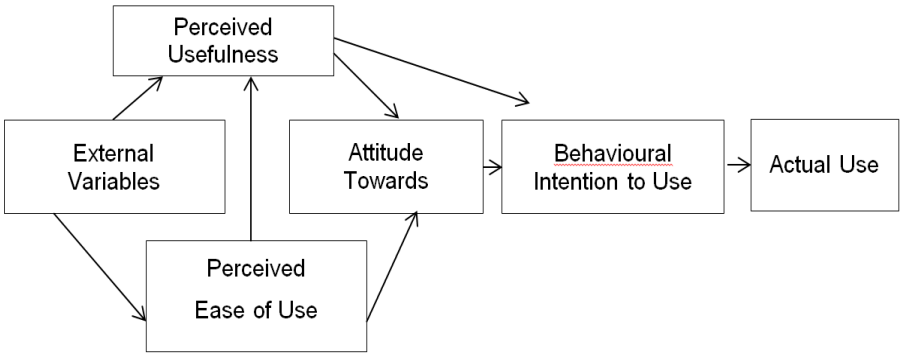

Figure 1.1: Technology Acceptance Model (TAM) (Davis, 1989)

According to Park (2009:151), the TAM, "*provides a basis with which one traces how external variables influence belief, attitude, and intention to use*." Godoe and Johansen (2012:39) further state that TAM "*is designed specifically to explain computer usage behaviour*." The TAM was selected to underpin this study mainly because of its empirical support for being robust in predicting technology adoption in various contexts. The study adopted TAM as a lens for understanding the effect of emerging technologies on the performance of employees in the government departments. How data are collected and analysed will fall within the frame of TAM constructs that include perceived usefulness (PU), perceived ease of use (PEoU), behavioural intentions (BI) and actual system use (ASU).

1.6 Research design and methodology

This section presents the methodology and design applied in carrying out the research.

1.6.1 Research strategy

The research strategy is a process followed by the researcher to understand and decide which method is more applicable for addressing the research problem and addressing the questions in order to achieve the objectives of the study. Mouton (2009:35) attests that a research methodology focusses on the research process and the kind of tools and procedures to be used in achieving the objectives of the study.

1.6.2 Research design

Research project requires a research design that will define the research type in a systematic manner and guide different phases and activities to be undertaken in order to address the phenomena in question. Within a qualitative research method, there are several designs from which a researcher may choose. They include case studies, action research, and ethnographic.

This research adopted a case study design. Yin (2003:3) describes a case study as an empirical inquiry that investigates "*contemporary phenomena within its real life context especially when the boundaries between phenomena and context are not clearly evident*". Thomas (2016:3) further

describes a case study as a research method that focusses on one phenomenon in detail; it may be a person, a group, a country, an institution or an event at a certain period in time. This type of approach allows the researcher to study the subject in-depth from the various sources of data collected, such as interviews, questionnaires and documents (Yin, 2011:4).

1.6.3 Methodological approach

The research adopted the qualitative research approach to determine how government administrative employees perceive the effectiveness of emerging technologies in their work environment. This approach "is a form of social inquiry that focuses on the way people interpret and make sense of their experience and the world in which they live" (Holloway & Wheeler, 2010:3).

1.6.4 Population and sampling

The population for the two government departments consisted of employees and managers as indicated in Table 1.1 below. The table presents the total number of employees and managers in the Department of Education and Transport respectively. The information provided was obtained by the researcher through telephonic enquiries from the participating departments.

A sample of the administrative staff (*n*=247) and managers (*n*=17) from the two government departments in the Gauteng Province was selected applying purposive sampling. Purposive sampling was selected because it is primarily used in qualitative studies and may be defined as selecting units based on specific purposes associated with answering a research study's questions

(Teddlie & Yu, 2007:77). According to Polit and Beck (2008:343), purposive sampling is based on the researcher's discretion that the participants who are judged to be typical of the population that are knowledgeable about the phenomenon.

Table 1.1: Total number of employees and managers in the Department of Transport and Education

GOVERNMENT DEPARTMENT	TOTAL NUMBER OF EMPLOYEES	TOTAL NUMBER OF MANAGERS	TOTAL
Transport	97	83	143
Education	150	93	243
TOTAL	**247**	**176**	**386**

1.6.5 Data collection

Semi-structured interviews in conjunction with closed-ended questions were used to elicit the required information for analysis. Semi-structured interviews were used to collect data from the managers, while, closed-ended questionnaires were self-administered to 10% of the total number of administrative employees in each government department. Both interviews and questionnaires allowed the participants to share their perceptions on how emerging technologies influenced their effectiveness within the organisation.

An audio tape recorder was used to record interviews. Prior to the interviews, permission was requested from and granted by the participants to record the proceedings. The interviews were stopped at the point of data saturation, namely, at the point where no new information was forthcoming from the interviewees. As such, the continuous data collection signaled little need to continue because additional data would only serve to confirm an emerging understanding (Huberman & Miles, 1994:350).

1.6.6 Data analysis

The data collection methods were triangulated (*cf:* 1.6.5). The qualitative data were then analysed using the tenets of TAM while quantitative data were populated on Microsoft Excel spreadsheet and further analysed through SPSS. TAM in qualitative data analysis is a reflective process that leads to the development of certain insights and helps to develop the meaning of the variables (Srivastava & Hopwood, 2009:76) in order to understand the administrative employees' perceived usefulness, perceived ease of use and behavioural intention to use emerging technologies. The TAM was selected to underpin the study mainly because of its empirical support with regard to predicting technology adoption in various contexts. In addition, this study adopted TAM as a lens to understand the effect of emerging technologies on the effectiveness of employees in the government departments.

1.7 Validity and reliability

According to Curtis and Curtis (2011:13), reliability "measures the extent to which the analysis of data yields reliable results that can be repeated or reproduced at different times," while validity measures the extent to which the research is accurate and whether there is trustworthiness.

In assessing the trustworthiness of qualitative research, validity and reliability are important (Merriam, 1995:52). To ensure trustworthiness, the researcher adopted the elements of Lincoln and Guba (1985) as reflected below.

- **Transferability**: In demonstrating that the findings have applicability in other contexts, the study was conducted at two government departments. Transferability in this study was enhanced by purposively selecting participants, in order to identify persons who were able to provide a rich account of the phenomena under study (Babbie & Mouton, 2009:277).

- **Dependability**: Dependability was ensured by maintaining an audit trail (Babbie & Mouton, 2009:278) of raw data that had been coded and archived to allow checking of the findings against the raw data (De Vos, Strydom, Fouché & Delport, 2011:420).

1.8 Ethical considerations

According to De Vos *et al.,* (2011:114), ethics are a set of commands, values and moral principles. The aim is to avoid harming participants. In this regard, permission was requested from the two government departments to participate in the study. Permission was obtained from participants who had to sign the informed consent forms. During this process, the participants were debriefed about the nature of the research. This information offered the participants the opportunity to withdraw from participating in the study if they were no longer comfortable with participating.

Data collected from the participants were treated confidentially by not revealing individuals' names under any circumstances. Only the researcher and the supervisor had access to the data that was used for the study.

1.9 Chapter outline

The study is organised into five chapters as follows:

- **Chapter 1** introduced the entire study presenting the research problem statement, objectives, research questions, and methodology and how the dissertation was carried out.

- **Chapter 2** contained the literature review on the role of government administrative employees, emerging technologies and an overview of TAM.

- **Chapter 3** presented the methodological process applied in carrying out the study.

- **Chapter 4** presents the analyses and interpretation of data.

- **Chapter 5** presented the evaluation of the dissertation; the conclusion, recommendations and suggestions for possible areas of further research in this field was also made in this final chapter.

1.10 Summary

The aim of the study was to investigate how government administrative employees perceived the effectiveness of emerging technologies in the workplace. It is imperative for government departments to invest in technology to ensure faster service delivery to the right people on time. Organisations rely on technology in the 21st century to introduce innovation in businesses to achieve and maintain their competitive stability in the marketplace.

Therefore, the emerging technologies play a critical role in the sustainability and strategic development of organisations, and at the same time, they encourage and/or motivate employees to perform better.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

It is not clear whether the arrival of new technologies has affected organisations and workers effectiveness. The growth of the Internet affects our daily lives in various dimensions (Sharma & Chandel, 2013:48). The use of emerging technologies has changed the practices and procedures of nearly all forms of endeavour within organisations, governance and civil service fundamentally (Yusuf, Festus & Loto, 2013:177). The nature of office work has changed over time as a result of the emergence of new technologies that are adopted and implemented in the government departments. According to Gravens (2000) in the article of Mwanganyi, Charles and Odote (2014:386), the drivers of change in today's world include deregulation, global excess capacity, global competition, changing customer expectations, information and communication technologies (ICTs), demographic shifts and changing work and lifestyles. As change continues to reshape our lives, the old office equipment and processes such as photocopiers, telephones, computers, information processing, furniture and other office machinery have shifted away from industrial to office automation as new technologies are ever-increasing. Therefore, the latest technologies will make the existing machines redundant, resulting in organisations investing in the latest machines available on the market.

Therefore, this chapter presents the review of literature that focusses on the effectiveness of emerging technologies on administrative employees in the government departments. The chapter has three main sections.

The first section covers the administrative functions, the second addresses the emerging technologies, while the third section covers the TAM that underpins the study. This chapter closes with a summary.

2.2 The professional role of administrative employees

According to Igbinedion (2010:116), the perception that any person sitting behind a typewriter or computer is an administrator, is entirely wrong. Buseni (2013:89) indicates that in the history of the administrative field nobody knows when administrative employees originated. According to Ferreira and van Antwerpen (2011:26), the term “administration” is derived from the middle English word *administracioun*, which has specific meanings in various contexts, but all retain a sense of service provision. Based on the various descriptions of the term, an “administrative employee” has a wide meaning and it is important to appreciate the various meanings associated with it” (Aliata & Hawa, 2014:53). Therefore, several definitions have been used by different researchers to define an administrative employee. Ezenwafor (2013:425), describes administrative employees as office personnel who deal with correspondence, keep records and assist managers to ensure the progress of their organisations. They are referred to as non-managerial staff or employees (Ferreira & van Antwerpen, 2011:12607). Based on Ferreira and van Antwerpen’s description, one can argue that administrative employees are people who are employed by a specific organisation to perform and handle a range of administrative and organisations tasks to ensure the effectiveness and efficient running of the office environment.

Igbinedion (2010:116) asserts that the above definitions underscore the fact that inter-working relationships between the administrative employee and the organisational executive must be excellent for the organisation to prosper and succeed.

The roles of administrative employees are versatile because no organisation can function without their support (Buseni, 2013:89). The author further outlines the different roles and responsibilities carried out by administrative employees, which include:

- Typing
- Taking dictation and transcribing
- Managing records, receiving, storing and retrieving information
- Operating the computer,
- Attending meetings,
- Answering telephone calls
- Carries out research
- Prepares the managers' itinerary
- Makes travel bookings and hotel reservations
- Supervise the junior workers, and makes some decisions using his/her initiatives.
- To answer some questions on behalf of the employer and to coordinate the administrative activities
- Organise the office for efficient performance of the assigned tasks.

The roles and responsibilities carried out by administrative employees depend on the job specification in their respective business environments. In this regard, van Antwerpen (2003:28) categorises administrative employees according to their job titles as follows:

Stratum 1: *Typist/PC operator/Data Capturer/Clerk/Filing clerk/Receptionist*

Stratum 2: *Junior secretary/Office assistant*

Stratum 3: *Secretary/Administrative assistant/Office manager/Administrative officer*

Stratum 4: *Executive secretary/Personal assistant (PA)*

The success of any organisation relies to a large extent, on the administrative employees whose role is critical to the achievement of organisational goals and objectives (Aliata & Hawa, 2014:52). Without the services of administrative employees in any business sector, information, records and resource management would not be carried out efficiently (Ferreira, Erasmus, Groenewald, Masakale & Rossouw, 2015:1).

Ngcobo, Msimango, Dube, Majiya, Ndaba and Ngcobo (2006:3) further observe that administrative employees are usually responsible for many tasks in the organisation. Some of the administrative duties and functions that are found in every organisation, the so-called generic functions in different divisions, are presented in Table 2.1.

Table 2.1: Administrative duties Source: (Badenhorst, van Rooyen, Ferreira, Groenewald, Joubert, Marcus, Steenekamp, Swanepoel, van Den Berg, & van Heerden, 2005)

General office	**Accounts departments**	**Purchases and sales department**
Telephonists/receptionists Word processing operators Filing clerks Correspondence clerks Mailroom clerks	Costing clerks Cashiers Credit control clerks Accounting clerks Bookkeepers Debtors and creditors clerks Salaries clerks	Order clerks Sales clerks Warehouse clerks Delivery clerks

Administrative roles have advanced over time as the world keeps changing and innovation with regard to performing tasks is advancing rapidly. The introduction of technology plays a major role in how an individual performs his or her office tasks. However, utilisation of technology requires a specific skills-set and an average educational background that is important for enabling administrative employees to carry out their roles and responsibilities (Igbinedion, 2010:117). The skills they possess are critical for the survival of any organisation. According to Igbinedion (2010:11), some of the skills "*include shorthand 100 to 120 wpm and typing 50 – 60 wpm, accurate spelling, and sound knowledge of the reprography of economics, commerce, ICT, book-keeping and organisational ethics".* Acquiring the latest skills with regard to technology will contribute positively to the administrative employee's capability of being an innovator, a problem solver, competitive and a good thinker.

In every organisation, administrators are assigned different roles and responsibilities. It is clear from Table 2.1 above that administrative duties may vary between divisions, departments and organisations. All that is required is the right people in the right positions to perform administrative tasks. According to Ezenwafor and Okeke (2012:134), these people need administrative competencies, human relation competencies, communication competencies, personality competencies, and office technology management competencies for effective performance in today's office.

2.3 Emerging technologies

Emerging technologies are those information and communication technologies that continued to evolve rapidly, changing the way people communicate and information flows (Radniecki, 2013:2). These technologies have influenced organisations and government departments in a variety of ways such as changing the ways of service delivery, providing information and how tasks are performed. In other words, emerging technology influences how functions are executed; people interact; information is managed and delivered within the organisation.

Meijer and Bovers (2005:173) observe that ICTs have influenced five accountability relationships (organisational accountability, political accountability, legal accountability and administrative accountability) in different ways and public managers have to deal with all of these types of accountability. They maintain that these types of accountability shape relations and information exchanges between managers and civil servants within government organisations and form a linkage between practices within government organisations and the relevant environment of these organisations. Furthermore, Sharma and Chandel (2013:48) assert that people are shifting their work methods from traditional methods to technology-based work. Therefore, a new skills-set is critical for keeping up with ways of doing things that add value to the work environment.

Over the past few years, different types of emerging technologies are rapidly introduced at an alarming rate, which are adopted by many organisations to strengthen their accountability, transparency and increase their operational processes. Most of these emerging technologies are already in use and will allow people to plan, and share data and enable government departments to faster service delivery, efficiency in problem-solving and effectiveness in access to information. Technologies include products and services such as desktop computers, laptops, hand-held devices, wired or wireless intranet, business software, network security among others (Binuyo & Aregbeshola, 2014:59). Meijer and Bovers (2005:173) ICTs are used to support the key functions of the government and ICTs are both used within government organisations and in contacts between the organisation and the outside world (citizens, companies and other organisations). They further stressed that database systems, workflow management systems, email systems and web technology systems are all used to support government operations, engage citizens and provide government services. Figure 2.1 below presents some of the common emerging technologies that are in use in many organisations and government included.

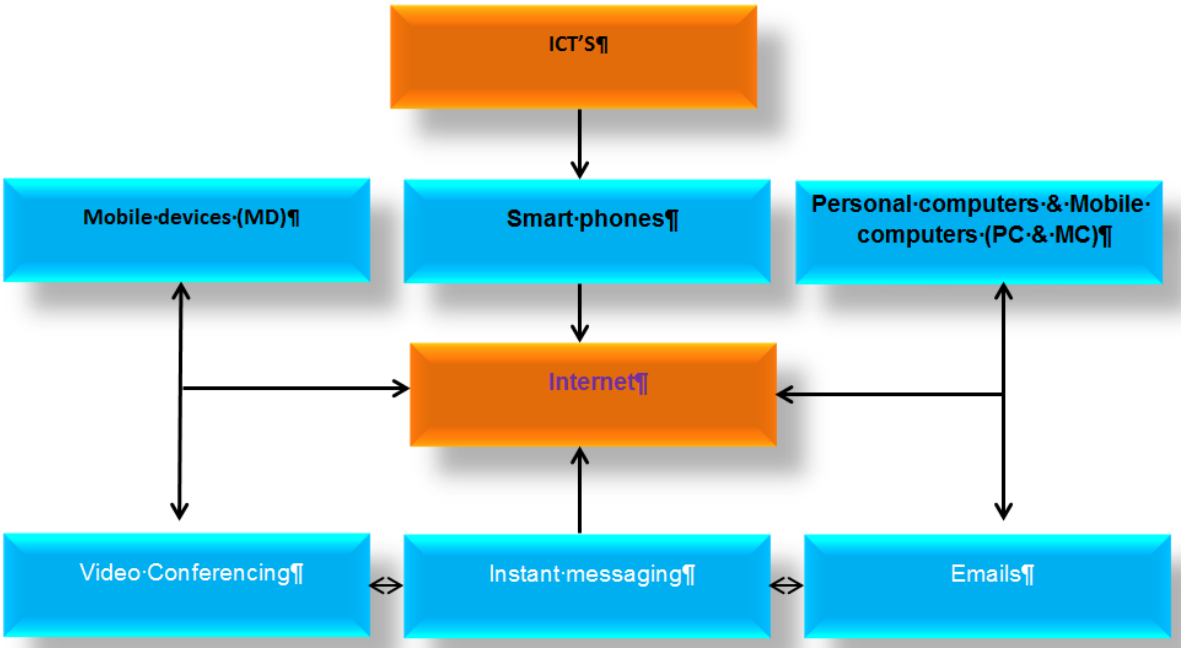

Figure 2.1: Common emerging technologies

The technologies presented in Figure 2.1, provide significant improvements with programmes such as word processing; communication in the form of electronic mail, a database for improving business efficiency, eliminating unnecessary delays in communication between routine filling and correspondence (Ogbonna & Ebimobowei, 2013:202). For example, in the government sectors, technologies play a major role in accelerating service delivery. Accordingly, ICTs are being introduced to an organisation to increase operational efficiency, quality, and transparency (Zimmermann & Finger, 2005:231).

South African government departments have embraced the use of technology in all spheres. Olufemi (2012:59) contends that governments that have adopted technology have an opportunity to achieve high efficient service delivery. There is no doubt that the use of technologies plays a critical role in improving the efficiency and effectiveness of any organisation. This

perception is supported by Pirzada and Ahmed (2013:95) when they assert that every organisation uses the common technologies, which, in some way, contribute to achieving organisational objectives easily. Moreover, Ayandele and Adeoye (2010:35) reveal that technology is fast becoming an important tool for growth for the world's economy, creating countless opportunities for many enterprising individuals, organisations and communities globally. They serve to enhance the organisation's communications, reduce human labour, support the short and long-term organisational goals and distribute complex information to appropriate people, when necessary (Kumar, 2014:1023). Therefore, the use of emerging technologies for basic service delivery is improving, and government departments continue to adopt them for various reasons such as:

- Improving socioeconomic condition
- Internal and external communication
- Ensuring faster service delivery
- Improving the decision-making process
- Sustaining organisation performance
- Promoting economic growth

However, the implementation of emerging technologies in many organisations is sometimes complicated and requires extensive training. What is the more critical is the organisational culture and behaviour of employees (Naghibi & Baban, 2011:542) that can enable or constrain the utility of these technologies in organisations. A well-designed system based on collaborative effort will improve organisational effectiveness and will assist the organisations and

government departments included to provide a quick service, at anytime and anywhere (Abbas *et al*., 2014:272).

2.3.1 Benefits of emerging technologies

The adoption and use of emerging technologies holds benefits for both organisations and individuals as noted by Pirzada and Ahmed (2013:96):

- With the help of technology people are getting help in every department.
- It saves time and it has made our lives easier and people are making fewer mistakes.
- It has brought the world closer as we share information quickly and efficiently by means of phones, the internet and fax machines.
- The organisation knows the taste of the customers.

Technology will continue to improve public administrative efficiency by making information accessible, reduce administrative activities and lastly, enhance good governance that is generally characterised by participation, transparency and accountability. According to Kumar (2014:1023), using information systems can enable an organisation to streamline its operations into a cohesive functioning unit. Ojo (2014:77) points out that ICT involved over many years has made the activities of government more accessible to the governed, while the traditional barrier of distance becomes surmountable through the modern approach of communication. He further maintains that the recent advances in communication technologies and the Internet provide opportunities for transforming the relationship between governments and

citizens in a new way, thus contributed to the achievement of good governance goals. Sarrayrih and Sriram, (2015:230) the aim of e-government (ICTs) is to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information and make the government more accountable to citizens.

Pirzada and Ahmed (2013:95) further assert that technology provides a unique ways of developing a distinct advantage for organisations in a competitive market and to outperform their competitors. Organisations are able to meet their obligations through technology, which allows for a paradigm shift in the business vision. The advantages of technology for the government are that the government may provide a better service in terms of time, making the government more efficient and more effective.

However, technology has created challenges and opportunities for other organisation.

2.3.2 Disadvantages of emerging technologies

Emergence and innovation in technologies are dividing the universe into different sections (Beena & Mathur, 2012:573). In this regard, South Africa is currently experiencing an ICT skills shortage (Lotriet, Matthee & Alexander, 2010:38). Technology has brought great enlightenment in every government department since it emerged. It challenges office managers and administrative employees' designers to address a host of vital socioeconomic issues such as reliable infrastructure, skilled human resources, open government and other essential issues of capacity building (Amiaya, 2014:2).

As IT evolves to meet the technology demands of today's workplace, different challenges are arising and IT is striving to meet them (Kumar, 2014:1020). According to Pirzada and Ahmed (2013:96), the disadvantage of advanced technology is that machines are complex and complicated and the people that are responsible for working with them do not operate the machines properly. Organisations and government departments experience challenges with keeping up with the emerging technologies that can enable them to survive in this digital society.

Government departments rely on some various technologies to carry administrative duties out. In government departments, various types of data and information are processed and stored using these technologies. This information can be accessed by every person including unauthorised people compromising its confidentiality. This could easily be achieved through the adoption and application of ICT at national level (Ojo, 2014:88). One should have an awareness and knowledge of the technology to achieve the security of government data and information, network security is by far the greatest concern for many organisations, and they rely heavy on their IT staff to prevent or stop these system breaches (Kumar, 2014:1020). Kumar further suggests that IT professionals are responsible for assisting others to get their work done efficiently without the complex jargon of the technology world.

However, Ayandele and Adeoye (2010:35) maintain that the proper management of ICT is a major challenge for managers and organisations should ensure that it has the capability, capacity and a need for technology before using or embarking on it. They further assert that employee's skills and competence have to be improved and management must be trained to

innovate and manage the performance of ICT for its sustainability. Patrick and Kumar (2011:105) outline the disadvantages of ICT on governments as follows:

- An electronic government has to move the government services to an electronic-based system. This system loses the person -to-person interaction which is valued by many people.
- The Implementation of an e-government service means that with many technology based services, it is often easy to make an excuse (for example, the server has gone down) so that problems with the service provided are caused by the technology.
- The implementation of an e-government does have certain constraints in terms of the literacy levels of the users and the ability to use computers and users who do not know how to read and write that will need assistance.
- Studies have shown that there is a potential for a reduction in the usability of an online government because of the lack of access to internet technology and the usability of services as well as the ability to access computers.

2.4. The impact of ICT in a government administrative environment

ICT has a definite effect on an individual and organisational structure. According to Naghibi and Baban (2011:542), changes had already affected

the organisation from the top to the bottom most of the time and administrative environments are no exception. Technologies include products and services such as desktop computers, laptops, hand-held devices, wired or wireless intranet, business software, network security among others (Binuyo & Aregbeshola, 2014:59). These technologies are utilised by administrative employees on a daily basis to carry out their roles and responsibilities.

The use of ICT has become extremely important for all organisations that intend to remain competitive in the market (Irungu, 2012:1). However, significant changes have been taking place in the office environments. The nature and background of office work are no longer the same as they were in the past. The advent of emerging technologies has totally revolutionised the way government accesses, processes, stores, retrieves and disseminates information both within and outside organisations or across the globe (Adegbemile, 2012:82). Organisations around the globe, including the government, are undergoing unprecedented change (Patrick & Kumar, 2011:24). Employees in government departments are affected markedly by innovations that are becoming pervasive. These innovative ways of doing things have influenced many organisations across the world "*to rely increasingly on the use of ICTs for the internal dissemination of key corporate information, whether this is via email, intranet, mobile technologies, or multimedia applications*" (Greenwood & Cooke, 2008:137).

In this digital era, ICTs have changed the scope of work. The world of work will never be the same again. Despite these changes, Beena and Mathur (2012:573) point out that "*ICT is the driving force in the world and intensely*

making an impact on economy, development and social growth of any nation." This is confirmed by Ghodbane (2008:2) who acknowledges that ICT is the driving force behind the new economy. However, some organisations and governments resist change because their perception of technology is that, it will have a negative influence on the effectiveness of an individual's performance at work.

While emerging technologies hold much promise by providing a quality service to people, the importance of technology in government departments as discussed by Patrick and Kumar, (2011:103), is that "*ICT applications are promising to enhance the delivery of public goods and services to citizens not only by improving the process and management of government but also by redefining the traditional concepts of citizenship and democracy.*" Other business environments may perceive that emerging technologies make a significant contribution to both the organisation and the individual's work and most importantly, provide a more efficient and effective service to the right people on time.

2. 4.1 Factors involved in utilising emerging technologies

People, processes and technology, are important aspects of any organisation to deliver a service. However, Edwards (2011:299) points out that these three elements link together, each of them having a reciprocal relationship with each of the other two. He also indicates that people help design and then operate processes, while processes define the roles and the knowledge needed by people. These organisational resources are complementary and

are integrated into the organisation as they are essential pillars for effective innovation. According to Prodan, Prodan and Parcarea (2015:481), this holistic approach considered that to improve the overall organisation, the efforts need to be focussed on these three areas. The success or failure of the effective use of technology depends on people, processes and technology as presented in Figure 2.2 and; they are presented and discussed in detailed below.

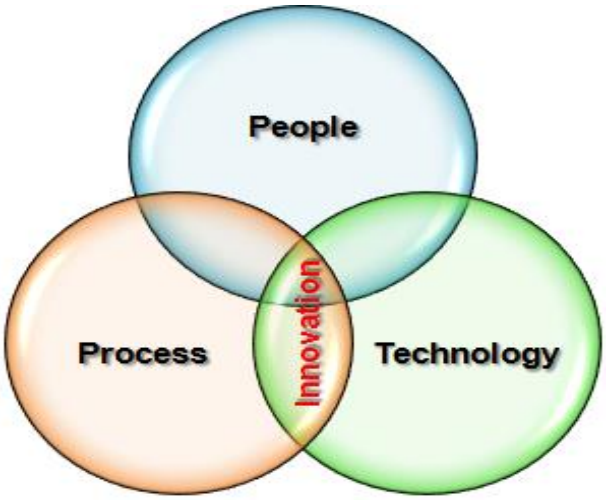

Figure 2.2: Components of utilising emerging technologies (Adopted from Visagie, 2010:31)

2.4.1.1 The role of people

People are the most valuable organisational assets. In fact, technological innovation rests on the creative ability of human beings (Dauda & Akingbade, 2011a:329). They further add that humankind has the capacity to use his/her knowledge to create new machine processes and methods that could enhance or improve the quality of goods or services.

ICTs are technologies that people use to share, distribute, and gather information and to communicate with one another, one-on-one or in groups through the use of computers and interconnected networks (Kushwaha, 2011:32). Technological devices such as the telephone, the internet, emails and fax machines are used for communication and allow the organisations to exchange information and resources.

Technology has become a critical aspect of human endeavour and provides resources that benefit both the organisation and the employee. Organisations which do not invest in technology, consequently their employees have to keep on struggling to access information (Abbas *et al*., 2014:272). Prodan *et al*., (2015:482) stress that this pertains to the fact that:

- People know what and how to perform activities
- They have the right skills and knowledge for the job
- They are motivated and actively involved in efforts to achieve higher performance
- They are encouraged to improve day-by-day, and they are involved in improved projects.

2.4.1.2. Processes

It is important to stress that the term "process," according to Iyamu and Adelakun (2008:4), refers to *"the component which kick starts the possibility for the development and implementation of IT strategy*." The key goal of processes is to improve organisational effectiveness and efficiency which enable the enhancement of service delivery. Administrative employees utilise

technology in carrying out their daily duties (processes). People help design and then perform their roles following processes, while the processes define the roles of, and the knowledge needed by people (Edwards, 2011:299).

2.4.1.3. Technology

Technology has become more of a dependent key factor in the government as result of use of modern ICT such as the Internet, the local area network and mobiles, to name a few, by governments to improve effectiveness, efficiency and service delivery to promote easy access to the government services by the public (Ojo, 2014:78). One of the critical roles of government departments is to improve electronic content management, expand opportunities regarding skills development that will contribute to an efficient and effective service, to promote teamwork and the speed of service delivery to all South Africans. This could be made simple through the use of emerging technologies for communication (Unachukwu & Nwankwo, 2012:114).

Technology is a powerful tool in both government and business where it helps with the executing of actions, planning and dealing with the complexity of disciplines so that they can operate more efficiently. Ojo (2014:78) in support of the above perception, points out that technology can improve the way the government works, and result in improved better interactions with its citizens.

Chukwunonso, Omoju, Ikani and Ribadu (2011:122) argue that in today's work environment, the quality of ICT infrastructure can provide organisations with the ability to share information across different departments and exploit business opportunities and the flexibility to respond to changes in business

strategies. Adegbemile (2012:82) further mentions that all organisations as well as individuals in this 21st century, resort to the Internet for accurate and up-to-date information, the sharing of information and working or trading with various people at different places through the Internet.

Technologies that are dominant and utilised in today's offices include portable telephones, computers embedded with wired or wireless intranet or extranet, emails and network printers. Technologies have enabled most organisations and governments included in performing their day to day functions and roles. In many instances, ICTs has been described as the tools for changing world values and making our society a knowledge base environment where everything is done electronically (Ojo, 2014:79). In addition, it has become the main enabler of organisational activities and processes. Therefore, emerging technologies have become a versatile tool in today's world, and they are used by people for executing such activities and processes.

2.5. Technology acceptance model (TAM)

The TAM was developed from the theory of reasoned action (TRA), in order to describe an individual's IT acceptance behaviour (Elkaseh, Wong, & Fung (2016:193). The TAM was proposed by Davis in his doctoral thesis (Surendran, 2012:176). According to Turner, Kitchenhan, Brereton, Charters and Budgen (2010:463), the TAM was proposed in 1989 as a means of predicting technology usage. Since then, TAM has been commonly used to analysed IT acceptance, and it also became an area of interest for many scholars and researchers within the research fraternity. The progression and

development of new technology and its emergence grows faster and more strongly every day.

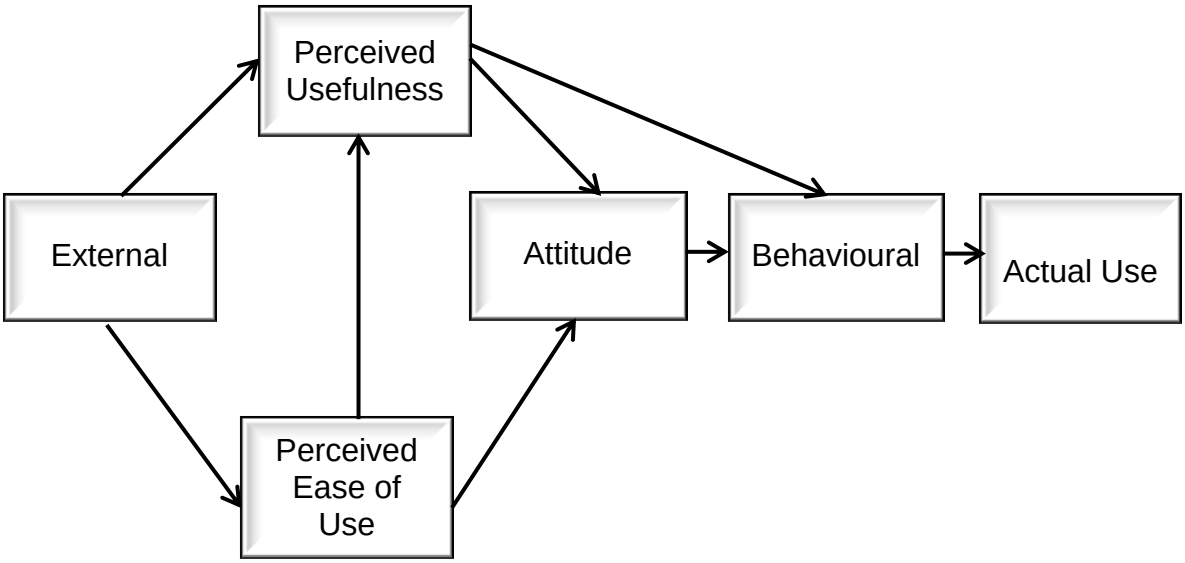

Figure 2.3: Technology Acceptance Model (Davis, 1989)

TAM, a causal model that proposes user acceptance and usage of technology is determined by two key attitudinal components: Perceived usefulness (PU) and perceived ease of use (PEOU) (Flett, Alpass, Humphries, Massey, Morriss & Long, 2004:200). TAM can be used for many reasons to analyse the opinions of participants in a specific research study and can also assist researchers and participants with making effective decisions to improve acceptance and usage of emerging technology. TAM posits that acceptance of a new information system can be predicted based on users' behavioural intention (BI), attitude towards use (A), and two other internal beliefs: perceived usefulness (U) and perceived ease of use (E) (Alharbi & Drew, 2014:145).

TAM has been divided into numerous categories, specifically, the external variables, perceived usefulness and perceived ease of use, which are the main categories that are examined with regard to the acceptance of technology by the users. However, Erasmus, Rothmann and Van Eeden (2015:2) note that the perceived ease of use, attitude towards using and behavioural intention to use components, represent the core functions of the TAM, whereas, external variables and actual system use serve merely as an input to and output from the model respectively. Surendran (2012:175) further, comments that the perceived usefulness and perceived ease of use are the foremost factors in computer use behaviours based on TAM. The key purpose of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions (Legris, Ingham & Collerette, 2003:192). Elkaseh *et al.,* (2016:193) explain that the objective of TAM is to examine why users' attitudes and beliefs influence their acceptance or rejection of IT.

Therefore, this study finds it appropriate to adopt this model to investigate how emerging technologies are perceived by government administrative employees in terms of ease of use and how they enable or constrain employees in carrying out their roles and responsibilities within the organisation.

2.5.1 External variable

Technology has many uses around the world as many users rely on technological devices to live their lives. In this regard, users use the organisations' technological devices to perform their daily duties. Burton-Jones and Hubona (2006:707) external variables for example (user training) influence users' beliefs about using a system (for example, their perceptions of a system's ease-of-use and usefulness). According to Moeser, Moryson and Schwenk (2013:434), the external variables influence perceived usefulness (PU) and perceived ease of use (PEU) of an information system, which both influence a person's attitude towards use (ATT), in turn, influences behavioural intention to use (INT), which finally influences actual usage behaviour.

2.5.2 Perceived ease of use

The perceived ease of use is described as a degree to which an individual believes that using a particular system would be free of hardship and hard effort (Johar & Awalluddin, 2011:3). As new technology keeps innovating and emerging, it does lead to certain complication, and some of the users find it much easier to use technology, especially the users that are young or those that are up to date with new technology. How the usefulness of technology is perceived depends on an individual. Users who find it easy to use technology find their work much easier as this technology helps them with different aspects of work. If a system is relatively easy to use, individuals will be more willing to learn about its features and will finally have the intention of

continuing to use it (Hamida, Razakb, Bakarc & Abdullahc, 2016:646). On the other hand, users who have difficulty with regard to using technology, regard it as little or extremely complicated as they do not have access to all the benefits that come with innovation as many find it difficult to access electronic information. In effect, perceived ease of use influences perceived usefulness.

2.5.3 Perceived usefulness

Perceived usefulness (PU) is the extent to which a person believes that using a particular technology will enhance their job or life performance (Flett *et al*., 2004:200). Furthermore, Johar and Awalluddin (2011:3), add that perceived usefulness is the degree to which an individual believes that using a particular system will enhance one's job performance. Brezavšček, Šparl and Žnidaršič (2014:118) Perceived usefulness could be influenced by several external variables which may affect the users' attitudes toward using the system (for example, documentation, a system feature, training and user support). Accordingly, the user of IT intends to utilise technology if he/she feels that the technology will be useful for them and if they feel it is easy to use (Brezavšček *et al*., 2014:117). Both the perceived ease of use and perceived usefulness influence the attitude towards use.

2.5.4 Attitude towards use

Attitude towards use is described as the assessment that is made by the user to determine the level of desirability of using a particular technology (Uta, 2015:10). Both perceived usefulness and perceived ease of use according to

Teo (2009:108) jointly affect the attitude towards usage, while perceived ease of use has a direct impact on perceived usefulness. Many users of technologies do have different views and attitudes towards the use of technologies in terms of how it has impacted their lives. This technology as well as the technological innovations that have impacted the lives of people on both personal and professional levels in organisations and innovators is used by different office personnel professionals from the secretary, administrative officer to the office manager.

Besides, most employees that have positive and good relations with the emergence and the use of technology are young administrative employees. They are eager and interested in learning to use new technologies that are being introduced into the world of work. Moreover, new technologies benefit them as it accommodates the administrative roles and responsibilities that they are performing and helps them to interconnect with their fellow colleagues. Whereas, old employees may have negative attitude towards the use of technologies because they may feel daunted about using such technologies.

According to Teo (2009:107) people's attitudes, whether positive or negative, affect how administrative employees react to technology in an instructional setting. In general, the attitude towards the use of technology and acceptance are perceived positively by some and negatively by others. Huang and Liaw (2005:730) stressed that no matter how sophisticated and capable the technology may be, its effective implementation depends on users having a positive attitude towards it. Teo (2009:107) observes that users' attitudes are

posited to influence behavioural intention to use technology, which, in turn, influences actual usage behaviour.

2.5.5 Behaviour intention

Since the emergence and innovation of these technologies the behaviour of the people has changed including their perceptions concerning the use of these technologies in their work environment. "*Behavioural intention to use a particular technology is an important factor that determines whether users will actually utilise technology or not*" (Teo, 2009:107). He further stresses that intention to use is influenced directly by their attitudes towards technology use, as well as the direct and indirect effects of perceived usefulness and perceived ease of use. Behavioural intention to use predicts a user's intention to perform an intentional act such as deciding to accept and use an information system (Erasmus *et al*., 2015:3).

Behavioural intention is a practical way of measuring the actual use of the technologies (Teo, Su Luan & Sing 2008:268). Most of the administrative employees have little knowledge of utilising office technology machines in the actual work environment as their fear may hamper their work expertise. Behaviour intention is a function of two concrete behaviour beliefs: perceived usefulness and perceived ease of use (Tao, 2008:717). According to Teo *et al*., (2008:268), stressed that this model has been tested by many researchers and the findings reported confirm this relationship. The behavioural intention to use can indicate acceptance of emerging technologies currently in the

government departments, due to the fact that emerging technologies are still not well established in the government sector.

Therefore, the overall aim of behavioural intention to use technologies is important as most people around the globe are using technology in their personal lives as well as for their professional work. Guritno and Siringoringo (2013:212) further maintain that it is a fact that behavioural intention influences the actual behaviour. They maintain that this model has been tested by many researchers and the findings reported confirm the relationship between behavioural intention and actual behaviour.

2.5.6 Actual system use

According to TAM, one's actual use of a technology system is influenced directly or indirectly by the user's behavioural intentions, attitudes, perceived usefulness of the system and perceived ease of the system Park (2009:151). The administrative employees, who work in government sectors, use technologies for various reasons ranging from distributing emails, make appointments, make incoming or outgoing calls, print, amongst others. Even when emerging technology may be seen as potentially beneficial, building workers' acceptance of the technology and their commitment to using it to its greatest extent is an essential prerequisite to successful implementation (Peterson, Latourrette & Bartis, 2001: xviii). However, the actual use may be viewed positively by the employees when they realise it has reduced their workloads and has broken the previous boundaries that impeded their tasks. Accordingly, they may have faith in the security aspects with regard to using

technologies. In fact, they have reduced both their workloads and the time spent on their work as they can communicate instantly and store and receive documents electronically. The attitudes of staff would also depend on individuals' value of the systems used and to what extent; the system is providing those services (Mtshali, 2011:83).

2.6 Summary

The chapter presents a literature review on the role of government administrative employees, emerging technologies, social network and an overview of TAM, were examined and discussed. Therefore, the outcomes of this chapter indicate that emerging technologies play a crucial role in enhancing job effectiveness of administrative employees in formulating their daily roles and responsibility and why it is so important that administrative employees should have the required competencies to ensure the accomplishment of the government departments.

The next chapter discusses the research design and methodology by means of which data concerning the perceived effectiveness of emerging technologies among government administrative employees were collected. The sampling techniques indicating how the sample to be used was selected and will be discussed thoroughly followed by the data interpretation.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The purpose of this research was to determine the perceived effectiveness of emerging technologies among government administrative employees. A research methodology is underpinned by the "*philosophy of research conceived as the way in which the research strategy was formulated and conducted*" (Vargas-Hernández; De León & Valdéz, 2011:47). A research methodology *"explains how the research was done, the methods of data collection, [the] materials used, [the]subjects interviewed, or places visited*" (Jabar, Sidi, Selamat, Ghani & Ibrahim, 2009:47). The author's further stressed that research methodology focusses on the methods and principles utilised in an activity. Vargas-Hernández *et al*., (2011:47) further, note that research methodology entails purposes, activities, procedures, measurements and applications. Therefore, research is the process of collecting accurate, sound and reliable information about the effectiveness of your interventions, thereby, providing the researcher with evidence of its effectiveness (Kumar, 2014:6). It is a systematic process of collecting, analysing and interpreting information to increase the researcher understands of the phenomenon in question (Leedy & Ormrod, 2010:2).

The methodology followed when conducting the study to achieve the research objectives is presented in this chapter that is organised into five main sections. The first section describes the research strategy; the second section presents the research design adopted in carrying out the study. The third section discusses the data collection method and the fourth section explains how the data were analysed. The fifth section covers the ethical

considerations to which the researcher tried to adhere when conducting the research. This chapter ends with a summary.

3.2 Research strategy

A research strategy is the process followed by the researcher to understand and decide which method is the most applicable to address the research problem and answer the research questions to achieve the objectives of the study. Wedawatta, Ingirige and Amaratunga (2011:270) further indicate that a research strategy provides the overall direction of the research including the process by means of which the research is conducted. In addition, Vargas-Hernández *et al., (*2011:61) draw attention to the fact that a good research strategy is one that enables observation of the phenomena under study and the analysis of data that are being collected from a variety of sources and perspectives. Therefore, the research strategy process starts by understanding and deciding which method is the most applicable for this study. There are two well-known methodological paradigms a researcher can choose from when doing social research. The researcher can either adopt qualitative or quantitative or both methods depending on the phenomena in question. The two methods are not in conflict with each other but rather complement one another. Neither qualitative nor quantitative methodology is essentially better than the other. Okoya (2013:138) further maintains that these methods also constitute measures that allow researchers to confirm that the knowledge they have formed has reliability and validity. Choy (2014:101)

provides a summary of the strengths and weaknesses of qualitative and quantitative research methodologies as presented in Figure 3.1 below.

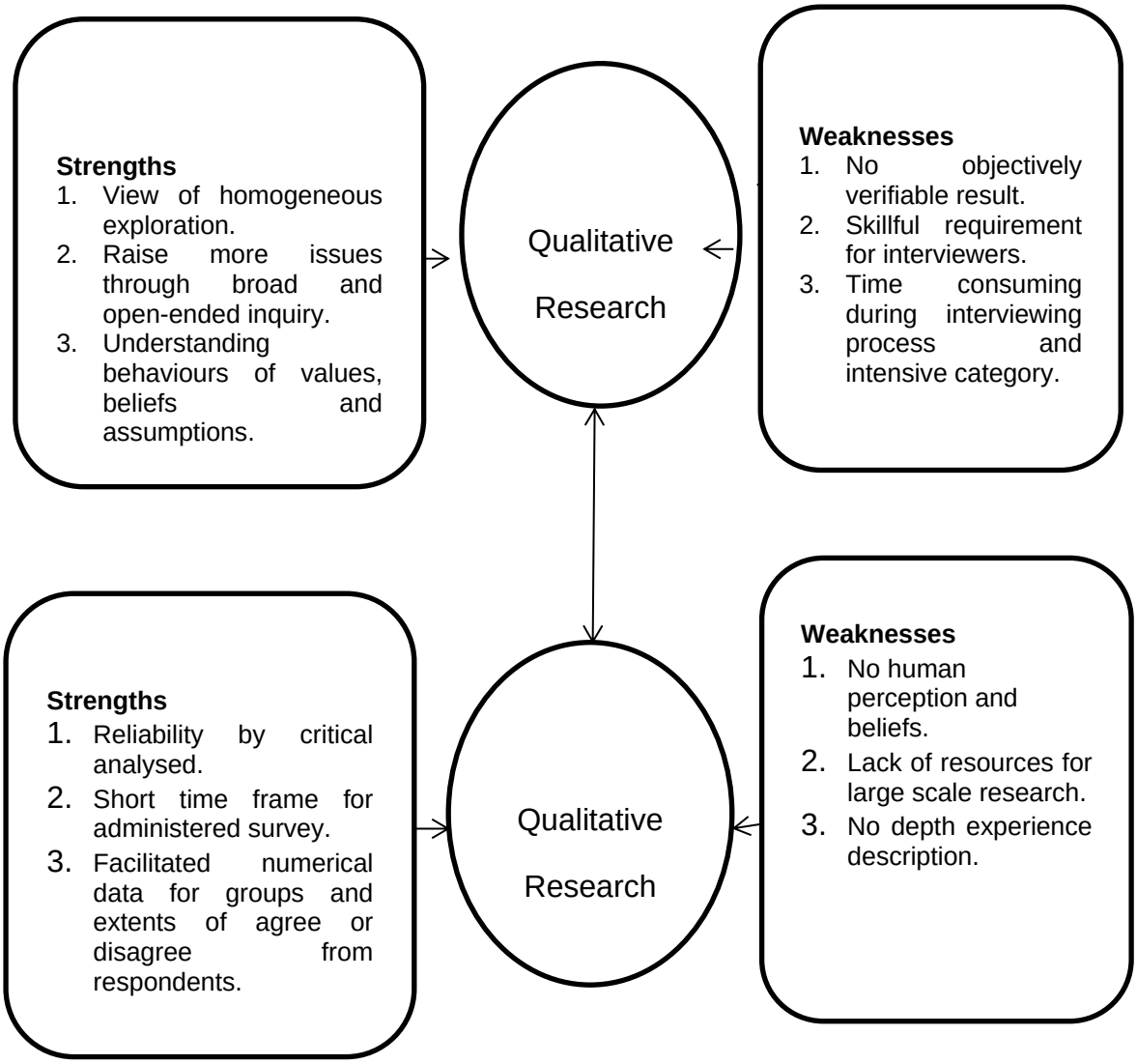

Figure 3.1: Quantitative and qualitative research method strength and weaknesses (Choy 2014:101)

3.2.1 Quantitative research method

The quantitative research method is the most frequently used approach when conducting social science research. Greener (2011:56), stressed that quantitative research is regarded as important by social research founders (and potential academic and non-academic employers) and it has gained its status and importance from being able to prove or disprove a theory, and to produce specific answers to questions. He further maintains that the method provides a range of established tools for measuring social phenomena which can be counted in some way or another. This paradigm uses a wide range of numerous quiet different data sources to analyse the data collected, the primary data collection methods included interviews, questionnaires, observation, transactional logs and archival records. Leedy and Ormrod (2010:94) further assert that quantitative research involve looking at amounts or quantities of one or more variables of interest. Therefore, a quantitative study uses techniques that will produce data in the form of numbers (Neuman, 2014a:204). In particular, the method entails numerical and statistical representation or of data solicited from participants of the study. On a similar note, Williams (2007:66) maintained that quantitative research involves data collection that is typically numerical and the researcher tends to use mathematical models as the methodology of data analysis. Moksha (2013:25) conceded that quantitative research contains the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute “alternate knowledge claims”. The purpose is for the researcher to projects his or her findings onto the larger population through an objective (Borrego, Douglas & Amaelink, 2009:54).

With every methodology, there are strengths and weaknesses. Johnson and Onwuegbuzie (2004:19) identify the strengths of quantitative research as follows:

- Testing and validating previously constructed theories about how (and to a lesser degree, why) phenomena occur.
- It tests hypotheses that are constructed before the data are collected. One can generalise the research findings when the data are based on random samples of sufficient size.
- One can generalise a research finding when it has been replicated on many different populations and subpopulations.
- It is useful for obtaining data that allow quantitative predictions to be made.
- The researcher may construct a situation that eliminates the confounding influence of many variables, allowing one to assess cause-and-effect relationships more credibly.
- Data collection using some quantitative methods is relatively quick (for example, telephone interviews).
- It provides precise, quantitative, numerical data.
- The data analysis is relatively less time consuming (using statistical software).
- The research results are relatively independent of the researcher (for example, effect size, statistical significance).
- It may have higher credibility with many people in power (for example, administrators, politicians, people who fund programs).

- It is useful for studying large numbers of people.

The findings from quantitative research can be predictive, explanatory, and confirming (Williams, 2007:66). The goal of quantitative research is collecting facts of human behaviour, which, when accumulated will provide verification and elaboration on a theory that will enable all scientists to state causes and predict human behaviour (Castellan, 2010:5).

3.2.2 Qualitative research method

A qualitative research approach is the most frequently used approach when conducting social science research, in particular, entails informative details of information (data) solicited from participants of the study. A qualitative research method is considered as non-numeric data – for example, categorical information that can be collected systematically and presented in narrative form, such as word tables (Yin, 2009:11). Punch (2014:3) furthermore describes a qualitative method as an empirical research method where the data collected are not in the form of numbers. The method is more appropriate for exploring the variation and diversity in any aspect of social life, and they also provide immense flexibility (Kumar, 2014:133). The approach of this methodology focusses on the meanings, traits and defining characteristics of events, people, setting or culture and experience (Tewksbury, 2009:38). Therefore, qualitative research can be regarded as a multi-focal investigation to obtain in-depth insight into the behaviours, values, attitudes and motivations based on unstructured interviews, feedback and recording methods (Vargas-Hernández *et al*., 2011:61).

Redlich-Amirav and Higginbottom (2014:1) notes that qualitative research involves a great deal of human communication as communication plays a major role in all aspects of qualitative research from planning to execution. The goal of a qualitative research approach is to understand, human viewpoints and phenomena traits. It is piloted through intense and /or prolonged contact with a field or life situation (Punch, 2014:119). Therefore, it is about how people perceive the world, their emotions and lived experiences (Silverman, 2013:325).

This paradigm uses a wide range of quite different data sources to analyse the data collected; the primary sources include interviews, questionnaires, participant observations, journals and document reviews. More importantly, Anderson (2010:2) further adds that qualitative data include:

- Audio recordings and transcripts from focus group sessions.
- Structured interview questionnaires contain substantial open comments including a substantial number of responses to open comment items.
- Audio recordings and transcripts from focus group sessions.
- Field notes
- Video recording (lecturer delivery, class assignments)
- Case study notes
- Images
- Documents (reports, e-mails)
- Diaries, video diaries
- Observation notes
- Press clippings
- Photographs

Therefore, in this study, a qualitative research approach was adopted to understand how government administrative employees perceive the effectiveness of emerging technologies in their work environments. This methodology was guided by research objectives and aims of the study; the ambition was to understand how government administrative employees perceive the effectiveness of emerging technologies in their work environment.

According to Kumar (2014:132), the main benefit of doing qualitative research is to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs, and experiences of a group of individuals. Choy (2014:102) further observes that the advantage of a qualitative approach inquiry is broad and open-ended, allowing study participants to raise issues that matter to them. For this study, a qualitative approach has provided the researcher with rich results regarding how emerging technologies are perceived by administrative employees and presents an opportunity for the researcher to incorporate the relevant principles into this study.

3.3 Research design

Every project requires a research design that will define the study type in a systematic manner and guide the different phases and activities to be undertaken to address the phenomena in question. Punch (2014:114) further describes a research design as the basic plan for a piece of research, and it includes four main ideas: firstly, the strategy, secondly, the conceptual

framework, thirdly, the question of who or what will be studied, and fourthly, the tools and procedures to be used for collecting and analysing empirical materials. It is considered as a road map that the researcher may decide to follow during the research journey to find answers to research questions, objectively, accurately and economically as possible (Kumar, 2014: 122). The author further maintains that "*is a plan through which you decide for yourself and communicate to others your decisions regarding what study design you propose to use, how you will collect information from your respondents, how the information you will collect it to be analysed and how you will communicate your findings"*. The research design aids the researcher with the allocation of limited resources by posing crucial choices in the methodology (Cooper & Schindler, 2011:139). According to Sinkovics and Alfoldi (2012:825), with research design, a researcher draws up a blueprint seeking a good fit between theoretical foundations, epistemological assumptions and practical feasibility issues. According to Maher (2013:19), the central purpose of the research design is to assist in avoiding the situation in where the evidence collected throughout the research process, does not address the research questions.

There are various methods of research design in a qualitative approach, from which a researcher can choose, namely, a case study, grounded theory, historical methods, applied, and action research, biographical method and ethnography. Each of them has their different meaning, nature and purpose for their use.

Action research brings together the action (or the doing) and the researching (or the inquiring) Punch (2014:7). Action research is based on a philosophy of

community development that seeks the involvement of community members (Kumar, 2014:160). However, Mukhopadhyay and Gupta (2014:111) identified interviews, observations, case studies, ethnographic studies, action research and archives as primary research methods that are widely used in qualitative research designs and moreover the researchers developed a diagram of research methods used by qualitative researchers, as shown in Figure 3.2.

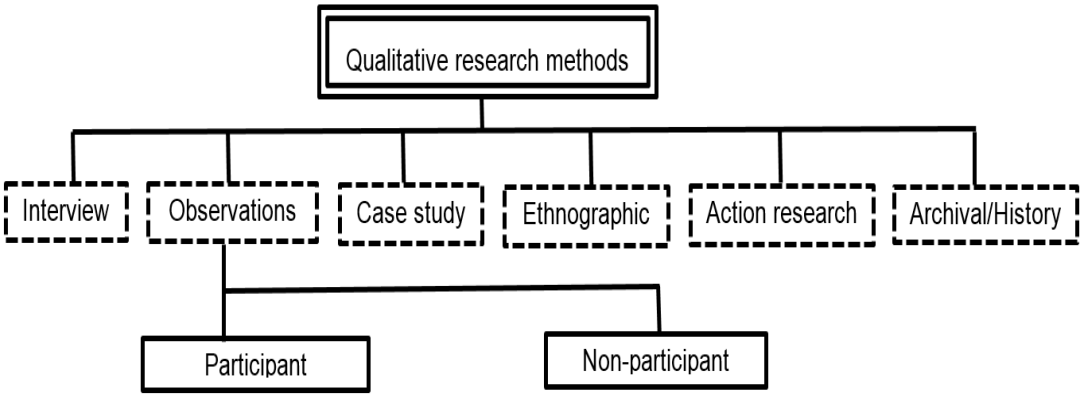

Figure 3.2: Qualitative research methods (Source: Mukhopadhyay & Gupta, 2014:111)

Grounded theory is a research strategy where participants are interviewed in a group setting; the data can be collected faster and usually at a lower economic cost to the researcher (Onwuegbuzie, Leech & Collins, 2010:711).

Ethnography focusses on the way of life of some group of people, which can only be understood from the insider's perspective (Punch, 2014:139). Ethnography is based on observational work in particular social settings Silverman (2013:49).

A **case study** involves the investigation of a specific, unique system with patterned behaviour, dynamic properties, and defined features (Curry, Nembhard & Bradley, 2009:144)

Historic methods involve a process of obtaining, recording, presenting and interpreting historical or current information, based on personal experiences and opinions of some members of a study group or unit (Kumar, 2014:156).

Therefore, case study research approach was adopted as the appropriate qualitative research design for this study, and it is discussed in details below.

3.3.1 Case study research design

There are a number of articles and books that have provided multiple meanings and definitions of a case study, and they have used the term in different perspectives. A qualitative case study methodology is known to benefit researcher(s) by bringing out important details from the viewpoint of the participants by using multiple sources of data, the application of multi-method case studies remains limited (Anisimova & Thomson, 2012:97). A case, according to Kumar (2014:155) is referred to as an individual, a group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city. Crowe, Cresswell, Robertson, Huby, Avery and Sheikh (2011:1) characterises a qualitative case study as an established research design that is used extensively in a wide variety of disciplines, particularly in the social sciences.

A qualitative case study research method is defined by Simons (2009:21), as an in-depth exploration from numerous viewpoints of the complexity and uniqueness of a specific policy, project, institution, programme or system in a real life context. Case data often include observations, interviews, documents, past records, and audiovisual materials (Leedy & Ormrod, 2010:137).

Hyett, Kenny and Dickson-Swift (2014:1) further argue that qualitative case study methods are shaped by paradigm, research design, and selection methods, and as a result, case studies in the published literature vary. Yin (2009:18) further maintains that qualitative case study research as dealing with an empirical inquiry about a contemporary phenomenon in depth and within its real-life situation context, especially when the boundaries between phenomenon and context are not clearly evident. Baxter and Jack (2008:544) affirmed that a qualitative case study is an approach that provides tools for the researcher to facilitate exploration of a phenomenon within its context using a variety of data sources.

In other words, a qualitative case study is the combination of data collections techniques like participate observation, interviews, archive records and other. However, Punch (2014:121), distinguishes different types of case studies:

- ***Intrinsic case study***, the study is undertaken because the researcher wants a better understanding of a particular case.

- ***Instrument case study***, where a particular case is examined to provide insight into an issue, or to revise a generalisation,

- ***Collective case study***, where the instrumental case is extended to cover several cases, to learn more about the phenomenon, population or general condition.

Punch further states that the first two are single case studies, where the focus is on the case, and the third case involves multiple cases (comparative case study), where the focus is both within and across cases. Intrinsic, instrumental

and collective approaches to case studies allow for multiple sources of data collection (Chetty, 2013:42).

A case study approach was selected mainly because of its focus on real-life situations and their uniqueness. Kumar (2014:155) points out that it is a useful design when exploring an area where little is known or where a researcher wants to have a holistic understanding of the situation, phenomenon, episode, site, group or community. Kumar (2014:155) further points out that when selecting a qualitative case study, you usually use purposive, judgmental or information-oriented sampling techniques. According to Zainal (2007:2), a qualitative case study must be able to prove that:

- It is the only viable method to elicit implicit data from the subjects
- It is appropriate in terms of the research question
- It follows the set of procedures with its application
- The scientific conventions used social sciences are followed strictly
- A chain of evidence, either quantitatively or qualitatively, are recorded or achieved systematically particularly when interviews and direct observations by the researcher are the main sources of data.

The crucial purpose with regard to undertaking a case study is to generate an in-depth understanding of a specific topic, programme, policy, institution or system to generate knowledge and/or inform policy development, professional practice and civil or community action (Simons, 2009:21).

According to Yin (2009:4), qualitative case study approach “allows investigator(s) to retain the holistic and meaningful characteristics of real-life events – such as individual life cycles, small group behaviour, organisational

and managerial processes, school performance, international relations, and the maturation of industries". Yin (2011:14) further argues that a case study asks the following questions, namely, "how" and "why". If a case study is applied, properly, it holds great promise for answering the "how" and "what" questions. Furthermore, Kumar (2014:155) remarks that the advantage of a qualitative case study design is to provide an overview and an in-depth understanding of case(s), processes and interactional dynamics within the units of study. When the approach is applied correctly, it becomes a valuable method for the researcher to develop a theory, evaluate programmes, and develop interventions because of its flexibility and rigour (Baxter & Jack, 2008:544). A case study can offer important benefits for studies because may be "exploratory (define questions or hypotheses), descriptive (to depict a phenomenon within its context), or explanatory (to identify cause-and-effect relationships) in nature" (Curry *et al*., 2009:144). There are different types of qualitative case studies that a researcher may consider before conducting any study, which is a single and multiple case study design.

3.3.1.1 Single case design

According to Yin (2009:47), a single case design is analogous to a single experiment. He further cites that single case study can be used to determine whether a theory's propositions are correct. Leedy and Ormrod (2010:137) states its (single case study) uniqueness or exceptional qualities can promote understanding or inform practice for similar situations. On the other hand the author states that a single case study could be criticised for its inability to provide a generalising conclusion, in particular when the events are rare.

3.3.1.2 Multiple case studies

A multiple case also is known as a collective case study. Multiple case study is defined by Baxter and Jack (2008:548), as studies that enable the researcher to explore differences within and between cases. This type of a case study can be adopted with real-life cases that show numerous sources of evidence through replication rather than sampling logic (Zainal, 2007:2). A multiple case design enables the researcher to follow a replication logic approach meant at attaining analytical rather than statistical generalisations (Maher, 2013:24).

In order to achieve the objectives of this study, a single study design was adopted.

3.4 Data collection

All research projects include a collection of data. Data collection focusses on the actual types of procedures to be followed during data collection process (Creswell, 2013:145). Data collection according to Creswell (2013:145) means *"gaining permissions, conducting a good qualitative sampling strategy, developing means for recording information both digitally and on paper, storing the data, and anticipating ethical issues that may arise*." The collection of data for a research study is treated as a design issue to enhance the construct and internal validity of the study, as well as the external validity and reliability (Vargas-Hernández *et al*., 2011:61). Therefore, the collection of data is regarded as a very crucial step in any research process (Adejimi, Oyediran

& Ogunsanmi, 2010:50). According to Terrell (2012:273), "*data can be collected simultaneously or sequentially; depending on the design and priority that can be given to either data type or they can be considered equally*."

A range of methods of data collection techniques can be used in a research study, but the common techniques include questionnaires, interviews, and observations. Although different data collection can be adopted when using a qualitative case study, the study triangulated both quantitative and qualitative data collection methods. According to Perveen (2014:1), triangulation is a powerful technique that facilitates the validation of data through cross verification from two or more sources. Yeasmin and Rahman (2012:156) adds that in the social sciences*, "it refers to the combination of two or more theories, data sources, methods or investigators in one study of a single phenomenon to converge on a single construct , and can be employed in both quantitative (validation) and qualitative (inquiry) studies"*. According to Perveen (2014:1-2), the main purpose of triangulation in specific contexts is to obtain confirmation of the findings through the convergence of different perspectives. Perveen further adds that the usefulness of triangulation includes:

- Increase confidence in research data
- Revealing unique findings.
- Creating multiple ways of understanding data and
- Providing a clear and deep understanding of problem

Yeasmin and Rahman (2012:157) further distinguish between the four forms, providing a clear and deep understanding of the problem of triangulation in research.

Data triangulation: It is the retrieval of data from a number of different sources to form one body of data.

Investigator triangulation: It is the use of multiple observers instead of a single observer in the form of the gathering and interpreting of data.

Theory triangulation: It is the use of more than theoretical positions in interpreting data,

Methodological triangulation: It is the use of more than one research method or data collection technique.

This study used closed-ended questionnaires and interviews as methods of data collection. The objective was to get rich data from the participants and ensure both the validity and reliability of the data collecting instrument. The methods are discussed in detail below.

3.4.1 Questionnaires

Questionnaires are a written list of questions, the answers to which are recorded by respondents (Kumar, 2014:178). He further states that in a questionnaire respondent reads the question, interprets what is expected and then writes the answers down. It has been considered to be probably the single most common data collection process that is relatively well understood and applied by most researchers in a quantitative study (Adejimi *et al*.,

2010:49). The reason behind its wide adoption by a quantitative researcher is based on its advantages as outlined by Kumar (2014:181):

- Questionnaires are less expensive – as you do not interview respondents, you save both time, and financial resources.
- They offer greater anonymity – as there is no face-to-face interaction between respondents and the interviewer.

There are various ways in which questionnaires can be distributed. Bird (2009:1313) notes the advantages and disadvantages of the more common modes of questionnaire distribution within a quantitative framework, as presented in Table 3.1 below:

Table 3.1: Advantages and disadvantages of modes of questionnaire distribution Bird (2009:1313)

Mode of distribution	Advantages	Disadvantages
Self-administered mail:	• Cost effective • Greater coverage area • Time to consider responses • Anonymity • The interviewer cannot shape questions	• Limited length • Limited complexity i.e. questions must be brief and self-explanatory • No control who completes the survey • Interviewer cannot shape questions • Response rates can be poor • Difficult to check non-response biases
Mailed questionnaires	• Cost effective especially for the use of colour graphics • Time to consider responses • More complex questions therefore more complex qualitative data • Strong response rate	• Distribution shaped by age, class and gender biases that shape computer use and email patronage • Interviewer cannot shape questions
Administered Telephone	• Cost effective when compared to face-to-face • More anonymity than face-to- face interviews • Encourage participation • Less threatening than face-to- face participants • Can motivate participants • Question sequenced controlled • Longer verbal responses compared to written • Vague responses can be probed	• Time consuming therefore questionnaire length may be constrained • Question format must be kept simple • Number of response categories in closed questions limited • May create class or gender bias amongst • Telephone surveys are becoming very unpopular in society
Face-to-face	• Complex questions can be asked • Can motivate participants • Longer verbal responses compared to written • Questions can be clarified • Question sequenced controlled • Vague responses can be probed • •Visual prompts can be used • Long questionnaires sustained • High response rates	• Costly • Time consuming • Spatially restricted • Answers may be filtered or censored • Interviewer's presence may affect • responses

There are two types of questionnaires from which a researcher can choose, namely, open-ended and close-ended questionnaires. Zohrabi (2013:254) differentiates between these two types of questionnaires noting that **closed-ended questionnaires** provide the inquirer with quantitative or numerical data and **open-ended questionnaires** with qualitative or text information.

3.4.1.1 Closed-ended questionnaires

Closed-ended questions provide metrics, which generally track the results found in the open-ended questions, and there are no apparent gaps between the sets of information (Bleuel, 2015:1). The closed-ended questions helped the respondents to choose precise answers from the alternatives, which were given. Neuman (2014b:205) outline the advantages and disadvantages of closed-ended questionnaires as indicated in Table 3.2.

Table 3.2: Advantages and disadvantages of closed-ended questionnaires Neuman (2014b:205)

Closed ended questionnaires	
Advantages	**Disadvantages**
• It is easier and quicker for respondents to answer • The answers of different respondents are easier to compare • Answers are easier to code and statistically analysed • The response choices can clarify question meaning for respondents • Respondents are more likely to answer about sensitive topics • There are fewer irrelevant or confused answers to questions • Less articulate or less literate respondents are not at a disadvantage • Replication is easier	• They can suggest ideas that the respondent would not otherwise have • Respondents with no opinion or no knowledge can answer anyway • Respondents can be frustrated because their desired answer is not a choice • It is confusing if many (for example, 20) response choices are offered • The misinterpretation of a question can go unnoticed • Distinctions between respondent answers may be blurred • Clerical mistakes or marking the wrong response is possible • They force respondents to give simplistic responses to complex issues • They force people to make choices they would not make in the real world.

3.4.1.2 Open-ended questionnaires

Open-ended questionnaires allow the participant to provide their own terms in order for the researcher to elicit the respondent experience or perception. Roberts, Stewart, Tingley, Lucas, Leder-Luis, Gadarian, Albertson and Rand, (2014:2) further aver that open-ended questionnaire provides a direct view into a respondent's own thinking. Therefore open-ended questionnaires sought for the opinions of the respondents to enable them to express their

own views and answers to the question which was asked (Jones, Whitehurst & Egerton, 2012:74). Neuman (2014b:205) outlined the advantages and disadvantages of open-ended questionnaires as indicated in Table 3.3.

Table 3.3 Advantages and Disadvantages of open-ended questionnaire Neuman (2014b:205)

Open-ended questionnaires	
Advantages	**disadvantages**
• They permit an unlimited number of possible answers • Respondents can answer in detail and can qualify and clarify responses • Unanticipated findings can be discovered • They permit adequate answers to complex issues • They permit creativity, self-expression and richness of detail, and • They reveal a respondent's logic, thinking process and frame of reference	• Different respondents give different degrees of detail in answers • Responses may be irrelevant or buried in useless details • Comparisons and statistical analysis become extremely difficult • Coding responses is difficult • Articulate and highly literate respondents have an advantage • Questions may be too general for respondents who lose direction • Responses are written verbatim, which is difficult to interviewers • A greater amount of respondent time, though and effort is necessary • Answers take up a lot of space in the questionnaire

The study adopted closed-ended questionnaires to solicit data from administrative employees that participated in this study. The questionnaires were self-administered to the two government departments in Gauteng, South Africa. Table 3.4 below presents the total number of questionnaires that were distributed per department.

Table 3.4: Questionnaires distribution per department

Government department	Number of questionnaire distributed	Actual questionnaires received back
Transport	97	56
Education	150	109
Total	**247**	**165**

A total of 247 questionnaires were distributed to two government departments respectively. The questionnaires were delivered personally to the research sites and collected on the agreed dates. However, out of the 247 self-delivered questionnaires, only 165 questionnaires were returned completed, and 82 were counted as non-responsive and were discarded. These resulted in a response rate of 58%, which is acceptable as noted by (Mbithi, 2011:68). The reason was that some of the participants were not willing to participate in the study as they felt uncomfortable with the questionnaires. Some claimed that they did not have time to complete questionnaires.

3.4.2 Interviews

An interview entails person-to-person interaction, either face-to-face or otherwise, between two or more people with a specific purpose in mind (Kumar, 2014:176). From Kumar's definition, it is clear that an interview is another method of data collection that allows the researcher to gather and solicit information from the respondent(s) through verbal or non-verbal communication and gaining insight into respondent. Furthermore, Punch (2014:145) describes interviews as a data collection tool of great flexibility,

which can be adapted to suit a wide variety of research situations. He further stressed that it is an excellent way of accessing people's insights, meanings, and definitions of situations and contractions of reality. As a matter of fact, interviews can be piloted in groups, face-to-face, by telephone, an e-mail, and the internet, collective or otherwise. Interviews cannot be conducted if there is no participant and interviewer. According to Punch (2014:149) before any interviews are conducted the researcher must pay attention to the following main issues:

- Who will be interviewed and why?
- How many will be interviewed, and how many times will each person be interviewed?
- When and for how long will each respondent be interviewed?
- How will access to the interview situation be organised?

According to Kumar (2014:182), there are several advantages to collecting data through interviews:

- More appropriate for complex situations.
- Useful for collecting in-depth information.
- Information can be supplemented.
- Questions can be explained.
- Has a wider application.
- Useful when participants cannot be directly observed (Creswell, 2013:191).

Interviews can either be structured, unstructured or semi-structured. These types of interviews are described as follows:

Unstructured interviews according to Kumar (2014:177) are extremely useful for exploring phenomena intensively and extensively and digging deeper into a situation, a phenomenon, issue or problem.

Structured interviews the participants are asked a series of pre-established questions, with a pre-set response (Punch, 2014:146). The author further stresses that there is little room for variation in response, although open-ended questions may sometimes be used as well.

Semi-structured interviews provide the best opportunity for in-depth discussion to achieve a full understanding of the issues investigated (Maher, 2013:25). Harris and Brown (2010:1) further assert that in a semi-structured interview, interviewers begin with a small set of open-ended questions, but spend a considerable amount of time probing participant's responses, encouraging them to provide detail and clarifications, these are generally analysed qualitatively.

The study adopted semi-structured interviews to solicit data from managers in government department participated in the study. Semi-structured interviews were adopted since this type of interview is flexible and allows the interviewee to provide more information than the other ones (Zohrabi, 2013:254).

3.4.2.1 Semi-structured interviews

Managers and supervisors from the participating government departments were interviewed. The interviews were recorded with the permission of the

participants. Hand-written notes were taken as required to complement the recording process and to note down issues that needed to be probed further.

The recorded data were transcribed for the purpose of analysis. The interviews were stopped at the point of saturation, which is at the point where no new information was forthcoming. Table 3.5 below presents the number of managers and supervisors interviewed for the study.

Table 3.5: Interview participants

Government department	Total number of managers and supervisors	Number of participants interviewed	Number of participants not participated
Transport	83	2	81
Education	93	3	90
Total	**176**	**5**	**171**

Semi-structured interviews were conducted with managers and supervisors from the two government departments that participated in this study. However, of the 17 managers and supervisors selected, only five were available to be interviewed. The interview did not reach the point of data saturation, because some managers were not available when the interviews were conducted. Some of the managers kept on rescheduling the dates for the interviews to the extent that they never materialised.

3.4.2.2 Demographics of interviews

The demographics of interviews are an important element in ensuring balance with regard to the participants. For this reason, purposeful rather than random sampling was an effective way of selecting the participants. The selection of

the participants was specific, based on the competencies (knowledge and skills) possessed by those selected that could help explain the findings of participation and the problem we wish to solve. The participants were not selected based on their qualifications, age or anything else, but their expertise and the effectiveness of the phenomena. Therefore the selection of the participants was mainly based on their skills, knowledge and accessibility to emerging technologies.

Participants from both government departments were presented with the same interview questions. However, room was allowed during the interviews to follow new leads and address other interesting topics emerging from the conversations. The main purpose of conducting interviews in this way is to enable the researcher to select participants that are the most suitable for the subject matter under study (Speziale, Streubert & Carpenter, 2011:30). Participants are thus chosen purely based on the basis of who has relevant knowledge and experience about the phenomena. The concern was not how much data were gathered, or how many participants were interviewed, but to gather sufficient rich information.

3.4.2.3 Interview guide

An interview guide is an important element to be considered when conducting interviews in a research study. According to Koskei and Simiyu (2015:109), an interview guide is the list of questions, topics and issues that the researcher desires to cover during the interview. The interview guide should be clear and avoid ambiguity.

The interviews were carried out adhering to following guidelines:

- Permission was obtained from the participants by way of informed consent
- The participants were briefed about the nature of the research with an opportunity to ask questions.
- The interviewees were afforded the opportunity to withdraw from participating if they were no longer comfortable to do so
- The participants were informed that the their responses would remain confidential and that their anonymity would be respected

The use of an interview guide permitted flexibility and consistency with regard to the attainment of rich data from the interviewee. Furthermore, the interview guide ensured that there was structure and consistency to the interview, even though the interviews were treated as conversations during which the interviewer elicited detailed information and comments from the respondents.

3.4.2.4 Pilot interviews and questionnaires

Another crucial element regarding the pilot questionnaires and interviews is the employment of a pilot test (Turner, 2010:757). A pilot study can assist the researcher in determining if there are flaws, limitations or other weaknesses within the interview design that allow him or her to make the necessary revisions prior to the collection of data during the main study (Abdullah & Sulaiman, 2013:296). A pilot test should be conducted with the participants that have similar interests as those that will participate in the implemented study (Turner, 2010:757). According to Hazzi and Maldaon (2015:53), the

importance of the pilot study lies in improving the quality and efficiency of the main study. They further stress that a pilot study could be used to reveal some logistics issues before embarking on the main study, which study results can inform feasibility and identify the modifications needed in the main study.

Before the main interviews and the distribution of the questionnaire, a pilot study was conducted on a group of ten (10) volunteer administrative personnel and two managers who were as similar as possible to the target population. The participants were selected on the basis of convenience, accessibility and geographical proximity. The pilot study helped to improve the quality of the interview questions and the questionnaire. For example, some questions were refined as it was found that they were too broad and would have led to the research being taken out of context.

3.5 Data analysis

Castellan (2010:7) states that the analysis of data is an ongoing, inductive process where data are sorted, sifted through, read and reread. Kaphesi (2003:276) further states that data analysis involves working with data by organising and breaking it into manageable units, searching for patterns, discovering what is important and what is learned, and deciding what you will tell others. The process requires a skillful interpretation and handling of the data and relies on a systematic and rigorous method (Srivastava & Hopwood, 2009:77). Therefore, it is a step-by-step procedure aimed at the interpretation

and finding meaningful relationships between the non-numeric data collected through interviews and questionnaires.

Data analysis can assist the researcher with categorising, ordering, manipulating and summarising data to obtain answers to the research questions (Mathiyazhagan & Nandan, 2010:37). They further explain that it also helps with reducing data to an intelligible and interpretable form so that the relations of research problems can be studied and tested.

The study employed both quantitative and qualitative data collection methods. As indicated in this chapter, closed-ended questionnaires and semi-structured interviews were used to elicit data for the analysis. In order to achieve the objectives of this study, the analysis of data began during the data collection stage.

Quantitative data were analysed using SPSS with the assistance of the statistician at the Tshwane University of Technology. The data were coded and populated on a Microsoft Excel 2010 spreadsheet and presented using Microsoft Excel graphs and tables. Inferential co-effiency statistics were not included in this study because the focus was not to test a hypothesis. However, the results will be used when writing research articles.

After the analysis of the self-administered questionnaires, it was decided to confirm the results with semi-structured interviews. The individual interviews were recorded with the permission of the participants and later transcribed for the analysis. Moreover, interviews were given identity codes, interview numbers and interview line numbers. The data were analysed following the two central tenets of TAM (perceived usefulness and ease of use), to

understand administrative employees' perceptions of utilising emerging technology in the government departments. TAM was selected to underpin the study mainly because of its empirical support for being robust with regard to predicting technology adoption in various contexts.

3.5.1 Units of analysis

It is important to define the unit of analysis clearly, so that the proposition can both guide the collection of relevant data and ultimately enable the linking of data to the proposition in order to aid the analysis and interpret the findings. Units of analysis can refer to "groups, organisations or institutions" the researcher is interested in (Kumar, 2014:193). The main participants of the study were administrative employees and their supervisors and managers in two government departments.

The unit of analysis, namely the managers, supervisors and administrative staff, were selected by means of purposeful sampling as mentioned above. Each unit implied a different kind of data collection, a different focus for the analysis of data and a different level at which statements about findings and conclusions were made.

Table 3.6: Units of Analysis

	Macro Level	Micro level
Unit of analysis	Managers	Administrative employees
	Supervisors	

The units of analysis, macro and micro levels were aimed at understanding and organising the data for analysis.

3.6 Reliability and validity

In this study, the researcher adhered to certain concepts of 'morality,' 'reliability' and 'validity.' Traditionally, reliability and validity have been associated with quantitative research; increasingly, they are being seen as significant concepts in qualitative research as well (Anderson, 2010:2). Reliability and validity measurements must be considered in all research studies whether they use a qualitative or quantitative approach.

The trustworthiness or measurements as well as the reliability of reproduced results or findings depend on them. For any measure to be scientifically worthwhile; it must possess both reliability and validity (Thornberry & Krohn, 2000:44). Anderson (2010:2) notes that reliability refers to the reproducibility and stability of the data, whereas, validity refers to the honesty and genuineness of the research data. Golafshani (2003:604) further reports that reliability and validity are conceptualised as trustworthiness, rigor and quality in qualitative research. On similar note, Bashir, Afzal and Azeem (2008:35) persisted that these concepts remain appropriate concepts for attaining rigor in qualitative research. However, it is impossible to ensure perfect validity and reliability as claimed by (Mi, Collins, Lerner, Losina & Katz, 2013:1). In this study, high levels of both internal and external validity were attained as discussed in detail below.

3.6.1 Reliability

Reliability is the extent to which different methods, research results, or people arrive at the same interpretations or facts (Krippendorff, 2011:1). He further notes that reliability is a prerequisite for validity. In qualitative research, reliability often refers to the extent to which a measured variable is free from rand error (Stangor, 2011:91). Since perfection is rare, reliability is conceived as the scale on which perfect reliability and its absence are two crucial reference points (Krippendorff, 2011:2).

Therefore, in this present study, reliability was enhanced by obtaining detailed field notes by employing a good-quality tape for recording and by transcribing the data gathered from a tape recorder. Secondly pilot testing the data collection instruments ensured that the data collected were relevant to the study.

3.6.2 Validity

In a qualitative paradigm, validity means the extent to which the data are plausible, credible and trustworthy, and can thus, be defended when challenged (Bashir *et al*., 2008:35). According to Thornberry and Krohn (2000:50) validity pertains to the crucial relationship between the theoretical concepts you are attempting to measure and what you actually measure. There are many different forms of validity, namely, content validity, face validity, predictive validity and construct validity as explained by (Thornberry & Krohn 2000:51):

- ***Content validity*** is a subjective or logical assessment of the extent to which the measure adequately reflects the full domain, or the full content of the concept being measured. Content validity of a measure should seek to assess not only the opinions of the measure under consideration, but also the informants' conceptualisation of the concept the measure seeks to assess (Keeley, Al-Jahanabi, Lorgelly & Coast, 2013:2). The author further points out that qualitative content validation can be completed with the public, patients and experts in the relevant fields acting as informants.

- ***Construct validity*** to the extent to which the measure being validated is related in theoretically expected ways to other concepts or constructs. Drost (2011:119) points out that to substantiate construct validity, evidence must be accumulated in terms of six validity types, namely, face validity, content validity, predictive validity and convergent and discriminant validity.

- ***Predictive validity*** refers to the ability of a test to measure some event or outcome in the future (Drost, 2011:119).

- ***Face validity*** refers to a subjective judgment on the operationalisation of a construct. As a result, Drost (2011:119) avers that face validity is often seen as a week form of construct validity.

In this study, validity of the research data and results was achieved with the adoption of TAM as a lens for analysis.

3.7 Ethical considerations

Ethical issues are of crucial importance in any research study. They entail the moral and professional obligations of an individual researcher to be ethical even when the research participants are unaware of or unconcerned about ethics (Khan, 2014:231). Ethics is primarily concerned with specific moral principles or a philosophy, studying what is right or wrong. According to Creswell (2013:174), a qualitative researcher faces many ethical issues that surface during data collection in the field and in analysis and dissemination of qualitative reports. Ethical issues concerned with how confidential data are handled, are important and unambiguous. Importantly, the researcher's responsibilities involve issues such as ensuring the protection of participants and adhering to the ethical considerations which involve, specifically: the right to dignity, anonymity, privacy, avoid of harm and discomfort, self-determination, confidentiality, informed/debriefed, fair treatment, volunteerism and freedom.

Based on the above, this study took cognition of the ethical considerations, to ensure that the ethical principles were followed for the purpose of:

- **Debriefing** – during the process of data collection, participants were briefed about the nature of the research study and were given an opportunity to ask questions. The most important aspect of ethically appropriate research is that the participants are informed that their participation is voluntary (Curtis & Curtis, 2011:15). They further assert that it is generally considered to be an essential requirement of ethical

research, in the context of minimising the risk of harm to the participants.

- **Informed consent** – permission to conduct the study was requested and was granted subsequently by the two government departments and informed consent was obtained from the participants in the study and to indicate their willingness to participate.

- **Privacy, anonymity, self-determination and confidentiality** – the researcher will not reveal any participant or organisation's identity; instead, pseudonyms were used in order to protect the identity of participants. The information obtained by means of either audio recordings and/or printed transcripts was strictly kept confidential and could only be accessed by either the researcher or the study supervisors.

- **Harm, discomfort, fair treatment and freedom** – during the briefing session, the participants were informed about their rights with regard to their willingness to participate. Should they have felt uncomfortable about participating, they were given an opportunity to withdraw from participating in the study.

3.8 Summary

Chapter 3, the researcher presented the detailed research methodology and design approach that was followed when carrying out this study, which included the research strategy, research design, data collection, data analysis, reliability and validity and concluded with a discussion of the ethical considerations to which this study adhered.

Both quantitative and qualitative data collection methods were used to solicit information from the participants. Triangulation of the data collection methods assisted in validating the results derived from the findings.

CHAPTER FOUR

DATA ANALYSIS AND INTERPREATION

4.1. Introduction

The main purpose of this chapter is to present and discuss the analysis and interpretation of data from the data obtained. This is done to identify how government administrative employees perceived the effectiveness of emerging technologies in their working environments and how these technologies can be used to improve administrative employees' effectiveness. This study was conducted in two government departments in the Gauteng Province.

Accordingly, this study triangulated two data collection methods to solicit data from the participants. Semi-structured interviews were used to determine managers' perceptions on how emerging technologies can be used to improve the administrative employees' effectiveness within their environments. Structured questionnaires were distributed to administrative employees in both the Department of Transport and the Department of Education. Data collected from the interviews was transcribed and the transcription for department was allocated an identity code, an interviewee number, a page number and line numbering as indicated in the example below.

Department of Education – "DPE01, 01:01 - 05"
Department of Transport – "DPT01, 01:01 - 05"

This chapter is divided into three sections. The first section presents the discussion of the demographic data, while the second section presents the analyses of the data collected from the two South African government departments. The third section combines the resulting findings and their interpretation. Finally, this chapter is concluded with a summary

4.2 Discussion of demographic data

In order to understand the perceptions of the managers and administrative employees that participated in this study, it was deemed fit to categorise the participants into gender, age, positions and years of service groups in their respective departments. These demographic profiles were of critical importance for understanding how people from different ages, genders, positions, educational backgrounds and years of service perceived the utilisation of emerging technologies when performing their roles and responsibilities in their designated areas. However, in the analysis a comparison distinction was not presented in the study, but it rather focused on covering all the employees in the respective departments to allow a fair coverage of events in their environments.

4.2.1 Age

Figure 4.1 below depicts the distribution of administrative employees with respect to different age categories.

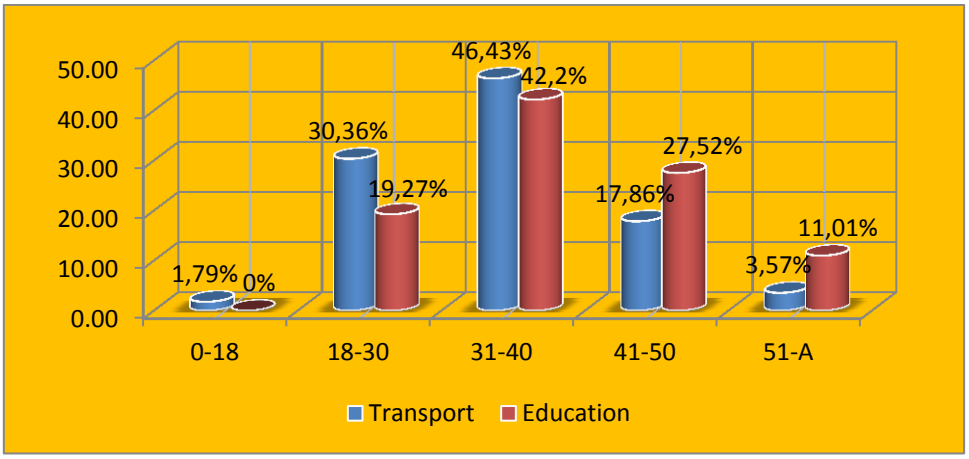

Figure 4.1: Age distribution

From the data depicted in Figure 4.1 above, it is evident that 46.43% and 42.20% of administrative employees were between the ages of 31 to 40 years. In addition, 17.86% and 27.52% of these employees were between the ages of 41 to 50 respectively, which indicated that there were relatively young employees in both departments. Furthermore, a minimum of 3.57% and 11.01% of the participants were between the ages of 51 and above.

4.2.2 Gender

In this study, gender is discussed in terms of a range of differences between men and women because of socially constructed roles and expectations. From the data collected, as shown in Figure 4.2 below, it has emerged that 57.17% of the participants from the Department of Transport were females, while 42.86% were males, similarly, 51.38% of the participants from the Department of Education were females, while 48.62% were males.

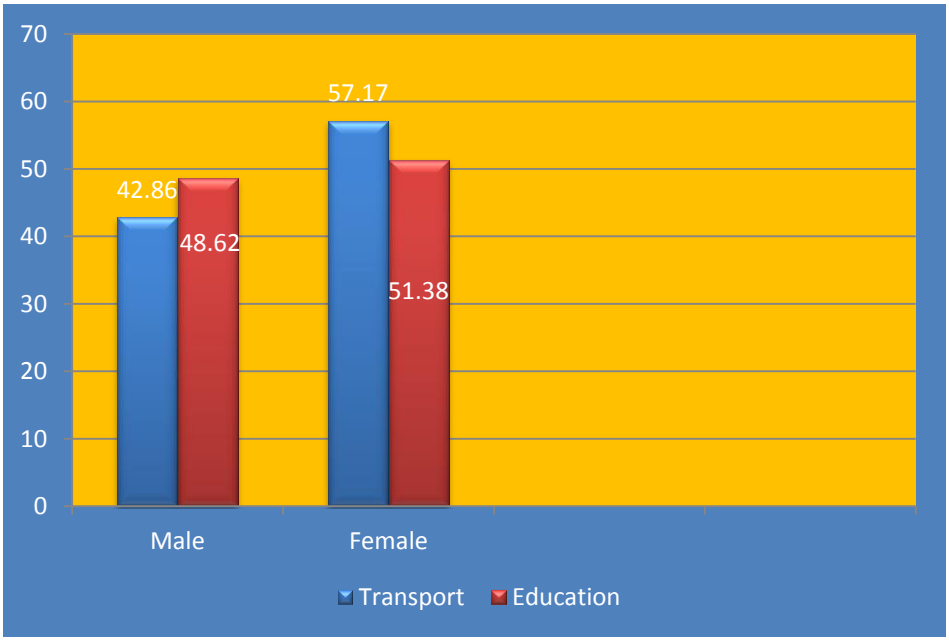

Figure 4.2: Distribution of gender

These percentages indicated that the majority of the administrative positions in the government sector were occupied by females. In the Department of Transport, the percentage of the respondents was 57.01% and in the Department of Education it was 51.38%. On the other hand, the male participants made up 42.86% and 48.62% of the respondents respectively.

The gender demographic was used to understand the perceptions of all participants' across government departments. This is due to the fact that attitudes towards technology differed significantly between males and females. However, the study was not aimed at comparing the male and female administrative employees in government departments, but rather acknowledges the fact that gender plays a crucial part in technology adoption and usage.

4.2.3 Participants' positions

Figure 4.3 indicates various positions held by the administrative employees in their respective working environments.

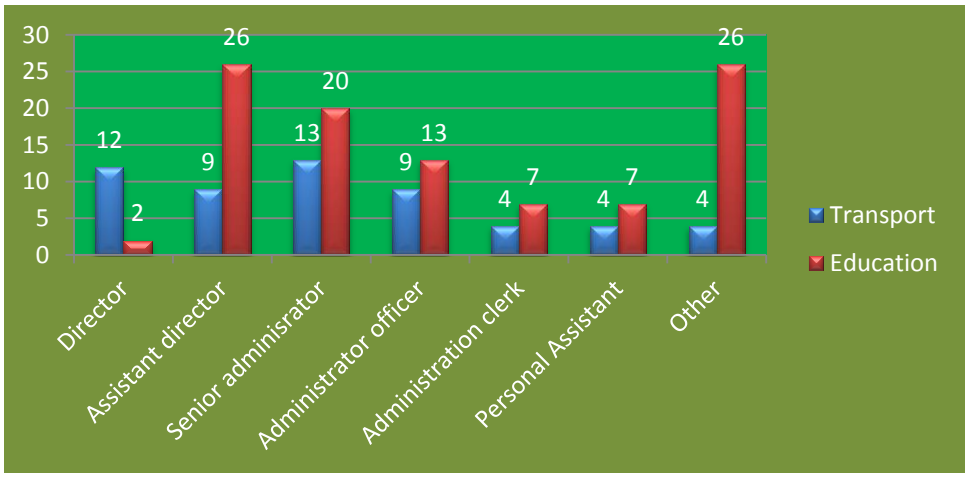

Figure 4.3: participants' position

The majority of the participants in the Department of Education were in assistant and director, senior administrator positions and other designations that did not form part of the list. The positions that delivered a low percentage were directors, administrative officers, administrative clerks and personal assistants. In the Department of Transport, most of the positions were occupied by directors, senior administrators, assistant directors and administrative officers. The positions with a low percentage were administrative clerks, personal assistant and others.

4.2.4 Educational background

The primary objective of including a section on formal education was to provide an idea about the type of individuals employed in government departments to obtain an understanding of how they were equipped with competencies relevant to their specific careers in the industry (Zopiatis, 2010:2).

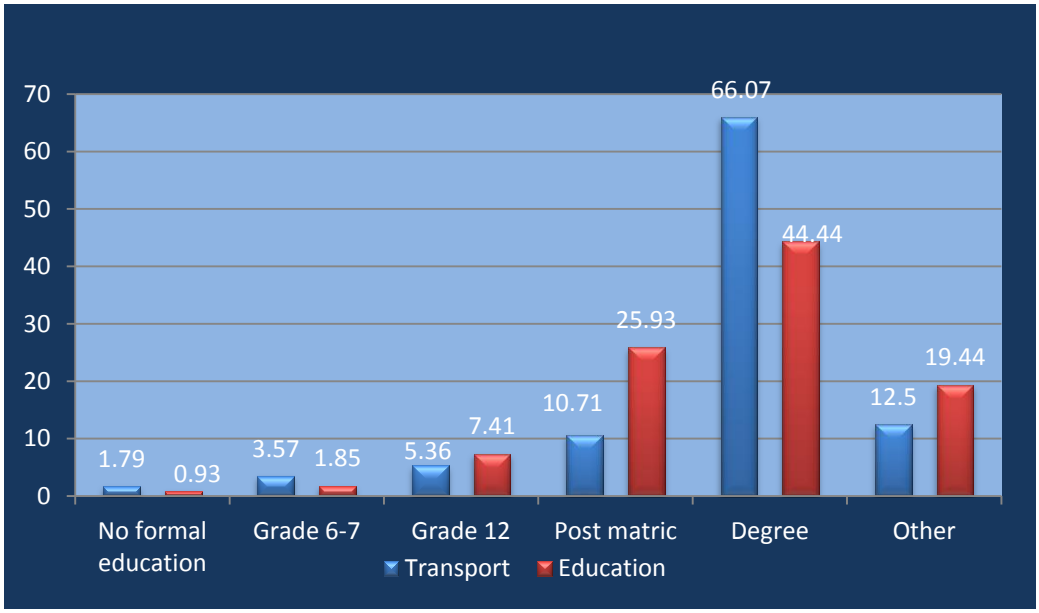

Figure 4.4: Educational qualifications

Figure 4.4 above depicts that most of the participants from both departments (66.07% and 44.04%) respectively, were in a possession of degree certificates as their highest educational qualifications. They were followed by 10.71% and 25.69% respectively, of the participants who had attained post matric certificates and 12.5% and 19.27% respectively of the participants had attained other qualifications. Only a small percentage of 5.36% and 7.41% were in possession of a grade 12 certificate only. However, there were those employees who did not have any formal qualifications as indicated by 1.79% from the Department of Transport and 0.93% in the Department of Education

4.2.5 Years of service

The number of years of service from a minimum of less than six months to a maximum of thirteen years was found to be appropriate for providing accurate and relevant information. Figure 4.5 below indicates the number of years an administrative employee had been employed in their current positions in the department.

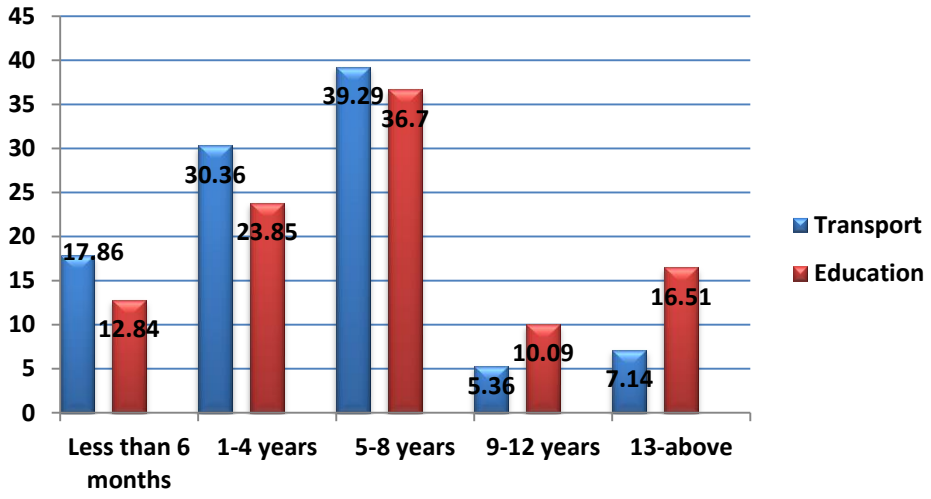

Figure 4.5: Years of service

From the data illustrated in Figure 4.5 above, it can be seen that the majority of participants had between five and eight years' work experience in their respective departments. This is followed by the administrative employees who had been employed for one to four years. Those who had been holding their current positions for less than six months were 17.86% in the Department of Transport and 12.84% in the Department of Education.

From Figure 4.5, it can be discerned that both departments were well equipped with experienced administrative employees who had been holding their respective positions for years. This also applied to the staff occupying managerial positions as is evidenced by the following statements of two of the managers:

> "*I have been working for [the] Department of Education for nine years*" (DPE01, 01:04).

> *"I have been working for this department for the past six years" (DPT02, 03:53)*

The above demographics were deemed critical and relevant to this study as it gave a clear picture of the type of population that participated in this study to obtain rich information for the analysis of the primary data that is presented below.

4.3 Primary data analysis through the lens of the technology acceptance model

This section presents the analysis of data following the TAM model that consists of the following four tenets (perceived usefulness, perceived ease of use, behavioural intention and actual use of emerging technology). In this study, the analysis was based on the two most central tenets of TAM, which are perceived usefulness and perceived ease of use.

4.3.1 Perceived usefulness

Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his or her job. In this study, usefulness is the extent to how individual employees within a government department perceive the systems to be useful in accomplishing their daily routines.

It is critical in this technological era that organisations move from ancient ways of doing things to more innovative ways. The years of handling office roles and responsibilities pushing paper are gone. In this 21st century, technology plays a critical role in any organisation in order to achieve their strategic goals and to mark its presence in this competitive innovative century. Therefore, organisations should be moving with the times in terms of the office equipment and technology that they use.

The availability of electronic devices will improve and enhance workplace effectiveness and efficiency. In order to achieve this, both organisations and

government departments, should ensure accessibility to adequate technological devices. These devices should also be modern in nature to enhance speed, accuracy, efficiency and effectiveness in the day-to-day office operations. Devices such as desktop computers, portable telephones, amongst others, are of a critical nature for both managers and administrative employees to enable them to carry their roles and responsibilities out effectively and efficiently.

The majority of employees from the two government departments had access to various electronic devices as is highlighted by the responses of some of the managers:

> *"Generally I can say majority of us in the department we do have access to computers. However, devices such as scanners and are only provided to certain employees based on their roles and responsibilities in the department. And when it comes to printers mostly we use a centralised printer" (DPE03, 08:182-185).*
>
> *"[The] Majority of employees do have access to computers however not all of them due to budget constraints and some because their role does not require an electronic devices" (DPT01, 01:8-9).*

Table 4.1 below clearly shows that the majority of staff members from both government departments did have access to different electronic devices.

Table 4.1: The availability of electronic devices

Electronic devices	Department	Yes	No
Desktop Computer with Webcam	Transport	33(60.0%)	22(40.0%)
	Education	53(49.1%)	55(50.9%)
Laptop embedded with Webcam	Transport	40(71.4%)	16(28.6%)
	Education	49(44.9%)	60(55.0%)
Network printer	Transport	55(98.2%)	1(1.8%)
	Education	92(84.4%)	17(15.6%)
Portable Telephone	Transport	40(71.4%)	16(28.6%)
	Education	62(56.9%)	47(43.1%)
Ipad or Tablet	Transport	15(26.8%)	41(73.2%)
	Education	25(22.9%)	84(77.1%)
Scanner	Transport	46(82.1%)	10(17.9%)
	Education	73(67.0%)	36(33.0%)
Shredding machine	Transport	34(60.7%)	22(39.3%)
	Education	41(37.6%)	68(62.4%)
Pen drive	Transport	5(8.9%)	51(91.1%)
	Education	18(16.5%)	91(83.5%)
Personal digital assistant (PDA)	Transport	6(10.7%)	50(89.3%)
	Education	10(9.2%)	99(90.8%)
Electric typewriters	Transport	26(46.4%)	30(53.6%)
	Education	26(23.9%)	83(76.1%)

Both government departments had access to a network printer representing 98.2% and 84.4% respectively. This is followed by access to a scanner with percentages of 82.1% and 67.00% respectively, followed by portable telephones with 71.4% and 56.9% respectively and laptops equipped with webcams with 71.4% and 44.9% respectively. The figures for access to desktop computers with webcams were 60.0% and 49.1% respectively. Furthermore, 46.4% and 23.9% respectively of the respondents' in this study, the departments still utilised typewriters. Technology on the move devices such as Ipads or tablet, pen drives and personal digital assistants presented a lower percentage for both departments as shown in Table 4.1 above. Utility of these electronic devices differed from one individual to another depending on the job specifications. Some of the managers shared the following:

> *"Office technology equipment's that I have in my office is a computer which I used to diarise my work, appointments and typing*

but sometimes I use a laptop especially when I am working outside the office (department). Multi-functional printer in my department I normally use it to make copies of documents, scanning and printing documents" (DPE02, 4:99-103).

I use [a] computer to send out emails and telephones to communicate with stakeholders" (DPE01, 01:14-15).

Office machines that I have in my office are computers which I use to capture information, printing machine to print and photocopy different documents, fax machine to fax documents and telephones to communicate with individuals in and outside the department (DPT01, 01:12-14).

The office technologies that I use in executing my administrative duties are computers which are I use it to type documents, send emails, telephone to communicate with stakeholders and colleagues, printer to print and photocopy documents and shredding machine to shred papers (DPT02, 03:61-63)

Office equipment plays a considerable role in executing administrative roles and responsibilities. They have a major influence on how to promote the interests of individual employees when performing tasks, thereby increasing productivity as presented in Table 4.2 below. Both government departments presented a high percentage of 64.29% and 64.22% respectively in this regard. No organisation can achieve sufficient productivity without aligning it with processing speed and timeframes. It was therefore clear that these critical elements of competitive advantage were evident in the departments

with 71.43% and 76.15% respectively; which saves the departments' time and money as indicated by the figures of 66.07% and 65.14% respectively. These were due to easier and faster access of files and records as indicated by the responses of 69.64% and 69.72% respectively of the administrative employee participants. On the other hand, office equipment also enhanced a good work balance and flexibility as indicated by the percentages of 57.14% and 65.14% respectively.

It is evident that any administrative work requires office equipment as the majority (60.71% and 64.22% respectively) of the administrative employees indicated in terms of the extent to which they were fully dependent on this equipment with regard to performing their daily tasks. Therefore, one can argue that without the relevant office equipment, organisations can find themselves constrained as far as providing goods and services are concerned as expected, to reach their markets or achieve competitive goals. Undoubtedly, the government departments play a major role in the delivery of services to its citizens. Even though the majority of the employees that participated in this study, had access to office equipment that assisted them in carrying out their daily tasks in different ways, it is also critical for government departments to ensure that all employees have accessibility to these technologies. For example, for departments to be fully productive and deliver services efficiently to its citizens all employees should be at the level where the use of office equipment always enhances work balance and increasing effectiveness in their environments, unlike the 33.93% in the Department of Transport and 27.52% in the Department of Education reported by the participants in this study.

Table 4.2: The importance of office equipment

Question (statements)	Department	Never	Seldom	Usually	Always
Office equipment has certainly made my office work more interesting and productive	Transport	0(0.00%)	5(8.93%)	15(26.79%)	36(64.29%)
	Education	1(0.92%)	6(5.50%)	32(29.36%)	70(64.22%)
Office equipment's has assisted me to work faster than before	Transport	0(0.00%)	3(5.36%)	13(23.21%)	40(71.43%)
	Education	1(0.92%)	5(4.59%)	20(18.35%)	83(76.15%)
Office equipment has saved my time and costs	Transport	1(1.79%)	3(5.36%)	15(26.79%)	37(66.07%)
	Education	1(0.92%)	9(8.26%)	28(25.69%)	71(65.14%)
Office equipment's has help me to access records, files, more easier and accessible	Transport	1(1.79%)	3(5.36%)	13(23.21%)	39(69.64%)
	Education	2(1.83%)	6(5.50%)	26(23.85%)	76(69.72%)
Office equipment's has enhanced great work balance and flexible work	Transport	1(1.79%)	4(7.14%)	19(33.93%)	32(57.14%)
	Education	2(1.83%)	6(5.50%)	30(27.52%)	71(65.14%)
Office equipment's has increased my effectiveness level	Transport	0(0.00%)	5(8.93%)	20(35.71%)	31(55.36%)
	Education	1(0.92%)	5(4.59%)	24(22.02%)	79(72.48%)
My work depend on office equipment	Transport	1(1.79%)	10(17.86 %)	11(19.64%)	34(60.71%)
	Education	1(0.92%)	9(8.26%)	29(26.61%)	70(64.22%)

The utility of office equipment in terms of enhancing productivity in the organisations and government departments included can be achieved with the automation of office systems. Although the majority of office equipment' such as computers, fax machines, photocopiers and scanners are stand alone, they are most efficient and can handle a variety of office automation activities and data. According to the data presented in Table 4.3 below not all administrative employees were familiar with electronic publishing systems as presented by the percentages of 8.93% and 8.26% respectively. However, an average percentage of administrative employee participants from both government departments had always utilised electronic publishing systems

such as, word processing, desktop publishing and copying systems as indicated by the scores of 53.57% and 45.87% respectively. The percentages of 30.36% and 36.70% respectively reveal they usually utilised these automated machines in different activities.

Table 4.3: Office automation (zimmermann & finger, 2005)

Electronic systems	Department	Never	Seldom	Usually	Always
Electronic publishing system - word processing, desktop publishing and copying system	Transport	5(8.93%)	4(7.14%)	17(30.36%)	30(53.57%)
	Education	9(8.26%)	10(9.17%)	40(36.70%)	50(45.87%)
Electronic communication system - electronic mail, voice mail, facsimile, desktop, video and conferencing	Transport	1(1.79%)	4(7.14%)	11(19.64%)	40(71.43%)
	Education	12(11.01%)	16(14.68%)	33(30.28%)	48(44.04%)
Electronic collaboration system – electronic meeting system, collaborative work system, teleconferencing and telecommuting	Transport	13(23.21%)	14(25.00%)	9(16.07%)	20(35.71%)
	Education	27(24.77%)	32(29.36%)	31(28.44%)	19(17.43%)
Office management system – electronic office accessories, electronic scheduling and task management.	Transport	6(10.71%)	11(19.64%)	17(30.36%)	22(39.29%)
	Education	17(15.60%)	26(23.85%)	31(28.44%)	35(32.11%)
Image processing system – electronic document management, other image processing, presentation graphics and multimedia system	Transport	13(23.21%)	13(23.21%)	14(25.00%)	16(28.57%)
	Education	22(20.18%)	32(29.36%)	23(21.10%)	32(29.36%)

The major functional components of an office automation system include electronic mail, voicemail, facsimiles, desktop, video and conferencing. These electronic systems are available to administrative employees in government departments for automating tasks or functions that were previously done manually as shown in Table 4.3 above. A high percentage of 71.43% of administrative employees in the Department of Transport had access as well

as the ability of utilising these machines. However, access in the Department of Education was lower with only 44.04% of administrative employees having the opportunity to utilise various technology equipment, applications and software. Although 30.8% and 19.64% in the respective departments usually utilised the electronic communication systems, however there was a large percentage of administrative employees who seldom or never utilised these systems.

Furthermore, participating in electronic collaboration systems is possible through electronic meeting systems, collaborative work system, teleconferencing and telecommuting. These systems promoted collaboration and teamwork within and outside the organisation. From the data analysis it is evident that teamwork had not been achieved as proven by only 35.71% and 17.43% respectively of the administrative employees always used electronic collaboration systems in their respective environments. It is of concern that 23.21% of the government administrators seldom utilised electronic collaboration systems and 24.77% of them had never been exposed to these systems.

The fact that government departments often analyse information for reports, appointments and the reservation of data with accompanying details of scheduled individual or specific service is important. Therefore, the lack of accessibility and the utilisation of office management systems can influence the administrative employee effectiveness negatively with regard to managing tasks and scheduling electronic activities. This is evident from the data presented in Table 4.3 above that in both departments not all the employees did have access as 10.71% and 15.60% had never been exposed to office

management systems. On the other hand, 19.64% and 23.85% of the respondents from the respective departments were seldom utilising these systems. Furthermore, 39.29% and 32.11% of the administrative employees from the Department of Education and Transport always utilised office management systems to manage the different tasks depending on individuals' roles. The managers from both government departments were not exceptional. Some of the managers shared the following:

> *"Most of the times we are between meetings, and I utilise these electronic systems not very often. In most occasions I personally rely on my personal assistant to ensure all the information I need for reports is typed and ready to use. The system that I interact with on daily basis is Miscrosoft Outlook to check my emails and communicate accordingly" (DPE03, 07:194-198).*

> *"I have never given myself time to learn how these systems works but I do have an idea because of our busy schedule. Electronic tasks such as emails and checking of my appointments I am familiar. Furthermore we do have occasions where we have teleconferencing meetings with other stakeholders" (DPT02, 03:66-69).*

It is of importance that all employees have access to different electronic resources to carry out their roles and responsibilities efficiently. This can also have a negative impact on the overall operations and prevent an organisation from running at its fullest potential. For example, in this digital era, outdated ways of handling paper are being used. Documents nowadays are managed

electronically and the presentation of information is done in various versions such as graphics presentations and through multimedia systems. The system converts text, drawings and photographs into a digital form that can be stored electronically.

From the data presented above, it was clear that the percentage of administrative employees from both departments participated in the study, is almost equal ranging from those employees who never, seldom, usually and always utilised image processing systems. The negative result is that government lags behind in embracing innovative ways of managing records and applications. Therefore, one can argue that the lack of access and utility of office automation systems prevented government departments with regard to providing a powerful mechanism for increasing productivity and improving the quality of administrative work by changing the fundamental nature of organisational information processing. For both managers and administrative employees to be able to succeed in embracing office automation systems, the primary skills-set and technological expertise they should possess is the ability to operate computer basic applications and software.

Table 4.4: Microsoft programmes and applications

	Department	Never	Seldom	Usually	Always
Word processing	Transport	1(1.79%)	3(5.36%)	2(3.57%)	50(89.29%)
	Education	4(3.70%)	4(3.70%)	18(16.67%)	82(75.93%)
Instant messenger	Transport	11(19.64%)	9(16.07%)	8(14.29%)	28(50.00%)
	Education	18(16.51%)	12(11.01%)	18(16.51%)	61(55.96%)
E-mail	Transport	0(0.00%)	2(3.57%)	5(8.93%)	49(87.50%)
	Education	4(3.67%)	2(1.83%)	10(9.17%)	93(85.32%)
Creating and editing	Transport	4(7.14%)	9(16.07%)	11(19.64%)	32(57.14%)
	Education	8(7.34%)	18(16.51%)	25(22.94%)	58(53.21%)
Web surfing or Internet research	Transport	4(7.14%)	4(7.14%)	5(8.93%)	43(76.79%)
	Education	8(7.34%)	9(8.26%)	26(23.85%)	66(60.55%)
Office 365	Transport	22(40.74%)	9(16.67%)	8(14.81%)	15(27.78%)
	Education	40(36.70%)	18(16.51%)	23(21.10%)	28(25.69%)
OneNote	Transport	24(44.44%)	12(22.22%)	7(12.96%)	11(20.37%)
	Education	40(36.70%)	22(20.18%)	24(22.02%)	23(21.10%)
Creating labels, electronic business card, calendars	Transport	19(33.93%)	14(25.00%)	10(17.86%)	13(23.21%)
	Education	29(26.61%)	30(27.52%)	19(17.43%)	31(28.44%)
Sending messages, scheduling meeting & appointments and tasks prioritisation.	Transport	4(7.14%)	4(7.14%)	16(28.57%)	32(57.14%)
	Education	6(5.50%)	19(17.43%)	26(23.85%)	58(53.21%)
Word, Excel, PowerPoint, Outlook, Publisher, Access.	Transport	1(1.82%)	1(1.82%)	4(7.27%)	49(89.09%)
	Education	3(2.75%)	4(3.67%)	19(17.43%)	83(76.15%)

As represented in Table 4.4 above, applications such as the Microsoft Office suite (Word, Excel, PowerPoint and Access) are crucial for office administrators. The majority of government administrators have the knowledge and skills-set to operate these applications range from a percentage of 89.09% and 76.15% respectively. There were also employees who usually utilised these applications in both government departments as it is indicated above. However, the percentage is not extremely high (7.27% and 17.43%) it can be regarded as acceptable. However, in this digital age, all staff members should be exposed to technology in order to embrace it in such a way that it assists them in carrying out their roles and responsibilities efficiently. From the data collected, a small percentage of administrative

employees seldom utilised the application and others never utilised them at all as presented in Table 4.4 above.

The above-mentioned office suites can be utilised to perform various tasks such as document creation, its management and distribution of information. For example, Publisher enable individual to create labels, electronic business cards and calendars. The government administrative employees have not embraced the use of this application fully as it is evident that a small percentage of 23.21% and 28.44% respectively of the employees always used Publisher as well as 17.86% and 17.43% respectively who seldom utilised this technology. The majority of the employees (33.93% and 26.61% respectively) had never utilised this application. Furthermore, the knowledge of utilising communication tools such as MS Outlook for different tasks could ensure a fast and efficient way of handling and disseminating information within and outside the organisation.

A large majority of 87.50% and 85.32% of the employee participants from the respective departments' had access to emails and always utilised them for performing various tasks depending on their roles and responsibilities. Although not all the employees always made use of emails, others used it seldom, while others never used emails in their environment. In the Department of Transport all the staff members utilised emails as compared to the Department of Education where 3.67% of the administrative employees in the sample, did not have access to emails. Irrespective of access to emails, there were still those administrative employees who utilised this communication tool very seldom, namely, 3.57% and 1.83% respectively. The emails were used for sending messages, scheduling meetings and

appointment and prioritising tasks as indicated by the figures of 57.14% and 53.21% respectively, who always used the tool, as well as the 28.57% and 23.85% respectively, who usually took advantage of its benefits with regard to distributing and sharing information effectively. Besides emails, administrative employees also made use of Instant messenger. As can be seen in Table 4.4 above, 50% and 55.96% from the two departments respectively utilised instant messenger within and outside the departments. A percentage of 14.29% and 15.51% respectively usually used these applications, however, 16.07% and 11.01% respectively of some of the administrators seldom and others never used these applications as presented in the table, 19.64% and 16.51% respectively of the administrators who participated in the study.

The office suite applications such as word processing were one of the important technologies used in the two government departments. A high percentage of 89.29% and 75.93% respectively were always utilising office equipment such as computer for word processing. Furthermore, 3.57% and 16.67% respectively of the respondents usually utilised the application while there were those employees who had seldom or never been exposed to such applications as indicated in Table 4.4 above. A key feature of word processing is the automatic manipulation of the text. A word processor enables the individual to create and edit documents electronically. A percentage of 57.14% and 53.21% of the selected government employees always utilised this application to create and edit documents. On the other hand 19.64% and 22.94% respectively of the respondents revealed that they usually utilised this application depending on the roles and responsibilities in their respective departments. However, it was a cause for concern that some administrative

employees (16.07% and 16.51% respectively) seldom took advantage of this application to produce error free documents. This was also evident for most of the managers who shared their views as follows:

> *"I only use MS Word to draft documents and my personal assistant takes care of the rest because I always struggle with document formatting. The application that I can say I am familiar with is MS PowerPoint because as managers we do lot of presentations" (DPE01, 02:33-37).*

> *"What we do as managers always is to delegate. So documents and reports mostly are done by administrators. Technology that I find utilising most of the time is emails because it doesn't need me to do a lot of work like working on MS Word or MS Excel" (DPT01, 01:17-19).*

Document production and its sharing are two of the key roles of administrative employees at any organisation. Some of the applications such as OneNote are significant in information sharing within the organisation. However, the government departments lag behind in improving the workflow and information management that comes with the utility of OneNote. The majority of the administrative employees did not have access to OneNote. Percentages of 44.44% and 36.70% as presented in Table 4.4 indicated that they had never used OneNote in their respective environments. Those who had utilised it were few, with figures ranging from 20.37% and 21.10% respectively as well as the percentages of administrative employees who usually used the application, namely, 12.96% and 22.02% respectively.

Emails and Instant messengers operate on an Internet platform. Importantly, 76.79% of the selected respondents from the Department of Transport indicated that Internet infrastructure was available, while 60.55% of the selected administrative employees from the Department of Education reported that they always had access to the Internet. They shared that they always utilised it for web surfing and Internet research. Furthermore there were those employees (8.93% and 23.85% respectively) who always surfed the internet and performed Internet research for various work related tasks, while 7.14% and 8.26 % respectively of the selected administrators seldom used it. Furthermore 7.14% and 7.34% respectively of the respondents did not have access to it.

It is evident that administrative employees had access to Internet services in government departments as shown in Table 4.4 above. This platform was utilised by administrative employees for different things such as social networks. However, most of the participants, namely 82.14%, from Department of Transport were not active on the social networks. This was almost the same as in the Department of Education with 63.3% of the participants not active on social networks as indicated in Figure 4.6 below. However 17.86% and 36.7% of the respondents respectively, from both departments used this social platform in their related environments to execute different job functions. On the other hand, a small percentage of the respondents, namely, 17.6% in the Department of Transport and 36.7% in the Department of Education were active on social networks.

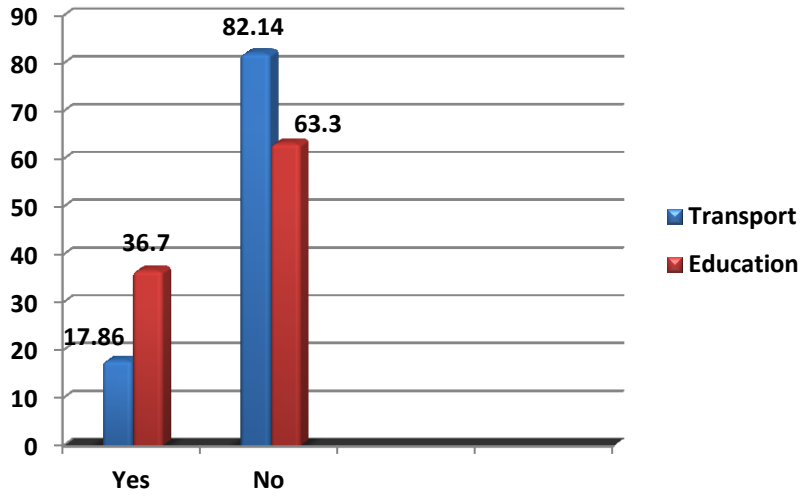

Figure 4.6: Employees active on social networks

The inaccessibility of social network plays a major role in impeding the government from progressing innovatively in a digital world. Some of the managers shared the following:

> *"Since the introduction of E-government all departments were supposed to be utilising Internet including social media to reach more citizens, but it is not always the case. We constantly have problems with network being slow" (DPE02, 97-99).*

> *"As a manager I do have access to social network but not all employees have access. Only certain people can access social networks because of their roles and responsibilities require them to utilise it daily" (DPT02, 03:70-72).*

This is one of the constraining factors that may contribute to government departments' not reaching the citizens with real time news and information critical to service delivery. For example, Hamidullah (2015:82) has found that government personnel can use social media during emergencies to

communicate warnings. He further emphasises that social media have added the benefit of providing immediate interactive communication between government organisations and their citizens. Those administrators who had access to social networks from the two government departments indicated which different sites they were visiting daily in the course of carrying out their roles and responsibilities as shown in Table 4.5 below.

Table 4.5: Types of social media used by administrative employees

Department of Transport	Department of Education
Bablo	Blogs
Blogs	Chart Room
Chat on	Citrix
Facebook	Facebook
Foolyroom	Gmail
Gmail	Google+
Google+	Hangouts
ICQ	Instagram
IMO	LinkedIn
Instagram	Twitter
LinkedIn	Viber
Messenger	We chat
We chat	WhatsApp
WhatsApp	Skype
Skype	
Viber	
Twitter	
Tango	

The different types of social media depicted in Table 4.5 above, were utilised by those administrators identified in Figure 4.7 to execute different roles with regard to their job functions. However, not all employees who had access to social networks were using this platform during working hours as shown in Figure 4.7 below. A percentage of 37.61% of the administrative employee participants from the Department of Transport and 25% participants from the Department of Education were accessing the social network sites after hours. These could be because neither of the departments allowed any access to social platforms as shown in Figure 4.6 above.

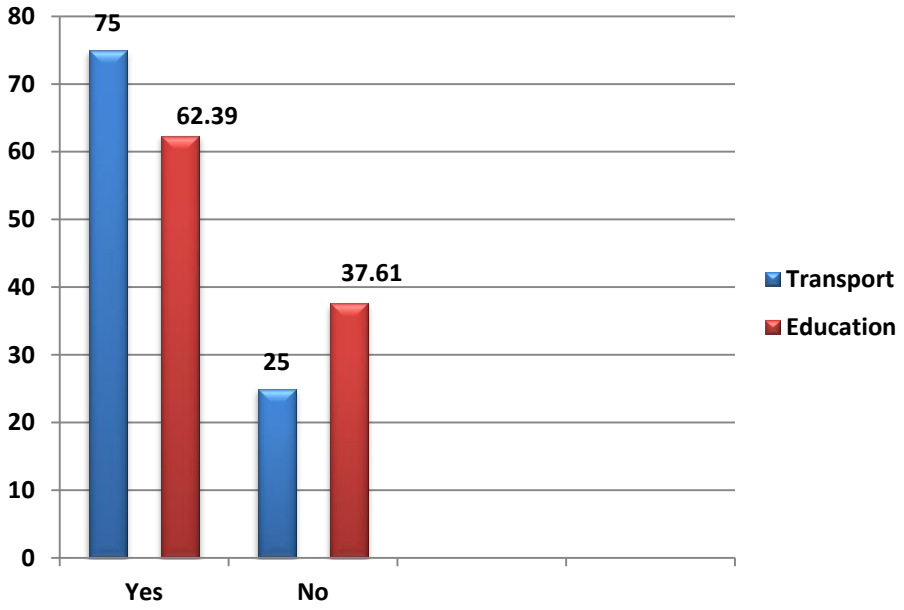

Figure 4.7: Use of social networks during office hours

On the other hand, there were also various factors that could lead to some of the administrative employees being unable to access and utilise social networks in their environments. Factors such as Internet infrastructure deployment play a critical role with regard to organisations in this digital society. How infrastructure is deployed and set up for connection has a major impact on the organisation. The Internet infrastructure has been deployed successfully at all government departments across the country. Furthermore, it was clear that government employees connected to the Internet used the same methods as presented in Figure 4.8 below.

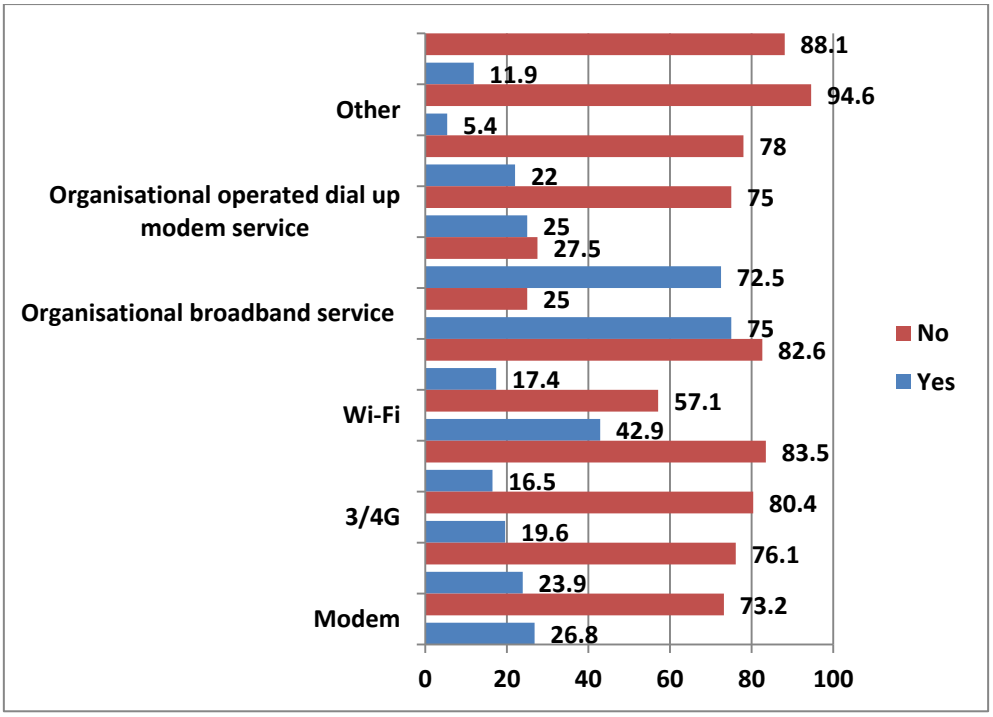

Figure 4.8: Various methods of primary internet connections in government departments.

It is clear from Table 4.8 above that both departments make use of the organisational broadband service for connecting to the Internet as presented by 72.5% and 75% respectively of the employees selected from the respective departments. The majority of the employee participants scored a high percentage for various connections that did not have access to the Internet and its services such as social networks. These social networks platforms can help to boost both the morale of employees as well as employee engagement, which can have an added benefit to the organisation (Hamidullah, 2015:81). The author further emphasises that many social media allow the government to be collaborative, transparent and participatory. Thus, social networks can be used to achieve the government mission for outreach and public affairs. Therefore, government departments are far from achieving such a goal due to the majority of administrative employees not having access to the Internet and its services such as social networks.

Administrative employees work with computers and different technologies on a daily basis to carry out their roles and responsibilities. They utilise computers and various technologies to perform tasks such as document management, communication and the presentation of information in various versions such as graphic presentations and through multimedia systems. All these activities in completion or in the process of completion need to be saved and stored for future reference.

Table 4.6: Storage of complete and incomplete work

	Department	Never	Seldom	Usually	Always
Electronically	**Transport**	0(0.00%)	3(5.36%)	8(14.29%)	45(80.36%)
	Education	1(0.92%)	7(6.42%)	14(12.84%)	87(79.82%)
File drawers	**Transport**	10(17.86%)	14(25.00%)	11(19.64%)	21(37.50%)
	Education	16(14.68%)	21(19.27%)	32(29.36%)	40(36.70%)
On work surface	**Transport**	19(33.93%)	17(30.36%)	11(19.64%)	9(16.07%)
	Education	39(35.78%)	33(30.28%)	23(21.10%)	14(12.84%)

The majority of administrators file documents electronically as shown in Table 4.6 above. A high percentage of 80.36% and 79.82% respectively of the participants always saved and stored documents electronically while 12.84% and 14.29% respectively usually do so. Only a low percentage, namely 5.36% and 6.42% respectively of the participants seldom stored documents electronically, thus, these administrators were still using old-fashioned methods in their work. The electronic way of filing has reduced drawer filing as shown in Table 4.6. Drawer filing was always used by 37.50% of administrators selected from the Department of Transport and 36.70%

selected from the Department of Education. Furthermore, 25% and 19.27% respectively of the participants seldom filed manually.

Based on this analysis, one can argue that some administrators used both electronic and manual filing as presented above. This is supported by a high percentage of the selected administrative employees who always and usually stated that they utilised filing drawers. However in the case of unfinished tasks and some completed documents, the majority of the administrators were not eager to leave the documents lying on the work surface such as office tables. This is evident because 33.93% and 35.78% respectively of the employees selected never kept unfinished tasks on their tables. Although 30.36% and 30.28% respectively of the participants acknowledged that they seldom kept some documents around their workstations.

4.3.2 Perceived ease of use

Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort. It therefore, represents the user's subjective evaluation of the process of interaction with a particular computer system (Davis & Wong, 2007:98).

Technology has changed the majority of administrators' office work as indicated in Table 4.7 below by 64.29% and 68.81% respectively, indicating that emerging technologies had changed their office work. Some of the changes that were experienced were how technology has alleviated their administrative roles as presented by 51.79% in the Department of Transport and 66.97% in the Department of Education. For example it has reduced

paper work by making it easier to schedule meetings (66.06% and 76.79% respectively) and also enabling employees to diarise tasks and appointments digitally as indicated in Table 4.7 below. Furthermore, emerging technologies had an influence on how work groups and daily routines were carried out (68.81% and 57.14% respectively) due to the fact that it reduced errors as indicated by 35.71% and 38.89% respectively.

Table 4.7: The importance of emerging technologies

Questions (statements)	Department	Never	Seldom	Usually	Always
Technology has alleviated my administrative roles	**Transport**	5(8.93%)	7(12.50%)	15(26.79%)	29(51.79%)
	Education	4(3.67%)	6(5.50%)	26(23.85%)	73(66.97%)
Technology has increased my administrative roles	**Transport**	7(12.50%)	8(14.29%)	12(21.43%)	29(51.79%)
	Education	7(6.42%)	8(7.34%)	20(18.35%)	74(67.89%)
Technology has reduced my paper work	**Transport**	2(3.57%)	3(5.36%)	17(30.36%)	34(60.71%)
	Education	5(4.59%)	6(5.50%)	22(20.18%)	76(69.72%)
Technology has made my scheduling of meeting easier	**Transport**	0(0.00%)	1(1.79%)	12(21.43%)	43(76.79%)
	Education	4(3.67%)	8(7.34%)	25(22.94%)	72(66.06%)
Technology has enabled me to diaries my work	**Transport**	2(3.57%)	3(5.36%)	10(17.86%)	41(73.21%)
	Education	1(0.92%)	10(9.17%)	34(31.19%)	64(58.72%)
Technology has changed my office work	**Transport**	0(0.00%)	3(5.36%)	17(3.36%)	36(64.29%)
	Education	2(1.83%)	10(9.17%)	22(20.18%)	75(68.81%)
Technology has changed work groups and my daily work	**Transport**	1(1.79%)	5(8.93%)	18(32.14%)	32(57.14%)
	Education	1(0.92%)	10(9.17%)	28(25.69%)	70(64.22%)
Technology has help me to receive instant messages	**Transport**	2(3.57%)	2(3.57%)	9(16.09%)	43(76.79%)
	Education	3(2.75%)	7(6.42%)	22(20.18%)	77(70.64%)
Overall I made minor errors with technology	**Transport**	0(0.00%)	11(19.64%)	25(44.64%)	35.71%)
	Education	5(4.63%)	23(21.30%)	38(35.19%)	42(38.89%)

Therefore, this created an opportunity for the government administrative employees' to understand the significance of emerging technologies for their office work. With regard to the Department of Education, 28.44% of the selected administrators as well as 28.30% of the participants from the

Department of Transport have found that emerging technologies contributed to their effectiveness in the office as presented in Table 4.8 below. Although a low percentage (3.67% and 3.77% respectively) of the selected administrators seldom found these technologies worthwhile in their environment with a small percentage of 1.83% in the Department of Education who never acknowledged the significance of these technologies. However, the majority of the employee participants, namely, 66.06% and 67.92% respectively, that participated in the study, stated that always utilising emerging technologies in their daily office routines had contributed to their effectiveness and accuracy when handling administrative duties as indicated in Table 4.8 below.

Table 4.8: Effectiveness of emerging technologies for office work

	Department	Never	Seldom	Usually	Always
With emerging technologies I complete my daily activities more quickly, effectively and accurately.	**Transport**	0(0%)	2(3.77%)	15(28.30%)	36(67.92%)
	Education	2(1.83%)	4(3.67%)	31(28.44%)	72(66.06%)

These views were further shared by one of the managers who expressed the following:

> *"The use of emerging technologies have improve the methods of communication within the department and for me I do not experience any challenges in using the emerging technologies so I could say emerging technologies have positive influence towards my administrative duties within the department"* (DPE03, 08:196-199).

The use of emerging technologies played an important role in ensuring service delivery and performing office activities by the government administrators. According to Evanson, Usoro and Umoudo (2012:7), the importance of emerging technologies in office administration increases workers' productivity in terms of meeting organisational goals and satisfying the public. However, this cannot be achieved without the administrators' knowledge to operate computers and the use of technology. Knowledge of ICT seemed to motivate employees to embrace and integrate ICT positively in the management processes and work procedures (Ujunju, 2012:57).

In general, the majority of the employee participants had knowledge of utilising emerging technologies as presented in Table 4.9 below. A high percentage of 80.36% and 73.15% respectively of the departments' staff that participated in this study always utilised these technologies to transmit and receive instant information. These have been due to the fact that the majority of administrative employees in both departments had access to different computer programmes and applications (*cf:* Table 4.4).

The available technologies at their disposal were utilised for various tasks by individuals in accordance with their roles and responsibilities within the respective government departments. Some administrative employees used emerging technologies to acquire, share, manipulate, capture, present and update information. However, a small percentage of employees seldom and to an extent, never utilised these technologies as presented in Table 4.9.

Table 4.9 Knowledge of the usage of emerging technologies

	Department	Never	Seldom	Usually	Always
To transmit/receive information instantly	**Transport**	0(0.00%)	1(1.79%)	10(17.86%)	45(80.36%)
	Education	5(4.63%)	4(3.70%)	20(18.52%)	79(73.15%)
To share information	**Transport**	0(0.00%)	0(0.00%)	9(16.07%)	47(83.93%)
	Education	4(3.67%)	6(5.50%)	18(16.51%)	81(74.31%)
To manipulate information	**Transport**	19(33.93%)	3(5.36%)	5(8.93%)	29(51.79%)
	Education	31(28.44%)	14(12.84%)	24(22.02%)	40(36.70%)
To order/acquire information	**Transport**	3(5.36%)	6(10.71%)	12(21.43%)	35(62.50%)
	Education	11(10.00)	8(7.34)	27(24.77)	63(57.80%)
To present information	**Transport**	1(1.79%)	7(12.50%)	9(16.07%)	39(69.64%)
	Education	6(5.50%)	16(14.68%)	21(19.27%)	66(60.55%)
To capture information	**Transport**	1(1.79%)	3(5.36%)	12(21.43%)	40(71.43%)
	Education	2(1.83%)	4(3.67%)	20(18.25%)	83(76.15%)
To manage information	**Transport**	0(0.00%)	2(3.57%)	10(17.86%)	44(78.57%)
	Education	5(4.59%)	5(4.59%)	21(19.27%)	78(71.56%)
To access information	**Transport**	0(0.00%)	0(0.00%)	6(10.71%)	50(89.29%)
	Education	2(1.83%)	4(3.67%)	17(15.60%)	86(78.90%)
To update information	**Transport**	0(0.00%)	4(7.14%)	9(19.07%)	43(76.79%)
	Education	3(2.75%)	3(2.75%)	19(17.43%)	84(77.06%)

However, the participants had different expectations when it came to how the emerging technologies impacted on their office work. Although the government administrative employees as well as the managers acknowledged the significance of the emerging technologies, there were, however, different views when it came to individuals' expectations with regard to the emerging technologies as presented in Table 4.10 below.

Table 4.10 Expectations of emerging technologies.

	Department	Never	Seldom	Usually	Always
The use of emerging technology meet my expectations	**Transport**	0(0.00%)	4(7.14%)	27(48.21%)	25(44.64%)
	Education	4(3.67%)	9(8.26%)	37(33.94%)	59(54.13%)
The primary use of emerging technology in my work improve the presentation of my work	**Transport**	1(1.79%)	4(7.14%)	13(23.21%)	38(67.86%)
	Education	3(2.75%)	11(10.09%)	28(25.69%)	67(61.47%)

It is clear from the above table that the majority of participants from both departments mentioned how the use of emerging technologies had met their expectations as presented by 44.64% from the Department of Transport and 54.13% from the Department of Education. Furthermore, 48.21% and 33.94% respectively indicated that these technologies usually met their expectations. The success of every organisational investment on technology is determined by its adoption and successful use in all divisions within the organisation. In both government departments not all the administrative employees were embracing these technologies as they seldom met their expectations as stated by 7.14% and 8.26% respectively of the participants. In addition to that, was the 3.67% of the selected administrative employees from the Department of Education who regarded these technologies as not meeting their expectations.

One of the benefits of emerging technologies is to improve the presentation of the work performed by administrators in the office environment. These benefits have always been embraced by 67.86% of the selected administrative employees from the Department of Transport and 61.47% in the Department of Education. A further 23.21% and 25.69% respectively of the participants selected from both government departments, usually found

that emerging technologies to be beneficial with regard to improving the presentation of their work within their divisions.

Not all the participants viewed the benefits of technology in their work in the same way, therefore, that was the reason why 7.14% of the selected administrative employees from the Department of Transport and 10.09% from the Department of Education seldom saw its significance with regard to the work they performed in the office. Moreover, 1.79% and 2.75% respectively of the participants from both departments, never perceived the use of technology with regard to performing their daily routines as essential for executing their roles and responsibilities successfully.

Although emerging technologies held promises for the effective office administration in modern offices they were also associated with countless challenges. It is therefore critical for organisations to provide skilled and well equipped manpower to match the current modern office obstacles. Evanson *et al*., (2012:7) assert that effective utilisation of emerging technologies in office administration can be achieved only if organisations are able to identify obstacles associated with its utilisation.

Table 4.11: Obstacles associated with the use of technologies

	Transport	Education
I do not possess communication technology skills	0(0.0%)	9(4.28%)
I have troubleshooting too many browser variations	2(3.17%)	10(4.76%)
It is difficult to adjust	3(4.76%)	3(1.42%)
I have trouble connecting to the internet	10(15.87%)	23(10.95%)
I'm used to old machines or old pattern of work	3(4.76%)	14(6.66%)
I do not know what is technology	0(0.0%)	4(1.90%)
I never use technology to aid me to do my work	0(0.0%)	2(0.95%)
I don't have sufficient access to other office devices	7(11.11%)	24(11.42%)
I have trouble connecting to internet	9(14.28%)	15(7.14%)
I'm not skilful in latest technology	5(7.93%)	16(7.16%)
It too difficult to use technology	0(0.00)	1(0.47%)
I do not possess the background knowledge of the competencies required for my effectiveness in today's office	0(0.0%)	7(3.33%)
I don't have the technical support	2(3.17%)	15(7.14%)
It is extra work	1(1.58%)	5(2.38%)
Overall I don't have the necessary skills	1(1.58%)	6(2.85%)
There are no obstacles	26(41.26%)	47(22.38%)
Other	3(4.76%)	9(4.28%)

Although the majority of administrative employees did have technological skills apart from a minority (4.28%) among the participants from the Department of Education, it is clear from Table 4.11 above that there were few challenges with regard to knowledge of utilising the emerging technologies. For example, the majority of the participants possessed

background knowledge of the competencies required for individuals' effectiveness in today's office environment. In the Department of Education, only 3.33% of the selected administrative employees did not possess such knowledge. One can argue that knowledge goes hand-in-hand with skills-sets, and among the participants from both government departments, some (1.58% and 2.85% respectively) did not possess the necessary skills to use technology in their environment. These frustrations were also shared by some of the managers as follows:

> *"I am still experiencing some challenges in using emerging technologies as I do not have time to sit down to learn the system comes with the emerging technologies that are design to assist us in doing our administrative duties"* (DPE01, 02:44-46).

> *"I do not really follow up in using emerging technologies as it evolves rapidly and most of the time I get stuck in using these emerging technologies as it comes with its complications"* (DPE02:04:109-111).

> *"The challenges that I am experiencing in utilising emerging technologies are the computer software that are implemented within as there do not take us through them to utilise them but expected to teach ourself to utilise them (computer software)"* (DPT02, 02:40-42).

Although some employees were challenged by various obstacles with regard to using technology, some employees enjoyed the benefits that come with the utilising of emerging technologies. The participants from both departments (with 41.26% from the Department of Transport and 22.38% from the Department of Education) indicated that, overall, they did not have any obstacles preventing them from using emerging technologies in their respective environments as can be seen in Table 4.11 above. On the other hand, a few of the employees were faced with challenges regarding utilising the emerging technologies; therefore it is the duty of organisations to ensure that all employees are familiar with emerging technologies in this digital society. Training was required to equip all employees with the necessary technological skills to ensure their effectiveness in the office environment so that some of the identified obstacles could be addressed,

Administrative employees should be trained and retrained frequently to acquire the competencies and skills to deal with the present-day challenges of emerging technologies. However as presented in Table 4.12 below, the majority of administrative employee participants from both departments, namely, 35.71% and 22.02% respectively, were not provided with formal training when utilising technology in their environment. Although the lack of formal training when it came to the utilisation of technology was a cause for concern as can be seen in Table 4.12, on the other hand, 25% of the administrative employee participants from the Department of Transport intimated that they were usually presented with training while another 21.43% always attended technology training. Administrative employees participants from the Department of Education, with 28.44% indicating that they were

usually exposed to training and 29.36% were always exposed to technology training. This training as perceived by employees should be on a regular basis as technology keeps on emerging. On this note, 32.14% and 40.74% respectively of the participants from both departments; felt that government departments should always provide formal training when handling technology in order to perform their roles and execute their responsibilities efficiently. Furthermore 19.64% and 27.78% respectively usually require training. One of the managers shared the following:

> *"Even though I am not using most of the technological resources available in our department, I still believe that training is very important to all of us because technology changes very fast. Therefore one needs continuous training in order to keep up with these changes" (DPT01, 02:45-47).*

There were some employees who felt that they were technologically skilled as is evidenced by the participants' responses, namely that 30.36% from the Department of Transport and 24.07% from the Department of Education seldom required training. On the other hand, there were those employees who deemed technological training unnecessary as can be seen in participants' responses of 17.86% and 7.41% respectively.

Table 4.12: Training

Questions	Department	Never	Seldom	Usually	Always
Did your organisation provide you with a formal training of the job you do that involves use of technology	**Transport**	20(35.71%)	10(17.86%)	14(25.00%)	12(21.43%)
	Education	24(22.02%)	22(20.18%)	31(28.44%)	32(29.36%)
In your own perspective do you think you need training in terms of using technology	**Transport**	10(17.86%)	17(30.36%)	11(19.64%)	18(32.14%)
	Education	8(7.41%)	26(24.07%)	30(27.78%)	44(40.74%)
I need more time for technology skills or browsing the internet	**Transport**	20(35.71%)	12(21.43%)	13(23.21%)	11(16.64%)
	Education	22(20.56%)	33(30.84%)	23(21.50%)	29(27.10%)
One of my goals is to learn more ways to use technology in an unlimited ways	**Transport**	1(1.89%)	6(11.32%)	13(24.53%)	33(62.26%)
	Education	6(5.61%)	6(5.6%)	31(28.97%)	64(59.81%)

Furthermore, these administrators felt they did not require more time for technological expertise and browsing of the Internet as indicated by 35.71% of the participants from the Department of Transport and 20.56% from the Department of Education. However, not all the employees felt the same way, as 21.43% and 30.84% respectively of the participants seldom required more time to advance their technological skills. This was further highlighted by 23.21 % of the participants from the Department of Transport and 21.50% from the Department of Education who usually deemed it necessary to receive such training. In turn, 16.64% and 27.10% respectively of the participants who always understood the significance of regular training when working with technology in the office environment.

The need for training became evident from the responses of some of the administrative employee participants whose goals were to learn more ways of using technology in unlimited ways as intimated by 62.26% of the participants from the Department of Transport and 59.81% from the Department of Education. These sentiments were further shared by 24.53% and 28.97% who usually looked forward to learning how to use technology as it continues to evolve. However, as presented in Table 4.12 above, (11.32% and 5.6% respectively), of the government employee participants seldom explored the different ways of utilising emerging technologies as one of their goals when carrying out their roles and responsibilities in the office.

In general, administrative employees from the two government departments perceived emerging technologies as important in this digital age in improving the efficiency and productivity of office workers. A high percentage of 83.93% for the participants from the Department of Transport as well as 89.91% from the Department of Education were pleased by the way technology had enhanced their daily routines in the office environment. However, it was clear that not all individuals felt the same way depending on their experience and accessibility of technology in their workplaces. These was proven by 16.07% of administrator participants from the Department of Transport and 10.09% from the Department of Education who were never pleased with the way they were carrying out their daily roles and responsibilities utilising technology as indicated in Table 4.13.

Table 4.13: Perceived effectiveness of emerging technologies

Question (statements)	Department	No	Yes
I am pleased with the way in which I am carrying out my daily duties using emerging technologies	Transport	9(16.07%)	47(83.93%)
	Education	11(10.09%)	98(89.91%)

However, the overall perception of the administrative employee participants from the two selected government departments varied in terms of their perceptions on emerging technology. For example, 34.91% and 51.79% respectively of the participants regarded the utility of the emerging technologies as an excellent strategy in particular, for the government to reach out to communities and provide effective and efficient services to its citizens. On the other hand, some indicated that the utility of these technologies had an average impact, while others felt it had a good impact with regard to the execution of their office roles and responsibilities. These sentiments were also shared by some of the managers who mentioned that:

> *"Technology has made my work easier because it enables me to share information via emails and communicate more efficiently with clients and other stakeholders" (DPT02, 03:73-74)..*

> *"Government departments handle lot of paperwork and the use of technology played a major role in reducing the amount of paperwork and contributed in effective and efficient work flow processes" (DPE03, 08:194-196).*

On the other hand, a small percentage of 9.43% and 1.79% respectively reported that technology had a fair impact on their job as can be seen in Table 4.13.

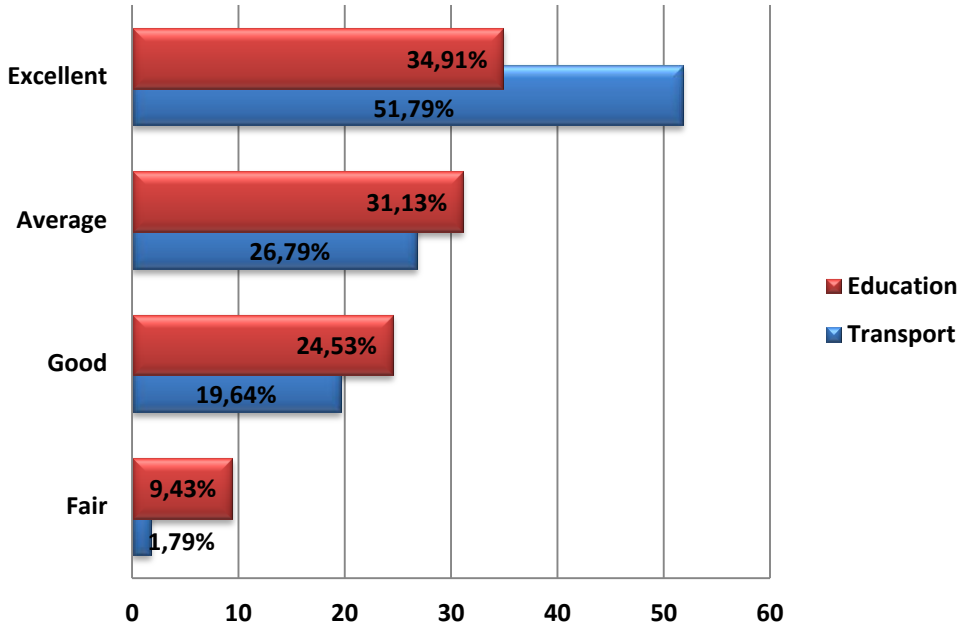

Figure 4.9: Overall perception in using emerging technologies

4.4 Findings

This section presents the findings derived from the analysis of the two government departments used in this study. Some factors were found to be critical with regard to how effective administrative employees perceived the emerging technologies to be in government departments. These factors, which included a lack of technological expertise, skills-sets, the lack of training, accessibility and insufficient resources, are depicted in Figure 4.10 and discussed further below.

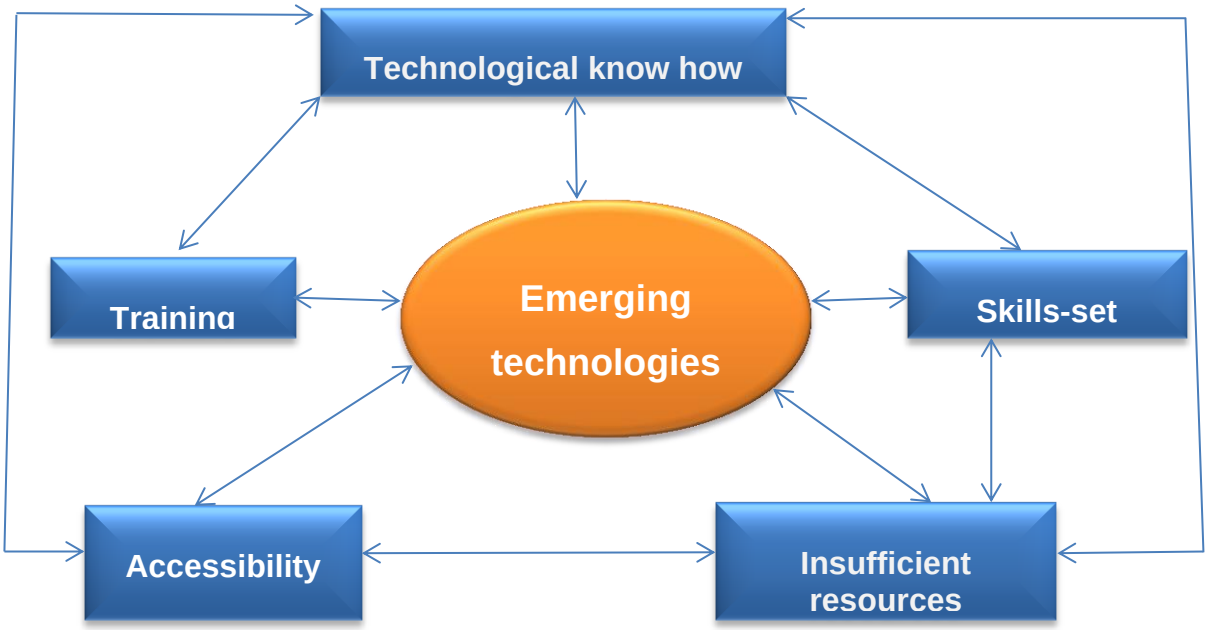

Figure 4.10: Factors that influence the perceived effectiveness of emerging technologies in government departments

- **Insufficient resources**

The majority of the employee participants did not have access to technological resources such as computers, hardware and software that could have enabled them to be more efficient when performing their roles and responsibilities. These resources are critical with regard to enabling all the employees to perform their office duties effectively and efficiently. The data analysis provided evidence that different types of electronic resources allocated to administrative employees in the government departments were not adequate, which hampered their ability to be innovative in their daily tasks in their respective environments. Some resources were allocated based on the job requirements of individuals, however, some employees were limited to resources that were provided to them irrespective of their job requirements. This had an impact on how departments provided services to the South African public. Services such as the e-government services were compromised because access to the Internet and the social media was

extremely limited with regard to the employees in South African government departments. Even though some technological resources were available in some departments, not all the employees had access to them in their respective environment.

- **Accessibility**

Accessibility to technology resources in a workplace is critical for the survival of any organisation in this digital age. Technology empowers employees in various areas such as sharing documents, collaborating on projects and communicating with team members. Inaccessibility could contribute to the organisation failing to improve and could increase employees' workloads. It was clear from the analysis that not all the employees had access to all emerging technologies that were relevant to assist them to perform their work faster and efficiently. In particular, on the move technologies such as a laptop, PDA, Ipad or tablet that can enable them to carry out tasks anywhere at any given time is not accessible to the majority of the employees. Therefore, government departments should improve the accessibility of technological resources in order to enhance employee productivity and in return, widen the pool of potential talent within the departments. When employees have sufficient access to technologies they have a sense of understanding their work well and could perform various office activities much quicker than before by speeding up the work flow processes. This can motivate employees, assist them to become more efficient and enhance collaboration within the organisation.

- **Technological expertise**

Technology entails the use of materials, tools, techniques and sources of power to make life easier or more pleasant, and work more productive for the employee. However, the successful employment of technology can only be achieved when knowledge-based technological skills-sets are applied in an organisation. The lack of expertise constrains those who may, in fact, have an advantage with regard to exploring the benefits of such technologies in the interest of improving job efficiency. In addition, it increases the lack of interest shown by conservative employees who could benefit from such technological services. Therefore, employees that exhibit a disinterest in technology and consequently, lack technological expertise, have a major negative impact on organisations in terms of acquiring the relevant skilled staff.

Knowledge in practice is critical when technology is being manipulated with the aim of exposing employees to innovative processes when executing their roles and responsibilities.

- **Skills-set**

Skills imbalance is one of the growing concerns being faced by many government departments. It refers to a situation in which employees have various inadequate skills and competencies level required to formulate and execute office work efficiently to accomplish departmental goals. The skills imbalance can affect office effectiveness, technology innovation and can also challenge work competences and requirements. Although, managers have access to technology resources, the fact that most of their critical technology tasks are processed by administrative employees limits opportunities for

innovation at strategic level. Furthermore, due to the lack of accessibility and sufficient technological resources, employees do not realise the significance of emerging technologies. Most of the employees were of the opinion that emerging technologies did not meet their expectations (*cf:* Table 4:10) due to the fact that few found that these technologies enhanced their job performance (*cf:* Tables 4.8 & 4.13). Therefore, it is critical that government departments create a learning environment in the form of training to increase employees' interest in fully utilising emerging technologies that are at their disposal, thereby contributing to developing creativity and knowledge sharing with the departments.

- **Training**

Employees can contribute to the success of the organisation when they are trained to perform their tasks. By providing training, an organisation creates an environment characterised by spreading and sharing knowledge, skills and best practices across the business. Any type of training in an organisation increases employees' self-efficacy when carrying out their respective roles and responsibilities. Therefore, training government employees on emerging technologies would improve their speed and efficiency, particularly those who are used to outdated ways of performing tasks by reducing manual offices and paper communication. From the analysis, it was clear that some employees, albeit the minority, were still conservative with regard to the utilisation of technology in their environment. For example, some employees were comfortable with utilising typewriters in this digital era and some were not exposed to any technological resources at all. If employees are well

trained they will be able to perform various office activities for the greater effectiveness and efficiency of their respective departments.

Although government departments offer training to its employees, much still needs to be done. A lack of training has contributed to employees' inability and struggle with utilising and gaining access to explore different emerging technologies. Therefore, the training provided by the government will be of importance predominantly because the majority of the participants did not possess the required technological competencies, skills and knowledge to execute their expected roles and responsibilities with regard to assisting the public.

4.5 Interpretation of the findings

The findings resulting from the data analysis were interpreted and are presented in this section. As discussed above, the findings cover the areas pertaining to the lack of technological expertise, skills-sets, the lack of training and accessibility and the insufficient resources. Within the context and objectives of this study, a more in-depth view of the findings was adopted. The researcher interpreted the events associated with the utilisation of emerging technologies as they manifested themselves to reveal the following factors, namely, technology adoption, technology resource limitations and technology readiness.

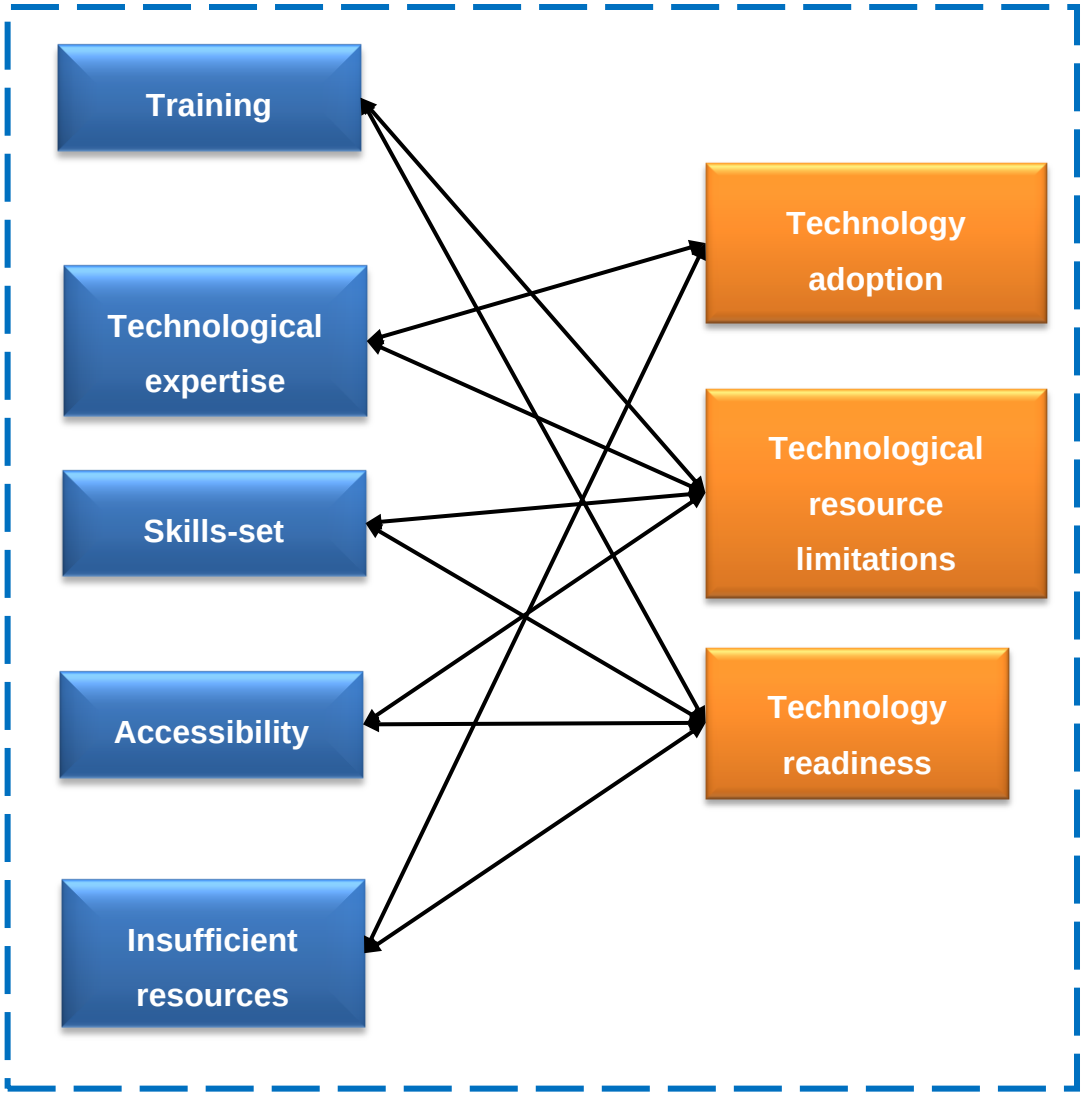

Figure 4.11: Interpretation of the findings

- **Technology adoption**

Technology adoption is critical for organisations across all spheres as it is a vehicle that allows businesses to participate in this ever changing digital society. Government departments have embraced the utility of technology; however, adoption is still lagging behind in some instances. The lack of technological expertise by some of the government employees when utilising the emerging technology due to insufficient technological resources, has a negative influence on individuals' intention to use it as well as the significance

of its usefulness within their different designations. The adoption of technology involves different people and processes. Moreover, people have different criteria when deciding whether or not to use technology. Therefore, an individual's intention to use technology and its perceived usefulness depends on the skills they possess and their attitude towards technology.

- **Technological resource limitation**

  The major technological resource limitation concern in government departments is the deficiency of technological resources. The scarcity of technological resources factor was influenced by accessibility factors. The implication of inaccessibility and insufficient technological resources made employees realise the significance of emerging technology is poorly perceived by employees.

  The adoption of emerging technologies is meaningless without the technology resources and sufficient infrastructure that makes it operational. Not all technology resources are available for use and those available are limited to certain individuals depending on their roles and responsibilities. Furthermore, on the move technology such as laptops and tablets are not available in either of the government departments that participated in this study.

- **Technology readiness**

  Technology readiness refers to people's tendency to embrace and use emerging technologies to accomplish organisational goals. The readiness is influenced by the availability of skilled people following the prescribed organisational processes that shape the day-today handling of technology.

Readiness could be achieved through training that will result in skilled employees, accessibility and sufficient technology resources. These require the government departments to invest in technology and skills development to increase employees' productivity and to achieve their strategic goals. Therefore, individual interest will increase the behavioural intention of using emerging technology, thereby promoting innovative ideas within the departments.

4.6 SUMMARY

This chapter presented a comprehensive analysis of the data as well as an interpretation of the findings from the data collected through questionnaires and interviews. Accordingly, the factors that influence the adoption of new technologies in government departments were identified.

The results indicated that the administrative employees and managers used the emerging technologies to perform their roles and responsibilities, even though the technologies had changed their perceptions. The findings also reveal that even though the government departments had embraced technology, full adoption was still far from being realised. Thus, all employees should have unlimited accessibility to technological resources and receive continuous training at all times in order to execute their roles and responsibilities more effectively and efficiently. Nonetheless, both the managers and administrative employees regarded emerging technologies as critical with regard to influencing the work flow processes that enabled them to achieve what was expected of them.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The main purpose of the study was to investigate how emerging technologies are perceived by government administrative employees in terms of ease of use and how they enabled or constrained employees with regard to carrying out their roles and responsibilities within the organisation. It was necessary to investigate the factors that influenced the adoption of emerging technologies in government departments and to understand how emerging technologies contributed to the effective functioning of administrative employees in government departments.

In this last chapter, namely Chapter 5, a general overview of the study is given on how each chapter contributed towards achieving the objectives of this research study. The chapter presents an evaluation of the thesis, by formulating a conclusion and making recommendations and suggestions with regard to possible areas for further research study in this field will also be made in this final chapter. The chapter is divided into five main sections as follows:

- The first section provides an overview of this research study.
- The second section presents an evaluation of the study.
- The third section discusses the contribution of this research study
- The benefits of this study are covered in the fourth section
- Section five discusses the limitations pertaining to this study
- Recommendations for future study are provided in the sixth section.
- The last section provides a summary of this study.

5.2 Overview of the research study

Although a concise summary of the chapters was presented in Chapter 1, this section provides a chapter-by-chapter overview of the research. The purpose is to be more explicit and to add some details on the content of the individual chapters, which are interrelated in terms of their contributions to the study even though each chapter addresses a distinct area of the study.

Chapter 1 - This chapter forms a significant part of the study as a whole. It introduces the entire study by presenting the research problem, the study objectives, the benefits of this study, a literature review, the research design and methodologies and how the study was carried out.

Chapter 2 - An in-depth literature relating to the study was discussed and presented in this chapter and included areas such as administrative employees' roles, emerging technologies and the TAM that underpins this study.

Chapter 3 - The focus was on the research methodology (techniques, approaches and methods) that were applied in the study. The application of the different techniques, approaches and methods was covered. The methodology included the qualitative case study method, and data collection methods such as interviews, and closed-ended questionnaires. The research ethics considered during the study were also addressed.

Chapter 4 – The data collected from the two government departments by means of interviews and questionnaires respectively, were analysed and interpreted in this chapter.

Chapter 5 - This chapter presents a summary of all the chapters in this study. The benefits and the limitations of the study are also covered and further research opportunities are highlighted

5.3 Evaluation of the study

The research study was evaluated to determine whether all the research objectives discussed in Chapter 1 had been achieved. Following the literature review and the results of the empirical research, a number of conclusions and recommendations based on them were formulated. The research objectives were revisited and answers were sought based on the findings. The research objectives of the study were as follows:

- To investigate the factors that influences the adoption of new technologies in government departments.
- To understand how emerging technologies contribute to the effective functioning of administrative employees in government departments.
- To determine the general perceptions of government administrators concerning the use of emerging technologies.

As stated in Chapter 1, the research questions were formulated with the aim of achieving the research objectives. The questions were employed in the data collection process in which use was made of the semi-structured interviews and closed-ended questionnaires. It was significant to use different techniques for the data gathering process to enhance the quality of the information and achieve the objectives of the research. The following research questions were

asked of the participants. The discussion that followed the research questions made it possible to achieve the objectives of the study.

- What are the factors that influence the adoption of emerging technologies in government departments?
- How can emerging technologies contribute to the effective functioning of administrative employees in government departments?
- What are the general perceptions of government administrators concerning the use of emerging technologies?

Factors that influence the adoption of emerging technologies in government departments

When dealing with technology, there are various factors that can influence its adoption in a working environment. These factors can be technical or non-technical. Their impact on individual experience can either enable or constrain them when carrying out their daily administrative roles and responsibilities within the organisation. Although emerging technologies was enabling and at the same constraining employees in carrying out administrative roles and responsibilities, it depended on individual interest.

From the analysis, various factors were found to be critical on how administrative employees perceived the effectiveness of emerging technologies in government departments. These factors, which included lack of technological expertise, skill-set, lack of training, accessibility, and insufficient resources, had a major impact on the use of emerging technologies by departments. They constrained both the managers and

administrative employees in embracing the use of technology in their job environment. Without appropriate training and skill-set, the use of technology will not be beneficial to those who utilise it daily as they lack the expertise. Therefore, usefulness of emerging technologies and ease of use will be difficult to be fully realised by employees and these had a major impact on efficacy and innovation within government departments. Furthermore it is imperative that access to sufficient technological resources be prioritised in order to be able to fully embrace use of emerging technologies and benefiting from its effectiveness.

Government department requires technology strategy in order to respond accordingly to emergence of technologies. However, the successfully adoption and implementation of new technologies in government departments depends on the administrative employee's attitude and support. It is believed that before technology is adopted it must win employees hearts. The implementers (leaders) must ensure that the process start first by winning both the hearts and minds of employees and by emphasising the benefits. Therefore, if administrative employees perceived technology as rewarding their needs, it is likely they will integrate the technology into their work roles and responsibilities. Positive technological attitude are expected to foster new technological equipment's in the work environments.

Contribution of emerging technologies to the effective functioning of administrative employees in government departments

Emerging technologies tend to play an effective role with regard to administrative employees and line managers who are eager to learn various

ways of using technology in unlimited ways. Although the improved use of new office machines and technologies can enable government departments to get the competitive edge, some machines are already in use, but are not fully integrated across the offices.

It emerged from the data collected that some of the technologies available in government departments such as computer programmes, office equipment and office automation played a fundamental role in enhancing employees' effectiveness. They were found to be critical with regard to promoting information acquisition and the updating and sharing of information internally and externally. Furthermore, the use of these technological resources has improved the work environment by alleviating some administrative roles, paperwork and scheduling of meetings. The successful implementation of new technologies to boost administrative operational efficacy depends on the government strategic vision with regard to investing in technology and staff development in this regard. Therefore, making technology infrastructure accessible of to all employees and providing sufficient resources will have a positive influence on how individual's intends to use and perceive the usefulness of technology in relation to their daily routines.

The general perceptions of government administrators concerning the use of emerging technologies

The utility and benefits of emerging technology were perceived and understood differently depending on individual interest, and was influenced by a lack of knowledge and training about how emerging technologies contribute to their effectiveness and can benefit the departments. The overall perception

of administrative employees from the two selected government departments varied in terms of their perception of emerging technology. For example, some participants regarded the utility of emerging technology as an excellent strategy in particular for the government to reach out to communities and provide an effective and efficient service to its citizens. On the other hand, some rated the utility of these technologies as having an average and good impact in contributing to the execution of their office roles and responsibilities.

Based on the above discussion, the research questions are considered to be answered successfully and the objectives achieved. The contributions of this study can be discussed in terms of different perspectives as will be seen in the following section.

5.4 Contribution of the study

This section presents the study's contribution in three-areas, namely theoretical, practical and methodological contributions respectively as discussed in detail below.

5.4.1 Theoretical contribution

The study was able to make use of the underpinning theory the TAM as a lens to analyse the data collected from the two government departments that participated in this study. Perceived usefulness and ease of use from the perspective of the TAM were adopted. The theory helped the researcher to understand how emerging technologies were perceived and used across

government departments. Without applying the TAM, it would have been difficult to understand how emerging technologies were used to enable or constrain government employee's efficacy.

The review of literature in the study contributed to the body of knowledge and other scholars can rely on this empirical work.

5.4.2 Practical contribution

This study can assist government employees and managers to understand the significance of emerging technologies in this digital society. Before the study, some of them were aware of technology but as revealed by this study, did not understand the extent and implications of using different types of technologies to enhance the effectiveness of their work.

5.4.3 Methodological contribution

The methodological steps presented in chapter one and chapter three respectively were followed to achieve the study's objectives. Some studies are not completed or did not achieve their original aims and objectives mainly because they did not follow the correct or appropriate methodological steps.

5.5 Benefits of the study

The study intended to contribute to both the body of knowledge, the industry and stakeholders that were responsible for making decisions or that effect the utilisation of emerging technologies within organisations as well as the

government. This study provides an understanding of how employees perceive the use of technology in the workplace and gain a broader perspective of management in terms of investing in technology.

This study was carried out in two government departments, namely the Department of Transport and the Department of Education. The findings of the study may create awareness in organisations, thus, aiding line managers and policy makers to make well-informed decisions about the adoption, efficiency and effectiveness of the utilisation of changing technologies.

Before this study, some participants were not aware of the emerging technologies that are being introduced and implemented in their environments. Accordingly, this study can assist both administrative employees and manager to get a clear understanding of the benefits of emerging technologies in their working environment, and the roles and responsibilities that can be performed using these technologies. Consequently, the importance of emerging technologies can be understood clearly as stated in Chapter two.

5.6 Limitations of this study

The major limitation was in relation to the data collection process. Regarding the administrative employees, not all the questionnaires were returned for analysis. Furthermore, due to the lack of field workers, the researcher administered and followed up on the completed questionnaire submissions. This created a delay in finalising the data collection.

Secondly, the unavailability of interviewees delayed the data collection process and the researcher was limited to only a few interviewees. If the interviews had taken place with all the relevant managers and supervisors and had not been limited to only a few interviewees, the study could have delivered different findings and the researcher could have reached different conclusions.

Not all the government employees were included, but distinctions were drawn between administrative employees and senior management within particular departments and directorates.

5.7 Recommendations

In view of the findings and interpretation of the results of this study that are based on the questionnaire results, and semi-structured interviews, the following recommendations are made:

5.7.1. Access to technological infrastructure is of crucial importance. For the government to achieve the e-government goal, all employees should have access to internet sites for work related activities.

5.7.2. The government should make funds available for continuous ICT training and retraining and should encourage educational improvements with regard to acquiring the necessary basic ICT skills as most employees still rely on old and outdated machines for the execution of their daily activities. The advantage is that, administrative employees will be well-equipped for the effective functioning of administrative roles and responsibilities in the government departments, to ensure departmental success and progress in

the relevant areas. This will also enrich and equip employees with the relevant and useful skills that can result in minimising administrative challenges in the work environment.

Government departments should invest in technology to ensure that they keep abreast of the latest technologies.

5.8 Further research

This study recommends that the following research be undertaken in future:

- This study could be conducted over nine provinces, thereby, including both the national and provincial departments. Ministers, director generals and MECs whose roles are to oversee the success of departments could also be included in the samples in order to get rich data.
- A comparative study between the public and private sectors to investigate the factors that constrain or enable the adoption and utilisation of emerging technologies.
- Moreover similar studies should be conducted in an attempt to find out if the utilisation of emerging technologies could make organisations and administrative employees more competitive.
- An investigation into how the organisational culture influences the adoption of emerging technologies.

5.9 Conclusion

This chapter has provided a discussion of the objectives set for this study, the recommendations made and suggestions for possible areas of further research. The appropriate techniques and research methods were applied during the data collection and analysis processes. The data analysis was carried out using the TAM, graphs and tables.

Based on the findings, it was concluded that the use of emerging technologies was important for information sharing, the updating and processing of information, the smooth functioning of administrative employees, especially in the government departments where information is shared with civil citizens and service providers. Accordingly, this research study showed how the utilisation of emerging technologies can play a crucial role in the government sector. Although the lack of sufficient technology infrastructure, the lack of accessibility of resources and the lack of technical skills development constrain the full adoption and utilisation of emerging technologies, some of the participants acknowledged the significance of these technologies when performing their daily work routines.

The line managers at government departments are therefore required to have knowledge of the various factors affecting employee effectiveness, in particular, technology usage. Knowledge of these factors may enable managers to succeed in developing employees' effectiveness to overcome future challenges.

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Appendix A – Permission Request Letter

Tshwane University of Technology
We empower people

FACULTY OF MANAGEMENT SCIENCE

DEPARTMENT OF OFFICE MANAGEMENT AND TECHNOLOGY

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25 June 2015

Dear Sir/Mam

To whom it may concern

This serves as a formal introduction of the candidate Mr Jackson Rabi Mogale to you. Mr Mogale is a registered postgraduate student at the Department of Office Management and Technology, Faculty of Management Sciences at Tshwane University of Technology. He is working on a research study, for his Masters Degree in Organisational Leadership. The study seeks to investigate how government administration employees perceive the effectiveness of emerging technologies in their environment. The focus is to uncover the factors involved in the utilisation of new technologies and their impact on how employees' carry out their daily administrative roles and responsibilities.

On behalf of Mr Mogale, the Department of Office Management and Technology hereby request permission to use your organisation as one of the participants in the research study. If granted, interview will be conducted with administrative employees and managers. Kindly note that the data collected from participants will not be used for any other purposes other than for this research. The data will be kept confidential to the researcher and the supervisors. The identity of the interviewees will be kept anonymous. The name of the organisation will be represented with a pseudonym.

The contribution from your organisation is intended to substantiate and is vital to the success of the study. Therefore, your assistance in this regard will be highly appreciated.

Should you need more information, please do not hesitate to contact the undersigned.

Kind regards

_____

Dr S.S. Mkhomazi

HOD: Office Management and Technology

Tel: (012) 382 5560/2

Fax: (012) 382 5517

Email: mkhomaziss@tut.ac.za

Appendix B – Departments Letters Permission

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

For administrative use:
Reference no: D2016 / 200
enquiries: Diane Buntting 011 843 6503

GDE RESEARCH APPROVAL LETTER

Date:	**5 August 2015**
Validity of Research Approval:	**5 August 2015 to 2 October 2015**
Name of Researcher:	**Mogale R.J.**
Address of Researcher:	**39977 Extension 18; Mamelodi East; 0122**
Telephone / Fax Number/s:	**078 078 3770**
Email address:	**rjmogale@gmail.com; mogalerj@tut.ac.za**
Research Topic:	**Perceived effectiveness of emerging technologies among government department**
Number and type of schools:	**NONE**
District/s/HO	**All Districts and Head Office**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved. A separate copy of this letter must be presented to the Principal, SGB and the relevant District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted. However participation is VOLUNTARY.

The following conditions apply to GDE research. The researcher has agreed to and may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

CONDITIONS FOR CONDUCTING RESEARCH IN GDE

1. The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter;
2. A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB);

2015/08/06

Making education a societal priority

Office of the Director: Knowledge Management and Research
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

3. A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned;
4. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, SGBs, teachers and learners involved. Participation is voluntary and additional remuneration will not be paid;
5. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal and/or Director must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage;
6. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year;
7. Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
8. It is the researcher's responsibility to obtain written parental and learner consent;
9. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources;
10. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations;
11. On successful completion of the study the researcher must supply the Director: Education Research and Knowledge Management with an electronic copy (and a Hard copy if possible) as well as a Research Summary of the completed Research Report;
12. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned; and
13. Should the researcher have been involved with research at a school and/or a district office level, the Director and school concerned must also be supplied with the Research Summary of the study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Dr David Makhado

Director: Education Research and Knowledge Management

DATE: 2015/05/06

Office of the Director: Knowledge Management and Research
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

Enquiries: S.G Ngwenya
Tel: (012) 401 6331/ 012 401 6385
Fax: (012) 401 6386
Email: Sello.Ngwenya@gauteng.gov.za
Ref: Private Sector Partnerships (14/1/1/1)

RESEARCH

TO: **MR RJ MOGALE (RESEARCHER)**

FROM: **MRS H E KEKANA**
DIRECTOR: TSHWANE SOUTH DISTRICT

DATE: **18 AUGUST 2015**

SUBJECT: **RESEARCH APPROVAL**

Mr R.J Mogale
39977 Extension 18
Mamelodi East
Pretoria
0122
Mobile Number: 078 078 3770
rjmogale@gmail.com; mogalerj@tut.ac.za

RESEARCH APPROVAL – RJ MOGALE

We have received the letter approving your research from Head Office and we grant you permission to access the research sites subject to the approval of the School Governing Bodies of the targeted schools. The title of your research is "**Perceived effectiveness of emerging technologies among government department**". You are expected to adhere strictly to the conditions given by Head Office Research and Knowledge Management Office.

Kindly communicate with the principals and/or SGBs of the schools you have selected for your research regarding your schedule.

Please submit your report including findings and recommendations to the district office and to Head Office Research and Knowledge management Office at least two weeks after concluding your research. You may be requested to participate in the Department of Education's mini-research conference to discuss your findings and recommendations with departmental officials and other researchers.

Office of the District Director: Tshwane South
(Mamelodi/Eersterust/Pretoria East/Pretoria South/Atteridgeville/Laudium)
President Towers building, 265 Pretorius Street, Pretoria, 0002
Private Bag X198, Pretoria, 0001 Tel: (012) 401 6317; Fax: (012) 401 6318
Website: www.education.gpg.gov.za

CONDITIONS

1. This programme is a support programme and may not supersede the Departmental programmes, projects and priorities. In case competition for accommodation arises, departmental programmes will take precedence.
2. The safety and wellness of all learners and school staff must be prioritised at all cost.
3. Teaching and learning time may not be interfered with.
4. The Department or schools may not be held liable for any payments incurred in this programme.
5. The programme will be self-sustaining and no costs will be charged to the Education Department at any level, learners and/ or their parents or the schools.

Our support will be rescinded in case you contravene the terms and conditions indicated herein or any departmental regulations and laws or if at any point risk to the reputation of the district, the GDE or the education Department becomes imminent.

Yours sincerely

pp

Mrs H.E Kekana
Director: Tshwane South District
Date: 20/08/2015

Office of the District Director: Tshwane South
(Mamelodi/Eersterust/Pretoria East/Pretoria South/Atteridgeville/Laudium)
President Towers building, 265 Pretorius Street, Pretoria, 0002
Private Bag X198, Pretoria, 0001 Tel: (012) 401 6317; Fax: (012) 401 6318
Website: www.education.gpg.gov.za

transport

Department:
Transport
REPUBLIC OF SOUTH AFRICA

Private Bag X193, Pretoria, 0001
159 Forum Building, Corner Struben and Bosman streets, Pretoria

Enq : Simon Ssekabira Ntege
Tel : 012 309 3749
E-mail : NtegeS@dot.gov.za

To the Head of Department,
Office Management & Technology,
Faculty of Management Sciences,
Tshwane University of Technology.

Attention: Dr SS Mkhomazi.

Re: Mr Rabi Jackson Mogale

This letter serves to ascertain that Mr Rabi Jackson Mogale approached the Department of Transport (DoT) requesting to conduct research/interviews, towards a Master of Technology, Organisational Leadership Degree, with the Tshwane University of Technology.

On the 9th November 2015, I introduced Mr Mogale to DoT employees, whom he interviewed.

It will be appreciated if the study findings are availed to DoT before publication.

Sincerely

Simon Ssekabira Ntege
Director: Research
Date: 16th November 2015

Appendix C - Consent Letter

RESEARCH TITLE: Perceived effectiveness of emerging technologies among administrative employees of selected government departments

Primary investigator : Mr RJ Mogale, BTech (Office Management and Technology)

Study leaders : Dr S.S. Mkhomazi and Prof E.M. Rankhumise

Dear Potential research participant

You are invited to complete questionnaire that forms part of my formal MTech studies. Before you agree to take part, you should fully understand what is involved. You should not agree to take part unless you are completely satisfied with all aspects of the study.

The aim of the study is to investigate how government administrative employees perceive the effectiveness of emerging technologies in their environment and how these technologies can be used to improve administrative employees' effectiveness.

If you decide to take part in this study, you will be required to complete a paper-based questionnaire. You will be asked to respond to questions regarding perceived effectiveness of emerging technologies among government department administrative employees. Please try to answer the attached questionnaire as honestly and completely as possible. This will not take you more than 10 minutes of your time. You will be required to sign the enclosed informed consent form.

Completion of this questionnaire involves no foreseeable emotional discomfort or inconvenience to you, manager or your organisation. The findings of this project will be used for academic purposes only and you will be provided with the summary of the findings on request.

Your participation in this study is entirely voluntary and you have the right to withdraw at any stage without any penalty or future disadvantage whatsoever. You don't even have

to provide reason/s for your decision. All information obtained from the questionnaire is strictly confidential. This means that access to your data will be strictly limited to the researcher, study leader, post graduate department and examiners appointed by Tshwane University of Technology. Your questionnaire responses and personal information will be kept and stored in a confidential format that will only be accessible to the researcher and will be disclosed with your permission or as required by law. The results of this study might be published in a scientific journal and / or presented at scientific meetings, but again without revealing the identity of any research participant.

The original questionnaires will be stored at the office management and technology department for three years, after which they will be destroyed.

The Faculty Higher Degrees Committee (FHDC) and Faculty Research Ethics Committee (FREC) of the Tshwane University of Technology have approved the formal research proposal in June 2014. All parts of the study will be conducted according to internationally accepted ethical principles.

The primary investigator, Mr RJ Mogale, can be contacted during office hours at Tel (012) 382 5560 or on his cell phone at 078 078 3770. The study leader, Dr SS Mkhomazi, can be contacted during office hours at Tel (012) 382 5562/5402. Alternatively, you can report any serious unethical behaviour at the university's Toll Free Hotline 0800 21 23 41.

Your co-operation and participation in the study will be highly appreciated. Please sign the underneath informed consent if you agree to participate in the study

EMPLOYEE CONSENT

I hereby consent that I have been adequately informed by the researcher about the nature, risks and benefits of the study. I have received, read and understood the above written letter. I am aware that the results of the study will be anonymously processed into a research report. I had sufficient opportunity to ask questions and I can freely declare myself a participant in the study and I may withdraw at any stage of the study without any negative consequences.

Research participant's name: _____ Researcher's name: Jackson Mogale

Research participant's signature: _____ Researcher's signature: _____

Date: _____ Date: _____

Appendix D – Questionnaires

SECTION A

Demographic information

Please complete the following questionnaires by putting an X in the appropriate block.

Office Use	
V1	
V2	
V3	
V4	
V5	

1. **What is your age**

Less than 18	18 - 30	31 – 40	41 – 50	51 Above

2. **What is your gender**

Male	Female
1	2

3. **How long have you been working in your current position**

Less than 6 months	1 – 4 years	5 – 8 years	9 – 12 years	13 - above
1	2	3	4	5

4. **Educational background**

No formal education	Grade 6 - 7	Grade 12	Post matric certificate	Degree	Other
1	2	3	4	5	6

5. **Years of service**

Less than 6 months	1 – 4 years	5 – 8 years	9 – 12 years	13 - above
1	2	3	4	5

SECTION B

Please rate the following questionnaires effectively

6. **Which electronic devices are available for you to use in the office**

	Yes	No		
Desktop Computer with Webcam			**V6a**	
Laptop embedded with Webcam			**V6b**	
Network printer			**V6c**	
Portable Telephone			**V6d**	
Ipad or Tablet			**V6e**	
Scanner			**V6f**	
Shredding machine			**V6g**	
Pen drive			**V6h**	
Personal digital assistant (PDA)			**V6i**	
Electric typewriters			**V6j**	

7. **Importance of office equipment's**

	Never	Seldom	Usually	Always		
Office equipment's has certainly made my office work more interesting and productive					**V7a**	
Office equipment's has assistance me to work faster than before					**V7b**	
Office equipment has save my time and costs					**V7c**	
Office equipment's has help me to access records, files, more easier and accessible					**V7d**	
Office equipment's has enhanced great work balance and flexible work					**V7e**	
Office equipment's has increased my effectiveness level					**V7f**	
My work depend on office equipment					**V7g**	

8. **Office automation (zimmermann & finger, 2005)**

	Never	Seldom	Usually	Always	
Electronic publishing system - word processing, desktop publishing and copying system					V8a
Electronic communication system - electronic mail, voice mail, facsimile, desktop, video and conferencing					V8b
Electronic collaboration system – electronic meeting system, collaborative work system, teleconferencing and telecommuting					V8c
Office management system – electronic office accessories, electronic scheduling and task management.					V8d
Image processing system – electronic document management, other image processing, presentation graphics and multimedia system					V8e

9. **Which computer programs and applications are you proficient of or comfortable using? (please tick whichever applicable)**

	Never	Seldom	Usually	Always	
Word processing					V9a
Instant messenger					V9b
E-mail					V9c
Creating and editing					V9d
Web surfing or internet research					V9e
Office 365					V9f
OneNote					V9g
Creating labels, electronic business card, calendars.					V9h
Sending messages, scheduling meeting & appointments and tasks prioritisation.					V9i
Word, Excel, PowerPoint, Outlook, Publisher, Access, etc.					V9j

10. **Are you active on social networks**

No	Yes	
1	2	V10

11. **List social networks you use most, if any**

V11

12. **Are you allowed to use any social networks during office hours?**

No	Yes
1	2

V12

13. **What is your device's primary connection to the internet in the office? (choose more than one option)**

	Yes	No	
Modem			**V13a**
3/4G			**V13b**
Wi-Fi			**V13c**
Organisation broadband service (e.g. cable modem)			**V13d**
Organisation operated dial up modem service			

14. **Where do you store complete and incomplete work? (choose more than one option)**

	Never	Seldom	Usually	Always	
Electronically					**V14a**
File drawers					**V14b**
On work surface					**V14c**

15. **Importance of emerging technologies**

	Never	Seldom	Usually	Always	
Technology has alleviated my administrative role					**V15a**
Technology has increased my administrative role					**V15b**
Technology has reduced my paper work					**V15c**
Technology has made my scheduling of meeting easier					**V15d**
Technology has enabled me to diaries my work					**V15e**
Technology provide me with up to date information					**V15f**
Technology has changed my office work					**V15g**
Technology has changed work groups and my daily work					**V15h**
Technology has help me to receive instant messages					**V15i**
Overall I made minor errors with technology					**V15j**

16. **With new technologies can you complete you daily activities more quickly, effectively and accurately**

Never	Seldom	Usually	Always
1	2	3	4

V16 ☐

17. **Knowledge in the usage of emerging technologies (please tick whichever applicable)**

	Never	Seldom	Usually	Always	
To transmit/receive instantly information					**V17a** ☐
To share information					**V17b** ☐
To manipulate information					**V17c** ☐
To order/acquire information					**V17d** ☐
To manipulate information					**V17e** ☐
To present information					**V17f** ☐
To capture information					**V17g** ☐
To manage information					**V17h** ☐
To access information					**V17I** ☐
To update information					**V17J** ☐

18. **Expectations of emerging technologies**

	Never	Seldom	Usually	Always	
The use of emerging technology meet my expectations					**V18a** ☐
The primary use of emerging technology in my work improve the presentation of my work					**V18b** ☐

19. **Obstacles associated with the use of technologies? (please tick whichever applicable)**

I do not possess communication technology skills		V219a
I have troubleshooting too many browser variations		V19b
It is difficult to adjust		V19c
I have trouble connecting to the internet		V19d
I'm used to old machines or old pattern of work		V19e
I do not know what is technology		V19f
I never use technology to aid me to do my work		V19g
I don't have sufficient access to other office devices		V19h
I have trouble connecting to internet		V19l
I'm not skilful in latest technology		V19j
It too difficult to use technology		V19k
I do not possess the background knowledge of the competencies required for my effectiveness in today's office		V19i
I don't have the technical support		V19m
It is extra work		V19n
Overall I don't have the necessary skills		V19o
There are no obstacles		V19p

20. **Training**

	Never	Seldom	Usually	Always	
Did your organisation provide you with a formal training of the job you do that involves use of technology					V20a
In your own perspective do you think you need train in terms of using technology					V20b
I need more time for technology skills or browsing the internet					V20c
One of my goals is to learn more ways to use technology in an unlimited ways					V20d

21. **I'm pleased with the way in which I am carrying out my daily duties using emerging technologies**

No	Yes	
1	2	V21

22. **How would you describe your overall experience using emerging technologies**

Fair	1	V22a
Good	2	V22b
Average	3	V22c
Excellent	4	V22d

Thank you for your participation

Appendix E – Managers Interview Questionnaires

1. How long have you been working for the department?
2. There are different types of office technology equipment that one can use to carry out daily roles and responsibilities, such as computers, fax machines, telephones etc. In your environment, which office technologies are available to utilise in carrying out your administrative functions?
3. How do you use these technologies in performing your administrative functions?
4. Do you think utilising Microsoft applications and programs can administrators improve performance and efficiency in carrying out their functions?
5. Does the department allow employees access to internet services such as social media?
6. In general, do you think the emerging of technologies has a positive or negative influence on how you carry out administrative duties effectively?
7. In your opinion, what might be the challenges when utilising new technologies to perform your duties?
8. In your opinion, do you think that work training in the department can improve or contribute on the improvement of administrative functions and efficiency?
9. Technology evolves rapidly. How to do you perceive the adoption of new technologies in your working environment?