E-GOVERNMENT SUSTAINABILITY: A CASE STUDY OF THE GAUTENG PROVINCIAL GOVERNMENT, SOUTH AFRICA

by

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E-GOVERNMENT SUSTAINABILITY: A CASE STUDY OF THE GAUTENG PROVINCIAL GOVERNMENT, SOUTH AFRICA

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ _____

SIGNATURE DATE

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Peer-reviewed Research Publications from the study

Articles Published

Masemola M.B, Phahlane M.M. and Ochara N.M. (2019). A Proposed Framework for Digital Government Services' Sustainability in the Gauteng Provincial Government (South Africa). In the proceedings of the *IEEE Open Innovations (OI)* Conference, 02 – 04 October 2019, Cape Town, South Africa.

ABSTRACT

The advancement of information and communications technology (ICT) has been changing not only the daily lives of people but also the interactions between governments and citizens. The South African government, in the Gauteng province, the province's department of e-Government decided to take advantage of this advancement and implemented some electronic services for its citizens. The problem is that there is not enough literature that details how electronic services are implemented in the provincial government, that is, how the roll out happens and how the e-services are sustained beyond the implementation phase as part of service delivery provision to citizens. The main goal of this study was to determine how e-Government services' sustainability can be ensured in the Gauteng provincial government.

The research adopted the Actor Network Theory (ANT) as an underpinning theory, ANT has been used by Information Systems (IS) researchers as it acknowledges that non-human actors play a role in networks and are neither neutral nor fully controlled by individuals. The Technology-Organisation-Environment Model (TOE), is another model which was used in this study, as TOE is a suitable instrument for organisational-level research. The study used an interpretive, qualitative case study to understand the case of Gauteng e-Government with interviews as data collection methods. A purposive sample of management and operational employees were interviewed using semi-structured interviews and organisational policies as data collection methods in the Gauteng e-Government offices.

The emerging themes from the collected data allude to the fact that the impact and benefits of electronic services projects must be consistently monitored and evaluated in order to achieve broader public governance goals, support economic growth and serve citizens better. Awareness and broader education of the implemented services to citizens must form part of e-Government projects which will ensure that citizens perceive the economic benefits of using electronic services and engage with the implemented platforms meaningfully.

The study concluded that e-Government sustainability is dependent on the planning phase of the project for it to realise its goals and this must be planned for appropriately in order to ensure citizens' use of the services provided. Further, the tools implemented by the

department of e-Government in the Gauteng Provincial Government must be used as tools for citizen empowerment.

The study contributes practically by providing a framework for e-Government sustainability in local government which can be used by government officials to guide their e-Government initiatives. It contributed theoretically that ANT is still one of the robust theories in information systems research to understand networks and actors within that network. Methodologically the use of an interpretive qualitative case study to determine sustainability has uncovered the depth of the state of sustainability in ‘e-Government services’ in local government. The study contributes to context by offering a thorough understanding of sustainable electronic services that is unique to the South African public sector.

Keywords

Electronic government, digital government, digital divide, e-Government, e-Governance, e-Government services, Electronic services, e-Government Monitoring and Evaluation, e-Government sustainability, Digital government sustainability, Electronic participation

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DEDICATION

I dedicate this dissertation to my family. A special feeling of gratitude for being my cheer leaders throughout the journey of my study. Thank you for your unceasing support, reassurance and encouragement. Your patience and motivation have greatly contributed to the completion of this study. Thank you!

ABBREVIATIONS

ANT	Actor Network Theory
e-Government	Electronic Government
e-Governance	Electronic Governance
e-Participation	Electronic Participation
e-engagement	Electronic Engagement
e-involvement	Electronic Involvement
e-services	Electronic Services
GPG	Gauteng Provincial Government
GCR	Gauteng City Region
ICT	Information Communication Technology
ICT4D	Information and Communication Technologies for Development
IS	Information Systems
IT	Information Technology
LDC	Least Developed Country

M&E	Monitoring and Evaluation
NPM	New Public Management
OECD	Organisation for Economic Co-operation and Development
TAM	Technology Acceptance Model
SDGs	Sustainable Development Goals
TMR	Transformation, Modernisation and Re-industrialisation
T-O-E	Technology-Organisation-Environment model
4IR	Fourth Industrial Revolution

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CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE STUDY

1.1. OVERVIEW OF THE CHAPTER

This chapter provides the foundation for the study and comprises the background to the study, the study context, definitions of key terms, background to the research problem, problem statement, main research question and sub-questions, the research aim, research objectives, underpinning theory, research methodology, contributions of the study and the dissertation outline.

1.2. BACKGROUND OF THE STUDY

Electronic government, also known as e-Government, is defined by Twizeyimana and Andersson (2019) as the concept of governments' use of Information and Communications Technologies (ICTs) together with the administrative change to improve the operations and structures of governments. Countries across the world have adopted the concept of electronic government to efficiently provide services to their citizens (Chipeta, 2018). The United Nations (2016), define e-Government as the use of ICTs by governments to conduct business both internally and externally. e-Government is a form of provision of government services to citizens through electronic means, as well as the facilitation of interactions between government and other stakeholders electronically.

Sabani, Deng and Thai (2018) highlight that the advancement of e-Government simplifies processes in public institutions, thereby improving their efficiency and effectiveness. The government of Indonesia recognised the significance of e-Government in making public services more accessible and transparent to the broader public (Republik of Indonesia, 2014). In 2001, the government officially introduced the 'e-Indonesia' initiative for facilitating the development of e-Government (Republik Indonesia 2014). e-Government is presently a high priority on the agenda of many developing countries. Bwalya, Du Plessis and Rensleigh (2011) note the initiatives were undertaken by Southern African Development Community (SADC) countries, Botswana, Mozambique and Malawi to develop and promote e-Government through deliberate ICT policies and deployment of ICT platforms. The impact of having these

deliberate efforts towards e-Government is meant to ensure that citizens do use and engage in electronic services with their governments.

According to Joshi and Islam (2018), the sustainability of electronic government (e-Government) services in developing countries is still a great challenge. In the latest E-Government Development Index (EGDI) (2021), the substantial investment and formulation of policies towards e-Government initiatives have catapulted the country of Ghana to be the top African country with regard to e-Government implementation, according to Abusamhadana, Bakon and Elias (2021). An evident challenge with how e-Government service offers benefits to citizens in Ghana and the challenges that the initiatives face seem to be overlooked by researchers. Adaba, Nwainyekule and Frimpong (2021), note that the government of Tanzania has also developed e-Government plans led by the country's e-Government Agency (eGA) in order to establish a strategy for e-Government adoption and implementation. Coetzer (2022), emphasises that South Africa, as a developing country, has also adopted e-Government services for its citizens, however, it is also faced with similar challenges as other developing countries. For e-Government services to be considered efficient and effective, there should be continuous availability of these services to the citizens (Faber and Gradus, 2018). However, due to infrastructure challenges in developing countries, this is not always the case.

According to Chipeta (2018), for these services to be sustainable, various stakeholders must have a common understanding of how this would be realised from the planning stages up to the implementation phase. Porogo and Kalusopa (2021) suggest that another aspect of sustainability is ensuring that legislation, in the form of policies and guidelines, is part of project plans. Sigwejo (2015) observed that for researchers to explore e-Government in developing countries, it is equally important to understand the e-Government policy process, its design, execution and evaluation for ensuring electronic services' sustainability to citizens.

The OECD 2017 report states that developing countries, such as South Africa, have in the past few years embarked on the development and implementation of digital government, synonymously known as e-Government programmes. These programmes are based on governments' key policy prioritisation (Bhatnagar and Singh, 2010). The OECD (2019), later declared that research on the public sector has indicated that many government institutions

around the world are still faced with the challenges of a quickly changing environment and are increasingly struggling to respond to rising expectations and demands of citizens for more efficient and interactive government, as a result, the sustainability of e-Government projects is often negatively impacted.

1.2.1. e-Government in Developing Countries as Compared with Developed Countries

e-Government in developed countries is not on the same level as in developing countries, for example, some of these challenges include a huge digital divide, insufficient electronic infrastructure and a shortage of skills and capabilities for the design, implementation, use and management of e-Government systems, as well as low levels of education (Twizeyimana, 2017).

The abovementioned challenges play a role in e-Government sustainability. Shkarlet, Oliychenko, Dubyna, Ditkovska and Zhovtok (2020) note that the implementation, adoption and use of e-Government are at different stages across different countries in the world. This is due to the fact that developed countries are at an advantage in implementing and rolling out new e-Government components due to refined ICTs in their countries. Apleni and Smuts (2020), on the other hand, noted that in developing countries, e-Government initiatives compete with factors such as health services and high unemployment. For this reason, developed countries tend to see better implementation and sustainability of electronic services initiatives as compared to developing countries.

It can be stated, without a doubt, that from a global perspective, the countries of sub-Saharan Africa are particularly underdeveloped in the implementation of e-Government, with the exception of South Africa (Schuppan, 2009). Despite South Africa being an exception, there are challenges that South Africa still experiences with regard to ICT use as well as e-Government. Letseka and Pitsoe (2018) state that the provision of electronic services in South Africa is still a challenge due to the minimal or lack of ICT and other infrastructure in certain areas of the country.

In light of the above background of research done on e-Government sustainability in the African continent, this study has looked at the sustainability of e-Government services at the Gauteng Provincial Government's Department of e-Government. The Gauteng Department of e-Government is a department within the Gauteng Provincial Government (GPG) in South Africa. The following section explores the research context of the study.

1.3. RESEARCH CONTEXT

This section discusses the geographical location where the study is based. The country of South Africa is introduced and briefly discussed. The provincial government in which the study is based is also discussed. The state of e-Government in South Africa and government plans on how initiatives relating to e-Government are also analysed.

1.3.1. South Africa Overview

According to the official (Department: Statistics South Africa, 2021), the country of South Africa is divided into nine provinces, namely: Eastern Cape, Free State, Gauteng, Kwazulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape. These provinces vary considerably in land size and population. The smallest province, according to land size, is Gauteng. Although it is small in land size, the Gauteng province is highly urbanised. Figure 1. Below shows the map of the Republic of South Africa.

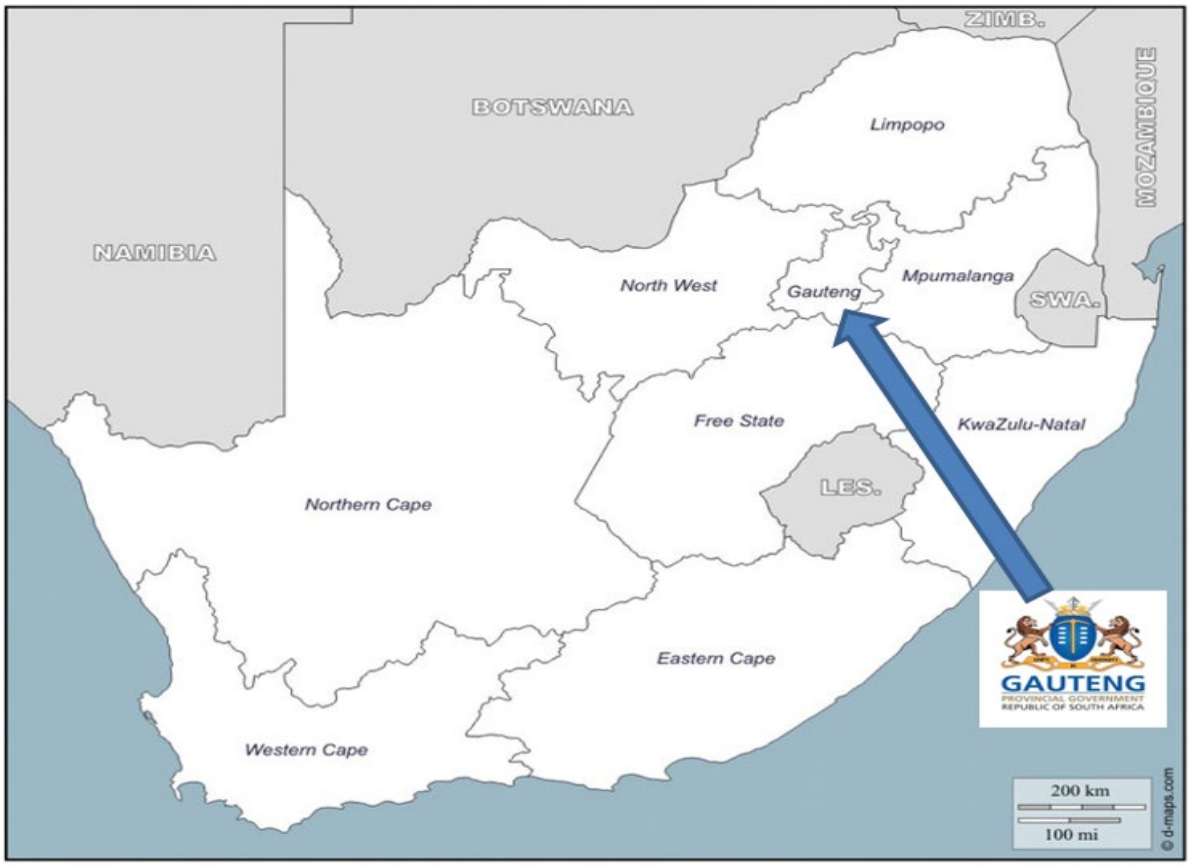


Figure 1: Map of South Africa, showing the location of Gauteng Province (Official South African Government Website: www.gov.za)

Figure 1 shows the map of South Africa indicating each province in the country. All the provinces in South Africa have their own legislature, premier and executive council. The country shares boundaries with Namibia, Zimbabwe, Botswana, Mozambique and Eswatini. The kingdom of Lesotho is completely surrounded by South Africa. The country has eleven official languages: Sepedi, Sesotho, Setswana, siSwati, Tshivenda, Xitsonga, Afrikaans, English, isiNdebele, isiXhosa and isiZulu.

1.3.2. Gauteng Provincial Government

The Gauteng provincial government is a provincial government in one of the nine provinces in South Africa. The province is the economic hub of the country. The province, as well as the country of South Africa as a whole, faces many challenges with regard to service delivery to

its citizens (National Development Plan (NDP) 2030). It is, therefore, important for the Gauteng provincial government to keep abreast with technological advancements to provide adequate service delivery to its citizens. The provincial government created a department called the Department of e-Government in 2015. The department's primary functions include the following: improving service delivery to its citizens, modernising the public service and stimulating the province's knowledge-based economy. This is according to the mandate of the Gauteng department of e-Government (Gauteng Department of E-Government, 2021).

1.3.3. e-Government in South Africa

The National e-Government Strategy and Roadmap (2017) states that there are currently several role players in the South African Government that have a legislative mandate, be it directly or indirectly, to manage, enable, develop, or implement e-Government. The main purpose of the National e-Government Strategy and Roadmap was outlined as a guide for digital transformation of public service in the Republic of South Africa. Some of the legislative framework detailed in the roadmap include:

The *Electronic Communication and Transaction (ECT) Act of 2002*–this act aims to facilitate and regulate e-Government services and electronic communications as well as transactions between public and private bodies, institutions and citizens. The other legislative framework listed in the roadmap is The *Public Service Act of 1994*, inclusive of all its amendments–the purpose of this act was to empower the Minister of Public Services and Administration (MPSA) to come up with and establish norms and standards that relate to, amongst others: information management and e-Government in the public sector.

The *Public Service Regulations of 2001*, inclusive of all its amendments–proposes regulations for e-Government in Chapter 5. This section acknowledges three areas of e-Government. The first area requires all government departments to manage Information Technology (IT) effectively and resourcefully to ensure that IT improves the delivery of public services to citizens. The second area focuses on information security; this requires the MPSA to provide a handbook called the *Minimum Information Security Standards (MISS)*. All public servants are required to comply with the MISS. The third and final area is concerned with

interoperability, wherein the MPSA together with the Government Information Technology Officer Council (GITOC), must issue a handbook on *Minimum Interoperability Standards (MIOS)*. All government departments are required to comply with MIOS.

The *State Information Technology Agency Act, 1998 (Act No. 88 of 1998)*, amended in 2002, is responsible for the formation of a company referred to as the State Information Technology Agency (SITA). The SITA institution has the mandate to provide information technology, information systems and related services to, or on behalf of government departments. Therefore, SITA plays an essential role in ensuring the execution of the e-Government Strategy in the country.

According to the *National e-Government Strategy and Roadmap (2017*), the government of South Africa recognised the need and importance of delivering services to citizens through the use of Information and Communications Technologies as far back as the year 1995. The evolution of e-Government initiatives in South Africa is illustrated in Table 1 below.

Table 1: Evolution of e-Government in South Africa

1995: White Paper on the transformation of public service was released. This White Paper proposed the creation of a number of new and additional structures, including the Presidential Review Commission (PRC).1 **1995:** White Paper on the transformation of public service was released. This White Paper proposed the creation of a number of new and additional structures, including the Presidential Review Commission (PRC).2 **1997:** a White Paper on transforming public service delivery was released labelled as the Batho Pele White Paper. The purpose of this White Paper was to provide a policy framework and a practical implementation strategy for the transformation of public service delivery. The DPSA was instrumental in the development of the eight Batho Pele (put the people first) guiding principles which should be taken into consideration in the implementation of e-Government in South Africa. **1998:** the Presidential Review Commission (PRC) released a report which detailed the PRC's main findings and recommendations in relation to the operation, transformation and development of the South African Public Service. Chapter 6 addressed the problems that were associated with Information Management, Information Systems and Information Technology in the public service. As a consequence of the recommendations of the PRC, the DPSA was granted the administrative responsibility for ICT in government. The formal ICT governance framework of Office **2011:** NDP introduces a single cohesive strategy to ensure diffusion of ICTs in all areas of society and economy. **2012:** SITA developed an e-Government Framework and started offering e-services. 2014: establishment of the new Department of Telecommunications and Postal Services and transfer of e-Government mandate from DTPS and SITA	of the Government Chief Information Officer (OGCIO), SITA and Government Information Technology Officer's Council (GITOC) was established to proactively bring value to government in terms of ICT use for internal administrative applications and general government service provisioning to citizens and business entities in society. **1999:** The Thusong Service Centre programme of government was initiated to extend services of government to outlying areas where people live. The primary focus has been rural and underserviced communities with the aim of providing citizens with access to government services and information. **2001:** the DPSA produced an e-Government policy document entitled 'Electronic Government: The Digital Future – A Public Service IT Policy Framework'. The DPSA also released the first version of Minimum Interoperability Standards (MIOS). MIOS specifies the technical standards and policies required for the achievement of interoperability of ICT systems across the public sector. **2002:** Electronic Communications and Transactions Act (ECTA) was promulgated. **2004:** the DPSA established an e-Government Batho Pele Gateway which is a publicly accessible, central government services information portal. **2007:** Information Society and Development (ISAD) Plan by DTPS adopted with emphasis on e-Government. **2015:** Gauteng and Western Cape provinces developed their provincial e-Government Strategies. **2016:** approval of the National ICT Integrated Policy White Paper, with emphasis on digital transformation of public service and the need to develop a National e-Government Strategy and Roadmap. 2016: Development of the National e-Government Strategy and Roadmap.

Source: National e-Government Strategy and Roadmap, 2017.

The National e-Government Strategy and Roadmap of 2017 further acknowledged that there have been several e-Government initiatives in South Africa at national, provincial and district levels. Some of these initiatives have been successful and can be replicated. Provinces such as the Gauteng and the Western Cape have progressed to a stage where they have introduced Provincial e-Government Strategies and have established independent e-Government departments.

1.3.4. e-GOVERNMENT PLAN FOR THE GAUTENG PROVINCIAL GOVERNMENT

The department lists amongst other regulatory frameworks, the South African *National Integrated ICT Policy White Paper of 2016*, in their approved Strategic Plan for 2020 to 2025. The *National Integrated ICT Policy White Paper of 2016* gives a brief proclamation of the main points of the all-encompassing policy framework for the transformation of South Africa into a comprehensive and trailblazing digital and knowledge society. The policy emphasises and defines existing strategies such as South Africa Connect, the national broadband policy, the National Information Society and Development Plan, as well as the National Cybersecurity Policy Framework of 2012.

The Strategic Plan (2020-2025) of the Department of e-Government in Gauteng outlines that the Department also derives its mandate from the Constitution of the Republic of South Africa (Act 108 of 1996). This is the mandate and background within which the Department operates and it is defined within Sections 125 and 195 of the Constitution.

In the following sections, the study continues to elaborate on what e-Government Services entail in the Gauteng provincial government's department of e-Government.

1.4. e-GOVERNMENT SERVICES IN GAUTENG PROVINCIAL GOVERNMENT

The responsibility of Gauteng's e-Government Services is to implement, among others, the following electronic services: the school admission system and the job application portal which are discussed below.

1.4.1. Gauteng School Admission System

The School admission system is a system that enables parents to apply online for their children who will be doing Grades 1 and 8 at public schools. Parents have the option of

applying to a school of their choice and can also select other options in case their first choice is not successful (Gauteng Department of e-Government, 2021).

1.4.2. Gauteng Provincial Government (GPG) Professional Job Centre Portal

The GPG Professional Job Centre is a portal that enables job seekers to register their profiles, view and apply for advertised vacancies. The vacancies are advertised by the Gauteng Provincial Government to ensure an efficient, effective and development-oriented public service in the Gauteng provincial government. These vacancies are updated when there are vacant jobs in the Gauteng provincial government (Gauteng Department of e-Government, 2022).

1.5. e-GOVERNMENT DEVELOPMENT AND PROGRESS

The United Nations (UN) (2016) indicates that countries with low e-Government Development Index (EGDI) are largely African countries. A total of fourteen (14) African countries are categorised within the low-EGDI as compared to zero (0) in Europe, 0 in the Americas, 2 in Asia and 0 in Oceania. According to the 2018 UN e-Government survey, most of the countries ranked in the Low-EGDI group are African countries which constitute 14 countries out of 16. Some of these African countries include the Central African Republic, Chad, Comoros, Djibouti, Equatorial Guinea, Mali, Niger and Somalia amongst others. Table 2 below shows the e-Government development rankings in Africa. South Africa is ranked at position 5 according to the United Nations 2018 African countries' e-Government development index and world government development ranking.

Table 2: Top-ranked countries in Africa on e-Government Development

		e-Government development index		World government development ranking	
Rank	**Country**	**2018**	**2012**	**2018**	**2012**
1	Seychelles	0.5192	0.4179	84	104
2	Mauritius	0.5066	0.4645	93	77
3	South Africa	0.4869	0.4306	101	97
4	Tunisia	0.4833	0.4826	103	66
5	Egypt	0.4611	0.4518	107	86
6	Cape Verde	0.4297	0.4054	118	106
7	Kenya	0.4212	0.3338	119	124
8	Morocco	0.4209	0.3287	120	126
9	Botswana	0.4186	0.3637	121	117
10	Namibia	0.3937	0.3314	123	125

(Adapted from United Nations (2018)

Table 2 above demonstrated the position of South Africa in the African countries' e-Government development index and world government development ranking.

1.5.1. South Africa's EGDI (E-Government Development Index) Position

The e-Government Development Index (EGDI) measures e-Government performance in all the United Nations member states. The EGDI assesses e-Government development at a national level and is founded on three components - the online service index, the telecommunication infrastructure index, and the human capital index.

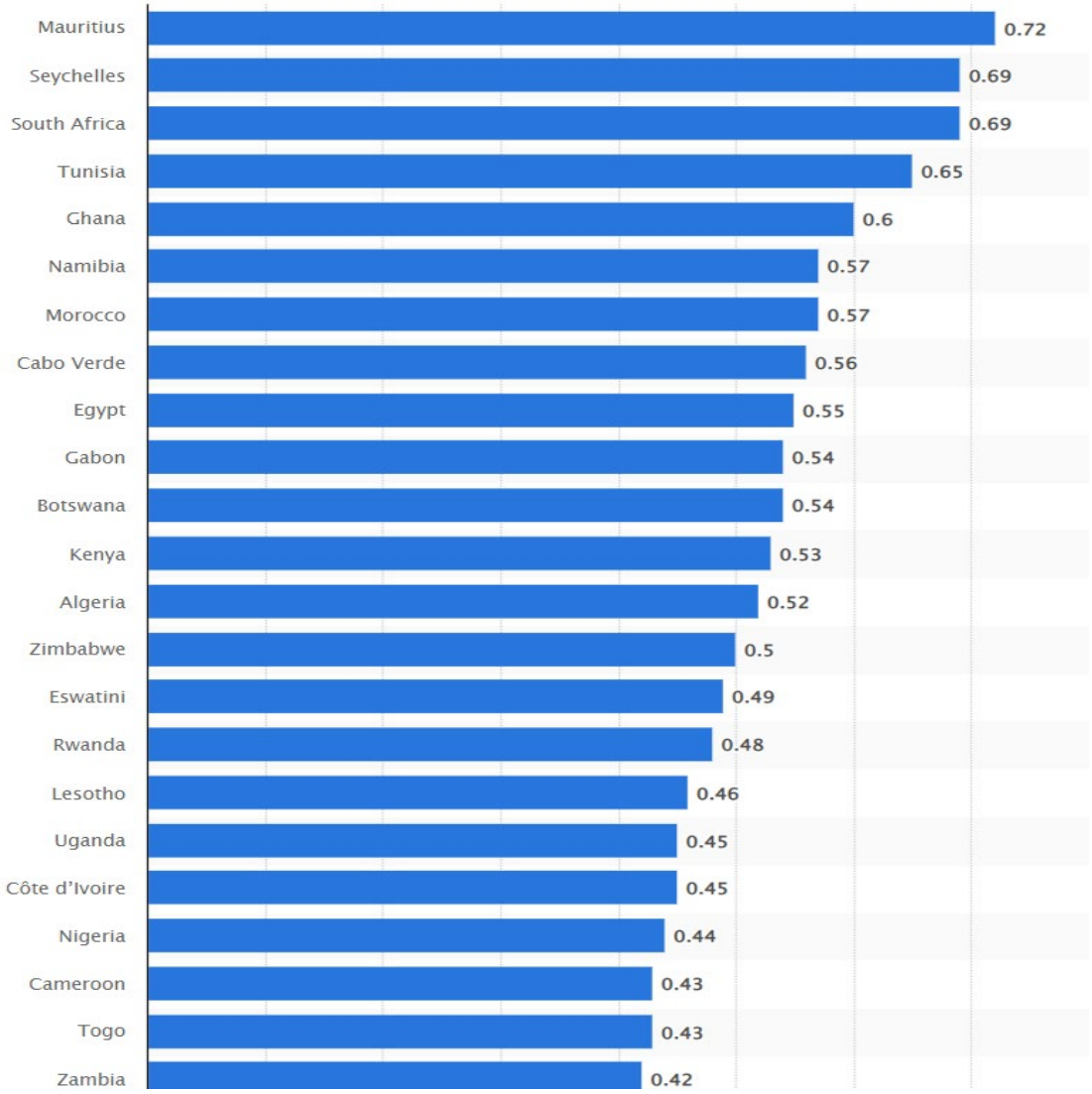


Figure 2. The e-Government Development Index (EGDI) in African countries for 2020 (Adapted from the EGDI index rating)

The United Nations defines the EGDI's method of e-Government assessment as follows:

> "The EGDI is based on an in-depth survey of the online presence of all 193 United Nations Member States. The index evaluates national websites and how e-Government policies and strategies are applied in general and in specific sectors for the delivery of essential government services."

With an average of (0.39), the EDGI's index rating for the African continent is nearly a third lower than the world average of 0.60. South Africa is ranked at position three according to the

EGDI 2020 index rating. The ranking has not changed since the 2018 e-Government development assessment on the African continent.

1.6. DEFINITION OF TERMS THAT MAKE UP THE DISSERTATION TOPIC

The following sub-sections discuss some of the key terms that form part of the study. Key terms that form part of this study are e-Government, e-Government Services and e-Government Sustainability. Their definitions are as follows:

1.6.1. e-Government

Rahude (2016) defines e-Government as the use of any information and communications technology (ICT)-based initiative to connect government to citizens and business nationally and internationally; provide information to government employees; and connect government agencies together to achieve higher levels of service delivery, internal processes and the sharing of government information.

1.6.2. e-Government Services

Uwizeyimana (2015) argues that e-Government services are services provided by governments to citizens by using technologies. This is in order to improve the ease of connection between the government and the citizens.

1.6.3. e-Government Sustainability

According to Mohammed, Olayah, Ali and Gazem (2020), e-Government sustainability refers to the ability of citizen-centric trustworthy e-Government Services that adopt modern technology to deliver a cost-saving, resilient and effective service, and to support active participation and satisfaction from all levels of users.

1.7. BACKGROUND TO THE RESEARCH PROBLEM

Kitaw (2006) argues that African countries face several challenges to fully put in place and adapt e-Government applications that are developed in other countries and for those contexts. This exacerbates the challenges and makes it more difficult to adopt and use these e-Government applications as they do not fit Africa's unique context. To highlight these ongoing challenges, the following gaps have been identified in the literature to focus on e-Government services' provision shortcomings.

1.7.1. Gap 1 - Lack of monitoring and evaluation of e-Government services' sustainability

Grant (2005) argue that although considerable attention has been focused on how e-Government Services implementation can help public agencies improve service offerings to its citizens, more emphasis must be placed on studies that focus on their sustainability.

e-Government sustainability is often not monitored and evaluated in order to ensure that these services do achieve what they are designed to do (Hatsu and Ngassam, 2016). The design of these e-Government services does not always factor in long-term sustainability. It is, therefore, important to constantly evaluate the implemented services and measure them against the government's vision and ensure that the intended purpose is accomplished (Mtshali, 2015).

1.7.2. Gap 2 – Political buy-in when dealing with e-Government initiatives

The lack of political buy-in is often cited as the main cause of the deficiency of e-Government Services' sustainability (Srinivasan, 2004). Agangiba, Kabanda and Brown (2018) argue that this challenge results from the lack of effective institutions and the 'top-down' approach to e-Government where the support for the lower-level officials remained only as long as the initial 'champions'.

1.7.3. Gap 3 – ICT Infrastructure

Wu, Ding, Xu, Mo, and Jin (2016), identified inadequate ICT infrastructure as one of the main obstacles to implementing and ensuring the sustainability of e-Government in developing countries. Cao and Niu (2019), affirm that the resources required for the implementation and sustainability of e-Government such as digital technology, broadband coverage and communication tools are often a challenge for the governments of developing countries. The inadequate network coverage and internet access limit people from accessing e-Government services, especially in poorer communities (United Nations, 2018).

1.7.4. Gap 4 – Security, Privacy and Trust

Privacy and security are important elements of concern in the establishment, use and sustainability of e-Government around the world (Wu and Wu, 2019). Arpaci (2019) asserts that developing countries often lack clear and appropriate strategies to assure their citizens that their information is protected from any unauthorised third-party access. More research is needed to investigate citizens' trust from multiple dimensions to provide a comprehensive understanding of the background of citizens' trust to promote their participation in the government's electronic services (Khan, Rahim and Maarop, 2020).

1.8. PROBLEM STATEMENT

A sustainable e-Government requires government services to be more citizen-focused and simplified. Based on the gaps from the aforementioned sections, the gaps are highlighted in the literature that details sustainability of e-Government services' provision to citizens. The study then builds on these gaps to highlight the limitations in the available, although non-comprehensive studies that concentrates on sustainable e-government as a problem and the importance of this study.

1.9. RESEARCH QUESTIONS

The primary question of the study was:

How can e-Government Services be made sustainable in the Gauteng Provincial Government?

The following are secondary questions that are addressed in the study:

1. What is e-Government Services sustainability according to the Gauteng Provincial Government?
2. How are e-Government Services evaluated for sustainability in the Gauteng Provincial Government?
3. How can e-Government be made to be sustainable in the Gauteng Province?

1.10. RESEARCH AIM AND OBJECTIVES

The aim of this research is to determine how e-Government Services' sustainability can be ensured in the Gauteng provincial government.

The primary research objective of the study is to determine how e-Government services can be made sustainable in the Gauteng provincial government.

To address the above-mentioned aim, the study came up with the following secondary objectives:

1. Use document analysis to determine what e-Government Services sustainability is according to the Gauteng Provincial Government.
2. Describe how e-Government Services' sustainability is evaluated by the Gauteng Provincial government.
3. Describe how e-Government could be made sustainable for the Gauteng Provincial Government.

1.11. UNDERPINNING THEORY AND FRAMEWORK

The study used the Actor Network Theory (ANT) as an underpinning theory. Georges (2019) refers to the actor network theory as a powerful method that can be used for analysing 'innovation as process'. Actor Network Theory is described by Bilodeau and Potvin (2016) as a theory used to gain an understanding of how to change complex systems, where it has been used to examine technology or new strategies for service improvement.

The Technology-Organisation-Environment Model (TOE) is another model which was used in this study. TOE, is defined by Aristyana, Nizar, Meidi, and Ayuning (2018) as a framework that represents various dimensions that influence the implementation and adoption of innovation. Hadwer (2021) posits that TOE is a suitable and all-inclusive instrument for organisational-

level research. It is a comprehensive model for the technical aspects of e-Government and the external and internal organisational factors that employ the successful use of electronic services.

1.12. RESEARCH METHODOLOGY

The research methodology for this study is summarised as follows: The research philosophy followed was interpretive. A qualitative research approach was used. A case study research strategy was adopted. The unit of analysis is the organisation, that is, the Gauteng Department of e-Government. The population included officials tasked with managing the school admission system and the jobs application portal, as well as senior managers and decision-makers. Data was collected using semi-structured interviews and documents as secondary sources. The time horizon is cross-sectional. Data were analysed using thematic analysis for the interviews and document analysis.

1.13. CONTRIBUTIONS OF THE STUDY

This section of the research presents the contributions of the study to the Information Systems and e-Government area and body of knowledge. The four contributions made by this study are theoretical, practical, contextual and methodological.

1.13.1. Theoretical Contributions

The Actor Network Theory (ANT) was used in this study and was relevant because of its contribution to the understanding of e-Government sustainability. ANT deals with systems made of human and non-human entities and it proposes a relational view between those entities. The Technology-Organisation-Environment Model (TOE) was a relevant model to be employed in this study as it looks at factors that influence an organisation when adopting innovation.

1.13.2. Practical Contributions

This study contributes to a standardised method of evaluating electronic services' sustainability in the provincial government. The study can assist the provincial government of Gauteng to ensure that e-Government initiatives that are embarked upon in the province respond to the needs of citizens and communities in the province.

1.13.3. Contextual Contributions

This study has been conducted to understand the status of e-Government initiatives' sustainability in South Africa, with the Gauteng province as the main focal point. Africa, as a continent, is unique when it comes to the use of technologies and the status of e-Government initiatives in most of its countries. The Gauteng province is one of two provinces that have established dedicated e-Government departments whereas the other is the Western Cape. It is, therefore, important and beneficial to gain an understanding of the sustainability of the province's e-Government initiatives in this context.

1.13.4. Methodological Contributions

The study used interpretivist philosophy with a qualitative case-based research approach of the department of e-Government in Gauteng to study its electronic services' sustainability. The theory of the research was multidimensional using an interpretive case. This methodology allowed the researcher to be in an environment where e-Government initiatives are planned, implemented and monitored for sustainability. The framework conceptualised from this study could assist with the addition of detail to the theory.

1.14. DISSERTATION OUTLINE

Figure 3 below provides an overview of the study. This study comprises seven chapters. The overview of the chapters is as follows:

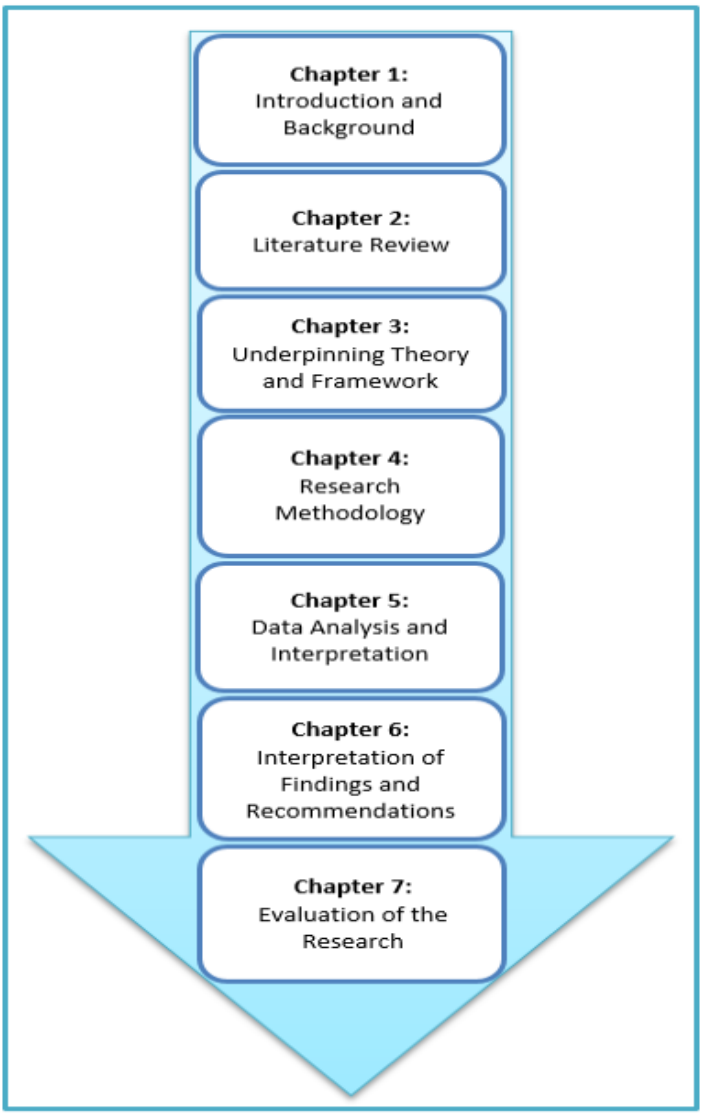


Figure 3: Overview of the study

1.14.1 Chapter 1: Introduction and background of the study

In the first chapter, the introduction to the study is presented followed by the background to the study, the problem statement and the primary research question. Secondary research questions and the objectives and aim of the research are listed. Some of the key terms used in the study are described and the research context is presented.

1.14.2 Chapter 2: Literature Review

The literature review presented in this study is from the surveyed literature. A thorough review of studies done regarding digital government, electronic or e-Government and the benefits of these concepts in the provision of services to citizens, is done in this chapter.

1.14.3 Chapter 3: Underpinning theory and framework

In the third chapter, theoretical frameworks that are generally utilised in the field of information systems are presented. The framework that closely underpins this study is reviewed and presented.

1.14.4 Chapter 4: Research Methodology

In the research methodology chapter, the high-level cognitive thinking, instruments, approach and methods utilised in the execution of this study are presented.

1.14.5 Chapter 5: Data Analysis and Interpretation

The fifth chapter presents the analysis and interpretation of data that has been presented in the preceding chapters. The data is structured and presented according to themes which are linked to the primary research question and subsequent secondary questions of the study.

1.14.6 Chapter 6: Interpretation of Findings and Recommendations

The interpretation of findings as well as recommendations are presented in this chapter. The research questions and objectives are related with reference to existing knowledge, and the importance of the study is elaborated upon.

1.14.7 Chapter 7: Evaluation of the research

In this last chapter, the research is evaluated. The study is assessed and a report is presented on how the research constitutes theoretical, practical, contextual as well as methodological contributions.

1.15. SUMMARY OF THE CHAPTER

This chapter has provided a broad overview of the study as an introductory section. The study background is presented which is linked to the research problem. The research problem is outlined in this chapter. An assessment of key concepts about electronic government (e-Government) and the sustainability thereof is presented in this chapter.

The Gauteng Provincial government, in particular the department of e-Government, are introduced as well as some of the electronic services that the department offers to the citizens of Gauteng. Additionally, this chapter makes reference to the primary research question with the subsequent sub-questions as secondary questions. The study's objectives, research context and aim are presented in order to offer reasons for why conducting the study. The overview of the dissertation was illustrated in section 1.14 (Dissertation Outline [overview of the study]).

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

The main purpose of this chapter is to review the literature which is associated with this research as detailed in the preceding chapter. Attention will be on the sustainability of electronic government or digital government, also referred to as e-Government. The focus of the literature review is the Gauteng provincial government's Department of e-Government and the broader e-Government and digital government field of research.

2.2. ORIGIN OF e-GOVERNMENT: DIFFERENT PERCEPTIONS

Although many governments are increasingly deploying ICTs in their daily operations, the reason for doing so is rarely probed. Garcia and Moyano (2007) employed institutional theory and the study of rules as the substance of change to explain why and how e-Government has evolved over the years. In their study, two essential dynamics in e-Government evolution were identified. Initially, e-Government was generated out of the Internet boom. Subsequently, e-Government actions and functions are being developed from the national government level down to local government or municipalities.

Ingrams (2014) asserts that the development and evolution of e-Government generally emanate from a need to streamline public administration and reinvent how governments work. For similar reasons, Brown (2005) looked at e-Government in a comparative public administration context. His study described e-Government as originating from the interactions between three separate groups of forces, each of which has gone through its own revolution, namely, government, Information and Communications Technologies and management concepts.

On the first aspect of government, Sangki (2018) indicated that e-Government has mainly developed from the government's need to respond to the rising and continuously changing demands and capabilities of the public, the economy as well as society. Mimbi and Lehong,

(2017) emphasised in their study that e-Government came to light as the New Public Management (NPM) strategy to bring alignment between government and citizens that was created during the 1990s' 'managerialism'.

In clarifying the history and advancement of e-Government Thomas (2005) stated that the intricacies and risks attached to technology have created an important role in the government sector for the management of administration. A confirmatory argument is made by Ashay, (2014) who added that e-Government is a result of the change from technology to management, and the expansion of scope performance and policy intentions. e-Government is based on the integration of IT capacity – primarily databases and websites – to facilitate self-service through ICT platforms. On the other hand, the e-Government concept is still considered relatively new and an imported concept in developing countries such as South Africa.

Janowski (2017) utilised a four-phase Digital Government Evolution Model to describe the development of e-Government. This model describes the evolution of e-Government from a transformational perspective. It includes the following stages: digitisation (technology in government), transformation (electronic government), engagement (electronic governance) and contextualisation (policy-driven electronic governance).

The summary of this model suggests that e-Government developed to transform the internal processes of government and the relationships between government and other political and social stakeholders. This was done in an attempt for local strategies to highlight essential differences in political and social setups in different countries.

2.3. DIGITAL GOVERNMENT AND e-GOVERNMENT

Rajah and Lekorwe (2017) presented that the current literature categorises e-Government definitions into three main categories: (a) e-Government as the governments' use of Information and Communications Technologies (ICTs), (b) e-Government as the delivery of government services over the internet, and (c) e-Government as a facilitator for public service transformation by the means of ICTs. Thus, the definitions stress three general aspects: context (government), technology (Internet) and outcome (transformation enabler). The classification of these definitions is based on their areas of emphasis. In this understanding, e-Government can be described from the viewpoint of context, technology and results. E-Government is understood narrowly to be the government's provision of services through the deployment of particular technologies.

The Gauteng Department of e-Government's approved strategic plan for 2020-2025, states that the strategy, firstly, strives for the shift from e-Government to e-Governance whereby the link of government to the inhabitants of the province is universal and secondly, that the public service must be modernised such that citizens can effortlessly engage with the government and obtain government services. The effortless interaction will result in more affordable and accessible government services for the citizens. The strategic plan further lists the following as part of the plan to provide sustainable e-services to the citizens of the province: the roll-out of the Gauteng Broadband Network (GNB) across the Gauteng City Region (GCR), the delivery of electronic services, interoperability and the elimination of duplication for requests within the GCR, effectiveness of governance, the promotion of more use of existing electronic services as well as the stimulation of the ICT economy in the Gauteng province.

Information and communication technologies (ICTs) have been acknowledged to have remarkable administrative capabilities (AlBar and Hoque, 2017). For instance, ICTs are able to form a networked structure for interconnectivity (Yang, 2018), service delivery, efficiency and effectiveness (Bekkers and Zouridis, 2009).

The term digital government or e-Government has in recent years appeared to be a prevalent term in government sectors. There has not been a comprehensively accepted definition of the

electronic government model (Halchin, 2004). Therefore, in order to cover the variation of the utilisation and the terms currently in use, numerous definitions are presented below.

e-Government is defined as the utilisation of the Internet and the World Wide Web for providing government information and services to citizens (UN and ASPA, 2017). The term e-Government may also take into consideration the use of other ICTs in addition to the Internet and the World Wide Web.

The e-Gov or e-Government endeavours by the European Union (EU) are based on the following definition: ’e-Government is the use of Information and Communication Technologies (ICTs) in public administrations merged with organisational change and new skills to improve public services and democratic processes (EU, 2004).

The World Bank defines e-Government as ’the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management.’ (World Bank, 2004)

The definitions presented above are more about governance rather than the government. e-Government practice tends to use varied definitions. In summary, e-Government is about what is happening within government organisations. In information systems research the term is often restricted to those government organisations that provide services to citizens or companies. e-Governance, in contrast, refers to the broader system involved in managing society. The system includes activities not only by government organisations but also companies and non-profit organisations, and citizens (Riley, 2004). Table 3 below is a comparison of Government and Governance, as well as e-Government and e-Governnace.

Table 3. Government Compared to Governance, e-Government Compared to e-Governance.

Government	**Governance**
Superstructure	Functionality
Decisions	Processes
Rules	Goals
Implementation	Coordination
Outputs	Outcomes
e-Government	**e-Governance**
Electronic service delivery	Electronic consultation
Electronic productivity	Networked societal guidance
Electronic workflow	Electronic controllership

Source: (Riley, 2004)

Gronlund (2004) further illustrates that different definitions lead to different performance measures for e-Government. Table 4 below presents some examples, but there are evidently many more. Information Systems e-Government research is every so often focused on matters directly linked to the implementation of technical systems, such as those pertaining to the first definition. Measurements can arguably be more easily aimed at the first definition than the fourth. Nevertheless, the fourth definition scores higher on applicability from a governance point of view as it assesses outcomes rather than activities.

Table 4. Examples of Performance Measures Relevant to the Different e-Gov Definitions

	Definition	Example Measure
Def. 1	Internet (online) service delivery and other Internet-based activity	Online presence, cost cuts, access
Def. 2	e-Government is equated to the use of ICTs in government. While the focus is generally on the delivery of services and processing, the broadest definition encompasses all aspects of government activity	Productivity as measured by specified tasks, e.g., service delivery
Def. 3	e-Government is defined as a capacity to transform public administration through the use of ICTs or indeed is used to describe a new form of government built around ICTs. This aspect is usually linked to Internet use	Implementation of strategy, degree of political control over public administration
Def. 4	Better government	Improved interaction with business and industry, increased transparency, reduced corruption

Source: Gronlund (2004)

Palvia and Sharma (2007) state that e-Government offers an allowance for universal access to the government's information resources, replacing the traditional operations of physical government offices with their characteristic red tape by facilitating the participation of citizens in public policy-making processes, facilitating improved productivity, and enhancing cost savings.

e-Governance focuses on the administration and management of resources within the organisation. Examples of e-Government activities might include the e-procurement of government tenders, electronic voting (e-voting), tax filing (e-filing), and the payment of bills. On the other hand, e-governance includes applications that manipulate information to calculate retirement benefits, access to important public service delivery applications, and collaboration among government employees (Bwalya, 2010).

In light of this information, some of the differences between the characteristics of e-Government and e-governance are noted and listed in Table 5 below.

Table 5: Distinction between e-Government and e-Governance

e-Government	e-Governance
• ICT superstructure and institutional approach to public service delivery systems using ICTs • Rules and roles in public service delivery frameworks • Implementation of e-government • Electronic productivity (e-productivity) • Electronic voting (e-voting) • Electronic workflow	• System functionality and performance • Business processes for public service delivery • e-Consultation • e-Participation • Coordination of public service delivery systems • Goals and outcomes

(Adapted from Bwalya, 2010)

2.4. CLASSIFICATION OF e-GOVERNMENT APPLICATIONS

Min-Shiang, Chun-Ta, Jau-Ji, and Yen-Ping (2004), categorised e-Government applications and identified four basic communities involved in e-Government: Government, Officeholder, Citizens, and Business. All applications in an e-Government system revolve around these four communities. The classification of the e-Government applications as proposed by Min-Shiang et al. (2004) is outlined below.

2.4.1. Government-to-Government e-Government (G-to-G e-Gov)

Wahanisa, Mukminto, Damayanti and Muhtada (2021) state that Government-to-Government e-Government (G-to-G e-Gov) provides for the exchange of information between the inter-organisational governmental departments, such as the system for receiving official documents and for the dispatch of such documents.

Ndou (2004) asserts that the efficiency and effectiveness of processes are enhanced by the usage of online communication and collaboration which permit the sharing of databases and resources and the merging of skills and competencies. G-to-G e-Gov provides information regarding payments and benefits policies, training and learning opportunities in a readily accessible manner. The most important aim of G2G development is to increase and improve inter-government organisational processes by streamlining collaboration and coordination.

Provincial governments depend on other levels of government. In the case of Gauteng, it depends on the national level to efficiently deliver services and allocate resources and responsibilities. G-to-G includes sharing data and facilitating electronic transactions between governmental entities.

2.4.2. Government-to-Officeholder e-Government (G-to-O e-Gov)

Min-Shiang et al. (2004) also refer to what is called Government-to-Officeholder e-Government (G-to-O e-Gov) – this class refers to the support of intra-organisational government officeholders, public affairs organisations, and secondary organisations' cooperative processes and procedures of government related matters and affairs.

2.4.3. Government-to-Citizen e-Government (G-to-C e-Gov)

Seifert (2003) refers to G-to-C e-Gov as a category whereby citizens have direct and convenient access to government information and services from everywhere at any time, through the use of multiple mediums. Additionally, to make certain transactions, such as paying governmental debts and making applications for certain benefits, the ability of G-to-C initiatives to break through possible time and geographic limitations assists to connect citizens who may not otherwise come into contact with each another and may, in turn, facilitate and increase citizen participation in government.

In this class, citizens are aware of the government-related services that are provided by the government. These services are provisioned through communication networks and citizens'

access to services with their personal identities through secure mechanisms (Khan, Pervez and Abbasi, 2017).

2.4.4. Government-to-Business e-Government (G-to-B e-Gov)

Pascual (2003), refers to Government to business or G-to-B as a significant category that can bring efficiencies to both governments and businesses. G-to-B includes a variety of services that are exchanged between the government and various business sectors, including the distribution of policies, rules and regulations. Business services that are offered under this category include obtaining current business information, downloading application forms, submitting tax information, renewing licenses, business registration, obtaining permits, and so forth.

Services that are offered through G-to-B transactions also play a very important role in business development, in particular the development of small and medium enterprises (SMEs). The opportunity of being able to do online transactions with the government decreases red tape and, therefore, assists businesses to become more competitive.

Government institutions deal with private business entities on a regular basis. Therefore, businesses are aware of the services that are provided by government institutions. These services are provided through communication networks and private businesses use these services by accessing them through legal identity via secure mechanisms.

2.4.5. Citizen-to-Citizen e-Government (C-to-C e-Gov)

In Citizen-to-Citizen e-Government, the Government provides the service of being a mediator role for the exchange of information. As an example, the Government will act as a problem solver in citizens' disputes. In this type of application, the Government is a mediator that offers help in terms of information sharing through government personnel (Wahanisa et al., 2021).

2.4.6. Business-to-Business e-Government (B-to-B e-Gov)

Similar to the above-defined application of C-to-C e-Government, in Business-to-Business e-Government, government institutions play an intermediary role in the exchange of information. For example, the Government could invite business entities to bid for contracts that contain sensitive and classified government information. These private businesses might produce the country's weaponry, such as tanks, warships, and warplanes (Min-Shiang et al., 2004).

2.4.7. Citizen-to-Government e-Government (C-to-G e-Gov)

Electronic communities are formed and established based on the demands of the citizens (demand aggregate-driven). As an example, citizens in a government constituency may request assistance or give suggestions to the citizenry (Min-Shiang et al., 2004).

2.4.8. Business-to-Government e-Government (B-to-G e-Gov)

Similar to the above-described application of C-to-G e-Government, electronic communities are formed based on the demands of the business (demand aggregate-driven). Private businesses may request governmental patronage or proposals from other businesses through electronic means.

Yildiz (2003) summarises some of the e-Government categories in Table 6 below. These categories, together with their characteristics, definitions and examples, are illustrated

in Table 6. This illustration suggests that it is possible to identify the concept of e-Government differently depending on one's view.

Table 6: A general evaluation of the theory and practice of e-Government (Yildiz, 2003)

Parties of communication	Content	Dominant characteristics	Definition	Example
Government-to-Government (G2G)	Government information and services	Communication, coordination, standardization of information and services	E-administration	Establishing and using a common data warehouse
Government-to-Citizen (G2C)		Communication, transparency, accountability, effectiveness, efficiency, standardization of information and services, productivity	E-government	Government organization Web Sites, e-mail communication between the citizens and government officials
Government-to-Business (G2B)		Communication, collaboration, commerce	E-government, e-commerce, e-collaboration	Posting government bids on the Web, e-procurement, e-partnerships
Government-to-Civil Society Organizations (G2SC)		Communication, coordination, transparency, accountability	E-governance	Electronic communication and coordination efforts after a disaster
Citizen-to-Citizen (C2C)		Communication, coordination, transparency, accountability, grassroots organization	E-governance	Electronic discussion groups on civic issues

Electronic participation or commonly known as e-Participation has become a common instrument used by government entities the world over as an integral part of e-Government initiatives. The next section covers definitional issues and locates e-Participation in relation to other governance-related concepts with which it interacts.

2.5. e-PARTICIPATION: AN OVERVIEW

Definitions of e-Participation found in academic literature vary, but many of these studies revolve mostly around the basic concept of making use of ICTs to provide service delivery to citizens (Medaglia, 2012). e-Participation is defined as a branch of e-Government with a distinct emphasis on citizen engagement for deliberation and decision orientation (Welch, 2012). The definition used by the United Nations (UN) is 'the methods and procedures of engaging citizens through ICTs in policy, decision-making, service design and delivery in order to make it participatory, all-encompassing and purposeful' (UN, 2014).

Saebo (2008), defines e-Participation as a social undertaking, facilitated by ICT, involving collaboration between citizens and public administration as well as political figures. This particular definition demonstrates the key significance of the triangle: citizens, public administration and policymakers. In all these definitions, the government has a significant role to play.

e-Government literature commonly focuses on the electronic delivery of public services to citizens by means of ICTs. e-Participation is, on the other hand, considered part of e-Government because e-Participation refers to participation endeavours that are facilitated through ICTs. The domain of policy-making is typically considered part of e-Government and is included in studies of e-Participation (Rose et al., 2015).

The realisation of e-Government initiatives fundamentally depends on the values that prevail in public administration. This is applicable at all levels of public administration, specific public entities, and individual personnel (Steinbach et al., 2019). The philosophy of government directives and guidelines for public administration, as well as the principles that individual institutions promote, translate into ways of seeing engagements with citizens and outlining a role for ICTs to facilitate those relationships. Rose et al. (2015) suggest the existence of four ideal types of value points in public administration: professionalism, efficiency, service and engagement. The four positions envision the government-citizen relationship differently, convey diverse priorities in terms of e-Government, and have dissimilar views on the role of information technology.

Table 7: Four value positions for e-Government

	Professionalism ideal	Efficiency ideal	Service ideal	Engagement ideal
Public administration tradition	Providing an independent, robust and consistent administration, governed by a rule system based on law	Providing lean and efficient administration, which minimises waste of public resources gathered from taxpayers	Maximizing the utility of government to civil society by providing services directed towards the public good	Engaging with civil society to facilitate policy development in accordance with liberal democratic principles; articulating the public good
Representative values	Durability, equity, legality and accountability	Value for money, cost reduction, productivity and performance	Public service, citizen centricity, service level and quality	Democracy, deliberation and participation
E-Government purpose	Provide a flexible and secure digital public record and support standardized administrative procedures	Streamline, rationalize and transform public administration around digital technologies	Improve the availability, accessibility and usability of government services by providing them online	Support deliberative interactions with the public and the co-production of policy
Technological frame for IT	Infrastructural: IT securely carries the bureaucratic record in accordance with the law; encourages or enforces compliance with the rules	Automation: IT increases performance and reduces costs through automation of administrative tasks	Service enabling: IT extends the range, availability and quality of services for citizens	Networking facilitation: IT underpins communicative interaction between governments and citizens

(Adapted from: Rose et al., 2015)

The above factors also influence the institutionalisation of e-Participation, that is, how new ways to engage citizens sustainably impact internal processes in the organisation after initial adoption and implementation (Steinbach et al., 2019).

2.6. SUMMARY OF THE CHAPTER

e-Government, its implementation, adoption and sustainability are widely explored branches of knowledge areas. In this chapter, these terms were reviewed and explored in order to get a better understanding of how they have been analysed in other studies. An understanding was also sought of how these terms may have arisen to be fundamental features of the problem statement for this study. This section of the study has, in addition, explained the foundation and aspects of digital government and electronic government. The next chapter deals with the assessment of the theoretical frameworks underpinning this study.

CHAPTER 3: UNDERPINNING THEORY AND FRAMEWORK

3.1. INTRODUCTION

This study has looked at information systems theories and frameworks that could be used to underpin the study. The Actor Network Theory (ANT) and the Technology-Organisation-Environment (T-O-E) framework as introduced in briefly in chapter one of this study, were adopted by the researcher and combined their use as the underpinning theory and framework. The following section reviews the chosen ANT and T-O-E framework in more detail as they were used in the study as the common reference theory and framework.

3.2. ACTOR NETWORK THEORY (ANT)

ANT was developed by Bruno Latour, Michel Callon and others in the 1980s (Bilodeau and Potvin, 2018). Xavier, Naveiro, Aoussat and Reyes (2017) refer to the elements of ANT as the location of machines in an environment where there are other elements such as humans. The view in this theory is that technologies do not evolve under the evolution of scientific logic. Consequently, 'our technologies mirror our societies (Medeiros et al., 2014), as they are continuously shaped and reshaped by the collaboration of a diversity of mixed forces inside the networks. Terzi (2019) locates machines and technologies in e-Government initiatives as actors in the networks just as humans are. Actors in e-Government express the relationships between each other by intermediaries–an actor writes an intermediary and often puts a social meaning into it (Agbozo, 2019). Intermediaries describe their networks and compose them by giving them meaningful forms (Hojnik and Ruzzier, 2016). They are typically found in the form of texts, technical artefacts or human skills.

The ANT theory has been selected for several reasons. Firstly, it is a well-known theory and a lot of work has been done to explain, evaluate, develop and apply this theory. Secondly, it has other variations building on the original theory. Thirdly, this theory also manages to overcome important limitations of the technologically based 'ICT as an enabler' perspective taken by some literature. Law (2018) defines ANT as tools and methods of analysis that consider everything in the natural and social worlds as networks of relations. ANT is a framework for analysis and it is a popular theory within the science and technology field.

Lopes and Thome (2022) asserts that, the Actor Network Theory came into existence and materialized with the focus on understanding how human and non-human entities contributes in building knowledge through their socio-materiality positioning. Understanding actors' relationships in ANT means describing how actors are defined and related, and their responsibility to remain faithful to their associated groupings. Bilodeau and Potvin (2018), state that ANT has evolved to become a valuable tool for assessing multifaceted situations.

ANT was used in this study because it is a well-established theory in the sociology of science and technology, and has been implemented in various topics. Additionally, ANT is beneficial in interpretative and qualitative research and can assist with describing and understanding the context of case studies (Stanforth, 2006). This study investigated stakeholders and support systems as the actors. Complex elements and interaction, communication, as well as participation are the actor networks.

In this study, ANT has allowed the researcher to shift from a technical perspective of the research problem and reasonably apply a much broader, dynamic and multidisciplinary view to addressing information systems (IS) research problems. ANT can help IS researchers in multiple ways including 'making sense of the spoken and unspoken rules within the network, the point at which various actors are in fact in agreement with the vision for the network' and understanding the key determinants of the network (beyond technology application) and also to highlight other essential non-human elements apart from just ICT (Andrade and Urquhart, 2010). The following diagram illustrates the Actor Network Theory.

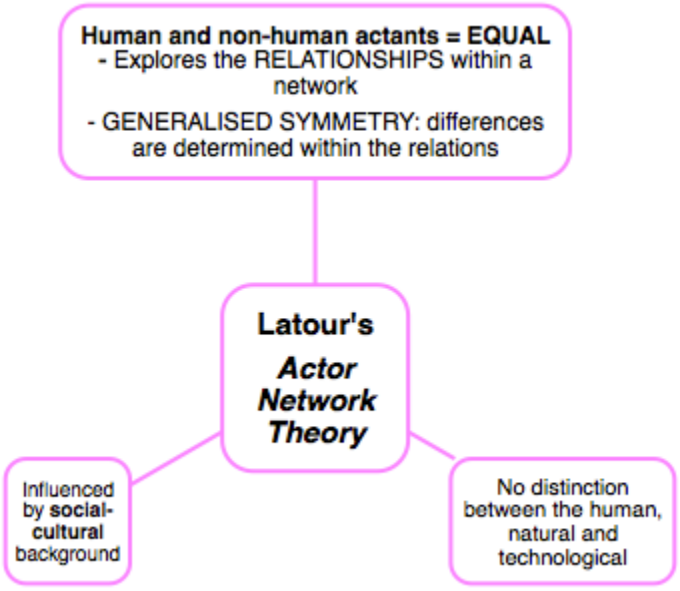


Figure 4. Actor Network Theory (Bilodeau and Potvin, 2018)

According to Bilodeau and Potvin (2018), the Actor Network Theory treats the world as a set of related bits and there is no social order. There are only endless attempts at organising through the formation of networks. Actors present preferable solutions and contest for them. By bringing associates on board, they can bring together resources to sustain an obligation for the newly established network.

ANT can, therefore, be used as an approach to information systems studies which have also mainly avoided technologically based theories of interconnection between ICTs and organisational effects. It is, therefore, seen to be ideal to employ this theory in this research on e-Government services sustainability for the Gauteng provincial government.

3.2.1. Limitations of ANT

A limitation of the Actor Network Theory is that in ANT technology and social aspects are equal. In today's society, this theory lacks development for the current period. There are, however, more positives about the use of ANT in the research of e-Government sustainability. Due to the electronic nature of e-Government initiatives, electronic services are meant to be provided to citizens in spatially disconnected areas. The most helpful aspect of this study was that ANT facilitated viewing electronic services in the Gauteng provincial government as an active part of the social context.

3.3. TECHNOLOGY-ORGANISATION-ENVIRONMENT (T-O-E)

According to Salwani, Marthandan, Norzaidi and Chong (2009), the T-O-E framework was developed by Xu, Zhu and Gibbs (2004) for organisational acceptance established on the Contingency Theory of Organisations. Awa (2012) claimed that the T-O-E framework involves a nonexclusive arrangement of elements to expect the probability of technology adoption. The T-O-E framework recommends that an organisation should be consistent with its surroundings and environmental needs and its power is guided by both internal and external factors like the environment, organisation size, and organisation strategy (Teo, 2009).

The technology-organisation-environment framework by Tornatzky and Fleischer (1990) is chosen for this research due to its focus on organisational factors instead of individual ones. Three key factors that affect organisational adoption were identified as technology, organisation and environment (Arpaci et. al., 2012)

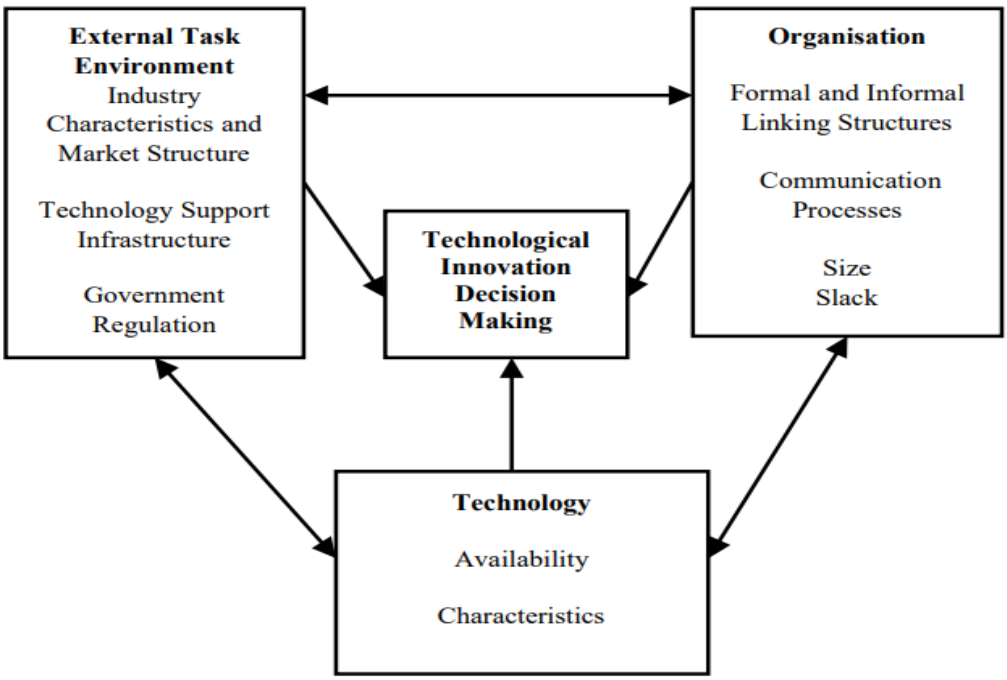


Figure 5: The Technology-Organisation-Environment Framework (Adapted: Zhu et. al., 2006)

According to Xu et.al., (2004), three contexts influence the technology innovation, adoption and implementation process, and these contexts of the T-O-E framework are the technology context, organisation context and the environmental context.

3.3.1. Technology Context

Pan, (2008) assert that, the technology context consists of variables that have a direct impact on individuals, organisations and industry's adoption of technological developments and consist of five innovation attributes articulated by (Ramdani et al. (2009)). The significant variables are system absorption, digestion, trail ability, and intricacy, whilst observability is seen as insignificant.

3.3.2. Organisation Context

Awa (2012) posit that the main variables of organisational context include:

> "financial resources, firm structure, organisational slack, innovation capacity, knowledge capability, operational capability, strategic use of technology, trust, technological resources, top management support, support for innovation, quality of human capital, organisational knowledge accumulation, expertise and infrastructure, and organisational readiness, while financial capacity and technology competence are identified as insignificant (Awa (2012))."

3.3.3. Environmental Context

Zhu et al. (2003) define the environmental context as an area that deals with variables like competitiveness, relations with buyers and suppliers, and areas of the industry life cycle. They further assert that the environmental context variables cover client order, exchanging accomplice pressure, merchant uphold, business reliance, ecological vulnerability, data power and organisation force.

3.3.4. Limitations of the T-O-E framework

Ramdani et al. (2009) indicate that the T-O-E framework's limitation is that it is not well integrated or well developed and needs more research studies on organisational adoption. Low et al. (2011) likewise presented that the T-O-E system has not significantly developed as a model. Wang et al. (2010) affirm that the major constructs and the variables in the T-O-E

framework are not brief and differ from context to context. The following section describes the conceptual research framework that was used for the research.

Having reviewed the above mentioned ANT and T-O-E, their relevance to this study is presented as follows. The Actor Network Theory (ANT) is relevant in this study due to the fact that, it allows the researcher to follow actors (both human and non-human) in a socio material setting, where technology and social practices intersect. In this study, e-Government initiatives bring together ICTs and people in order to solve social needs through electronic service delivery. The Technology-Organization-Environment (T-O-E) framework describes the adoption of technology with emphasis on how the technological, organizational and the environmental contexts influence the process. Both the ANT and T-O-E are relevant in this study as they address various elements of ensuring that e-Government is made sustainable in Gauteng provincial government.

3.4. CONCEPTUAL RESEARCH FRAMEWORK

Based on limitations of existing e-Government maturity models that cover e-Government Services sustainability, the following are some of the limitations identified: e-Government models are mostly technology-centric, presenting a narrow definition of e-Government and view e-Government as tools to provide web-based e-Government services. Taking the aforementioned limitations into consideration; a proposal of elements that can be incorporated into a model to support the Gauteng Provincial Government in delivering sustainable e-Government services are discussed as follows: Governance, Organisational and Managerial elements, as well as Citizen factors.

3.5. GOVERNANCE

The regulation and governance of ICTs may be improved to enhance the performance and sustainability of the government's goals (De Haes and Van Grembergen, 2009). This regulation and governance largely depend on ICTs' positioning within the government organisation owing to the critical role of ICTs in creating a conducive environment for the delivery of organisational objectives (De Haes and Van Grembergen, 2009). It is also critical

to monitor and evaluate these kinds of projects in order to ensure their sustainability. This view applies to the e-Government services sustainability for the Gauteng provincial government in the sense that the sustainability of these services needs to be evaluated to ensure adherence with organisational objectives.

3.6. ORGANISATIONAL AND MANAGERIAL ELEMENTS

Stakeholder management:

Provincial governments have a range of stakeholders with whom they must maintain relationships. These stakeholders may include citizens, businesses and non-profit organisations. It is, therefore, important that provincial governments such as the Gauteng provincial government maintain communication with these key stakeholders. It is also accepted that local government stakeholders have a significant role to play in the delivery and success of e-Government services (Rowley, 2011).

Government Silo Operations:

The World Bank reports that Government programmes have become silos that are supply-driven–focused only on outputs and not on the citizen's needs (The World Bank, 2011). The silos come from how governments have historically organised themselves for managerial efficiency and service specialisation resulting in silos.

e-Government was intended to get rid of the silos and assist governments in becoming more integrated and citizen-centric (Krishnaswamy, 2006). To fully realise the benefits of e-Government services, it will be important for the Gauteng Provincial Government to ensure that its ICT resources are used in a way that will ensure the sustainability of the implemented e-Government Services.

3.7. CITIZEN FACTORS

Trust:

Building citizen trust is important for enabling e-Government. Bélanger and Carter (2008) indicate that trust in government is one's perception regarding the integrity and capacity of the agency providing the service. The Gauteng provincial government needs to build trust with the users of its e-Government Services. When users have bad experiences with an ICT service, for example, if the personal data of users is compromised through a security breach, trust in the provider will be lost by the users.

Language:

South Africa has eleven officially recognised languages. The South African government is thus faced with the challenge of ensuring that it appropriately caters to its citizens in their language of choice for service delivery. This is an area that the provincial government needs to be sensitive to.

Research shows that there are benefits to ensuring that e-Government services are provided in the language of choice to citizens. The consideration of language within a bi-lingual or multi-lingual society in e-Government improved citizens' trust world-wide (Segovia et al., 2009).

Electronic Participation:

Citizen participation is important for the improvement of political accountability of the public sector towards its citizens (The World Bank, 2011). The World Bank report also notes that the voice of the citizens appears to have been lost due to the government's focus on centralised planning and meeting targets without considering how citizens would prefer the services to be delivered.

3.8. SUMMARY OF THE CHAPTER

Based on the underpinning theory of ANT and the theoretical framework of TOE, this chapter highlighted their importance in information systems research. The chapter also highlights the conceptual framework for e-Government sustainability, which is based on the underpinning theory and framework, the research questions and objectives.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. INTRODUCTION

This chapter will present the research methodology that was chosen for the study. The methodology is based on the research paradigm, the research approach, the research strategy, the sampling strategy, the sample, the population, the unit of analysis, the data collection and data analysis methods. The next section discusses the research onion as one of the perspectives used to understand research methodology.

4.2. RESEARCH ONION AS A MODEL FOR DESIGNING RESEARCH METHODOLOGY

According to Melnikovas (2018), The research Onion, used as a model to design research methodology, is a broad research approach which defines how research must be embarked upon. The research onion includes a system of belief and philosophical norms. These norms form the consideration of research questions and support the selection of research methods. Research methodology is a fundamental portion of a dissertation. The methodology assists with ensuring the uniformity between selected tools, methods and the fundamental philosophy. One of the ways of research methodology construction is based on the theoretical concept of the research onion depicted in Figure 6 below as proposed by Saunders et al. (2016).

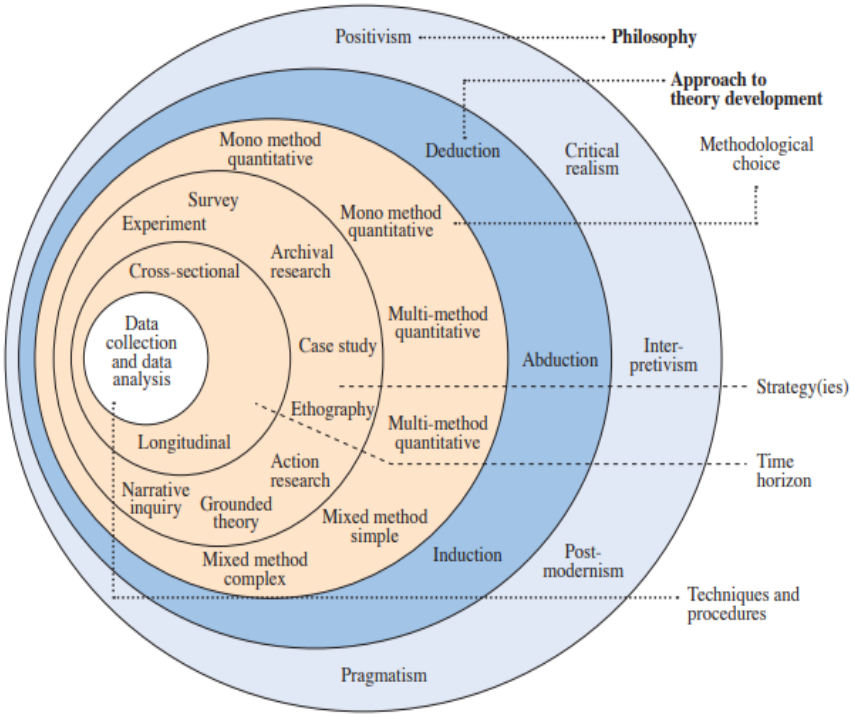


Figure 6. Research Onion (Saunders et al., 2016)

The research onion offers a reasonably comprehensive description of the main phases or stages which are to be achieved to convey an effective methodology (Raithatha, 2017). The research methodology begins by outlining the research's main philosophy, choosing approaches, methods and strategies as well as defining time horizons, which all in all take the research logic to the research design – main techniques and procedures of data collection and analysis.

The research onion consists of the following main layers and was adapted for use in the study at the Gauteng Department of e-Government.

1. Research philosophy – this forms the foundation of the research by delineation of ontology – nature of reality, epistemology – nature, sources of knowledge or facts, and axiology – values, beliefs and ethics of the research.

2. Approach to theory development – can be attributed to the research philosophy on the previous level, and the approach to theory development which usually includes deduction whereby the research starts with an existing theory, then proceeds to raising a question or hypothesis and data collection in order to confirm or reject the hypothesis; and induction

whereby the research starts with observation and data collection, moves to description and analysis in order to form a theory; and abduction which states that observation of an empirical phenomenon is followed by the research which comes up with a best speculation or conclusion based on available evidence. The deductive approach is employed for existing theory testing, whereas the inductive approach is normally used to develop a theory, or in fields that have little research on the topic. The abductive approach typically starts with a surprising fact and thereafter moves between induction and deduction approaches in order to find the most likely explanation.

3. Methodological choice – defines the use of quantitative and qualitative methods or a varied mix of both methods.

4. Strategy – is characterised by the collection and analysis of data through experiments, surveys, archival research, case studies, ethnography, action research, grounded theory, narrative enquiry.

5. Time horizons - This layer describes the time frame for the research – cross-sectional or short-term study, involving the collection of data at a specific point of time; longitudinal – the collection of data repetitively over a long period in order to compare data.

6. Techniques and procedures include data collection and analysis – the use of primary or secondary data, choosing sample groups, developing questionnaire content, preparing interviews and so forth.

The research onion, proposed by Saunders et al. (2016) is a tool which assists with organising the research and developing the research design following the layers of the research onion in phases.

4.2.1. Adapting the Research Onion

In order to adapt the research onion and employ it to this study, the following key layers of the research onion were noted: The research philosophy, The research approach, The research strategy, The methodological choice, The time horizon, The techniques and procedures, Data Collection, Population, Sample, Sampling Strategy as well as Data analysis strategy.

4.2.1.1. Layer 1: Research philosophy

A conventional research methodology is centred around a particular philosophical theory that points towards the techniques and strategies of research (Nweke and Orji ,2009). A historical point of view shows that there are two well-known conventional research philosophies – positivism as well as interpretivism, there are also two recent philosophies – the pragmatist and the critical realist (Mingers, 2006).

Positivism – primarily shows a philosophical attitude of a natural scientist. Whilst Ontology is founded on the objectivist presumptions that entities are observed and exist externally to social actors. As a result, only empirical data and observation may be stated as 'credible'. It is also noted that knowledge is attained through observation and discovering event uniformities, which are centred on law-like, causal and functional associations. According to Saunders et al. (2016), positivism assumes the predictability and controllability of the future. Future forecasts are based on the knowledge of present and past – finding events' uniformities, based on causal, law-like and functional relations, enabling precise calculation of future events by extrapolation.

Interpretivism is a view based on subjectivist ontological assumptions that entities are constituted of discourse, therefore existing or socially constructed reality may be only researched through social constructions such as consciousness or language (Myers, 2008). Reality is socially created and constantly evolving, therefore, knowledge and facts are relative and subjective. Interpretivism assumes the unpredictable nature of the future. The future is perceived as a random, chaotic, disorganised and unpredictable chain of events. Consequently, the control or prediction of the future as such is not possible, knowledge of the future can only be obtained through intuitive strategy (Saunders et al., 2016).

This study has employed the interpretivism research paradigm. Interpretive methods of research in Information Systems (IS) are aimed at creating and understanding the context of the information system, and the process whereby the information system influences and is influenced by the context (Walsham, 2015). Interpretive philosophy is the belief that social reality is subjective because it is socially constructed. Consequently, each person has their own sense of reality and there are multiple realities.

Interpretivism counts on the assumption that social reality is multi-dimensional and affected by the acts of investigating it. In cases where research findings could not be generalised, interpretivism would allow the researcher to transfer and apply qualitative data to other similar perspectives (Collis and Hussey, 2009).

According to Bhaskar (2008), social phenomenon is commonly both causal and interpretive in nature, therefore critical realism, in a way, brings together the two main ontological positions – positive and interpretive, they provide a basis to bridge explanation and understanding. Empirical observation, on the other hand, cannot be the only source of explanation. Causality can be understood only with regard to hidden, unobservable causal mechanisms, which are activated under certain circumstances and these mechanisms or tendencies, whether actualised or not, may not be empirically observable (Welch, 2011).

Causation cannot be reduced to the search for regularities due to the fact that a between cause and effect relationship does not necessarily produce regularity, for that reason, the development of causal explanations should be based on the exploration of generative mechanisms (Danermark, 2002). Within scientific research, this belief causes a change of focus – from researching events to the investigation of mechanisms that produce those events. Saunders et al. (2016) also share a similar view that choosing between a positive or interpretive position may be unrealistic. Therefore, other philosophical positions of scientific research are suggested in addition to the two proposed above.

Pragmatism is based on the presumption that within the research it is possible to adapt both positivist and interpretivist positions - whichever works best for a particular research question. Critical realism is a position based on two ontological assumptions: 1) the world consists of real entities; 2) people recognise the sensations and images of real entities or objects, not the real entities themselves (Saunders et al., 2016). Knowledge is attained by discovering generative mechanisms.

This study on assessing the sustainability of e-Government services in the Gauteng province employed the interpretivist research philosophy.

4.2.1.2. Layer 2: Research Approach

Saunders et al. (2016) identified three main approaches to theory development, namely deductive, inductive and abductive. Deductive research logic refers to reasoning moving from a general rule to a specific law-like inference and is usually used for theory testing. Inductive reasoning is, on the other hand, a way of theory building. It starts with specific observation on the basis of which a general rule is formulated. According to Kuosa (2011), inductive reasoning is mainly associated with intuitive techniques, while deductive reasoning, based on physical argumentation, is aimed to control functions and direct knowledge. The inductive approach is mostly suitable for a case study strategy; hence it was applied in this research. The research strategy provides a complete direction of the research, together with the process by which the research is conducted. This can also be seen as the overall plan of how the researcher addresses the research questions, or a general angle of the research (Bryman, 2008; Saunders et al., 2009).

According to (Paavola, 2006), abductive reasoning is a form of inference, starting with the observation of signs which offers the basic notion for further research. As a result, the abductive inference is a best guess or conclusion based on available evidence. In reference to Kuosa (2011), three research approaches may be distinguished for futures studies: deductive – aimed to direct knowledge and functions control, it also involves the use of physical argumentation; inductive – aimed to control information, it involves the use of structural and categorisation argumentation; abductive – aims to identify structures, connections, contexts and constraints, it also involves the use of cognitive argumentation. This study on the sustainability of e-Government at the Gauteng provincial government adopted the inductive reasoning approach. This is due to the fact that observations were done and a conclusion was subsequently formed.

4.2.1.3. Layer 3: Research Strategy

The research strategy could be described as a more general approach that assists the researcher to select the main data-gathering procedures or a combination of procedures through which the researcher will be able to answer the research question as well as attain research objectives. When research strategies are presented, Saunders et al. (2016) suggest archival research, case study, experiment, ethnography, survey, grounded theory, action

research, as well as a narrative enquiry for being the key research strategies. A case study strategy was chosen for this study at the Gauteng provincial government.

Orlikowski and Baroudi (1991) highlighted six research designs namely: the survey, case study, laboratory experiment, field experiment, action research and others such as practitioner-oriented articles, non-experimental pieces, or descriptive/argumentative. However, Denscombe (2003) summarised four main research strategies that could be adopted in practice, that is, case study, historical research, survey research and experimental study.

The case study is described as a collection of considerable detail from multiple sources about a particular phenomenon within its real-world setting, where the boundaries between the phenomenon have not been clearly evident. This type of research study generally uses the detailed contextual analysis of a single individual, group and event to explore underlying principles. The case study enquiry usually relies on multiple sources of evidence (Yin, 2009).

Case studies are best suited when a comprehensive, complete, assessment is needed. The issue that is being examined is typically a ’contemporary phenomenon in its real-life context’ (Yin, 2009). In this context, a case study thus provides for a thorough assessment of an occurrence in a natural setting usually using diverse sources of data (Tsang, 2014).

4.2.1.4. Layer 4: Methodological choice

Saunders et al. (2016) describe research selections with a focus on the utilisation of qualitative and quantitative methods of research, the use of a simple or complex mix of both can also be employed or the utilisation of mono methods. According to List (2005), there are two main forms of research methods, these are qualitative and quantitative. The study followed a qualitative research approach. The qualitative approach enabled a deeper understanding of how e-Government Services can be sustained in the Gauteng provincial government.

Qualitative analysis is suitable for relating multiple realities and developing a deep understanding and capturing everyday life. The types of data collected include text, pictures or sounds since the interpretation of its meaning is in text or images (Lee and Baskerville, 2003).

Quantitative research methods involve numbers and mathematical operations, while qualitative methods entail a collection of vast descriptive data. The mono method is used when the research is focused either on quantitative or qualitative data gathering. Mixed methods – quantitative and qualitative methods are used within the same research to achieve different aims and offset the constraints of the use of a single method. This study has adopted the qualitative research method in order to gain an in-depth view of how the Gauteng Department of e-Government ensures that electronic services are made sustainable.

4.2.1.5. Layer 5: Time horizons

Time horizons refer to the periods during which the phenomenon is being studied or the chronological horizon of varying scope. Kosow and Gabner (2008) distinguish three basic time horizons which are short-term – up to 10 years; medium-term – up to 25 years and long-term – more than 25 years. They also distinguish static interpretations from a point in time in the future, typically associated with normative strategies as an alternative time horizon. Such a point of retrospective enquiry is usually used for static scenario construction. This study is based on cross-sectional research where data is collected at a single point in time. Cross-sectional studies are observational studies that analyse data from a population at a single point in time (Wang and Chen, 2020). The cross-sectional research enabled the researcher to have a snapshot of the current state of ensuring the sustainability of e-Government initiatives in the Gauteng province.

4.2.1.6. Layer 6: Techniques and procedures – Data collection

Following the research onion step-by-step, the final layer is the techniques and procedures, wherein the research design leads to data collection and analysis. All the preceding choices determine the type of basic data collection and analysis procedures which lead to answering the research questions. The data collection process is a social interaction that includes the researcher and the participants, and are analysed by using any or a combination of the research purpose – descriptive, exploratory, predictive, or analytical. (Saunders et al., 2003). Semi-structured, open-ended interviews and the review of documentation (policy documents and official documentation) were used by the researcher in order to explore how e-Government Services can be sustained in Gauteng. Research data were collected using semi-structured interviews. Top management from the department of e-Government was selected for the semi-structured interviews. The managers were selected due to the fact that they are

involved with the development as well as the implementation of e-Government strategies for Gauteng province.

4.2.1.7. Layer 7: Sampling Strategy

According to Saunders et al. (2000), sampling is a technique that reduces the amount of data needed to collect by taking into consideration only data from a sub-group as opposed to all possible cases or elements. There are various types of sampling strategies that are used in research. Probability sampling is usually associated with quantitative approaches, whereby a sample is chosen as a representative sample from the population where every subject has an equal chance of being selected (Henry, 2017). Non-probability sampling is meant to identify specific groups of people who either possess or live in environments relevant to the social phenomenon being studied (Mays and Pope, 2015).

Quota sampling is, on the other hand, used when the population group is divided into sub-groups; the sub-groups can be divided according to categories such as gender, age and race (MacNealy, 2019). Purposive sampling, which was chosen for this study, is also referred to as judgmental sampling and it is the most popular sampling technique for qualitative research. With purposive sampling, the researcher seeks the most productive sample to answer research questions (Marshall, 2016). Purposive sampling was used in this research because in case study research it enables judgment to be used to select the cases that will relate to the research objective and address the questions.

4.2.1.8. Layer 8: Unit of Analysis

The unit of analysis refers to a person, group of individuals, objects or organisation from which a researcher is collecting data (Kumar, 2018). This study focused on the organisational level as a unit of analysis. The Gauteng Department of e-Government is the unit of analysis in this study.

4.2.1.9. Layer 9: Population

Gerring and Seawright (2008) define population in research as members or subjects that fit into a set of specifications that could provide the most relevant information. The Gauteng

Provincial Government's Department of e-Government will be the focus of this research. Government officials and staff that are tasked with launching and managing the school admission system and the jobs application portal and employees who are well versed with the department's IT strategy, within the Department, were interviewed for this study.

The participants were interviewed and policies and other relevant documents that are associated with Gauteng's e-Government and digital government services were reviewed.

4.2.1.10. Layer 10: Sample

In research terms, a sample is a group of people, objects, or items that are taken from a larger population for measurement (Saunders et al., 2000). The sample should be representative of the population to ensure that findings from the sample can be generalised to the population as a whole. The sample consists of decision-makers, senior managers, and document analysis of strategic documents that the Gauteng provincial government have developed and implemented for the e-Government strategy and implementation process.

4.2.1.11. Layer 11: Data Analysis

Thematic analysis and content (text) analysis were used for this research. The thematic approach to qualitative data analysis which was applied in this research was described by Braun and Clarke (2006). This study will be most useful to decision-makers in the Gauteng provincial government, government officials and Information Technology experts. The results of this research are intended to provide information with regard to how e-Government Services, the school admission system and the jobs application portal in Gauteng can be sustained.

Based on the aforementioned methodological options, the researcher has adopted the following options for the study.

Table 8. Summarised view of the research methodology

Research Design	**Methodology**
The Research philosophy	Interpretive
The Research approach	Inductive
Research Strategy	Case Study
Methodological Choice	Qualitative
Time Horizon	Cross-sectional
Data Collection Methods	Semi-structured interviews Document review
Sampling Strategy	Purposive sampling
Unit of Analysis	Organisational (Gauteng Department of e-Government).
Population	GPG officials and staff tasked with launching and managing the school admission system and the jobs application portal.
Sample	Senior managers Decision-makers Document analysis of strategic documents that the Gauteng provincial government have developed and implemented for the e-Government strategy and implementation process.
Data analysis	Thematic analysis and content analysis

The research methodology adopted for this research is as follows: The research philosophy used was interpretive. A qualitative research approach was used. A case study research strategy was adopted. The unit of analysis in the study was the Gauteng Department of e-Government's Chief Directors responsible for Strategy Management and ICT. The population for the study was the Gauteng Provincial Government's officials and staff who are tasked with launching and managing the school admission system and the jobs application portal. The sample was composed of senior managers and decision-makers, document analysis of strategic documents that the Gauteng provincial government has developed and implemented for the e-Government strategy and implementation process. The time horizon is retrospective,

whilst data collection methods are semi-structured interviews and document reviews. The data analysis techniques used are thematic and content analysis.

4.3. SUMMARY OF THE CHAPTER

This chapter documented the research methodology according to the research onion. The methodology was broken up according to the layers that make up the research onion. They are as follows: research philosophy, research approach, research strategy, methodological choice, time horizons, as well as techniques and procedures, data collection, population, sample, sampling strategy, as well as data analysis strategy. This chapter documented how the study on the sustainability of electronic government services in the Gauteng provincial government was approached and performed. The method and tools used were presented in this chapter.

CHAPTER 5: DATA ANALYSIS AND INTERPRETATION

5.1. INTRODUCTION

The previous chapter highlighted the research methodology and outlined the approaches, methods and data analysis techniques that were used for this research. This chapter presents the results of the study from the data that was collected from the Gauteng Department of e-Government through content and thematic analysis. The analysis of interview data was done using thematic analysis and organisational documents were analysed using content analysis.

5.2. ANALYSIS OF INTERVIEW DATA

A total of four people were interviewed during the study, two in management roles (one in middle management (Deputy Director) and the other in executive management (Director)), and two in operational roles (Monitoring and Evaluation). The respondents were determined and selected by the Gauteng department of e-Government as Subject Matter Experts involved with the implementation as well as monitoring and evaluation of implemented e-Government initiatives. The two management members both started at the Gauteng department of e-Government when it was established in 2015. The two operational members had three and four years' service respectively. Each respondent was interviewed telephonically for about an hour through semi structured interviews with pre-determined and unplanned questions.

The analysis of the data was done using the Actor Network Theory (ANT) by defining its elements. The semi-structured interviews outlined in this section were sourced from the participants of the Gauteng Provincial Government who were interviewed. The collected data from the interviews were analysed according to research themes in a table format based on the Actor Network Theory's semantic elements as illustrated in Table 9 below.

Table 9: Actor Network Theory's semantic elements

ANT Elements	Definition
Source	Any entity that is included in an ANT analysis (Source Actor).
Target	Any entity that is included in an ANT analysis (Target Actor)
Translator	Any entity that is included in an ANT analysis that translates between a Source and a Target (Translating Actor).
Relationships	Indicates the relationship between a Source, Translator and Target

The above table illustrates four main elements of the Actor Network Theory. The source refers to the actor that is being translated. The target is the actor that is being translated for. Whilst the translator refers to the actor that translates the source for the target. Finally, the relationships are the connection between the source, translator and target.

The following section is an analysis of the interview data from the top management members of the Gauteng Department of e-Government. Firstly, the theme is listed then followed by a sub-theme with a quotation to support the sub-theme. A table that details the semantic elements of the ANT is presented and an interpretation is then follows.

5.2.1. Theme one: **Legislation facilitation**

5.2.1.1 Sub-theme: Facilitate policies

The first sub-theme is based on the below table which is about the facilitation of policies by the Gauteng Department of e-Government. *'Facilitating integrated policies and public services to promote sustainable and inclusive economic growth and social development'.*

ANT Elements	Definition
Source	Policy documents
Target	Staff of Department of e-Government
Translator	Integrated policies and public services
Relationship	Facilitation of policies

The above sub-theme of facilitation of policies is defined in terms of source, target, translator and relationship. These elements make up the said theme and they are essential in ensuring that the task of facilitating policies is realised.

5.2.1.2. Sub-theme: Resource allocation

The second sub-theme is about e-Government supporting resource allocation to ensure the provision of services to citizens. *'Sustainability of e-Government will contribute to efficient resource management'.*

ANT Elements	**Definition**
Source	Resource management
Target	Citizens
Translator	e-Government in support of resource allocation
Relationship	Support resource allocation

The resource allocation theme deals with the need for resource management in the Gauteng province to be properly managed so that sustainability of e-Government services is maintained. With access to ICT resources being a challenge in developing countries, the allocation of resources is, therefore, necessary to ensure access to electronic services.

5.2.1.3. Sub-Theme: Infrastructure management

The third sub-theme discusses the need for infrastructure management. '*The intention of e-Government is to improve resource usage in the province'.*

ANT Elements	**Definition**
Source	Improve resource usage
Target	Citizens of Gauteng province
Translator	Infrastructure management
Relationship	Resources and services must be better utilised

Infrastructure management is important in order to assist the department of e-Government in Gauteng to ensure better utilisation of resources and services.

5.2.1.4. Sub-Theme: Monitoring and evaluation

The fourth sub-theme deals with the monitoring and evaluation of electronic services initiatives from the Gauteng Department of e-Government. '*A unit called Strategy Management facilitates planning in the Department'.*

ANT Elements	**Definition**
Source	Improve resource usage
Target	Citizens of Gauteng
Translator	Infrastructure management
Relationship	Resources and services must be better utilised

The monitoring and evaluation sub-theme relates to how plans are aligned with legislative mandates. This is in order to keep track of electronic services and ensure compliance with policies.

5.2.2. Theme two: **Public engagement with electronic services.**

5.2.2.1 Sub-theme: Reliable connectivity

The first sub-theme is based on the table below which is about the provision of reliable connectivity and high-speed broadband by the Gauteng Department of e-Government. '*Department of e-Government is mandated by the province to provide high-speed broadband connectivity to citizens for access to electronic services'.*

ANT Elements	**Definition**
Source	Broadband Internet connection
Target	Electronic services users
Translator	Access to electronic services
Relationship	Provision of reliable connectivity to users

The above sub-theme of reliable connectivity is defined in terms of source, target, translator and relationship. A reliable broadband internet connection is essential for users to interact with electronic services that are offered by the Gauteng Provincial Government.

5.2.2.2 Sub-theme: Digitalisation of identified services

The second sub-theme refers to the prioritisation of services that are identified for digitisation in the Gauteng province. '*The target for the next five years is to ensure that all identified e-services are digitised'.*

ANT Elements	Definition
Source	Digitalisation
Target	Identified government services
Translator	Prioritisation of services
Relationship	Identified services to be digitised in the next 5 years (goal – year 2024)

The above sub-theme demonstrates how the Gauteng Provincial Government has set out to identify services that will be digitised for ease of use by citizens. The prioritised services are earmarked to be digitised in the next 5 years (up to the year 2024).

5.2.2.3. Sub-theme: Customised citizen services

This third sub-theme deals with the provision of customised and intelligent personalised electronic services to citizens of the Gauteng province. '*Electronic services that are provided in the Gauteng province must be tailored to address specific citizen needs, for example, the school admission portal must allocate space for children at schools according to the proximity of their residential address'.*

ANT Elements	**Definition**
Source	Customised electronic services
Target	Citizens of Gauteng province
Translator	Intelligent personalised systems
Relationship	Electronic services that are customised for users

The electronic services that are offered by the department of e-Government in Gauteng need to be aligned with clients' needs.

5.2.2.4. Sub-theme: Performance impact

This fourth sub-theme deals with the monitoring and evaluation of implemented electronic services in the Gauteng province. '*Electronic services that are provided in the Gauteng province must be monitored and evaluated in order to ensure that these services do deliver the value that they have been designed for'.*

ANT Elements	**Definition**
Source	Performance
Target	Electronic Services
Translator	Monitoring and Evaluation
Relationship	Relevant Electronic services to users

The electronic services that are offered by the department of e-Government in Gauteng need to be monitored and evaluated to ensure that they are always aligned with providing relevant services to clients.

5.2.3. Theme three: **Improved services delivery through electronic services.**

5.2.3.1 Sub-theme: Improved service delivery

This sub-theme is based on improved service delivery through electronic services to citizens. '*Infrastructure investment and digital infrastructure will most certainly have a great impact on the economic growth of the province to reduce poverty, inequality and high levels of unemployment in the province'.*

ANT Elements	Definition
Source	Electronic services
Target	Citizens in Gauteng
Translator	Infrastructure investment
Relationship	Better service delivery to citizens

The above sub-theme of improved service delivery to Gauteng citizens through electronic services is defined in terms of the four elements of the Actor Network Theory which are source, target, translator and relationship.

5.2.3.2. Sub-theme: Skills and education

This second sub-theme is about e-Government supporting resource allocation relating to skills and education. '*It is incumbent on government to ensure that the necessary skills for the future are produced and facilitated as well as re-skilling of people in these jobs, to minimise the potential for job losses'*.

ANT Elements	Definition
Source	Skills
Target	Citizens
Translator	Partnership with the department of higher education
Relationship	Facilitate skills development

The Gauteng Department of e-Government intends to facilitate electronic initiatives through partnerships with Higher Education Institutions and the private sector.

5.2.3.3. Sub-theme: Customised citizen services

This sub-theme looks at the need to offer customised services to citizens in order to ensure proper resource allocation. '*The Department of e-Government's ideal end state is to modernise the GPG where citizens can access services of good quality faster. Whether renewing a driver's license, receiving health and human services support, or engaging with elected representatives'.*

ANT Elements	**Definition**
Source	Customised services
Target	Citizens of Gauteng province
Translator	Ensure quality services to citizens
Relationship	Resources and services must be better utilised

The Gauteng Provincial Government will offer customised services to the citizens of the province. This will ensure that resources are allocated to initiatives that are needed by citizens.

5.3. ADDRESSING THE PRIMARY RESEARCH QUESTION

The primary research question for this study was: How can e-Government Services be made sustainable in the Gauteng provincial government?

The analysis of the strategic plan for the Gauteng Department of e-Government revealed that the roll-out and maintenance of the provincial government's e-Government services is based firstly on the National Integrated ICT Policy white paper. The department also follows the (Gauteng Department of e-Government's Strategic Plan, for 2020-2025). This policy framework is the foundation of the department's strategic plan to ensure the sustainability of electronic services to the province's citizens.

According to the vision, as outlined in the National Integrated ICT Policy white paper, (2016), the following are visions of the national government of South Africa. The following objectives must be evaluated and monitored in order to ensure sustainable electronic services in the Gauteng province.

Document analysis of the National Integrated ICT Policy white paper, that the Gauteng Department of e-Government aligns the electronic services initiatives, is analysed using the Technology-Organisation-Environment (TOE) framework. The analysis is done using the elements of T-O-E as illustrated in Table 10.

Table 10: Technology-Organisation-Environment (T-O-E) framework

TOE	Elements
Technical complexity	Alignment of project goals, clarity of project goals and scope certainty
Organisational complexity	Resource and skills availability, experience of parties involved, and experience of parties involved
External complexity	Experience in the country, level of competition and dependencies on external stakeholders

The above table illustrates three main elements of the Technology-Organisation-Environment framework. Elements of the technical complexity part of T-O-E include elements such as the alignment of project goals, clarity of project goals and scope certainty. Organisational complexity includes resource and skills availability and the experience of the parties involved. Finally, external complexity has elements such as the experience in the country, the level of competition and dependencies on external stakeholders.

The following section is an analysis of the National Integrated ICT Policy White Paper that the Gauteng Department of e-Government bases its electronic initiatives. Firstly, the theme is

listed, then followed by a sub -heme with a quotation to support the sub-theme. A table that details the T-O-E elements is presented. Lastly, an interpretation is then presented.

5.3.1. Theme one: **Equality**

5.3.1.1 Sub-theme: Affordable access

The first sub-theme is based on the table below which is about offering affordable access to communication resources by the Gauteng Department of e-Government. '*All citizens must have affordable access to communications infrastructure and services and the capacity and means to access, create and distribute information, applications and content in the language of their choice'.*

TOE Elements	Definition
Technical complexity	Services available in citizens' language of choice
Organisational complexity	Capacity and means to access resources
External complexity	Distribution of information

The above sub-theme of offering affordable access to communications infrastructure and services is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of offering affordable access to communications infrastructure is achieved.

5.3.2. Theme two: **Accessibility**

5.3.2.1 Sub-theme: Accessible communication services

This sub-theme is based on the following table which deals with accessible communication services to all sectors of the population. '*Services, devices, infrastructure and content must be accessible for all sectors of the population, including persons with disabilities so that all can equally enjoy and benefit from communication services'.*

TOE Elements	Definition
Technical complexity	Accessible devices and infrastructure
Organisational complexity	Equal accessibility of communication services
External complexity	All sectors of the population to benefit from communication services

The above sub-theme of accessible communication services to all sectors of the population is defined in terms of the technical, organisational and external complexities of the TOE framework. These three elements cover the technical, organisational and external complexities with regard to ensuring accessible communication services.

5.3.3. Theme three: **Social Development**

5.3.3.1 Sub-theme: Facilitate social development

The facilitation of the social development sub-theme is based on facilitating social development as illustrated in the table below which is about facilitating social development and improving citizens' quality of life. '*All South Africans must benefit from the ability of the ICT sector to facilitate social development and improve the quality of life for individuals and communities'.*

TOE Elements	Definition
Technical complexity	ICT sector to facilitate social development
Organisational complexity	Improve citizens' quality of life
External complexity	Individuals and communities must benefit

The above sub-theme of facilitating social development is covered by the three TOE elements that the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of facilitating social development is realised.

5.3.4. Theme four: **Economic Growth**

5.3.4.1 Sub-theme: Policy facilitation

This sub-theme is based on the table below which is about quality communication infrastructure and services for economic growth, employment and wealth creation. '*Policy must facilitate access to quality communication infrastructure and services to enable economic growth, employment and wealth creation by all South Africans'.*

TOE Elements	Definition
Technical complexity	Policy facilitation to ensure access by citizens
Organisational complexity	Development and implementation of legislation
External complexity	Quality communication infrastructure and services to citizens

The above sub-theme of enabling economic growth, employment and wealth creation is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of enabling economic growth is achieved.

5.3.5. Theme five: **User Protection**

5.3.5.1 Sub-theme: Effective protection of users

This sub-theme is based on the table below and is about the effective protection and empowerment of end-users by the Gauteng Department of e-Government. *'End-users, from the most disadvantaged individual to the largest corporate, must be at the centre of ICT sector-related policies. Effective protection and empowerment of end-users and superior quality of service are therefore key objectives and necessary areas of regulatory intervention'.*

TOE Elements	Definition
Technical complexity	Protection of all users
Organisational complexity	Policies to ensure all users are protected
External complexity	Effectively protect and empower all users

The above sub-theme of ensuring effective user protection is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential for ensuring that all users are protected when engaging with the Gauteng Department of e-Government's electronic services.

5.3.6. Theme six: **Privacy and Security**

5.3.6.1 Sub-theme: Trust in ICTs

This sub-theme deals with the protection of citizens' privacy and security both online and offline. '*Provisions must safeguard the right of all citizens to privacy, protection of personal information, and to a safe and secure communications environment both online and offline. This is essential to trust in ICTs'.*

TOE Elements	Definition
Technical complexity	Safeguard and secure citizens' communications
Organisational complexity	Protection of personal information
External complexity	Safe and secure communication environment

The above sub-theme relates to the privacy and security of citizens' information both online and offline. This is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ascertaining that the task of ensuring the privacy and security of personal information is accomplished.

5.3.7. Theme seven: **Transparency and Accountability**

5.3.7.1 Sub-theme: Access to Information

This sub-theme is based on the table below and is about access to information by citizens of the Gauteng Province. '*The right of citizens to access to information and to maximum transparency in how services are delivered and conditions under which they are delivered must be promoted'.*

TOE Elements	**Definition**
Technical complexity	Access to information
Organisational complexity	Ensure maximum transparency and accountability
External complexity	Citizens' access to information

The above sub-theme on access to information and transparency, as well as accountability by the provincial government, is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that

transparency and accountability are ensured when citizens access information through electronic services.

5.3.8. Theme eight: **Environmental Protection**

5.3.8.1 Sub-theme: ICT recognise and protect the environment

This sub-theme is based on the following table which is about policy incorporating the need for ICTs to recognise and protect the environment during their design, utilisation as well as disposal. '*Policy must ensure that the design, use and eventual disposal of ICTs recognise and protect the right to an environment that is not harmful to health or well-being'*.

TOE Elements	**Definition**
Technical complexity	Design of ICTs
Organisational complexity	Environmentally friendly ICTs (Incorporate in policy)
External complexity	Recognise and Protect Environment

The above sub-theme of the need for ICTs to recognise and protect the environment from the design phase to their use, as well as for their disposal, is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of protecting the environment is accomplished.

5.3.9. Theme nine: **Technology Neutrality**

5.3.9.1 Sub-theme: Technologically neutral regulations

This sub-theme is based on the following table which is about offering regulations that are technologically neutral. '*Regulatory interventions should as far as possible be technologically neutral in order to stimulate innovation and facilitate the development of innovative new products and service offerings'*.

TOE Elements	**Definition**
Technical complexity	Develop technologically neutral regulation
Organizational complexity	Encourage innovation and facilitate development
External complexity	Innovative products and services

The above sub-theme of developing regulation that will be technologically neutral is geared towards stimulating innovation and facilitating the development of innovative new products and services. The technologically neutral regulations sub-theme is defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of offering technologically neutral regulations is accomplished.

5.3.10. Theme ten: **Open Access**

5.3.10.1 Sub-theme: Open access principles

This sub-theme is based on the table below which is about offering open access principles in regulatory intervention by the Gauteng Department of e-Government. '*Regulatory intervention should, wherever possible, be based on open access principles to ensure maximised, efficient*

and fully-leveraged use of available infrastructure and services, through encouraging infrastructure sharing, spectrum re-farming, optimal interconnection, balanced with the need for fair returns on investment'.

TOE Elements	**Definition**
Technical complexity	Open access principles
Organisational complexity	Regulatory intervention
External complexity	Available infrastructure and services

The above sub-theme is about offering open access principles to ensure maximised, efficient and fully-leveraged use of available infrastructure and services, through encouraging infrastructure sharing, spectrum re-farming, optimal interconnection, balanced with the need for fair returns on investment. The open access principles are defined in terms of the technical, organisational and external complexities of the TOE framework. These elements are essential in ensuring that the task of offering open access principles is realised.

It was noted in this study that because of the information age, government services must be offered online. This is a period of continuous change driven by information and communication technologies. New technological developments make significant influences on the transformation of individuals, organisations and communities at large. ICT applications, e-Government, in particular, offer innovative solutions to constant social and economic challenges which result in government's inefficiency, inequality, and inaccessibility to information, resources and services. The essential influence of e-Government, in particular on Gauteng, has intensified efforts to increase the efficiency of public services. Although e-Government promises many benefits to support the delivery of services to citizens, it is evident in the analysis of this study that e-Government success or failure is faced with political, technical, economic, social and cultural factors.

5.4. SUMMARY OF FINDINGS

The findings from the aforementioned data revealed the following key themes relating to the sustainability of e-Government initiatives in the Gauteng government: legislation facilitation, public engagement with electronic services, improved service delivery through electronic services, equality, social development, economic growth, user protection, privacy and security, transparency and accountability, environmental protection, technology neutrality as well as open access.

5.5. SUMMARY OF THE CHAPTER

Overall, data from the study has shown that sustainable e-Government services can promote equality and effectiveness in service delivery and improve the government's ability to reach previously inaccessible communities. To fulfil this all-inclusive potential for public sector transformation and sustainability, the Gauteng provincial government and the Department of e-Government, in particular, will need to constantly review and update their strategies. The significance of focusing on policy, on what the government's intentions are, what it actually does, why and how, is crucial at this stage and for future success.

CHAPTER 6: INTERPRETATION OF FINDINGS AND RECOMMENDATIONS

6.1. INTRODUCTION

In this chapter, the findings from the study are interpreted and recommendations based on the interpretations are then suggested. The analysis and interpretation of data from the research were presented in the preceding chapter. The goal of this research was to conceptualise a framework for evaluating the sustainability of e-Government initiatives in Gauteng province. This chapter provides an assessment of the current status, together with plans that the province is putting in place to ensure that electronic services are sustainable in the province. Recommendations are also presented in this chapter.

6.2. OVERVIEW OF FINDINGS

The following challenges must be addressed in order for the Gauteng provincial government to ensure the sustainability of electronic services to citizens.

Facilitation of Legislation in the Province

The findings of this study have shown that the sustainability of e-Government services in the South African Gauteng provincial government needs to be built on a strong vision and strategies. In the absence of or with a vague e-Government vision, the Gauteng provincial government has been found to lack adequate monitoring and evaluation for the implemented electronic services. This finding will directly impact the sustainability of delivering such services to the citizens of the province.

The Department of e-Government will need to clearly articulate a clear vision which will enable it to engage in a comprehensive evaluation of the current situation, the reality on the ground (citizen level) and the portfolio of projects. The impacts and benefits of e-services projects must also be consistently and constantly monitored and evaluated. This means that the

provincial government and all its stakeholders will be resolute in monitoring and evaluating e-Government initiatives to ensure their sustainability.

Strategic Planning for e-Government Initiatives

Strategic planning is important to support the sustainability of delivering services to citizens electronically. This will assist the provincial government of Gauteng to pursue citizen-driven and services-orientated delivery, thereby meeting individual needs and improving the quality of life in the province. Similarly, as evidenced by the data in the study, it is not only unclear plans and a lack of clear objectives that hamper and discourage the development and direction of e-Government in the province. The absence of adequate monitoring and evaluation policies and tools will also set e-Government for failure. In its nature, e-Government is a policy change programme, it, therefore, requires more attention in terms of vision, strategy, policy and regulatory laws in order to achieve maximum benefits out of it.

The findings of this study have established that there is an unintended gap that enables some individuals and communities in the Gauteng province to exploit the full potential of ICTs while others are unable to do so. This is contrary to the objectives of e-Government initiatives that seek to enable all citizens to access, process and create information as well as enabling them to participate in economic and democratic processes through the use of Information and Communication Technologies.

Monitoring and Evaluation

The findings of this study established that monitoring and evaluation are inevitable for the achievement of evidence-based policymaking, management and accountability. However, as evident from the results, there is insufficient monitoring and evaluation of e-Government initiatives in the Gauteng provincial government. Effective monitoring and evaluation will provide government officials, the Gauteng Department of e-Government and other relevant stakeholders with better means for drawing lessons from e-Government implementation, thereby improving government services delivery, the allocation of technology and financial resources as part of accountability to citizens and stakeholders. This will in turn ensure the sustainability of e-Government projects and electronic services in the province.

Public engagement with electronic services

Reliable connectivity is essential for sustainable electronic services in the Gauteng province. It is, therefore, important to ensure that a reliable and available internet connection, at affordable rates, is accessible to citizens in order to interact with these services that are offered by the Gauteng Provincial Government.

Economic Growth through e-Government Initiatives

Continued sustainable e-Government initiatives may also be facilitated through intentional policy development and implementation directed at e-Government initiatives. This is needed in order to ensure quality communication infrastructure and services for economic growth, employment and wealth creation for the citizens of the Gauteng province.

The next section presents the conceptualised framework for ensuring electronic services' sustainability in a provincial government, this was done in a South African context and for the Gauteng province.

6.3. FRAMEWORK DEVELOPMENT

This section follows the research's data analysis and discussions. It focuses on the development of the framework for ensuring electronic services' sustainability in a provincial government, a South African context. This is achieved by first revisiting the conceptual framework and making a reflection on elements that were integrated and are still relevant and those that are no longer relevant with essential explanations.

6.3.1. The Study's Conceptual Framework

The conceptual research framework followed the Actor Network Theory (ANT), which was a preferred model for the study. ANT treats the world as a set of related bits and there is no social order. There are only endless attempts at organising through the formation of networks. Actors present preferable solutions and contest for them. By bringing associates on board, they can bring together resources to sustain an obligation for the newly established network.

The T-O-E framework was also discussed in depth in Chapter three. As indicated in earlier discussions this framework recommends that an organisation should be consistent with its surroundings and environmental needs and its power is guided by both internal and external factors like the environment, organisation size, and organisation strategy.

THEMATIC AREA	SUB THEMES		
Governance	• Sustainability of ICT Projects • Monitoring and evaluation of ICT projects		SUSTAINABLE E-GOVERNMENT SERVICES
Organizational and Managerial	• Stakeholder Management • Government's Silo Operations		
Citizen Factors	• User Trust • Language • Electronic Participation		

Figure 7: A conceptual research framework for the implementation and sustainability of e-Government in Gauteng Provincial government

The conceptual research framework depicted in Figure 7 is proposed for implementation on e-Government initiatives at the Gauteng department of e-Government and, was developed using a combination of the ANT and the T-O-E models. The model proposes two areas of focus, namely' Thematic areas (Governance, Organisational and Managerial, as well as Citizen factors) and corresponding sub-themes (Sustainability of ICT projects, monitoring and evaluation of ICT projects, stakeholder management, government silo operations, user trust, language and electronic participation) that would lead to prospective sustainable e-Government services to citizens in the Gauteng province. The following section further elaborates on the identified themes and sub-theme areas.

6.3.1.1. Governance Thematic Area

Based on the findings of this study, clear leadership to formulate and promote the e-Government vision and strategies to all role players must include, among other things, the legislature and top management in public service. e-Government planning, execution and implementation should also include the involvement of lower level management members, such as coordinators and programme managers, who would be able to translate the e-Government vision, policies and objectives into action and execution.

6.3.1.2. Organisational and Managerial Thematic Area

The Gauteng provincial government have citizens as key stakeholders, and the Department of e-Government needs to constantly maintain relationships with them throughout the planning, implementation and delivery of services. As the vision of the Department of e-Government in Gauteng stipulates that, it is essential that communication with stakeholders is maintained, it is, therefore, important for the provincial government to ensure that community members are given the opportunity to interact with the government and contribute to decisions that affect what happens in their communities.

Through ensuring that stakeholder management is maintained in Gauteng, the provincial government may be able to make provision for driving the developmental effects of e-Government initiatives throughout the province.

6.3.1.3. Citizen Factors

As indicated earlier in this study, South Africa has 11 official languages, consequently, the government is confronted with the challenge of ensuring that services are delivered appropriately to citizens in the language of their choice. This is an area that the Gauteng provincial government should be cognisant of.

The research established that English is the predominantly used language for the delivery of electronic services in the province of Gauteng. Electronic services are often more effective when they are offered in a language that the users are comfortable with (Mutula and Mostert, 2010). With that in mind, effort needs to be made to ensure that the official languages spoken in the province are catered for when designing and implementing electronic services.

The need for participation by citizens is stated, to some degree, in the legal framework of the South African national government and Gauteng Provincial Government (GPG), however, it is inadequate from a delivery perspective. For that reason, the use of technology to maintain participatory governance and service delivery still requires attention in the Gauteng Provincial Government.

In general, evidence from the reviewed literature in chapter two shows that appropriate e-Government initiatives have the ability to promote equity in service delivery and improve the government's ability to reach previously disadvantaged communities. To fulfil this far-reaching potential for public sector transformation, the Gauteng provincial government will have to rethink its strategies. An intentional focus on policy, as well as a clear vision of what the provincial government intends to do, what it actually does, why and how, is of extreme importance.

6.4. ADDRESSING THE RESEARCH OBJECTIVE

The main objective of this study was to assess how the Gauteng Department of e-Government can ensure the sustainability of electronic services in the province. It has been evidenced that the Gauteng Provincial Government's investment in e-Government can contribute to raising the use of electronic services, yet such growth cannot be expected to be proportional to the investment. There is, however, evidence of other factors that influence the use of such services and thereby impacting sustainability negatively. There is also a need for the department of e-Government to make citizens aware of these services and to ensure that it is a requirement that citizens perceive the economic benefits of using e-Government. A citizen-centric e-Government policy and appropriate communication and e-services promotion strategies can assist to balance the levels of supply and demand.

Government entities, despite financial austerity measures, opt to invest in e-Government as a key strategic tool to achieve broader public governance goals, support economic growth and serve citizens. Typically, public entities such as the Gauteng Department of e-Government

have experienced a more advanced reach to citizens, thereby obtaining a return on investment through e-services' use by citizens. The provincial government must continue to strive to boost citizens' trust in their actions, and the findings of this study suggest that encouraging e-Government use would positively contribute to this goal.

6.5. SUMMARY OF THE CHAPTER

The Gauteng provincial government needs to ensure that measures to monitor and evaluate the public use and value (derived by citizens) from electronic services are implemented. Furthermore, public investment in e-Government projects can only achieve cost efficiency when the digital divide is effectively bridged. Guaranteeing equitable access and usage of e-Government by all citizens from all sectors of the population must also be ensured. Within this context, this study can confirm that policymakers and leaders in the Gauteng provincial government need to take deliberate action to assure all sectors of society regarding the benefits of e-Government initiatives. The assurance will assist in reducing the differences in electronic services' use and e-Government uptake across the province. A deliberate effort to ensure citizen electronic participation by the department of e-Government in the Gauteng Provincial Government must be used as a tool for citizen empowerment.

CHAPTER 7: EVALUATION OF THE RESEARCH

7.1. INTRODUCTION

The previous chapter provided the interpretation of the findings of the study and presented recommendations for the research. A conceptual framework to ensure the sustainability of electronic services for the Gauteng Provincial Government's Department of e-Government was also provided. In addition to the aforementioned elements, this last chapter provides a reflection of the dissertation that has been concluded and the chapter is structured as follows: an overview of the research is presented, followed by revisiting the research questions. The contributions and conclusions of the research are presented and then followed by a discussion of findings and future research to conclude the chapter. The main purpose of this chapter is to assess how the study has addressed the objective of what it was carried out to do.

7.2. OVERVIEW OF THE RESEARCH

The purpose of this section is to remind the reader of the structure of the study by presenting an overview of the chapters.

Chapter one introduced the dissertation and laid the foundation for the study by presenting the background, the area where the study was conducted, operational definitions of the study and definitions of keywords, the research context and purpose, the background to the research problem, problem statement, research questions, primary research question and sub-questions, the research aim, objectives, study justification and the dissertation outline.

Chapter two was dedicated to the review of the literature. The focus was on reviewing the key concepts that gave direction and guidance to the study. Key concepts such as e-Government, digital government, e-Participation and sustainability were defined and discussed. The literature review was presented with regard to the surveyed literature. A review of studies done regarding electronic or e-Government, digital government and the benefits of these concepts to the provision of electronic services were done in this chapter.

Chapter three of the study focused on theoretical frameworks that are mainly deployed in the field of Information and Communications Technology and Information Systems with a deliberate focus on the ones employed in defining the framework that underpins this study. In the third chapter, theoretical frameworks that are generally utilised in the field of information systems were presented. The framework models that are closely related to this study and the one that underpins the study were reviewed and presented.

Chapter four presented the thought process, tools and methods deployed and relied upon in the execution of this research. These relate to the philosophical paradigm upon which the research is founded, the sampling techniques, data collection and analysis methods. This is the research methodology chapter. In this chapter, the high-level cognitive thinking, instruments, approach and methods utilised in the execution of this study were presented.

In **Chapter five**, the analysis and interpretation of the data are presented. This was done with the assistance of the analytical approach defined and discussed in the preceding chapter. The data was organised and presented using themes which have a direct correlation to the research objectives. This fifth chapter presented the analysis and interpretation of data that was delivered in the previous chapters. The data was structured and presented according to themes which are linked to the primary research question and subsequent secondary questions of the study.

Chapter six provided interpretation of findings from the study as well as recommendations. The chapter also presented the limitations and contributions of the study and concluded with considerations for further research.

Chapter seven is the evaluation of the research. In this last chapter the research is evaluated. The study is assessed and a report is presented on how the study provides an overall contribution.

7.3. RESEARCH QUESTIONS REVISITED

The primary research question for this study was: How can e-Government Services be made sustainable in the Gauteng Provincial Government? Three secondary questions have been used to assist with addressing the primary question. The secondary research questions are discussed below.

7.3.1. The secondary questions that supported the primary question are:

The first sub-question is: *What is e-Government Services sustainability according to the Gauteng Provincial Government?* The study established from the collected data that, e-Government sustainability in the Gauteng Provincial Government is viewed as the achievement of the following elements: economic growth, sustainable social development of citizens and equality in terms of access to information and services. Sustainability will, therefore, be achieved through the facilitation of integrated policies and public services to promote sustainable and inclusive economic growth as well as social development.

The second sub-question is: *How are e-Government Services evaluated for sustainability in the Gauteng Provincial Government?* Electronic services that are provided in the Gauteng province are monitored and evaluated to ensure that the services do deliver the value that they have been designed for. A unit called Strategy Management facilitates planning in the Department. There is a need to strengthen the monitoring and evaluation of e-Government initiatives in the province.

The last sub-question is: *How can e-Government be made to be sustainable in the Gauteng Province?* The short, medium and long-term strategic planning processes by the Department of e-Government must be effectively managed by ensuring that plans are aligned with legislative mandates and broader government obligations. Monitoring, evaluation and reporting of the Departmental performance delivery are of utmost importance.

The primary research objective of the study was to determine how e-Government services can be made sustainable in the Gauteng Provincial Government. To support this primary objective, three secondary objectives were as follows:

1. Use document analysis to determine what is e-Government Services sustainability according to the Gauteng Provincial Government.
2. Describe how e-Government Services sustainability is evaluated by the Gauteng Provincial Government.
3. Describe how e-Government could be made sustainable for the Gauteng Provincial Government.

7.4. EVALUATION OF THE RESEARCH METHODOLOGY

A qualitative methodological choice was used for this research with a case study strategy as well as a semi-structured survey for data collection. This enabled the researcher to gain some particularly useful insights into how the staff of Gauteng's Department of e-Government perceive the sustainability of electronic services offered to citizens of the province. The aforementioned methodology also assisted the researcher with obtaining the views and opinions of personnel at the Department of e-Government in Gauteng with regard to what must be done going forward as well as how to improve the current status of electronic services for sustainable use by citizens.

7.5. CONTRIBUTIONS OF THE STUDY

This section of the research presents the contributions of the study in the Information Systems and e-Government area and body of knowledge. The four contributions made by this study are theoretical, practical, contextual and methodological.

7.5.1. Theoretical Contributions

The Actor Network Theory (ANT) was relevant in this study because it made the understanding of e-Government sustainability possible. ANT deals with systems made of human and non-human entities and it proposes a relational view between those entities. The Technology-Organization-Environment (TOE) Model was a relevant model to be employed in this study as it looks at factors that influence an organisation when adopting innovation. Categories of factors in TOE include technology, organisation as well as environmental factors. The combination of these two theories consequently brought a different perspective to the body of knowledge in e-Government sustainability research. This perspective involves the link between technologies and the people that the technologies are meant to assist in making their lives better. Hence technologies and people are looked at in a networked environment and not as isolated elements.

The primary research question for this study is 'How can the intended effect of e-Government Services to citizens through electronic services such as the job application portal and the school admission system be made sustainable in the Gauteng provincial government?'. To address this main research question, the researcher used the Technology-Organisation-Environment Model and the Actor Network Theory (ANT) models as an analytical lens through which an understanding is sought on the e-Government sustainability ideal. Although the above theories are common in e-Government related studies, the majority of the studies use either one of these models. The combination of these two theories consequently brings a different perspective to the body of knowledge in e-Government sustainability research. This perspective involves the link between technologies and the people that the technologies are meant to assist in making their lives better. This, again, s a case in which technologies and people are looked at in a networked environment and not as isolated elements.

7.5.2. Practical Contributions

This study explored several areas that the Gauteng Department of e-Government should pay attention to in order to improve e-Government services' sustainability measures. The reason for doing this is to ensure adequate and equal service delivery to all the citizens of the

province. Policymakers, decision-makers and practitioners may use this study to improve their work in the information systems field. The research further offers considerable contributions to enhance e-Government practice and policy formulation. This research may also be used to improve public sector e-Government initiatives in terms of ensuring that appropriate electronic services are developed as per the needs of citizens. Related studies can certainly use the contents and features used to evaluate the sustainability of e-Government services in this study. Consequently, this study contributes to a standardised method of evaluating electronic services' sustainability in provincial governments. Above all, the study can assist the provincial government of Gauteng to ensure that e-Government initiatives that are embarked upon in the province respond to the needs of citizens and communities.

7.5.3. Contextual Contributions

The study is carried out to understand the uniqueness of South Africa, with the Gauteng province as the main focal point with regard to e-Government initiatives' sustainability. Africa as a continent is unique when it comes to the use of technologies and the uptake of e-Government initiatives in most African countries. The general concept of e-Government in the African continent is still at a relatively developing stages as compared to first-world countries. South Africa, even though at a much better level in terms of e-Government development, is also still lagging compared to the developed countries in other continents. Gauteng is the smallest province within South Africa in terms of geographical land size, but it is an economic hub of the country. The province is one of the two that have established dedicated e-Government departments with Western Cape being the other. It is, therefore, very important and beneficial to gain an understanding in this concept of sustainability for the province's e-Government initiatives.

7.5.4. Methodological Contributions

The study used interpretivist philosophy with a qualitative case-based research approach of the Department of e-Government in Gauteng to study electronic services' sustainability. The theory of the research was multidimensional using an interpretive case. This allowed the researcher to be in an environment where e-Government initiatives are planned, implemented

and monitored for sustainability. Consequently, a deep and complete understanding of e-Government sustainability was accomplished by the researcher.

Most information systems studies on e-Government focus mainly on the implementation and use of electronic services. The sustainability perspective of these e-Government initiatives is not as well explored, more so in the African context. An interpretivist lens from this study revealed a unique understanding of how information systems can assist with examining the sustainability of electronic services. The conceptualised framework from this study could assist with the addition of detail to the theory.

7.6. ETHICAL CONSIDERATIONS

The integrity and confidentiality of the information gathered for this study were ensured by the researcher. Consent for publishing any information gathered from the participants and any documents have been sought beforehand. The researcher has ensured that all participants take part in the research voluntarily and that the research is independent and impartial.

The research's ethical considerations are addressed through informed consent, the right to privacy, and protection from harm.

Informed consent

All participants in this study were informed about what the study was about, and they were allowed to make a judgment regarding their participation. The participants were informed that they have the right not to participate in the study and that they may withdraw from the participation at any moment.

Right to privacy

The assurance of privacy in this research was assured by anonymity and confidentiality. Anonymity and confidentiality were guaranteed as there was no need to reveal the names of the participants or any other identity related to the information.

Protection from harm

Participation was voluntary and involved no risk, penalty or loss of benefits. The permission letter from the Gauteng Department of e-Government for staff as participants was appropriately authorised, and the ethical clearance by the University of South Africa (UNISA) College of Science, Engineering and Technology's (CSET) Research and Ethics Committee, reference number 060/MBM/2019/CSET_SOC was granted.

7.7. EXPECTED CONTRIBUTION OF THE STUDY

This research will be most useful to decision-makers in the Gauteng Provincial Government, government officials and Information Systems experts. The results provide information with regard to how e-Government services in Gauteng, a province in South Africa, can be sustained. The results and findings of this study are aimed at contributing to studies related to e-Government services sustainability.

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Annexure A: Ethical Clearance Certificate

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UNISA COLLEGE OF SCIENCE, ENGINEERING AND TECHNOLOGY'S (CSET) RESEARCH AND ETHICS COMMITTEE

18 February 2020

Ref #: 060/MBM/2019/CSET_SOC
Name: Mr Morwamokwena Benny Masemola
Staff #: 61633089

RECEIVED
2020 -02- 24
OFFICE OF THE EXECUTIVE DEAN
College of Science, Engineering and Technology

Dear Mr Morwamokwena Benny Masemola

Decision: Ethics Approval for 3 years
(Humans involved)

Researchers: Mr Morwamokwena Benny Masemola, 61633089@mylife.unisa.ac.za, +27 73 409 8920, +27 12 426 2043

Project Leader(s): Dr Mampilo Magdeline Phahlane, phahlmm@unisa.ac.za, 011 670 9135

Working Title of Research:

E-Government Services Sustainability in the Gauteng Provincial Government (South Africa)

Qualification: MSc in Computing

Thank you for the application for research ethics clearance by the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee for the above mentioned research. Ethics approval is granted for a period of three years, from 18 February 2020 to 18 February 2023.

1. The researcher will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.

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The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.

3. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
4. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
5. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
6. No field work activities may continue after the expiry date (18 February 2023). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 060/MBM/2019/CSET_SOC *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Unisa College of Science, Engineering and Technology's (CSET) Research and Ethics Committee.*

Yours sincerely

Dr. B Chimbo
Chair: Ethics Sub-Committee SoC, College of Science, Engineering and Technology (CSET)

Prof E. Mnkandla
Director: School of Computing, CSET

Prof B. Mamba
Executive Dean: CSET

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Annexure B - Permission Letter

GAUTENG PROVINCE
e-GOVERNMENT
REPUBLIC OF SOUTH AFRICA

75 Fox Street, Imbumba House

Marshalltown

Johannesburg

1501

28 November 2019

Subject: Request for permission to conduct Research Survey.

Dear Mr. B Masemola

I am pleased to inform you that your request to conduct a research study has been approved by the Head of Department.

Approval is granted as per the following conditions:

a) The Centre of Innovation will be responsible for coordinating the research project and your contact person is Mr. Jackie Mahanyele - Deputy Director Research and Development (011) 689 6886.
b) The research material to be shared with the Department of e-Government including any recommendations.
c) All interviews with staff to be coordinated via the DD: Research (Jackie Mahanyele).
d) Mr. Benny Masemola is requested to sign this form and return to the sender confirming:
   - That the Gauteng Department of e-Government is not liable for any undue occurrences concerning this research study.
   - That all the conditions set out in this approval letter are adhered to.

Regards

Dhaya Raidoo
Gauteng Department of e-Government

Indemnity

I, M.B Masemola. hereby accept all the terms and conditions presented in this letter of approval to conduct a Research study at the Gauteng Department of e- Government.

Signed _____ at Pretoria, Centurion on this day

02 / 12/2019.

Annexure C – Consent to participate

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (Please print)

Participant Signature…… .Date……

Researcher's Name & Surname: **Morwamokwena Benny Masemola** (please print)

Researcher's signature……MB Masemola…….. Date: 21 April 2022

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Annexure D - Participant information

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PARTICIPANT INFORMATION SHEET

Ethics clearance reference number: 060/MBM/2019/CSET_SOC

Date: April 2022

Title: E-Government Sustainability: A Case Study of the Gauteng Provincial Government (South Africa)

Dear Prospective Participant

My name is Morwamokwena Benny Masemola. I am doing research with Dr. Mampilo Phahlane, a senior lecturer in the Department of Information Systems, School of Computing, College of Science, Engineering and Technology at the University of South Africa (UNISA) towards a Masters degree in Information Technology at the University of South Africa. We are inviting you to participate in a study entitled: E-Government Sustainability: A Case Study of the Gauteng Provincial Government (South Africa).

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to determine how E-Government Services' sustainability can be ensured in the Gauteng provincial government, and how can sustainability be monitored and measured.

WHY AM I BEING INVITED TO PARTICIPATE?

You are invited to participate in the research as you have been identified by the student that is enrolled in DFCOM92 - Dissertation: Computing; at the School of Computing, College of Science engineering and Technology, towards a Masters degree. The research will consist of semi structured and open-ended interviews.

This research is aimed at determining how E-Government Services' sustainability can be ensured in the Gauteng provincial government, and how can it be monitored and measured. As

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a member of the Gauteng provincial government's Department of e-Government, responsible for a function/s related to electronic services provision, you are invited to take part in this study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study will determine how E-Government Services' sustainability can be ensured in the Gauteng provincial government. The research is about the importance of constantly evaluating the implemented E-government services and measuring them against the organizational vision and ensure that the intended purpose is realized.

Policy documents may be requested as part of the documentation review for the research.

As a selected participant, you are kindly requested to assist with providing responses, as far as you can, to the pre-set questions and documentation where possible.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participation is voluntary and there is no penalty or loss of benefit for non-participation and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

The presence and use of information systems in organizations is of great importance. Researchers and practitioners alike are trying to understand how such systems could be leveraged to accomplish what they're supposed to offer. Being part of this research would potentially assist the participant with regards to gaining a different perspective on the sustainability of electronic services' information systems.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There are no negative consequences that have been identified in the research.

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WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. And no one will be able to connect you to the answers you give. Your answers will be given a code number, or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. A report of the study may be submitted for publication, but participants will not be identifiable in such a report.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Copies of your answers will be stored by the researcher for a maximum period of five years at UNISA for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable.
Hard copies will be shredded, and/or electronic copies will be permanently deleted from the hard drive of the computer using a relevant software programme. The hard copies of data will be shredded and thrown away and electronic recording will be deleted.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the School of Computing, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Dr Mampilo Phahlane on phahlmm@unisa.ac.za or (011) 670 9176. Should you require any further

information or want to contact the researcher about any aspects of the study, please contact Mr Morwamokwena Benny Masemola on mbmasemola@yahoo.co.uk or (012) 426 2043.

Should you have concerns about the way in which the research has been conducted, you may contact Dr Mampilo Phahlane on (011) 670 9176 or phahlmm@unisa.ac.za. Contact the research ethics chairperson of the School of Computing's research ethics committee, Mr Colin Pilkington on (011) 471 2130 or Pilkicl@unisa.ac.za, if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Regards
Mr Morwamokwena Benny Masemola
UNISA Masters Student



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Annexure E – Interview Schedule

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Interview schedule

Topic: E-Government Services Sustainability in the Gauteng Provincial Government (South Africa)

Dear Participant

Thank you for your willingness to participate in this research.

- The interviews form part of research currently undertaken by the University of South Africa (UNISA).
- The purpose of this study is to determine how E-Government Services' sustainability is ensured in Gauteng provincial government.
- The research has been cleared with the Ethics Committee in CSET (College of Science, Engineering and Technology) at UNISA, please see attached ethics clearance certificate.
- Your opinion regarding this topic is very valuable to us.
- Please be assured that your privacy will be respected and that the information you provide will be treated as highly confidential.
- Please take note that the interview is voluntary, and you can withdraw at any time, should you so wish, with no consequences.
- Information collected from participants will be used exclusively for research purposes (entered as anonymous data).
- Your name/identifiers and the name/identifiers of your organisation and any other participants will not be included in any published records of the research.
- Please fill in the participation consent form (Appendix C) and submit it separately. Names/identifiers will not be reported in any published records of the study and no one will be able to connect any findings to individual organisations or participants.
- The organisation and participants will be given a code number or a pseudonym and will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

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For more information regarding this project and research topic, please feel free to contact me at any time: Dr M Phahlane

Kind regards

Dr. M Phahlane
Tel: 011 670 9135
School of Computing, University of South Africa

Section A

Participant Name & Surname :..... (Please print)

Participant position/role: .....

1. What is the level of your position in the organization's hierarchy?

Strategic ☐ Tactical ☐ Operational ☐ Other ☐

2. How long have you been working in this institution

1-3 years ☐ 4-9 years ☐ 10+ years ☐

Interview questions

1. What is E-Government Services sustainability according to the Gauteng Provincial Government?

2. What are the effective ways that the Gauteng Provincial Government has set out to stimulate public citizens to engage in the E-services value creation?

3. How can the intended effect of E-Government Services to citizens be made sustainable in the Gauteng provincial government?

4. How is the broad use of electronic services ensured in order to achieve the desired goal of better services to users?

5. Does the Gauteng Provincial government have a strategy in place to ensure improvements and long-term sustainability of electronic services?

6. How do you measure the province's development through its E-services progress and improvement? Please provide the methodology that is being used.

7. How are these electronic Services evaluated for sustainability in the Gauteng Provincial Government?

8. How can the intended effect of E-Government Services to citizens be made sustainable in the Gauteng provincial government?

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9. How is the broad use of electronic services ensured in order to achieve the desired goal of better service delivery to citizens?

10. Does the Gauteng Provincial government have a strategy in place to ensure improvements and long-term sustainability of electronic systems/services?

11. How can E-Services in the province foster economic inclusion for citizens and support equitable access?

12. How do you measure the province's development through its electronic services progress and improvement?

13. Does the department of E-Government rank the available electronic services according to the degree of importance or any other criteria?

14. How is user satisfaction measured with regards to the utilization of electronic services in order to effect continuous improvement?

15. How do you measure the degree of Effectiveness on the electronic services based on the Criteria of Availability, Ease of Use, Good Organization and Responsiveness to the Needs and Expectations of citizens?

16. What are the known and recorded problems with electronic systems in the Gauteng provincial government?

17. In relation to any problems associated with the electronic services, what are the causes and consequences of those problems?

18. Does the Gauteng Provincial Government's Department of E-Government use or have any specific method to assess E-government maturity level in relation to sustainability?

19. Do you have policies, standards, procedures and guidelines for the electronic services that the department of E-government provide to citizens? Please provide copies of any policies, standards, procedures and guidelines for electronic services.

20. Please supply us with any other information or plan/s relating to electronic services and systems that the Gauteng Provincial Government's Department of E-Government has which was not covered in the above questions.



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Annexure F – Language Editing Certificate

Qondani Mtshane Rwigema
MEd – Applied Linguistics; MCom – Business Management

EDITING CERTIFICATE

I hereby confirm that I have
edited the style, layout, references and language of the dissertation for the

Master of Science in Computing

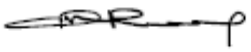
to be submitted to the
College of Science, Engineering & Technology
UNISA

By
MORWAMOKWENA BENNY MASEMOLA
Titled

E-GOVERNMENT SERVICES SUSTAINABILITY IN THE GAUTENG PROVINCIAL GOVERNMENT (SOUTH AFRICA)

114 pages, 26 424 words)

Note: The edited work described here may not be identical to that submitted. The author, at his sole discretion, has the prerogative to accept, delete or change amendments made by the editor before submission.

Signed: 

Date: 29 November 2022

Professional EDITORS Guild

Qondani Mtshane Rwigema
Associate Member

Membership number: RWI001
Membership year: March 2022 to February 2023

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Annexure G – Turnitin Report

E-GOVERNMENT SERVICES SUSTAINABILITY IN THE GAUTENG PROVINCIAL GOVERNMENT (SOUTH AFRICA)

ORIGINALITY REPORT

3%	2%	4%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Morwamokwena B. Masemola, Mampilo M. Phahlane, Nixon Ochara. "A Proposed Framework for Digital Government Services' Sustainability in the Gauteng Provincial Government (South Africa)", 2019 Open Innovations (OI), 2019 Publication	3%

Exclude quotes	On	Exclude matches	< 2%
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