

The impact of digital innovation on municipal service delivery: a case of Thulamela Local Municipality, Limpopo Province

BY

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DECLARATION

I, **Kopue Mitchel Masemola** (student number: 11640186), hereby declare that this dissertation for the Master of Administration, entitled '**The impact of digital innovation on municipal service delivery: a case of Thulamela Local Municipality, Limpopo Province**' in Faculty of Management, Commerce and Law submitted to the Department of Public and Development Administration at the University of Venda has not been submitted previously for any degree at this or another university. It is unique in both its origin and execution, and all citations have been properly acknowledged.

Signature: *KM Masemola*

Date: 27 / 11 / 2024

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DEDICATION

I dedicate this research to my children, Pono, Pabalelo, and Letago, who served as the motivation for it. I want to thank my fiancé, Mr. Charles Mampholo, for motivating me to complete this research. I also want to express my gratitude to my parents for their support and prayers during my darkest moments. Additionally, I would want to thank my family and friends for their various forms of assistance during this study.

ABSTRACT

The world has reached an era of digital ubiquity where public institutions are required to embrace the use of computers and the latest operating machines and adopting innovative methods to improve municipal service delivery. The study seeks to examine the impact of digital innovation on municipal service delivery in the Thulamela Local Municipality, Limpopo Province. Digital innovation is concerned with using modern technologies or developing new strategies to improve municipal services by municipalities. South Africa is characterized by continued challenges such as service delivery backlogs that result in protests and social unrests. The new digital age has brought an opportunity to change and influence effectiveness on public institutions especially, local municipalities. The use of technology and new approaches affect the duties of institutions, forcing them to work smarter instead of working hard. This approach would improve the productivity of the local sphere of government and raises the value of the services provided to communities.

The study adopted a qualitative approach to understand the impact of digital innovation on municipal service delivery. The researcher used qualitative research method as well as descriptive research design as an approach to solve the research question. In addition, interviews were used as data collection methods. A sample was taken from the employees of Thulamela Local Municipality as the focus group of this study. The researcher adopted a non-probability purposive method to select the sample subjects. Thematic analysis was utilized to analyse data, discussed in a narrative form. The researcher adhered to the ethical conduct of research.

The major findings of the study

The results of this study indicate that digital innovation plays a vital role in enhancing municipal service delivery. It is found that digital innovation takes the services closer to the people by creating easy access to the basic municipal services. This is done by improving how the local communities participate on matters of the municipality by including them in processes through social medial platforms. However, municipalities in the rural areas are not doing much about adopting digital innovations by investing in ICT infrastructure and addressing the matter of lack of skill among municipal employees.

Recommendations

It is recommended that municipalities should introduce new and improved ICT infrastructure and provide funds for the introduction of digital innovations. It is recommended that municipalities prioritise employing officials that have acquired relevant skills and provide proper training to those that need training to ensure that they stay relevant to the changing times. It is further recommended that incentives, such as awards, should be created for employees that look for innovative methods that can be implemented in the municipalities. It is also recommended that municipalities form a committee that will focus on the introduction of innovative strategies that will enhance digital innovation in the municipality.

Key words: Digital innovation; Fourth Industrial Revolution; Local government; Municipal service delivery

ABBREVIATIONS

4IR	: Fourth Industrial Revolution
BCX	: Business ConneXion Group
COVID-19	: Corona Virus Disease 2019
CPSI	: Centre for Public Service Innovation
DPSA	: Department of Public Service and Administration
ICT	: Information Communication Technology
IDP	: Integrated Development Plan
NDP	: National Development Plan
OECD	: Organisation for Economic Co-operation and Development
SDI	: Service Delivery Innovation
SDR	: Service Delivery Review
SITA	: State Information Technology Agency
STI	: Science, Technology and Innovation

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CHAPTER 1

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Public administration is the part of government that takes action and provides the means to achieve the objectives of the state (Rosenbloom, Kravchuk & Clerkin, 2022). Crous (2004) defined public administration as an administration that is involved in the conduct of public affairs by government officials to help improve public service delivery by being involved in processes of policymaking, financing, personnel provision, organising, determining work procedures and controlling. It is the primary role of government institutions to improve the general wellbeing of the people and to advance the socio-economic development of the country (Enaifoghe, 2021). Hergüner, Yaman, Sari, Yaman and Dönmez (2021) emphasized that, in this rapidly evolving technological period, natural scientists have a significant influence on some work practices and tactics used by administrative officials, which can benefit public administrators. Digital technologies can be used as tools for municipalities to get closer to the people, transform their processes and empower their employees. Therefore, innovation would be used to create strategies for overcoming barriers to reach communities and re-establishing public confidence in the government (Motloun, 2022). There is an increasing need for digital transformation in municipalities which is made by technological innovations around the world and there is a greater demand to supply such services. The study seeks to examine the impact of digital innovation on enhancing municipal service delivery in Thulamela Local Municipality, Limpopo Province.

1.2 BACKGROUND OF THE STUDY

In the current era of digital infrastructure, computers, smartphones, and broadband network connections are widely used globally and have become accessible and user-friendly (Motloun, 2022). Therefore, local government leaders around the world introduce digital technologies in economic and administrative processes to rapidly

evolve and leverage the quality of municipal services (Nzimakwe, 2021). The reason is that innovation in public institutions is regarded as the solution for developing communities to create and implement new processes, products, services and methods of delivery which are aimed at improving the lives of citizens (Hofisi, 2018: 4). Hence, adopting digital innovations would provide municipal services that are centred around development and improving the quality of life for the poor and to close the gap between the rich and the poor (Mabitsela, 2012).

Globally, governments are condemning outdated public organizational structures, which have been proven to be unresponsive, ineffective, and inefficient in terms of providing goods and services to the local communities (Nel & Masilela, 2020). Governments in developing and developed countries find themselves in situations in which their response to social challenges requires transformational responses and generating new solutions that seek to develop the public sector (Organisation for Economic Co-operation and Development, 2017). Sachs, Lafortune, Kroll, Fuller and Woelm (2022) in the Service Delivery Review (SDR), listed Denmark as an example of one of the countries that undertook digital transformation. Denmark has been the leading country in both Europe and the globe in the digitalization of public services for the past years (Scupola, 2018). The country has a long history of advancing the use of the internet in society through ICT governance and policymaking.

Scupola (2018) argues that Denmark is a member of the high-performing cluster nations and a global pioneer in digitalization with the most advanced digital economy, followed by that of Sweden, Finland, and the Netherlands. Denmark accelerated its public services by improving the interaction between the citizens and the government, and it boosted the productivity of government agencies through the implementation of digital technologies (Sachs et al., 2022). Moreover, the Danish government utilized E-commerce to advance the welfare society model in order to improve healthcare, public services, quality of life, scientific advancements, employment opportunities, and cultural offerings (Scupola, 2018).

The Danish government worked with 98 municipalities to develop the public sector's eGovernment strategy, which placed a focus on coordinating the execution of four initiatives at different levels of public sector administration (Fleron, Pries-Heje & Beskerville, 2021). This allowed the municipalities to take advantage of the

opportunities presented by digitalization and implement their strategies within the common framework. The Danish society can receive several services through digital platforms such as enrolling for public childcare, checking blood test results and making payment (Sachs et al., 2022). Fresh new ideas are therefore required to produce transformative results for developing countries.

The Organisation for Economic Co-operation and Development (OECD) (2017) declared that innovative tools should be used by governments around the world to understand the complexity and the nature of societies and to plan for their uncertainties. Motlounge (2022) regards the use of technology as a tool to improve communication between the people and the government institutions. For instance, innovative communication tools include the use of social media and websites to reach out to people wherever they are. It assists in cases that require rapid responses such as natural disasters and unforeseen emergencies like attacks and mass killings (Sachs et al., 2022).

According to the World Bank (2017), several countries have introduced technological innovations as systems to significantly improve public service delivery. Digital technologies enhance public service delivery by improving the productivity and adoption of technologies that seek to help lower-income and lower-skilled entrepreneurs and employees to work and learn better (Begazo, Blimpo & Dutz, 2023). Digital technologies can assist developing countries, especially in Africa, to achieve economic transformation and in turn help create more jobs for its people. Therefore, for digital innovation to exist, it requires support from governments by creating a sustainable environment for innovation by acting as a regulator, financier and coordinator (Motlounge, 2022).

In the African context, South Africa is one of the African countries that are leading in embracing the Fourth Industrial Revolution (4IR) and digital transformation (Hofisi, 2018: 9). South African government planned to move from the usual provision of public services to a digitized municipal service delivery (Maremi, Thulare & Herselman, 2022). South Africa has developed approaches and policies that seek to improve and promote innovation in the public sector including in municipalities. Through the National Development Plan 2030 (NDP), the country has put 'priorities to raise employment through faster economic growth, improve the quality of education, skills

development and innovation'. More departments have transformed their services from manual to digital. The Department of Basic Education has introduced subjects such as coding and robotics to schools to motivate and educate the learners of Information Technology and to prepare them for the future (Motloun, 2020).

There is a gap between the private sector and the public sector about digitization of their facilities. Numerous private South African businesses have been seen spearheading aggressive digital innovation and transformation projects in terms of scale and scope (Business ConneXion Group (BCX), 2022). The health care in the private sector has shown significant progress in resource infrastructure and equipment as compared to the healthcare in the public sector which is underfunded with fewer resources (BCX, 2022). This has affected the productivity and the quality of services provided in the public sector. The private sector has displayed improved services due to the advanced equipment and infrastructure that it has been presented with (Nel & Masilela, 2020). In contrast, the public sector is characterized by huge service backlogs.

South African government invested on Information Communication Technology (ICT) infrastructure and numerous interventions have been noticed since 1994 (Motloun, 2020). Some of the interventions include the development of institutions such as the Center for Public Sector Innovation (CPSI) and State Information Technology Agency (SITA) which are mandated to address the issues of digital innovation and the development of ICT infrastructure. These interventions were made in an effort to embrace the 4th Industrial Revolution. A lot of these digitization interventions have been seen more in urban areas than in rural areas. Motloun (2020) further pointed out that more of the advanced ICT infrastructure is more visible in metropolitan municipalities and within big cities while a few of the ICT developments are seen in rural areas. Rural municipalities continue to experience difficulties with digital transition of the facilities because of lack of funds allocated for the development of ICT infrastructure (Mawela, Ochara & Twinomurinzi, 2017).

Digital transition of municipal services is still a challenge for rural municipalities (Habiyaemye, King & Tregenna, 2022). Limpopo Province municipalities are not exceptional to this. Nhede, Mazenda and Masiya (2022) argue that South Africa's municipal employees still need to improve in multiple skills, emotional intelligence,

creativity and problem-solving skills to fulfil the requirements of the 4IR. It is significant that the public servants obtain appropriate skills and training to enable them to be efficient in providing municipal services such as housing, water, proper sanitations and proper roads and many more services that the local communities receive directly or indirectly from the local sphere of government (Du Toit, 2002). Many of the municipalities are still battling with addressing the socio-economic challenges like shortage of water, dusty untarred roads and underdeveloped public infrastructure. Resultantly, municipalities often put a halt to the introduction of new processes and technological means that will resonate with the changing times and instead they focus on carrying out their primary role of providing basic services.

1.3 PROBLEM STATEMENT

South African communities continue to experience poor provision of basic services such as clean water, proper roads and sanitations. There is a continuous trend of dissatisfaction of the services provided to communities by municipalities which cause service delivery protests (Modiba, 2020). This is due to the slow response of municipalities to communal requests because of the limited staff and the long distance that exists between the municipality and the people (Mawela et al., 2017). Motloung (2022) indicated that service delivery protests are manifestation of dissatisfaction of the quality of services provided to communities and, as a result collapse the infrastructure such as schools, roads and business properties. Municipalities are pushed by the changing digital times to embrace digital innovation which would result in the implementation of new ideas, services and products that will bring sustainable service delivery (Nel & Masilela, 2020).

According to the Auditor General report 2020-2021, 64 municipalities in South Africa were reported to be 'dysfunctional and entrenched in poor governance, weak institutional capacity, poor financial management, corruption and political instability'. It was further indicated in the report that the number of municipalities under administration or provincial intervention had increased from 23 in 2021 to 33 by February 2022. As a result, the national and provincial governments had to hire administrators to oversee these municipalities' daily operations. Municipalities have become so dysfunctional to the extent that it resulted in low levels of trust and

frustration in the community members due to inadequate provision of public services (Munzhedzi & Shopola, 2024). Digital innovation in municipalities is therefore required.

Thulamela Local Municipality (TLM) is one of the poor municipalities that struggle to deliver on their mandate of providing basic municipal services such as electricity, water and sanitation to their people because of insufficient technical skills and infrastructure (Sowetan Live, 20 September 2020; Munzhedzi & Uwizeyimana, 2022). TLM is characterised by poor infrastructure, high poverty and major service delivery backlogs. The municipality continues to struggle in its effort to provide basic service and as a result communities embark on service delivery protests. Mawela et al. (2017) is of the view that development in government institutions thrive when there is an implementation of service delivery innovation models and tools. Innovative models entails the utilisation of scarce infrastructure resources to produce fruitful public service outputs. Therefore, communities must embrace new strategies to address urgent societal issues in a rapidly evolving environment (OECD, 2017).

1.4 AIM OF THE STUDY

The aim of the study is to examine the impact of digital innovation as a tool to enhance municipal service delivery in the Thulamela Local Municipality, Limpopo Province with a purpose of recommending improvement measures.

1.5 OBJECTIVES OF THE STUDY

- To examine the relationship between digital innovation and municipal service delivery.
- To determine the drivers of digital innovation in the South African municipalities.
- To explore some of the barriers to digital innovation in the Thulamela Local Municipality.
- To make recommendations that will enhance and promote digital innovation in the Thulamela Local Municipality.

1.6 RESEARCH QUESTIONS

Maree (2016) stated that research questions are ‘questions that guide and direct the study, and in the end, every component of the design should be aimed at answering the research question’. The study pursues to answer the central question-what is the impact of digital innovation on municipal service delivery? To address the main question, these sub-questions were asked.

- What is the relationship between digital innovation and municipal service delivery?
- What are the drivers of digital innovation in the local Municipalities?
- What are the barriers to digital innovation in local Municipalities?
- What are the recommendations to enhance or promote digital innovation in the Thulamela Local Municipality?

1.7 SIGNIFICANCE OF THE STUDY

The study is significant since it seeks to examine and understand the effect of digital innovation on municipal service delivery by evaluating the effectiveness of digital innovations implemented by municipalities, particularly rural municipalities such as the Thulamela Local municipality. The findings will educate municipalities on the challenges that hinder the adoption of digital innovations with the effort to propose strategies that can promote the adoption of digital innovation in municipal service delivery processes. This will impact policies that seek to address communal challenges that halt provision of basic services and to reduce municipal service delivery backlog. The study is essential for the researcher to understand how the adoption of digital innovation can assist in different aspects of municipal service delivery such as promoting accountability, fostering public participatory governance, reducing operational costs that allow better use of municipal resources. In the end, the study will equip the researcher with skills and information required to address societal needs in the increasingly digital world. The University of Venda will benefit from this study because the study will increase its research output meaning that students will be able to use this research as reference information on issues related to digital innovation and municipal service delivery in a technological advanced world.

1.8 DELIMITATION OF THE STUDY

The study is based on the impact of digital innovations in the provision of municipal service delivery. The study is limited to the Thulamela Local Municipality (TLM) which is one of the four local municipalities in Vhembe District Municipality of the Limpopo Province. According to the Stats SA, Thulamela Local Municipality is completely rural in nature and is mostly populated by Venda and Tsonga speaking people wherein 85 percent of the people live in tribal areas.

1.9 DEFINITION OF CONCEPTS

Innovation

Innovation is the process of applying new knowledge to create new or improved products, new processes, or methods (Fagerberg et al., 2002; Habiyaemye et al., 2022). Innovation has to do with the creation and application of new ideas. Innovation in the local government is about determining new and improved ways to achieve public objectives (OECD, 2017). To this study, innovation in the local government means creating enhanced processes and products which are geared to maximize productivity in municipalities.

Digital innovation

Digital innovation is regarded as any technological invention that seeks to enhance socio-economic development of any marginalized and underserved society in developing countries (Manda & Backhouse, 2017). It is the process of 'transforming organizational activities, processes and models to fully leverage the changes and opportunities of a mix of digital technologies to increase its impact on society' (State Information Technology Agency (SITA), 2020). In addition, digital innovation involves incorporating new ideas and technology into municipal service delivery (Shaba & Vyas-Doorgapersad, 2022). In this study, digital innovation is concerned with using modern technologies to improve municipal services such as water, roads, sanitations, to increase service productivity, reduce the workload, increasing accountability and community participation within government.

Service delivery

According to Nel and Masilela (2020), 'Service delivery involves all aspects relating to when, how and where a service is delivered to a customer, and whether it is fair in nature'. Du Toit (2002) defines service delivery as the intentions of municipalities in providing services to cater for the needs and to improve the quality of the lives of the people. Shava and Doorgapersad (2022) illustrate that service delivery is about delivery of services in an appropriate manner. In this study, service delivery is the products and services that government produce to citizens in an attempt to improve their lives, for example providing households with access to electricity, water and proper sanitation.

Municipal services

Municipal services are services and products that are delivered by municipalities to society to meet their needs in ways that are convenient and efficient (Nhede et al., 2022). South African local government spheres are mandated by Chapter 7 of the Constitution of the Republic of South Africa 1996 to provide essential municipal services such as water, electricity, collection and disposal of sewage, disposal of solid waste, road maintenance, parks and recreation to their respective communities (Mangele, 2021). In this study municipal services are the outputs of policies and plans that are carried out by local municipalities to improve the livelihood of the communities.

1.10 ORGANIZATION OF THE STUDY

The study will be presented as follows:

Chapter 1: Introduction and background of the study

The first chapter begins by providing the introduction and background of the study as well as the problem statement, delimitation of the study, aims of the study, objectives, overview of research methodology and definitions of key concepts are outlined.

Chapter 2: Literature review

Chapter 2 outlines the review of theoretical framework and empirical literature that is provided by scholar with the purpose of understanding the research problem. The

chapter focuses on the past literature on digital innovation on service delivery and their challenges with reference to the municipality.

Chapter 3: Research methodology

The third chapter explains the methodology and procedures that were followed when conducting this research. This chapter also outlines the chosen study area, population of the study, sampling and data collection methods and instrument and data analysis. The chapter also discusses the ethical considerations that were followed when conducting this study.

Chapter 4: Data presentation, analysis and interpretation

The fourth chapter focuses on presenting the analysis and interpretation of the collected through interviews and questionnaires. Data collected was analysed using thematic analysis and the information is presented in a narrative form.

Chapter 5: Findings, recommendations and conclusion

This is the final and conclusive chapter, and it discusses major findings of the study. In this chapter recommendations and conclusions are made. Areas for further research from this study problem are also proposed.

1.11 CONCLUSION

This chapter begins by providing the introduction and background of the study as well as the research problem. It then outlines the objectives, research questions, aim of the study, the significance and delimitation of the study that informs the importance of the study. The definition of key terms are discussed in this chapter providing their specific applications within the study. The chapter is concluded by the organisation of the study. The next chapter discusses the literature review that explains how digital innovation affects the provision of municipal services and the theory underpinning the study.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 INTRODUCTION

The first chapter presented the problem statement, aim, objective, and research questions to introduce the study. The second chapter presents the theoretical framework and literature review. Thus, the theoretical framework that guides the study and review of existing literature on the impact of digital innovation on municipal service delivery will be discussed in this section. Under the theoretical framework, diffusion of innovation theory is discussed as the theory underpinning the study and its relevance to this study and is followed by the conceptualization of digital innovation. Literature relevant to the impact of digital innovation on municipal services are reviewed to understand the phenomenon. The chapter discusses the impact of digital innovation in local government, the drivers of digital innovation, and the challenges towards digital innovation.

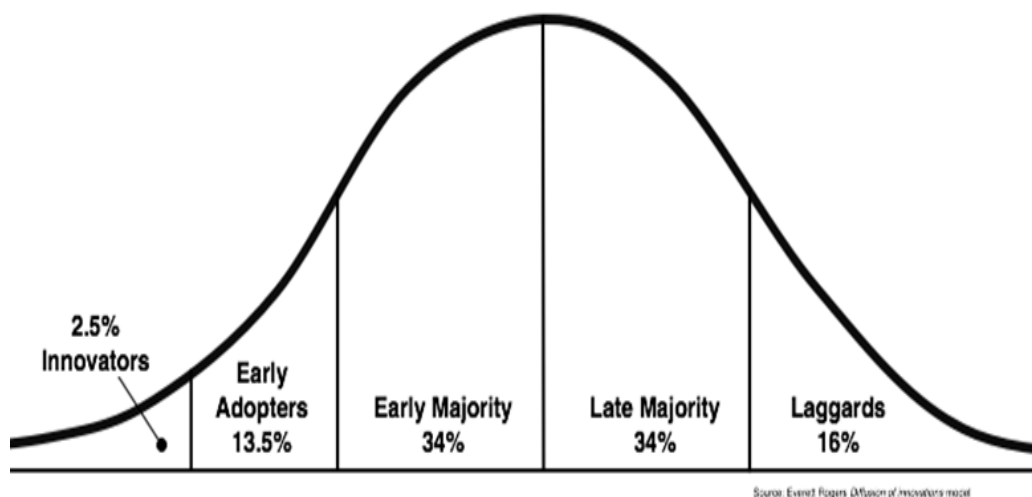
2.2 THEORETICAL FRAMEWORK

The study is underpinned by the Diffusion of Innovation Theory. The theory was popularized by Everett Rogers in his early works, in which he detailed the importance of the adoption of new technologies to organizational processes (Shipalana, 2019: 43). In 1962, Everett Rogers published his seminar work titled ‘Diffusion of Innovation’ to “describe how an idea or product gradually develops traction and diffuses (or spreads) within a particular population or social system” (Kaminski, 2011). The theory acts as a model that guides the changes of technological innovations that are modified and presented in ways that satisfy the needs of all levels of its users. According to García-Avilés (2020: 1), the theory focuses on the adoption of new concepts and practices that influence the procedures that people undertake. Feller and Menzel (1977) cited by Shipalana (2019: 43), pointed out that according to this theory, promotion of the use of modern technology will improve the effectiveness of municipal policies. The diffusion of innovation theory has influenced areas like marketing, technological

adoption, and public health campaigns by explaining the dynamics of how new ideas or technologies spread throughout a society (Rogers, Singhal & Quinlan, 2014: 207).

According to Dearing (2009), diffusion results from a combination of three factors: (a) the need for people to lessen their own uncertainty when they are presented with new information about an innovation; (b) the need for people to react to their impressions of what certain reliable people are thinking and doing after learning about the innovation; and (c) the widespread social pressure to behave in a way that is consistent with others. Dearing and Cox (2018: 183) define diffusion as a social process of people's response to learning about new innovative strategies that seek to extend or improve sectors. While Shipalana (2019: 45) implies that innovation, in its traditional sense, spreads timely within the social system member via certain channels, García-Avilés (2020: 1) on the other hand outline that innovation goes through phases before being embraced by different social groupings. The five phases are illustrated below in figure 2.1, which outlines the phases of the diffusion of innovation theory.

Figure 2.1: Diffusion of innovation model showing the distribution of adopter innovativeness based on time of adoption.



Source: (Adegbite-Badmus & Folayan, 2020: 49).

Innovators- According to Rogers et al. (2014: 208), innovators are the first to adopt new ideas and technology. The innovators typically do so because it is fresh, and they have little to lose (Shipalana, 2019: 46). Moreover, Innovators adopt out of excitement for novelty and a liberated sense of self (Dearing & Cox, 2018: 185). They take

chances and are responsive to new ideas. These individuals are often the first to think of fresh ideas since they are willing to take risks (Rogers et al., 2014: 308). Almost nothing has to be done to appeal to this group.

Early adopters-The second to adopt are the early adopters, which include the subgroup of opinion leaders (Dearing, 2009: 506). They adopt innovations because they have a considered assessment that an innovation's benefits outweigh its problems (Dearing & Cox, 2018: 185). Early adopters enjoy taking the lead and seizing new opportunities. Since they already recognise the need for change, they are open to new ideas (Shipalana, 2019: 45). According to Green, Ottoson, Garcia and Hiatt (2009: 163) the early adopter include journalists, actresses, artists, politicians, and businesspeople who the community looks up to as role models. These opinion leaders serve as a contact between agencies and communities, communicators of organizational messages, and may assist in institutionalizing programs following a funding agency's withdrawal from a project within a particular community.

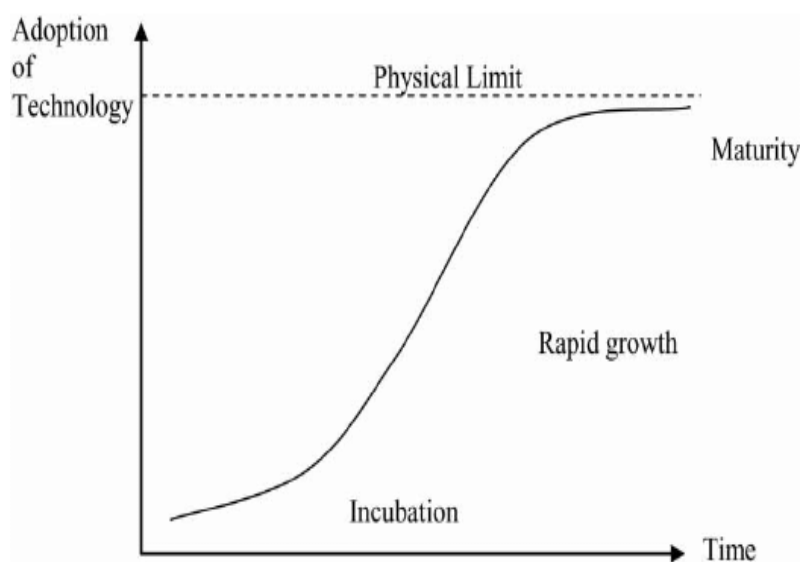
Late adopters-The late adopters are the majority that follow because they feel forced by society to do so (Dearing & Cox, 2018: 185). These are the overwhelming majority and typically adopt because they have evaluated the merits of the innovation adopts due to the actions of others, who have drawn them to consider it to be the moral thing to do (an imitation effect) (Dearing, 2009: 506). They are averse to change and won't embrace a novel concept until the majority has tried it (Kaminski, 2011). Green et al. (2009: 161) maintain that the arrival of the new era brought the Internet's growth, and a media landscape has given rise to a new kind of audience that is more sceptical of mass media than ever before and has begun to depend more on the opinions of others on a personal basis. Text messaging, blogging, two-way electronic gadgets, and other advancements in connectivity have largely replaced face-to-face communication as a major means of providing opinions and conducting interpersonal communication.

Laggards- Similar to innovators, laggards are more willing to take their time and are less susceptible to social pressure (Dearing & Cox, 2018: 185). These people are the most difficult group to convince to embrace change because they are highly distrustful of it and are extremely conservative and constrained by tradition (Shipalana, 2019: 46). Furthermore, Green et al. (2009: 162) declared that the way that various people react to innovation varies. Some wait to adopt until many of their peer groups have

done so, while others want a change in the community and media as a societal norm before deciding to adopt.

García-Avilés (2020: 2) mentions that innovation adoption is impacted by elements of trialability, observability of the innovation's development within the company and among competitors, implementation complexity, compatibility with organisational processes and expertise, and relative benefit over existing technologies. Therefore, the people's views of these five traits indicate how quickly ideas are adopted. Moreover, Dearing (2009: 506) argues that when faced with uncertainty over an innovation, potential adopters usually look for information and, if they think the innovation is intriguing and has potential benefits, they also look for evaluations from reliable sources (informal opinion leaders).

Figure 2.2: S-curve diffusion of innovation model



Source: Roger (2003: 11)

The adoption rate of innovation over time for reimagining the future is shown by the S-Curve diffusion of innovations model, which is seen in Figure 2.2 above. The population's adopters can be divided into several phases, which claim that innovation adoption follows a bell-shaped/s-shaped curve (Rogers et al., 2014: 208). The model shows the relationship between adoption rates and how diffusion is defined in various contexts, such as when innovations are released but not disseminated (Dearing & Cox, 2018: 185). According to Shipalana (2020: 1575), diffusion paths generally follow an S-curve, and social factors can have a significant impact on people's propensity to

adopt innovation initiatives and are an important tool for determining how quickly innovations spread in public intuitions. The phases of the s-shaped diffusion of innovation model are discussed below:

Phase 1: The first phase of the model on the adoption of innovation is the ‘incubation’ phase, also known as the innovation phase, which starts slowly with several uncertainties (Rogers et al., 2014: 208).

Phase 2: The second phase of the model is the improving phase, which is marked ‘rapid growth’, and it is marked as ‘rapid growth’ and incorporates adoption growth. The rapid growth indicates that adopters are beginning to recognise the value of innovation (Shipalana, 2019: 45).

Phase 3: Phase 3 of the model is the maturity phase, and it is when the majority of adopters have embraced the innovation, and the rate at which it is spreading has peaked. (Shipalana, 2019: 45).

Phase 4: In Phase 4 of the model is referred to as the invention of the future. At this phase, innovation has advanced to a point where it produces the desired results (Rogers et al., 2014: 208).

In relation to municipal service delivery, the S-Curve diffusion of innovations model can help measure the rate of adoption and utilisation of high-tech machinery and equipment used by municipal employees for improving service delivery, including wearables, modern computers, 3D printing, intelligent autonomous systems, and many others (Shipalana, 2019: 46). According to Green et al. (2009: 162), interpersonal interactions have an impact in the theory of diffusion of innovation, and it affects how new concepts and cultural practices spread both within and between employees. The value of human interaction and the social networks that facilitate it behaviours have been shown by empirical research in the processes of the spread of novel concepts and behaviours. Hence, when modern machinery is introduced, there is often uncertainty about its use, but if the municipal authorities feel confident using it, a gradual increase in the rate of adoption and utilisation will yield the desired results (Shipalana, 2020: 1576).

2.2.1 The relevance of the Diffusion of Innovation Theory on the study

The study seeks to understand the impact of institutions and government institutions' digital innovation on municipal service delivery. The study adopted the Diffusion of Innovation Theory as the theoretical framework underpinning it. The Diffusion of Innovation theory is 'a theory which helps in understanding the interlinked and complex relationships inherent among institutional mechanisms, technology and socio-economic context' in organizations including the public institutions (Manda & Backhouse, 2017). Diffusion of Innovative Theory is regarded as an important and effective implementation of new methods that are innovative in developing countries (Shipalana, 2019: 53). García-avilés (2020: 03) defined diffusion as a unique form of communication when individuals generate and exchange knowledge with one another with the aim of arriving at a shared understanding. This theory offers a framework for comprehending the diffusion and adoption of fresh ideas, innovations, or technologies within a community or a particular setting (Green et al., 2009: 162).

To this study, the theory is relevant as it influences the implementation of municipal policies better by expanding the adoption of digital innovation in local municipalities. When applied to the realm of municipal service delivery and digital innovation, an important aspect is understanding adoption patterns. The theory offers a framework through which the exploration of innovative approaches, such as the adoption of advanced technologies and systems that influence the quality of services rendered to communities, can be made (Dearing, 2009: 505). The idea aids in comprehending the various phases of digital innovation adoption in municipal settings. Generally, innovations follow a trajectory that begins with early adopters, progresses to the majority, and then reaches laggards (García-avilés, 2020: 03). Policymakers and administrators need to know this in order process to predict and oversee adoption process properly.

The theory also identifies a number of variables that may help or impede the adoption of digital advances. Perceived complexity, compatibility with current systems, trialability, advantages observability, and perceived hazards are some of these criteria (Mergel & Bretschneider, 2013: 455). Municipalities may encourage the successful adoption of digital technologies in municipal service delivery by recognizing and removing these obstacles. In sum, diffusion is possible if programmes and projects

are implemented by municipalities in collaboration with other key partners to support innovation and making innovation easy and possible (Economic Development Growth in eThekweni (EDGE), 2015: 16). Therefore, the theory is relevant to the study of the impact of digital innovation as it seeks to offer a framework that allows diffusion of innovation to the new and improved processes that are undertaken by different stakeholders in municipalities to improve its outcomes.

2.3 CONCEPTUAL FRAMEWORK FOR DIGITAL INNOVATION IN LOCAL MUNICIPALITIES

The term innovation originates from the Latin word ‘Innovare’ which translates to ‘making something new’ (Lin, 2007; Nel & Masilela, 2020: 36). The concept of “innovation is viewed as an idea, practice, or object perceived as new by an individual or other unit of adoption” (Medoff & Kaye, 2016: 9). According to the BCX Digital Innovation Report (2022: 7), innovation is influenced by the need for change that creates a new and improved dimension of performance. Innovation in the South African public institutions are driven by the use of ICTs or motivation of the workforce, restructuring the organization and general management of behaviours (Shava & Vyas-Doorgapersad, 2022: 142). The term is regarded as transformation of new dimension of performance and it acts as one of the main forces behind economic growth (BCX, 2022: 7).

The term ‘digital’ in the concept of digital innovation is more visible in the spheres such as Information and Communication Technology (ICT) and involves using digital tools to drive transformation (BCX, 2022: 10). Digital innovation provides emphasis to the term digitization, and it is commonly used to refer to shifting of processes from physical to digital (Shipalana, 2018: 13). The concept of digital innovation involves the use of digital technology and applications to introduce new service and business models, increase customer experience and expand occurring organizational processes and labour productivity (Westerman, Bonnet & Mc Afee, 2014). Digitization is regarded as a tool that may address complicated service delivery challenges and further aid efficiency, effectiveness, and good governance of the public sector (Shipalana, 2019: 14). Layton-Matthews and Landsberg (2022: 59), further clarified that digital innovation

is the application of technology to offer chances to improve institutional procedures, methods, and practices.

Digital innovation refers to the innovative use of new digital technology and applications in public service (Hong, Kim & Kwon, 2022: 4). Motlounq (2020: 58) indicated that digital innovation promotes good public governance, and “it creates an opportunity for effective collaboration, coordination and improves communication amongst different stakeholders”. Using digital technologies and applications to launch new goods or business models improves consumer experiences and increases labour productivity (BCX, 2022: 7). Bendak, Shikhli and Abdel-Razek (2020: 2) characterized innovation as a shift from previously established concepts, ideas, goods, and/or methods to freshly developed or greatly enhanced ones, can maintain the company's advantage over rivals: and it involves seeing marketing strategies, customer behaviour, and/or technological developments from new angles. On contrast, most municipalities in South Africa are reluctant to change but struggle with adopting new ideas and diffusion of digital innovations (Makale, 2015: 5). Other socioeconomic factors that affect the development of digital innovation include high unemployment rate, unequal access to public services, and extreme poverty (BXC, 2022: 7).

Local municipalities are regarded as those spheres of government closer to the people and are mandated to provide access to municipal services that improve the quality of life of the citizens and to help the poor graduate out of poverty (Makale, 2015: 1). Nel and Masilela (2020: 42) declared that municipalities “need to find ways to adapt to the evolving world” of technological innovations and find strategies to improve municipal service delivery, enhance transparency and promote community participation through service delivery innovation (SDI). It is therefore important that government institutions change the processes and ways of providing services to the people. Improving municipal services involves creating new methods, new resources, removal and reinventing of the old, or discovering something completely new (BCX, 2022: 04).

One of the principles of Public Administration is that it should be development-oriented. The principle is in line with the mission of the Centre for Public Service Innovation (CPSI) strategic plan 2020-2025 to ensure the improvement of the local government officials and supporting them in achieving their outcomes through more effective and innovative approaches and products. Thus, digital innovation attempts to achieve

flexibility of the public officials by introducing technological responses to the needs of the people, that strive to achieve low-costs and to support demand predictions and improve supply estimates in the local government (Westerman et al., 2014). Moreover, it is one of the priorities of the National Development Goal 2030 to “create a capable, moral, and progressive state by bringing innovation to local government” (Nel-Sander & Malomane, 2022: 7).

2.3.1 Key elements of the diffusion on innovation

The Diffusion of Innovations Theory (DOI) was developed in an effort to provide organizations, especially public institutions, with a clear knowledge of how to nurture creative management approaches and tactics (Shipalana, 2020: 1575). Diffusion is “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003: 5). Rogers et al. (2014: 210) identified innovation, time communication channel and social system as the four key elements and the building blocks for the Diffusion of Innovations Theory. Innovative thinkers and organisations can effectively promote and support the adoption of new ideas by understanding these elements (Dearing, 2009: 505), as discussed below.

2.3.1.1 Innovation element

Roger (2003: 12) perceives innovation as any concept, procedure, or endeavour that a person or other adoption unit views as being new. “Even if something has been around for a while, people may still consider it innovative if they believe it to be fresh” (Sahin, 2006: 14). The innovation decision process is made of three stages, which include knowledge, persuasion, and decision. Innovativeness involves the level and time at which new ideas are adopted by a person or other unit of adoption compared to other members of a social system (García-avilés, 2020: 03). Potential adopters evaluate an innovation based on its relative advantage, complexity, compatibility, observability, and trialability (Dearing, 2009: 206).

For innovation to be diffused and disseminated, it requires sophisticated technical proficiency and managerial skills that will support staff coordination, organizational

procedures and the integration of external and internal expertise (Motloun, 2020: 21). Thus, the other adopters will shorten the adoption's length if the innovation's adoption yields positive results. However, the innovation's complexity can alter how long it takes (Yeloglu & Sagsan, 2009: 19). Therefore, Local governments need to innovate systematically to become the best governments. Furthermore, it is required that highly adaptable techniques are adopted for the successful and resourceful application of those techniques.

2.3.1.2 Communication element

Communication is considered one of the elements of diffusion of innovation (Shipalana, 2019: 47). Communication involves processes where information is shared among participants to reach a common understanding on innovation using different communication channels (Medoff & Kaye, 2016). Also, Shipalana (2020: 1576) perceives communication as a change agent that can transfer a message about a new idea to possible adopters. Therefore, potential adopters and implementers have to be communicated effectively about innovative approaches and strategies to encourage their involvement in the innovation processes (Dearing & Kreute, 2010: 5106).

Communication channels need to have obvious features and transfer messages as quickly as possible (Yeloglu & Sagsan, 2009: 19). If not, the diffusion rate would be adversely affected by the slow transferring rate. Therefore, to stimulate their participation, innovative ideas and tactics must be successfully shared through proper communication channels to the potential adopters and implementers (Shipalana, 2019: 47). The innovative approaches include employing electronic mass media channels such as televisions, radio, and social media for raising awareness regarding innovation (Medoff & Kaye, 2016). In sum, government workers, the private sector, and the general public must be encouraged to exchange creative ideas in order to support the dynamic public sector environment (Maremi, Thulare & Herselman, 2022).

2.3.1.3 Time element

Rogers et al. (2014: 208) perceived time as an important aspect in the diffusion of the innovation process. Time affects the rate of the adoption of innovation (Dearing & Kreute, 2010: 5104). Dibra (2015: 1460) regards time as the duration it takes for potential adopters to be convinced to adopt or reject innovation. Time is a component of the innovation diffusion process, is crucial in setting the standard and milestone of the inventive management process (Shipalana, 2019: 51). The time aspect of the innovation dissemination process tracks adopter classification and adoption rates (Wani & Ali, 2015: 204). This measure tracks how quickly innovation spreads throughout society and gets embraced by various users.

Innovation in local municipalities needs to be aligned with the pre-existing organizational routines to ensure fast implementation of innovation processes (Motloun, 2020: 62). According to Dearing and Cox (2018: 184), diffusion modifies cultures through waves of innovations across time because resource-rich communities often adopt innovations earlier than impoverished groups. This can “lead to disparities in knowledge, disproportionate access to government and commercial services, and rising inequality” (Makale, 2015: 111). High levels of complexity also translate into higher levels of perceived and actual difficulty in employing the invention. This may lengthen the adoption's duration and increase the rate of diffusion (Yeloglu & Sagsan, 2009: 19). Also, SALGA (2017: 38) has identified time as a challenge for the implementation of innovation in municipalities because several innovations take time to materialise, and many municipalities do not have that time.

2.3.1.4 The social system element

The social system is one of the elements of innovation and is the domain in which innovation spreads out (Dibra, 2015). According to Rogers et al. (2014: 222), the social system affects individual innovativeness. It also includes the placement of interrelated units involved in solving a common problem to meet a common goal (Dibra, 2015: 1454). The members of the social system are individuals, informal groups, and organisations (Shipalana, 2019: 52). In addition, norms may impact the diffusion of

innovation in institutions, the roles of opinion leaders and change agents, decision-making processes, and the outcomes of innovation (Rogers et al., 2014: 222).

Motloun (2020: 60) argued that it is important for developing countries to adopt digital innovation frameworks that foster innovation in municipalities. According to Yeloglu and Sagsan (2009: 19) the rate at which an innovation spreads can vary depending on the circumstances, as can the length of time it takes in various social structures. The private sector and governmental organisations have been seen as crucial change agents to manage and coordinate the application of innovative approaches and methods to address social concerns and challenges with service delivery in developing countries (Shipalana, 2019: 51). This calls for “a change in the whole organization, i.e. processes, employees’ duties and tasks, information systems, organizational culture and behaviours, and the hierarchical structure” (Nel-Sander & Malomane, 2021: 7).

2.3.2 E-government versus digital innovation in the provision of municipal service delivery

The concept of E-government is also regarded as digital governance (Maphangwa, 2023: 8). The concept includes all facets of public service delivery and governance and is a more specialized field that is linked to the creation of direct (online) services for citizens, with a focus on e-taxes, e-education, and e-health services (Grigalashvili, 2022: 184). The initial motivation behind e-government has been linked to the public's demand for electronic access to government documents and decisions, followed by the emergence of public electronic services and the pursuit of avenues to engage with government institutions and contribute to decision-making (Nel-Sanders & Malomane, 2022: 4). The benefits of E-government include increased public sector corruption reduction, increased openness in government operations, and increased citizen participation in politics (Galushi & Malatji, 2022: 119).

E-government is defined as the government's attempts to communicate with the public and commercial actors in the community by using information technology to provide accurate and timely services (Grigalashvili, 2022: 184). Putting e-government systems into place can improve good governance and service delivery (Nel-Sanders & Malomane, 2022: 4). The use of e-government has received high praise since it offers new incentives for efficient and effective service delivery (Glyptis, Christofi, Vrontis,

Del Giudice, Dimitriou & Michael, 2020: 2). The government can now provide services to the public on any platform or device, at anytime, anywhere, thanks to e-governance and its services (e-services) (Galushi & Malatji, 2022: 120). Additionally, the public will have easy access to services at any time, as the e-government system will make them readily available (Mathebula, 2021: 18203).

E-government has the potential to create a new kind of community service where all government agencies offer their citizens contemporary, seamless, and integrated services (Karunia, Budiaji, Suzana, Dewi & Prasetyo, 2023: 48). As a result, government can undertake processes to leverage state-of-the-art information and communication technology, particularly web-based internet applications, to increase citizen convenience, enhance service quality, and chances to engage with democratic processes and institutions (Grigalashvili, 2022: 184). For example, during the Covid-19 health crisis, the South African government used a range of e-Service platforms, including national admin portals, smartphone applications, and social media platforms, to provide emergency contacts and relevant health and safety-related information (Galushi & Malatji, 2022: 120).

The role of innovation in the context of e-government is to use technology to deliver public services effectively and efficiently (Nel-Sanders & Malomane, 2022: 5). Many studies recognize e-government applications as innovations and adoption of e-government applications because they characterize e-government apps as being similar to innovations (Yeloglu & Sagsan, 2009: 18). These applications for e-government applications are considered innovation and include information management, such as electronic data or services; information sharing, such as rules and regulations; and local information provision (Yeloglu & Sagsan, 2009: 19). For example, internal innovations such as applications from the government to the employees and from the government to other governments (such as municipalities) as other types of e-government application. However, innovations from the government to businesses, individual services, and the marketplace can all be recognized as external innovations. In order to benefit nations, policymakers, and practitioners, it is important to considering the crucial success or failure factors that determine the fruitful implementation of these innovative applications (Glyptis et al., 2020: 2).

2.4 LITERATURE REVIEW ON DIGITAL INNOVATION AND MUNICIPAL SERVICE DELIVERY

According to Snyder (2019), a literature review entails integrating the results and viewpoints of numerous empirical discoveries to address the research questions. Kumar (2011) emphasized that a study must be supported by a literature review because, according to Snyder (2019), a literature review is crucial in evaluating the research field to motivate the purpose of the study, as well as the research question and hypothesis. In this study, the literature review focuses on the efficiency of digital innovation in local government, the strategies by the government to promote digital innovation in South Africa, digital innovation as a driver for the Fourth Industrial Revolution, drivers and challenges towards digital innovation in the local government and the state of digital innovation in selected countries and South African provinces.

2.4.1 Digital innovation in local government

The Local Government Municipal Structures Act 117 of 1998 primarily establishes the framework for a new local government system in South Africa by allowing for the creation of a new generation of municipalities. The main goals of local governments are to provide democratic and accountable governance for local communities (Maela, 2020:1), to ensure that communities receive municipal services in a sustainable manner, to promote social and economic advancement, to create a safe and healthy environment, and to encourage community involvement in local government (SALGA, 2011). Municipalities are the main organisations in the field of local government and are made up of people living in the municipal territory and the political structures and administration of the municipality (Municipal Structures Act, 1998). The three unique categories of municipalities are established by Section 156 of the South African Constitution (1996), and it states that national legislation shall specify the various sorts of municipalities that may be established within each category. The South African Constitution (1996) specifies Category A as Metropolitan Municipalities which are bestowed with exclusive authority to make rules over their area of jurisdiction. Local municipalities, which make up Category B, share jurisdiction with the district municipalities that surround them. Last but not least, Category C refers to District Municipalities, which have the power to regulate and manage territories that comprise

many local municipalities. Within their jurisdiction, district municipalities share authority with local municipalities.

Local government is the sphere of government that is closer to the people and is responsible for providing basic communal services such as clean water and maintenance and construction of roads (SALGA, 2011). South Africa has a strong commitment to improving citizen participation and strengthening transparency in the local governments (Layton-Matthews & Landsberg, 2022: 58). As a result, digital innovation can be used by local governments in South Africa to increase the local economy, improve citizen participation, and motivate the public officials to pursue e-governance or digital governance which is an innovative online provision of services (Shava & Doorgapersad, 2022: 85). Xiao et al. (2022: 2) also noted that the effectiveness of digital innovation in local government can impact delivery of public services, transparency, and general governance. When used successfully, digital innovation may enhance several facets of local government operations, increasing their effectiveness and responsiveness to community requirements (Nel & Masilela, 2020: 38). Mathebula (2021: 18199) also recognized digital technologies as catalytic agents for expanding communication channels and increasing transparency which improves citizen participation in decision-making processes within municipalities. Community participation is important for promoting good governance and encouraging development in the local government sphere (Maela, 2020: 118). Therefore, community participation must be strengthened to improve accountability and service delivery.

Digital innovation has the potential to develop e-government platforms that enable citizens to access government services online and conduct transactions from the comfort of their homes (Al-Besher & Kumar, 2022: 4). It is consequently crucial for local governments to embrace digital innovation such as social media platforms improve the way in that citizens engage with municipalities on matters of service delivery (Medoff & Kaye, 2016). For instance, initiatives such as 'Joburg City smart' in City of Joburg Metropolitan Municipality, Johannesburg, have been introduced to improve the way in which the municipality engages with the people (Motloun, 2020: 84). As a result, citizens can access the website to report faults and to view important notices. In this case the effectiveness of the response on emergency services that require the attention of the municipality would be known and addressed in due time.

Digital innovation has the potential to fast-track service delivery in the public sector. This is done by bringing industrialization and improved use of modern technology to improve public services (Galushi & Malatji, 2022: 117). According to Moses, Sithole & Blankley (2012: 1), it is important for countries to innovate to compete in the global market. Consequently, the industrialization that is brought by the acceptance of digital technologies will assist the government in growth and, attract investments worldwide and empower its citizens (Layton-Matthews & Landsberg, 2022: 60). This will help resolve challenges of unemployment, poverty and inequality. Governments should be able to use technology to respond quickly to the needs of the people (EDGE, 2015: 6). For instance, the City of Cape Town had to implement smart utility technology, such as remote metres during the 2018 drought to monitor and control strategic points as part of the water management strategy to avoid the hurdles of Day Zero (Du Toit & Stimile, 2023: 92).

The implementation of innovation in enterprises has proven to increase sales, which in turn leads to the creation of employment opportunities (Moses et al., 2012). Also, Galushi and Malatji (2022: 119) argue that it is important to train more ICT personnel so that municipalities have the capacity to provide online services. Thus, transforming municipalities into digital operations will assist in accommodating the new generation and is highly functional on the Internet to participate in government activities through e-participation (Mathebula, 2021: 18199). This also includes the government providing free wi-fi across the country, which will enable the use of communication networks and embrace technology to transform towns into smart cities (Du toit & Stimile, 2023: 91).

2.4.1.1 The relationship between digital innovation and municipal services

South African municipalities are obligated by The Constitution of South Africa (1996) to guarantee that citizens have access to necessities such as housing, electricity, water, and sanitary facilities. However, the provision of municipal services has been a persistent problem with both notable achievements and formidable obstacles (Modiba, 2020: 25). Effective delivery of municipal services is hampered by issues with money, infrastructure, governance, and accountability, despite several government initiatives to increase their accessibility and quality (Matloga, Mahole & Nekhavhambe, 2024). Although millions of people have better access to basic utilities and infrastructure,

access is still uneven, particularly in rural areas and informal settlements where people sometimes face inadequate or non-existent municipal services (Shongwe & Meyer, 2023: 140). This of results from corruption and bad governance, which act as major obstacles to providing services effectively (Auditor General, 2021). Residents of communities with high levels of corruption are less likely to receive rapid and reliable services, which exacerbates their grievances, resulting in service delivery protests (Modiba, 2020: 25). The South African Local Government Association (SALGA: 2019) claims that smaller and rural municipalities are particularly impacted since they lack the necessary skills to manage finances and projects properly. Moreover, other issues, such as infrastructure backlogs, are deemed a serious concern in providing municipal services by the National Development Plan (NDP), which estimated that billions of dollars would be needed to extend and modernise local infrastructure (National Planning Commission, 2012).

South African municipalities increased the scope of their digital service delivery offerings to include SMS-based services and mobile applications to make government services more accessible and responsive to the requirements of the public (Zindi, 2024: 93). The goal of adopting digital innovation is to fundamentally change the landscape of service and product delivery, through system creation and reorganising with new appropriate and valuable strategies (Shava & Doorgapersad: 2022: 86). This is because people have encountered smooth connections, interactions, and transactions with systems from a variety of industries, including online shopping apps and the banking industry (Netshirando, Munyoka & Kadyamatimba, 2024: 2). Digitization of municipal service delivery includes faster digitisation of government procedures, contactless, cashless, and paperless procedures, as well as joined and integrated services (Nzimakwe, 2021:5). Thus, citizens can use digital platforms to get municipal services including housing, water, power, and garbage collection without physically visiting government buildings (Mohale, 2024:3).

To finance service delivery, municipalities rely on a combination of national government transfers and local revenue from taxes, fees, and tariffs. Thus, many towns find it difficult to make enough money, especially in places with low economic standing where citizens cannot afford hefty property taxes or tariffs (Shongwe & Meyer, 2024: 141). The majority of individuals in rural areas lack the ICT devices and skills necessary to properly use digital services and tend to use e-government services less

frequently since so few services are digitalised (Mohale, 2024: 3). As a result, there are insufficient money to maintain infrastructure and provide basic services (Shongwe & Meyer, 2024: 141). However, municipalities should continue to be dedicated to using technology as a tool for empowerment and constructive change and to improve the future for all citizens.

2.4.1.2 The effect of the Covid-19 pandemic on digital innovation

Prior to the COVID-19 pandemic, the majority of municipalities used conventional, face-to-face, or on-site processes; they lacked a hybrid model that combined technologies to improve local administration (Nel-Sanders & Malomane, 2022: 02). The lockdowns and other social isolation measures led companies, government and educational institutions to quickly switch to work remotely to avoid physical conducts (Kanyane, 2023: 2). The pandemic has revealed the importance of technology in addressing the challenges in the communities and driving economic development (Layton-Matthews & Landsberg, 2022: 56). As a result, sectors such as education, health and hospitality were pushed to create a platform to drive digital innovation irrespective of all the restrictions made to limit the spread of the virus (Chen & Roldan, 2021: 16). And, the Covid-19 pandemic has influenced rapid systematic technological changes on world markets. Because of this, the majority of municipalities now use information and communication technologies (ICTs) to enhance service delivery and residents' overall well-being. A need frequently prompted these technological advancements and have the potential to contribute to long-term gains in productivity, accessibility, and resilience in South African society and the economy (BCX, 2022: 02).

The pandemic has resulted in a high digital transformation rate to the South African health care system (Munzhedzi, 2021; BCX, 2022: 11). The health system had to improve the facilities and infrastructure to meet the needs that were brought by the pandemic. Thus, digital technologies were identified as potential means of empowering people, overcoming barriers to growth, addressing social issues, and strengthening democratic institutions (Galushi & Malatji, 2022: 121). With over 82,6 percent of the population in South Africa depending on the public health sector (BCX, 2022: 23), improved ICT infrastructure was required to cater for the high demand of

health services which had to be rendered to the hard-hit healthcare (Xiao, Han, Zhang, 2022: 2).

Prior to the global COVID-19 epidemic, South Africa's service delivery through e-governance received little attention (Galushi & Malatji, 2022: 121; Munzhedzi & Uwizeyimana, 2022). And as a result, there are still challenges with implementation of e-services through e-government, till to date. Various officials in government, including in local government, still lack the digital abilities required to take advantage of the most digital innovations and skills training and development initiatives are required to cater for the growing technology environment (Shava & Doorgapersad, 2021: 88).

2.4.2 Digital innovation as a driver for Forth Industrial Revolution

The 4IR concept includes technology developments that act as catalyst for transformation that affects all spheres of existence (Mathebula, 2021: 18199). According to Philbeck and Davis (2018: 20), the term Fourth Industrial Revolution (4IR) is used to examine how technology has impacted all facets of development in the twenty-first century. The first industrial revolution began in the United Kingdom during the 18th century because women were banned from manufacturing professions in favour of a male-dominated working culture (Xu, David & Kim, 2018: 90). The second industrial revolution followed in the 1900s and it was characterized by a great advancement in manufacturing, technology, and industrial production methods (Philbeck & Davis, 2018: 19). On the other hand, third industrial revolution started in the 1950s and was characterised by main factors such as the Internet, Information Communication Technologies (ICT), and digitalization (Mathebula, 2021: 18201). The fourth industrial revolution began in 1960 and it entails connecting millions of people through mobile devices that are influenced by a range of fields such as the Internet of Things (IoT), Artificial intelligence, robotics, 3D printing, among many others (Schwab, 2017: 1).

The Fourth Industrial Revolution (4IR) is characterized by the integration of cutting-edge technologies that blur the boundaries between the physical, digital, and biological worlds, and is mostly driven by digital innovation (Mhlanga & Ndhlovu, 2023: 2). The changing technologies such as Internet of Things (IoT), Artificial Intelligence (AI), Big data, 3D printing, and Robotics are some of the key aspects of digital innovation that

are driving the Fourth Industrial Revolution (Motloun, 2020: 1) and affect the way government functions (Schwab, 2017: 1). The 4IR is powered by the AI as its software engine (Maphangwa, 2023: 79) and is also referred to as “machine intelligence” (intelligence expressed by machines) (Manda & Dhaou, 2019: 1). On the other hand, the big data analytics aim to uncover hidden patterns, correlations, and other insights by analysing large amounts of data (Enaifoghe, 2021: 33).

Nel and Masilela (2020: 36) posit that innovation in government institutions is an opportunity to develop, implement, and experiment with new ideas, services, and products into viable, practical, and sustainable public service delivery output. So, innovation is a critical solution for enhancing municipal service delivery in the 4IR (Shava & Doorgapersad, 2022: 142). Embracing new ICTs and digital technologies is therefore vital in improving the socio-economic lives of citizens in South Africa (Motloun, 2020). The 4IR in emerging economies will come with newest technologies (Nyagadza, Pashapa, Chare & Mazuruse, 2022: 6). Therefore, innovation is one of the fundamental building blocks of the 4IR, and government must adopt transformative strategies to fully take advantage of the opportunities provided by the 4IR (Nel & Masilela, 2020: 36). Moreover, the 4IR creates opportunities for global contacts and networking because technology makes accurate data become easily available and accessible (Nhede et al., 2022: 04).

2.4.3 Drivers for digital innovation in local government

As the number of people using technologies and the internet rises, the government and the private sector must embrace digital innovation to keep up with societal needs and expectations (Agolla & Lill, 2013: 167). Some factors drive digital innovation in the external and internal environment of local government. Mafunzwaini (2018: 6) defined drivers of innovation as factors that encourage businesses and organizations to innovate. This includes the factors that determine and influence the need for digital innovation to improve public services (Shava & Vyas-Doorgapersad, 2022: 87). The internal factors that drive digital innovation in the public sector include factors such as information communication technology infrastructure, the need for proper education and training dispensary and the change of needs and services that are required by communities (BCX, 2022: 18).

2.4.3.1 Information Communication Technology Infrastructure

Information and Communication Technology (ICT) is a key force behind digital innovation. It includes a broad range of innovations and devices that make it easier to produce, store, process, and communicate information (Brynjolfsson & McAfee, 2014: 14). The ICTs are key in transforming municipalities because Information technology-driven changes are the first stages in enhancing municipal services (Xiao et al., 2022: 2). It includes new technologies that create new opportunities for data collecting in order to promptly deliver vital information to decision-makers and obtain additional understanding of the predicament of those who are susceptible (Mathebula, 2021: 18201).

The emergence of new ICTs influences the country to adopt systems that are influenced by 4IR, such as enhanced communication systems that will improve accountability of municipal employees (Mathebula, 2021: 18201). Digital innovation increases communication and interaction borders, which subject public administration to change from its traditional roles (Heeks, 2001: Motloun, 2020: 19). That includes improving the way in which communities interact with the government. Social media platforms are some of the digital technologies that improve the participation of people in exchanging ideas and making recommendations on how to improve the services provided to them (Shava & Vyas-Doorgapersad, 2022: 82). The local government can also use the ICTs to monitor the development of the communities (Layton-Matthews & Landsberg, 2022: 59). In sum, poor and rural communities would benefit more from access to ICT infrastructure, usage, and skills since these places are more likely to be empowered and have the resources needed to assist people escape poverty (Frans & Pather, 2022: 3).

2.4.3.2 Education and Training Dispensation

Education and training dispensation can significantly impact digital innovation and the rate of experimenting with new technologies. This is the term for the laws and procedures defining how educational and training programmes are designed and delivered (Maphalala & Ajani, 2023: 2). The educational system of South Africa is regarded as poor compared to other developing countries because it has shown a

shortage of skills that are relevant to the 4IR (Motloun, 2020: 26). The National Planning Commission (2013) elaborated in the National Development Plan 2030, that digital innovation is a strategy for economic development for developing countries and can reduce poverty. Innovation is also regarded as an enabler to enforce an inclusive society through the creation of more opportunities across industries. Mathebula (2021: 18201) declared that relevant ICT skills are relevant in transforming the economy and tackling socio-economic challenges such as load-shedding, poverty, and unemployment. This is because digital innovation requires rapid, integrated, and sophisticated change of governmental operations. In addition, the proper skills enable the graduate to fit in and compete in the global market (OECD, 2017). Therefore, there is a need to improve skills among the youth and to equip the young with relevant influence in the education system to embrace innovation.

2.4.3.3 Change in societal preference of goods and services

Xiao et al. (2022: 2) is of the view that one of the main external drivers of local government digital transformation is the need to satisfy citizens' expectations of municipal administrations. This include offering high-value, real-time digital services in this digital age. People's preferences for interacting with municipalities have evolved and they now access services using electronic devices rather than just telephone lines (Motloun, 2020: 20). Consequently, people expect municipalities to be able to provide high-quality digital services (Xiao et al., 2022: 2). Furthermore, Hong et al., (2022: 8) observed that there is a positive correlation between the number of digital innovations local governments are experimenting with and the percentage of young people, which serves as a suitable proxy for the degree of needs or requests for digital innovation. The public expects municipalities to use modern technology to deliver efficient and effective online services (Anshari & Hamdan, 2022). The online services that citizens expect to receive from municipalities may include protection of human rights and legal guidelines to maintain ethical use of Artificial Intelligence and digital technology (Xiao et al., 2022: 3). It also includes full access to new knowledge on new technologies through adequate education in the digital era (Hong et al., 2022: 8).

In this digitalized 4IR era, social media platforms (the website, Instagram, Facebook, Twitter, and others) and modern digital technologies can be used meet efficiently

citizen needs for high-quality services (Shava & Doorgapesad, 2021: 86). Innovation is needed in municipalities because of the growing challenges and the more diverse requirements of society (Motloun, 2022: 20). Nel and Masilela (2020: 37) argue that service delivery involves everything that has to do with when, how, and where a client receives a service as well as whether or not it is equitable. With the increase of people who have access to ICTs, access to real-time information given by broadband internet has become essential for survival more than previously (Frans & Pather, 2022: 1). Thus, the impartial goal of government is to provide uninterrupted provision of electronic government services and information for twenty-four hours a day, seven days a week (Galushi & Malatji, 2022: 117). It is, therefore, crucial that the local municipalities treat the adoption of digital innovation with such seriousness to advance society in alignment with the *Batho Pele* (people first) principles.

Nhede et al. (2022: 04) explain that the change in society's preference of goods and services provided to them contributes to innovation in the public sector. The local government is expected to find solutions to the rising service delivery expectations and demands from the communities. It is promoted by the need to change processes and introduce new methods to improve the quality of services and maximize profit or institutional outcomes (OECD, 2017). In addition, the new technological processes improve the quality of goods and services while reducing costs (Nhede et al., 2022: 04). The different and improved strategies would help organizations that are already operating on tight budgets and heavy workloads (Mathebula, 2021: 18202). On this note, innovative strategies have been adopted in some of the departments in South Africa to decrease the workload and long queues (Motloun, 2020: 89). Initiatives such as the digitization of the Department of Home Affairs and Umalusi services are such examples of innovative strategies that are influenced by the preferences of the people (Maremi et al., 2022: 2), wherein citizens can apply for IDs and passports on the departmental website and Umalusi candidates who have lost or damaged their matric certificates can apply for a replacement certificate online.

2.4.3.4 Policy paradigm and innovation

Driving digital innovation in South Africa is included as a goal in the new policy paradigms and innovations (National Development Plan 2030: 59). Policy innovation

has a major role in supporting digital innovation, which is essential to meeting demands in sectors like infrastructure, education, and skills that arise from new inventions (Manda & Backhouse, 2017: 2). South Africa has prioritized digital transformation in recent years to increase economic development, enhance service delivery, and improve overall competitiveness (BCX, 2022: 04). South Africa has introduced initiatives such as the National Integrated ICT Policy White Paper, which is significant policy document that outlines the government's vision for digital innovation (White Paper, 2016). It emphasizes the need for broadband infrastructure, digital inclusion, and the development of the digital economy. This policy paradigm serves as the National Development Plan that is aimed at improving South Africa by 2030.

In summary, the National Treasury's e-government strategy and Innovation hubs and incubators are created as a foundation for various innovation initiatives in South Africa (Mathebula, 2021: 18203). These policy paradigms and innovation initiatives collectively contribute to South Africa's digital transformation and its journey toward becoming a more digitally inclusive and competitive nation (Abrahams & Burke, 2022: 4). On this note, a high digital transformation rate was introduced as a result of the Covid-19 pandemic on the South African health care system that prompted the government to implement innovative measures (BCX, 2022: 11).

There is a continuous need for the introduction of policies that guide the emergence of new technologies and innovation (Motloun, 2022: 7). According to the National Planning Commission's paper titled 'Digital Future: South Africa's Digital Readiness for the Fourth Industrial Revolution' (2020), the government published on the government gazette the SA connect as a national broadband policy plan and strategy to operationalize core element of the National Development Plan after its release in 2013. The government also introduced a wide range of policies such as the Electronic Communications and Transactions Act (ECTA) 25 of 2002, the Independent Communications Authority of South Africa (ICASA) Act 13 of 2000, and the Electronic Communications Act (ECA) 36 of 2005 that seek to increase accessibility and ensure equitable digital economy and society that is geared towards achieving the goals of the country to embrace technology.

2.4.4 The challenges impacting digital innovation in local government

Although adopting new ICTs and digital technologies is a step in the right direction for enhancing South Africans' socioeconomic conditions, there are still numerous obstacles to overcome (Shava & Vyas-Doogapersad, 2022: 89). The challenges towards digital innovation are those factors that hinder the adoption of new strategies, products and methods that are influenced using technology and internet. According to Mafunzwaini (2018: 5), the success of digital innovation in the public sector depends on determining the factors that act as barriers to effective innovation outcomes. Some of the main challenges linked to digital innovation and digital transformation in local government are a lack of proper ICT infrastructure, skills deficiency, the culture of hierarchy in government, and lack of investments. Below is a discussion of some of these barriers.

2.4.4.1 Lack of proper ICT infrastructure

The greatest challenge that is hindering the 4IR in South Africa is the lack of adequate viable resources and lack of infrastructural support (Layton-Matthews & Landsberg, 2022: 60). Manda and Backhouse (2017: 313) argue that proper ICT infrastructure is a notable feature for innovation in the municipalities and it is critical for public institutions to invest in internet technologies and telecommunications infrastructure and broadbands. This will enable the provision of digital connectivity for effective communication in a respective municipality (Mathebula, 2022: 18201). The BCX report (2022: 19) points out that old technical infrastructure hinders the development of innovation through technology. Also, the ability to improve the socio-economic lives of ordinary South Africans would be enabled by embracing new ICTs and purchasing new software and models to enhance municipal service delivery (Shava and Vyas-Doogapersad, 2022: 142).

The availability and quality of ICT infrastructure are key determinants of digital innovation; hence, closing infrastructure gaps is essential for enabling sustainable digital development (Dutta & Mia, 2018). Therefore, workshops and training are required to develop the fundamental skills needed for e-government (Manda & Backhouse, 2022: 313). The COVID-19 pandemic has revealed that ICTs are

necessary to enable people to overcome obstacles to growth, deal with social issues, and strengthen democratic institutions (Galushi & Malatji, 2022: 119). On the other hand, the ICASA report (2023) indicates that several South African industries, particularly the ICT sector, have been harmed by social phenomenon such as load-shedding. Interruptions in the supply of electricity have an impact on the quality of communications services provided to the public and businesses. Although at least one member of the household has access to the internet (mainly through mobile devices), about 90% of families lack a home internet connection (ICASA, 2023). This indicates that access to ICT infrastructure is still a challenge in South Africa, particularly in rural areas.

2.4.4.2 Skills deficiency

Digital innovation in the 4IR demands skilled, competent, creative workers and citizens (Manda & Backhouse, 2022: 311). In most developing nations, there is a shortage of skilled personnel and ICT skills in local government (Motloun, 2020: 51). Mawela et al. (2017: 159) articulate that skills are important for attaining an ICT department that can support government objectives and drive developmental objectives. And skills are the enabling aspect to drive innovation in the digital era. According to the BCX (2022: 19), finding people with the required skills to function in a digital environment is difficult. It is unfortunate that there is a shortage of ICT skills, particularly in rural communities, when they are the ones that need these critically. Shava and Vyas-Doorgapersad (2022: 85) believe that the implementation of digital innovations in local government should be closely watched since they have the potential to disrupt service delivery because they require public personnel to receive digital skill training. Therefore, managerial oversight is required in public institutions because employees' frequent access to digital devices and their use of iPods, tablets, smartphones, and other devices might cause service delivery to be delayed (Nzimakwe, 2021: 2).

The skills shortage affects government institutions negatively, often resulting in service delivery backlogs because of employees who are not able to cope with ICT challenges (Mawela et al., 2017: 160). The ICASA report (2023) shows that employment in the telecommunications industry fell by 3.40%, in the broadcasting sector by 4.13%, and in the postal service, where employment fell by 7.25% over the same time,

employment still indicates a fall in growth. Frans & Pather (2022: 2) highlight that users' educational background influences how they utilize ICTs at telecentres in rural areas, particularly when using computers and the internet. This illustrates that a skills gap exists in the country. It is therefore important to empower graduates and the workforce in the public sector with relevant skills to address the challenge of skills gap (BCX, 2022: 18). Moreover, tackling the high demand of ICT skill would elevate digital innovations by the youth and help curb the high unemployment rate in South Africa (Maremi et al., 2022: 7).

Collaborations and partnerships between the public sector and the private sector are vital in pausing a threat to digital innovation and skill development (Motloun, 2022: 73). Similarly, Shava and Doorgapersad (2022: 79) agree that the public and private sectors would help fill the void where the government could be short on skills and knowledge. Frans and Pather (2022: 2) posit that ICT training and education are required in rural Sub-Saharan African communities with accessible infrastructure to ensure that residents of rural areas use ICTs successfully and efficiently. Universities can provide training, while the private sector provides the technical skills and infrastructure needed (Shava, 2022: 80). Also, municipalities can provide data, information flow and knowledge sharing platforms. In contrast, the adoption of digital innovation in local government should be closely watched since the training and development of public officials' digital abilities might disrupt service delivery (Shava & Doorgapersad, 2022: 85).

Information and Communication Technology (ICT) is considered a part of a broader e-government and government modernization program that makes ineffective procedures more efficient for the South African country and citizens' economic as well as social development (Galushi & Malatji, 2022: 119). The South African government is having a challenge of strategic planning and implementation as most local governments do not have a clear tailored strategy for e-governance (Maremi et al., 2022: 7). A clear plan will help the government comprehend the current state of affairs, the costs associated with it, and its willingness to learn from the private sector (Nel-Sanders & Malomane, 2022: 05). In line with the above, the initiative will assist in areas of improving people's quality of life, satisfying their requirements, and providing excellent customer service. For this reason, skills development is important in enabling digital innovation because rural residents will continue to lag even if the government

makes technological advancements because they lack the knowledge or literacy to use them (Maremi et al., 2022: 6).

2.4.4.3 Lack of investments

Lack of funding for Information and Communication Technologies (ICT) is a factor considered a significant barrier for public institutions in their effort to induce digital innovation in delivering their mandates (Mathebula, 2021: 18202). In order to combat poverty and raise people's socioeconomic and living standards in difficult, poor communities, ICTs need to be prioritized. Although the South African government remained committed to investing in ICT infrastructure in order to fulfil its constitutional duty of providing services to the public during the Covid-19 pandemic, there is a need for more ICT infrastructure (Galushi & Malatji, 2022: 120). Budgets in the local municipalities are regarded as a disabling factor for innovation because budgets of municipalities priorities basic services such as local economic growth and service delivery (Mawela et al., 2017: 161).

South Africa spends less on ICT infrastructure than on social infrastructure, like schools and healthcare facilities, according to the 2023 ICASA research. In the BCX Digital Innovation Report (2022: 24), one enabling factor contributing to innovation is the development of enabling policies. Although South Africa has created institutions like the Council for Scientific and Industrial Research (CSIR) and the Technology Innovation Agency (TIA), the government has funded ICT research and development projects (Abrahams & Burke, 2022: 14), lack of funding for innovative developments in municipalities is still a challenge. Thus, the policies should be targeted at funding and investing in innovative processes and technologies that will be effective in the transition of the procedures of government.

The BCX digital Innovative Report (2022: 21) further detailed that digital innovation within the youth would be motivated by making funds available to reward innovative ideas that will improve the public institutions. Galushi and Malatji (2022: 120) regards high cost of IT systems infrastructure as a disabling factor for digital innovation. In addition, Frans and Pather (2022: 3) maintain that people living in rural areas may be more likely to use and adopt ICTs if they see a degree of assistance from governmental organisations setting up public access centres. This is because the municipality's

support plays a direct role in the diffusion of technology within specific areas. Therefore, it is relatively crucial that investment is also made in the latest technologies and systems (Shava, 2022: 85).

2.4.4.4 The digital divide

The digital divide is regarded as a barrier to digital innovation in South Africa. The digital divide is known as the difference between those who have access to ICTs and the Internet and those who do not (Nel-Sanders & Malomane, 2022: 09). And the digital divide illustrates the difference in computer literacy between people who are computer savvy and those who are not. In addition, Faloyi & Ajayi (2022: 2) emphasise that digital skills include more than just knowing how to operate computers and other technology; they also include knowing how to use web-based search engines efficiently as well as how to recognise and use all types of technology to process the essential information. Because of their poor incomes and lack of education, most people in these communities find it difficult to learn IT skills and may not be able to afford mobile devices or other technology-enabled gadgets (Aruleba & Jere, 2022: 3). As a result, tiny towns find it challenging to maintain access to public services, get outside information, and even get up-to-date information about the villages that are close by (Nel-Sanders & Malomane, 2022: 02). Thus, low levels of motivation are seen among those who lack physical access to technology due to practical issues, which widens the gap in digital access (Faloye & Ajayi, 2022: 4).

The digital divide exemplifies the disparity between individuals who are computer literate and those who are not in terms of computer literacy (Van Dijk, 2020). South Africa has been characterised by a high level of inequality as broadband penetration growth and successes are highly concentrated in urban areas. Boikaego and William (2021: 93) argue that the poor in rural communities still battle with connecting to digital communication because of high data prices. Furthermore, Maphangwa (2023: 79) argues that the Independent Communications Authority of South Africa (ICASA), as the regulator for South African postal service, broadcasting, and communications sectors, was supposed to establish a required open access network inside the industry as a manner of enhancing competition and lowering high broadband prices. The sociocultural context and environment of the alleged beneficiaries must be thoroughly

explored because the digital inclusion of rural communities on digital communication podia is a very complex topic. The market and wider environment's actors interact, learn, and unlearn as a result of this interaction (Maphangwa, 2023: 79). Local governments in South Africa can use digital advances to boost the local economy and increase citizen participation while working to close the digital divide brought on by social evils like unemployment and poverty (Shava & Doorgapersad, 2021: 85).

2.4.4.5 Increased Cybersecurity Threats

Cybersecurity is a challenge in the diffusion of 4IR technologies diffusion with privacy concerns such as hacking, cybersecurity, and manipulation of big data for the enrichment of a few (BCX, 2020: 19). The prevalence of data privacy violations, cyberattacks, and cyber fraud globally has an impact on the digital economy's productivity, earnings, and customer trust (African Union, 2020). Moreover, there is chance of someone gaining access to the data generated by smart devices and systems is a chance of someone gaining access to the data generated by smart devices and systems, leaving internet networks vulnerable (Maphangwa, 2023: 42). This delays most institutions from using digital platforms. It is, therefore, essential for safeguarding digital assets and user data but can occasionally stifle innovation for a variety of reasons. Also, Manda and Backhouse (2017: 6) view that the South African government enacted a Cyber-Security Policy Framework in 2015 in order to defend against cyberattacks and safeguard the country's information and communication infrastructure. Even with the existence of a framework for cyber security, issues with cyber security persist since the legal framework is insufficient.

The cost of cybersecurity is viewed as a reason that can hinder digital innovation in institutions (BCX, 2020: 19). The public's lack of faith in cloud computing services leads to privacy and data security concerns, and loss of control over data in the cloud computing environment (Mohlameane & Ruxwana, 2020: 1). Strong cybersecurity safeguards might be expensive to implement. On the other hand, funds that would otherwise be set aside for innovation may be diverted due to the cost of purchasing, maintaining, and updating security solutions (Javaid et al., 2023: 10). Also, organisations may become risk-averse and resent adopting new technology or procedures due to their concern over cyberattacks and data breaches. Thus, the

growing need for digitalization is putting pressure on governments to reorganize and realign their approaches to policymaking and public interaction (Shava & Doorgapersad, 2022: 86).

2.4.5 Strategies by government to promote digital innovation in South Africa

To spur economic growth, enhance service delivery, and solve social issues, the South African government has been actively fostering digital innovation (Sibiya, 2023: 2). South African National government departments are mandated to take part in formulating policies and regulations on digital transformation. As a result, the president of the Republic of South Africa, Cyril Ramaphosa, established the South African Presidential Commission on the Fourth Industrial Revolution in 2019 to develop a national strategy for 4IR (White Paper, 2016). The commission was established because South Africa was a helping developing country implement an integrated national strategy. Some of the other strategies include the National Integrated ICT Policy White Paper 2016, The National Development Plan 2030, Centre for Public Sector Innovation (CPSI), South African Local Government Administration and National System of Innovation (Mathebula, 2021: 182030), discussed below.

2.4.5.1 National Integrated ICT Policy White Paper 2016

The National Integrated ICT Policy White Paper was introduced and updated in 2016 by The Department of Telecommunications and Postal Services as a comprehensive policy aimed at transforming South Africa into a knowledge-based, innovative, digital, and inclusive society (Motloun, 2020: 77). The strategy places a strong emphasis on the value of broadband infrastructure, the development of digital skills, and the support of regional ICT sectors (National Integrated ICT Policy White Paper, 2016). The Integrated ICT policy White Paper (2016) describes the plans for enhancing and extending ICT infrastructure, particularly broadband connectivity, which is a crucial prerequisite for digital innovation. Maphangwa (2023: 80) explains that ICT enables society to respond to its requirements more quickly, easily, and simply in ways that businesses, startups, and people can access and use digital technologies more efficiently thanks to improved infrastructure. Hence, as businesses compete to provide

services that are better and more cutting-edge, a competitive environment can spur innovation (Nwakanma, 2018).

To improve cyber security and e-readiness initiatives, the White Paper builds upon and enhances current plans such as the National Broadband Strategy, the National Cyber Security Policy Framework, and the National Development Plan (Manda & Backhouse, 2017: 7). Regulations and anti-competitive measures can be implemented by the policy to promote investment and innovation in the ICT sector (Moyo, 2019). According to Mohlameane and Ruxwana (2020: 4), broadband is often costly in South Africa, and the White Paper suggests ways to guarantee that it is both readily available and of good quality. However, because of its inherent complexity, cloud computing poses a risk to government and policymakers if allowed unchecked. Although there are benefits to be gained from policies like the National Integrated ICT Policy White Paper, more needs to be done in terms of regulations and policy regarding cloud computing (Motloun, 2022: 20).

The White Paper identifies three pillars (digital inclusion, digital access and digital transformation in government) for digital and inclusive growth for transforming South Africa into an inclusive digital society (Manda & Backhouse, 2017: 7). Digital transformation in the public sector is an initiative to transform how government provide services by implementing new e-government framework. Kotzé & Alberts (2017: 494) argue that the White Paper provides guiding principles for e-government, for a comprehensive, coordinated national e-government plan and roadmap. In addition, E-Government is defined by the White Paper as the innovative use of ICTs (such as websites, mobile devices, and other ICT applications and services) to connect the public sector and citizens.

2.4.5.2 The National Development Plan 2030

The National Development Plan (NDP) is a plan for the country to eliminate poverty and reduce inequality by 2030 (Motloun, 2022: 76). This is done through uniting South Africans, unleashing the energies of its citizens, growing an inclusive economy, building capacities, enhancing the capability of the state and leaders working together to solve complex problems (Nel & Masilela, 2019: 40). The NDP envisions the information and communications technology (ICT) as a key role in creating a dynamic,

interconnected information society and a thriving, inclusive, and affluent knowledge economy by 2030 (Manda & Blackhouse, 2018: 465). The plan aims to increase innovation, education, and training to meet various demands and generate skilled people (National Planning Commission, 2013). The NDP seeks to expand research and development by collaborating across the South African education system and internationally accredited institutions that lead to high levels of innovation (Nel & Masilela, 2019: 40). The plan puts emphasis on the higher levels of education, skills, research and innovation which are required for developing new and utilizing existing technologies.

According to NDP 2030, ICT is highlighted as an economic facilitator that has increased global network dependence (Motloun, 2022: 75). The NDP plays a significant role in influencing digital innovation in the nation, and it offers a defined structure and policy direction for the nation's development (National Planning Commission, 2013). This includes establishing objectives and goals for the adoption of technology, digital infrastructure, and education (Nzimakwe, 2021). By expressing the government's commitment to the digital industry, these policies foster a favourable atmosphere for digital innovation. Thus, the value of training and education is emphasised in fostering South Africa's economic development (Vyas-Doorgapersad, 2023: 261). This includes spending on programmes that promote digital literacy and STEM (Science, Technology, Engineering, and Mathematics) education, all of which are essential for developing a trained workforce capable of advancing digital innovation. This is possible through the creation of rules and data protection laws that offer a stable and secure environment for digital firms and innovation, and in turn, it may impact the growth of digital innovation (Sibiya, 2023: 58).

2.4.5.3 Centre for Public Sector Innovation (CPSI)

Established in 2001, the Centre for Public Service Innovation aims to foster innovation in South Africa's public sector by coordinating the discovery, development, and application of creative ideas produced throughout the public service. (Nel & Masilela, 2020: 39). The CPSI uses innovation to create a public service that is effective, efficient and development-oriented in South Africa (Sono & Malan, 2021: 946). The CPSI reports to the Minister for the Public Service and Administration. It serves as an

advisory body for the minister on innovative service delivery practices related to the strategic objectives of government (CPSI, 2020: 10). Therefore, the CPSI is essential in promoting digital innovation and transformation in the public sector. The CPSI frequently holds competitions and challenges for innovations that inspire public servants to develop cutting-edge digital solutions to diverse public sector difficulties (Motloun, 2020: 62). These issues frequently centre on topics like e-government, bettering service delivery, and public participation. Employees in the public sector can enhance their knowledge and abilities in digital technology and innovation by taking advantage of CPSI's training programmes and workshops (CPSI, 2020: 11). These initiatives assist public servants in learning how to use digital tools efficiently (Nel & Masilela, 2019: 40).

The CPSI conducts research to identify trends and possibilities in digital innovation. It then publishes studies and insights that might help public sector decision-makers in their attempts to transform their organisations digitally (Motloun, 2020: 62). The CPSI encourages collaboration and networking among government agencies, employees, and outside partners such as the business world and academic institutions (Sono & Malan, 2021: 947). These relationships facilitate the exchange of resources and best practices for digital innovation. The CPSI may create or suggest digital platforms and solutions that government organisations might employ to improve their services. This could involve creating websites, mobile apps, or online portals to simplify the delivery of services and citizen interaction (CPSI, 2020: 10). It gives incentives for innovations created to enhance public sector efficiency or service delivery, improving residents' lives in the process (Sono & Malan, 2021: 947). This is done through various initiatives, such as the Annual Innovation Awards, which are designed to encourage and support innovation in the public sector of South Africa. The CPSI also develops venues that introduce innovation prospects and strategies to the public sector and its key partners by exchanging relevant knowledge and experiences (CPSI, 2022: 11).

2.4.5.4 South African Local Government Administration

The South African Local Government organization (hereafter referred as SALGA) is a self-governing organisation that represents all 257 local governments in South Africa (SALGA, 2017: 2). SALGA has, amongst other goals, a mission to represent, promote,

and protect the interests of local governments. It consists of a national organisation with a national office and nine provincial offices. SALGA plays a critical role in advancing digital innovation in South Africa by supporting and coordinating initiatives at the local government level (Musara, Niyimbanira & Madzivhandila, 2022: 89). This is done through close collaborations with local governments, federal agencies and the commercial sector to promote laws that support digital innovation (SALGA, 2018). For instance, it advocates for measures like the South African National Integrated ICT Policy White Paper to be implemented in order to foster the growth of the digital economy. These relationships may result in collaborations and knowledge exchange that fuel digital innovation. In sum, SALGA helps local governments obtain funds and awards for initiatives involving digital innovation (Mahlawe & Cohen, 2010: 32). The funding may come from both domestic and foreign sources, and it may be applied to the creation of smart city initiatives, digital infrastructure, or cutting-edge public services (Shava & Doorgapersad, 2021: 143). SALGA also participates in national projects focused on digital innovation. For instance, they work together with the Department of Communications and Digital Technologies to coordinate local governments' attempts to turn into digital organisations with the larger national digital agenda (Motloun, 2022: 66).

In sum, the in.KNOW.vation publication was created by SALGA to speed up knowledge exchange and learning to facilitate the replication of best practices and creative solutions to issues and challenges that municipalities and the public sector as a whole confront, (SALGA, 2018). The publication focuses on solutions for municipalities and highlights how small businesses can bring solutions that have a lasting impact. SALGA also publishes articles that highlight tools for Local government to use to bring innovation to life on a practical basis (Schoeman & Chakwizira, 2023: 28). There are currently some excellent innovations many of which are application to municipalities being incubated in organisations like the Innovation hub (SALGA, 2018). The Innovation Hub is the innovation “agency of the Gauteng Province and a wholly owned subsidiary of the Gauteng Growth and Development Agency that promotes economic development and competitiveness of Gauteng via promoting innovation and entrepreneurship” (Ntoi, 2023: 39).

2.4.5.5 National System of Innovation

The National System of Innovation (NSI) (hereafter referred to as NSI) originated from the countries of the North such as Japan, as a concept that was built on the predictions of the future policies of developing countries (Manzini, 2012: 1). In the South African concept, it is made up of numerous organisations and organisations that contribute in diverse complementary ways to the nation's creation of scientific knowledge and technical innovation. It was introduced in 1999 through the White Paper on Science and Innovation as a cornerstone of government policy on science and technology. The NSI is used to characterize a country's collaborative efforts towards encouraging technological innovation (Manzini, 2012: 3). In terms of a National System of Innovation, South Africa's science, technology, and innovation policy followed a similar trajectory to that of the majority of OECD nations (White Paper, 2017). South Africa has realized the value of a National System of Innovation (NSI) to promote innovation and economic growth by bringing together several stakeholders, including the government, business community, academic community, and civil society (Phago & Mazarire, 2021: 442).

According to Technology Innovation Agency (TIA) strategic plan (2020-2025), South Africa's innovation funding landscape has developed in the last ten years. The National System of Innovation works with numerous participants to create a variety of funds and funding instruments to encourage innovation and technology commercialization from publicly funded research institutions. This includes promoting cooperation between academic institutions, research organisations, and industry (Nel & Masilela, 2020: 39). Moreover, South Africa hopes to utilize innovation as a driver of economic growth, competitiveness, and social development by implementing the National System of Innovation (Phago & Mazarire, 2021: 442). The National Innovation systems have a vital role in defining organisations' ability to innovate and creating possibilities for innovation (Alexander, 2021: 1).

2.4.6 The state of digital innovation in selected South African municipalities.

Numerous cities in South Africa have started working on smart city initiatives (BCX, 2022: 39). These programmes seek to improve urban planning, advance sustainability,

and improve service delivery by utilising digital technologies (SALGA, 2018). Local government in South Africa is undergoing a digital transformation, and the best programmes to date have been seen in the metropolitan municipalities such as eThekweni, City of Cape Town, and the City of Johannesburg (Motloun, 2020: 80). South Africa has eight metropolitan municipalities, and all these metropolitan municipalities have prioritised innovation through their Integrated Development Plans. A metropolitan area is a geographic area of an inner city's urban core surrounded by and connected to other smaller pockets of urban civilization in the area (Maphangwa, 2023: 26).

Three major urban areas in South Africa, including Cape Town, eThekweni, Johannesburg, Ekurhuleni, and Tshwane, are rising major ICT and sensing infrastructure expenditures are needed for smart city technology (Nel, Nel & Minnie, n.d.). A smaller city needs to enable affordable, ideally free, internet connection for its less fortunate residents if it wants to become smart, for instance cities such as cities, such as Tshwane and Stellenbosch. For instance, these cities are already providing internet access and free Wi-Fi to their citizens. While some municipalities, such as Buffalo City, Mangaung, and Nelson Mandela Bay, have metropolitan status, their economies are not as diverse, and they are smaller (Motloun, 2020: 82). These cities, as well as smaller ones like Polokwane, Rustenburg, and Kimberly, are crucial to the economies of their respective regions. Below is a discussion on Metropolitan municipalities showing development in becoming smart cities in South Africa.

South African provinces have been seen integrating innovation plans into their economic and developmental plans (Motloun, 2020: 58). The Gauteng government is the leading province in the country in embracing modern technological developments (SALGA, 2018). The province is home to the biggest cities in the Southern Africa, such as Johannesburg and Pretoria. The province has introduced initiatives such as the Innovation Hub, which has the Gauteng Growth and Development Agency as its parent company of the Gauteng Innovation Hub (The Innovation Hub, 2016: 5). The Innovation Hub was founded by the Department of Economic Development of the Gauteng Provincial Government with the goal of advancing the province's socioeconomic growth and competitiveness via innovation (SALGA, 2018). It is the innovation enable programme that seeks to promote

economic development and competitiveness of Gauteng through innovation (The Innovation Hub, 2016).

2.4.6.1 City of Johannesburg Metropolitan Municipality

The City also established the 4th Industrial Revolution (4IR) Citywide Skills Development Programmes to prepare the workforce for the city's transition to a smart city and 4IR future. Johannesburg's extensive and lightning-fast broadband infrastructure aims to provide inexpensive, universal access to wall-to-wall connectivity for all citizens and enable free Wi-Fi on public transport and other city-wide public spaces, including buildings (CoJ final IDP, 2021). The Citywide Skills Development Programme aims to ensure the participation of CoJ employees in the process of transforming the organisation into a smart one that is data-driven, AI-enabled, and employs automation and other technology to support tasks that are performed and run by humans.

The CoJ has developed the Smart Citizen Digital Literacy programmes to facilitate smart citizen engagement. The Digital Literacy, Data & Device Access programme places citizens' needs at the forefront of development efforts (Milenkova & Lendzhova, 2021). The programme also entails promoting 4IR education, increasing awareness, and developing venues for engaged engagement that use technology as a facilitator. The foundation of the new Smart City Integrated Implementation Programme (SCIIP) is made up of the ten Smart City Catalytic Programmes, which build upon the Smart City Pillars and include programmes such as the digital Joburg & smart governance, unified data and information portal, 4th industrial revolution and the infrastructure, asserts, co-production innovation pipeline.

The Gauteng Department of Roads and Transport has identified Smart Mobility 2030 as a tool to grow Gauteng's economy through smart infrastructure (Republic of South Africa, 2021). The Smart Mobility 2030 vision has been introduced by the Department of Roads and Transport to transform the city region's mobility patterns and boost the province's economy. The Smart Mobility programme aims to create a public transportation system in Johannesburg that is as efficient, effective, and environmentally friendly as those in other major global cities. Technologies that will be employed to improve user satisfaction include integrated modes and ticketing, smart,

safe, clean, and digital stations, smart digital information boards and signage, etc (SALGA, 2018).

2.4.6.2 City of Tshwane Metropolitan Municipality

The City of Tshwane Metropolitan Municipality is one of the municipalities that have shown great progress in enhancing digital innovation in the city. In order to address the shortage of science laboratories in elementary and secondary schools, the City of Tshwane built Kusile Mobile Science Labs (The Innovation Hub, 2014). According to The Innovation Hub website, Kusile Labs and Technology provides underserved and remote schools with innovative, cost-effective mobile science labs. Its goal is to empower African countries by building and educating them through the supply of high-quality mobile science laboratories and interactive whiteboards for Mathematics, Science and Engineering classrooms. It aims to become the leading manufacturer and supplier of technology-based school mobile science laboratories in Africa and beyond. Although progress has been made on the adoption of digital technologies in the City of Tshwane, challenges such as digital divide, lack of funding and digital hesitancy exist. According to Shava and Vyas-Doorgapersad (2022: 86), there is a gap in the adoption of technology because funds were not set aside for the purchase of new software and models to improve service delivery or for the ICT retraining of municipal officials. Although the IDP may not contain all the facts about ICT use, it should outline the municipality's long-term goal to support digital technology as a means of meeting demand for services.

In 2012, the Research and Innovation Unit was created. With the creation, endorsement, and implementation of the Innovation Strategy in 2014, the CoT achieved a significant milestone (Mafunzwaini, 2018: 41). By generating new goods, services, and value chains through targeted initiatives, collaborative platforms, and strengthened institutional capacity, the CoT Innovation Strategy seeks to promote and accelerate innovation. The plan highlighted four focus areas, namely: organisational efficiency and effectiveness, social innovation and impact, business innovation and competitiveness, and knowledge-based cooperation (Mafunzwaini, 2018: 41).

The TshWi-Fi is the name of the free Wi-Fi service offered by CoT which is the one of the largest free public Wi-Fi networks in Africa. The CoT has more than 780 TshWi-Fi

internet zones in Tshwane and plans to add 1000 Wi-Fi hotspots, with the first 200 scheduled to come online in 2023. The City also partners with Project Isizwe to introduce the free Wi-Fi service, dubbed The IBM Digital-Nation Africa (D-NA) programme, which connects entrepreneurs and communities and offers knowledge and skill sharing in discovering new digital solutions, was also accessible to youth for free through the TshWi-Fi app (Shava & Vyas-Doorgapersad, 2022: 142).

2.4.6.3 eThekwini Metropolitan Municipality

The eThekwini Municipality is a metropolitan municipality in the KwaZulu Natal Province and is the largest metro in the province and the third largest in the country (SALGA, 2019: 24). The eThekwini Municipality is one of the two cities in South Africa to create an open data platform (Ramparsad, n. d). The City considers innovation to be a crucial component of economic growth, and the Durban municipality established an extensive innovation plan in 2013 (SALGA, 2019: 24). The goal of the innovation initiative is to encourage and propel the growth of the regional innovation ecosystem (Motloun, 2020: 80). The eThekwini Municipality's commitment to supporting innovation is aggressively being taken into new heights. The City recognize innovation as the key to economic growth and the creation of jobs. As a result, the Innovate Durban project was established to lead city innovation and give businesses access to creative thinking and technology that will increase operational effectiveness and efficiency (EDGE, 2015: 5).

Innovation in municipalities should be seen as a network of creative role-players rather than as an industry (EDGE, 2015: 7). Since then, this network has become known as the "Innovation Ecosystem" of eThekwini. In 2014, an Innovation Forum was founded to fully utilise the potential of this network (SALGA, 2019: 24). The city created a brand named "Innovate Durban" to promote the forum and its innovations. According to Innovate Durban Section 51 Manual, Innovate Durban is a registered non-profit organisation founded as a special purpose entity to promote inventors, innovation, and the innovation ecosystem through programmes, research, capacity building, and skills development. The organization's events and virtual and physical platforms support its programming and operations. Moreover, a range of initiatives are carried out by Innovate Durban with the goals of raising public and private sector innovation,

fostering community involvement, increasing awareness, and establishing essential links between innovation tools and role players (SALGA, 2019: 23).

2.4.6.4 City of Cape Town

The City of Cape Town was named Africa's most innovative city In the 2016–2017 Innovation Cities Index, with its large population of thinkers, innovators, and design-driven business owners (Motloun, 2022: 82). Cape Town is quickly becoming the epicentre of innovation in Africa with more tech start-ups than any other city in South Africa, Cape Town has become the country's leader in the information technology sector as a result of its thriving tech ecosystem (SALGA, 2018). In sum, with 75% of South Africa's venture capital deals, Cape Town has the country's largest telecommunications market and the most activity in that sector. A technology platform called the “EPIC Safety and Security Initiative Programme” allows all policing and emergency response management within the directorate to be coordinated to satisfy Cape Town residents' demands and expectations.

Many innovation hubs and incubators, like the Cape Innovation and Technology Initiative (CiTi), have been established in Cape Town. CiTi is best known for managing the business incubator Bandwidth Barn an incubator space for start-ups to grow and connect (SALGA, 2018). CiTi also runs several programmes in the skills and enterprise development space. These centres encourage digital innovation by offering a welcoming environment for new businesses and entrepreneurs. CiTi's initiatives helped South Africa leap to the top of the first-ever "Tech Ecosystems of the Future" ranking, taking first position overall but also in terms of economic potential, startup status, and business friendliness. In addition, the Western Cape government, Invest Cape Town, the City of Cape Town, and Endeavour insight all designated Cape Town as the Tech Capital of Africa thanks in large part to CiTi. The CiTi also provides skills development training as well as business support for women in the ICT sector (SALGA, 2018).

2.4.6.5 Thulamela Local Municipality

Thulamela Local Municipality (TLM) is one of the four local municipalities that make up the Vhembe District Municipality. According to a report by Department of Economic Development, Environment and Tourism (2022), the Vhembe District Municipality had more households without electricity compared to other district municipalities in Limpopo, which prevented them from connecting to the network. Thus, without energy, knowledge management connectivity is not conceivable. However, TLM has been investigating digital innovations to boost community involvement, improve service delivery, and stimulate economic growth (Thulamela Municipality IDP Review 2022/23 – 2026/2027). Residents may now more readily access government services thanks to the municipality's introduction of internet portals. Billing, tax payments, application submissions, and public service requests are among the services offered by these platforms (Thulamela Municipality IDP 2020/21 – 2022/23). This is done by eliminating the need for citizens to physically attend municipal offices, these platforms help them save time.

To improve public participation, the municipality regularly interacts with the public on social media by posting updates on events, projects, and critical alerts (Netshirando et al., 2024: 3). This direct interaction creates a forum for community participation and feedback while also keeping the community informed (Maemu, 2021: 117). The creation of mobile applications that enable citizens to report service problems is a creative strategy that motivates citizens to take part in community development (Motloun, 2022: 152). Thulamela Local Municipality is making progress towards becoming a more tech-enabled and connected community that is embracing digital technologies and encouraging digital literacy, however local governments in rural area are required to control internet pricing to guarantee affordability for all people (Netshirando et al., 2024: 3). This may also include the establishment of wi-fi at public places such as clinics and schools.

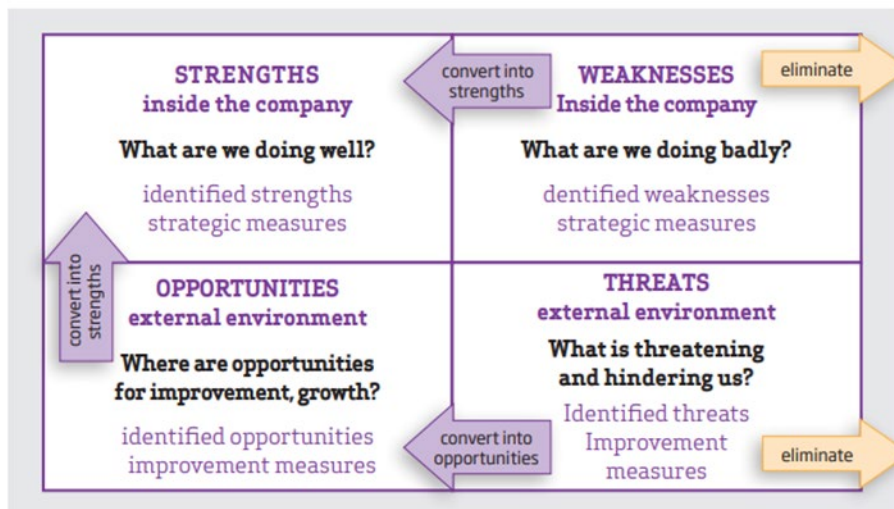
2.4.7 Essential instruments for designing an innovation plan in municipalities.

The South African Local Government Association (SALGA, 2017: 6) has created several tools based on global best practices to assist local governments in establishing

creative procedures. These tools are important because it is necessary for citizens to participate in the digital economy. The government also has a duty to provide its citizens with digitally enabled services. The association has developed the key instruments below to assist municipalities in designing innovation plans:

2.4.7.1 Innovation Baseline and SWOT Analysis

Figure 3: SWOT analysis model



Source: (Košmrlj, Širok & Likar, 2015: 55)

Košmrlj et al. (2015: 55) define SWOT analysis as a “tool, which a problem or a challenge is addressed from the point of view of its strengths, weaknesses, opportunities and threats”. The SWOT analysis is used to assess the company's position in the market and examine its internal and external environments when a business is unsure about how to proceed (Benzaghta, Elwanda, Mousa, Erkan & Rahman, 2021: 54). The SWOT method takes the form of filling out a straightforward matrix that is quick and simple to complete to find opportunities and issues so that improvements can be made (Košmrlj et al. (2015: 55). The method is beneficial for organizations in all fields because it seeks understanding of the industry and how to handle the future. The tool is utilised by organisations for strategic management and planning for developing both competitive and organizational strategies (Gurl, 2017: 995). The two dimensions of a SWOT analysis are internal and external environments as shown on SWOT analysis model (figure 2) below. The environmental variables, opportunities, and dangers are included in the external dimension; organizational

factors, strengths, and weaknesses are included in the internal dimension (Gurl, 2017: 995).

According to SALGA (2019: 44) conducting a SWOT analysis is a fundamental tool for understanding the municipality's current position and identifying areas for innovation. It helps in assessing internal strengths and weaknesses and external opportunities and threats (Košmrlić et al., 2015: 55) within the municipality. The findings from a SWOT analysis can inform the development of the innovation plan. SALGA (2019: 45) accent that municipalities can unlock internal perceptions of innovation by using the Innovation Baseline, a questionnaire that is essential for determining the level of innovation currently present in the municipality and any issues that may need improvement or attention. This exercise provides opportunities for follow-up activities, such as interventions to foster an innovative culture, improve the application of innovative thinking skills, and possibly produce fresh project ideas. It provides information about the climate for innovation and is used to present recommendations for activities to boost innovation, and these are further refined by utilising t-tests to investigate links between different internal groupings, such as gender and educational level (Cropley, 2016: 36).

2.4.7.2 Innovation Framework or Model

The South African framework on public sector innovation outline culture, organizational innovation facilitators and leadership as crucial elements for designing innovation in the public sector (Motloung & Hofisi, 2023: 8). Sun, Ku, and Shin (2015: 505) developed a framework for e-government in which governments would start to turn their attention to the more expansive and comprehensive duty of service innovation. Governments might require a novel framework for execution that will assist in finding about the advancement of service innovation in that institution. The framework attempts to uphold four public values by using a top-down approach consisting of process integration, resource integration and black office integration (Monyepao & Uwizeyimana, 2018: 11). Also, Cropley (2016: 35) detailed the process of planning an innovation plan using the Innovation Phase Model. The Innovation Phase Model is expanded as the creative process involving separate phases that draw on various psychological resources and describes the interaction of antecedent

process, person, product, and press elements (referred to as dimensions) across stages.

A municipality's vision will specify the kinds of problems that need to be prioritized and the kinds of innovation that are needed (SALGA, 2017: 47). With the use of the Innovation Framework tool, leadership may determine the municipality's future by determining the most pressing issues that need to be resolved, the kinds of solutions that are needed, the technology and skill sets that are needed, and the metrics that will be used to track innovations over time (SALGA, 2019: 35). Using an established innovation framework or model, such as the Innovation Ambition Matrix or the Innovation Funnel, can provide a structured approach to categorizing and prioritizing innovation initiatives. The innovation frameworks or models help municipalities clarify their innovation goals, assess potential projects, and allocate resources effectively (Cropley, 2016: 35).

2.4.7.3 Stakeholder Engagement Tools

The South African government views exchanging ideas throughout various government departments and agencies as the sources of inducing innovation as it will facilitate the replication of successful ones (Motloun, 2022: 62). For that reason, input and support from a wide range of stakeholders, including citizens, government officials, local businesses, and community organizations is necessary for effective innovation plan (SALGA, 2017: 47). Tools for stakeholder engagement, such as surveys, focus groups, public forums, and collaborative platforms, help gather insights, input, and feedback from the community, ensuring that the plan aligns with their needs and desires. The team can use more senses and fully experience a member's concept by creating a physical representation. Team members can touch and view the constructed model rather than listening to an explanation. Municipalities rely on partnerships to promote joint participation. The joint partnerships or collaborations benefit communities by creating change in municipalities through establishment of collaboration from multiple stakeholders and governing bodies (SALGA, 2017: 51).

The City of Tshwane established the research and innovation unit in 2012 to develop, approve and implement the 2014 innovation strategy. Their innovation strategy aims at using targeted programmes, collaborative platforms and enhanced institutional

capacity to stimulate and drive innovation by establishing new products , services and value chains (Mafunzwaini, 2018: 43). In the City of Johannesburg municipality, the Tshimologong precinct in Braamfontein was established as the digital skills academy that accelerates digital skills bridging the gap between academia and the workplace. In addition to focussing on content production and game development, this ICT Software Skills & Innovation precinct was established to meet the software and skill needs of nearby corporate, retail, and Wits University clients (SALGA, 2017: 28). The precinct is made of establishments, historic structures and railways in the inner-city, proximity to the University of Johannesburg and the Wits University (Abrahams, 2020: 7). The precinct is intended create digital innovation capacity by investing in the relevant enterprises and creating digital skills. Thus it boosts digital innovation and entrepreneurship in the City of Johannesburg communities.

2.4.7.4 Project Management Software

Implementing an innovation plan often involves multiple projects, each with its timeline, resources, and stakeholders (SALGA, 2017: 28). Project management software, such as Trello, Asana, or Microsoft Project, can help municipalities organize and track the progress of various innovation initiatives, ensuring that they stay on schedule and within budget (OECD, 2020: 47). For instance, Trello is an online project management tool used by countries such as Argentina, to monitor any progress in the execution of the milestone activities during the implementation of the open government commitments (Johnson, 2017: 209). Trello allows users to graphically categorize projects into smaller groups and arrange projects into boards. It is crucial to get the opinions, ideas, and thoughts of other parties who will be impacted when choosing the Innovation Project and comprehending its implications (SALGA, 2017: 28). Thus, it is crucial to identify and assess possible hazards when executing the Innovation Project in a small group in order to reduce risks. The proposal for an innovation project should include risk identification, and risk mitigation should be carried out both at the outset and over the project's duration (OECD, 2019: 47).

To monitor the success of innovation projects and their impact on the municipality, data analytics and performance measurement tools are crucial (SALGA, 2017: 47). These tools can help gather, analyse, and visualize data related to various aspects of

municipal operations, allowing for evidence-based decision-making and continuous improvement. The South Africa Municipal Systems Act 32 of 2000 requires municipalities to establish performance management systems to promote a culture of performance evaluation among its administration (Anshari & Hamdan, 2023: 1058). This ensures that the work of employees satisfies the goals, mission, and vision of the organization.

Performance management is a corporate process that connects daily activities of individuals and teams to the organization's overarching objectives, core values, cultural norms, and the demands of its clientele (Johnson, 2017: 209). Performance management in municipalities involves the facilitator going over the initial idea directions the group discussed, the direction that was chosen and the ideas that fell under it, then reading aloud the synopsis of each idea map, including the advantages and disadvantages of each idea (SALGA, 2017: 28). The committee then casts votes to determine which solution is the most feasible and likely to be implemented, as well as which is most likely to address the main municipal issue.

2.4.8 Digital innovation in selected African countries

The landscape of digital innovation in Africa is dynamic and changing quickly. The usage and innovation of digital technologies are significantly increasing across the continent (Motloun, 2020: 38). Digitization can offer avenues for citizens feedback on local government authorities' income mobilization, accountability and transparency in developing countries (Abugre, Osabutey & Sique, 2021: 9). African nations are starting to realize how digital innovation may spur economic expansion. The idea of digital innovation is to close the development gap. Financial inclusion and economic growth in Africa have been significantly impacted by the introduction of digital technologies like mobile money (Mbiti & Weil, 2019). However, digital innovation in Africa has particular obstacles, such as the digital divide and limited infrastructure. Innovations in technology and digitalization are promoting employment growth, tackling poverty, decreasing inequality, streamlining the provision of products and services, and contributing to the realization of Agenda 2063 and the Sustainable Development Goals (African Union, 2020).

According to the African Union (2020), every person on the continent should be digitally literate and able to access at least 6 megabytes per second at all times, wherever they may be on the continent, at a cost no more than 1 cent per megabytes through a smart device made locally for no more than \$100 USD. This will allow them to take advantage of all basic e-services and content, at least 30% of which is created and hosted in Africa. Even with recent improvements, African countries are trailing behind other regions in terms of the UN e-government development index (Asogwa, 2015: 1134). The African Union (2020) indicates that Africa's standard score rose from 0.26 in 2014 to 0.34 in 2018, and only four of the 54 African nations (Seychelles, Tunisia, South Africa, and Mauritius) scored higher than the global average of 0.54 for online services in 2018. On the other hand, 11 other nations, such as Tanzania, Uganda, Seychelles, Kenya, Ethiopia, Morocco, Ghana, Rwanda, Mauritius, Tunisia, and South Africa, scored higher than the global average of 0.56 (African Union, 2020). Below is an overview of digital innovation in the selected African countries.

2.4.8.1 Rwanda

Rwanda has been regarded as one of the countries that are a pioneer in terms of putting policies that encourage development and enhance service delivery in place (Motloun, 2020: 38). Rwanda has implemented e-government plans that are aimed at achieving Vision 2020, which include establishing institutional, legal and regulatory frameworks in e-government services (Bakunzibake, 2019: 41). The government of Rwanda started the Imihigo programme to encourage innovation and creativity in the country's public sector. This creative programme places a strong emphasis on citizen involvement in development planning, giving them a chance to influence laws that have a direct impact on their lives, and connecting national goals to global development frameworks (Bandauko, 2022: 14).

The Rwanda government established agencies that seek to implement e-government solutions in public service agencies at central and local governments (Bakunzibake, 2019: 43). For instance, in launching Rwanda's education sector strategic plan for 2018/2019 to 2023/2024, the country demonstrated enormous progress in the education sector, which was a consequence of an extended and increased curriculum that was introduced to match the new knowledge-based economic plan (Motloun,

2020: 48). The construction of computer systems, projectors, internet access, digital material, and smart classrooms are all part of the current Education Sector Strategic Program (ESSP) and preparation of educators for ICT use is another aspect of the approach. In addition, Rwanda established the educational strategic plan 2018/2019 to 2023/2024 aimed at raising internet connections from 5.3% in 2008 to 38.9% in 2010, and the country is home to over 3.4 million mobile users who buy electricity and airtime online (Bandauko, 2022: 14).

2.4.8.2 Ghana

Ghana is among the many countries that have used digital technology to enhance connectivity and communication between individuals, businesses, governmental organizations, and non-governmental organizations (Abugre et al., 2021: 15). The digitalization of the public sector operations in Ghana has advanced and is assisting in improving public sector efficiency and lowering corruption (Dzisah, 2022: 39). Many government services are now digital and available online rather than through manual processes. For instance, the Ghana Library Authority (GhLA), which promotes innovation to deliver inclusive and equitable services for all through digital transformation, won the prestigious 2021 United Nations Public Service Award in the category (Bandauko, 2022: 15). This project provided modem internet connections to Ghana's most rural and remote areas, held technology classes in locales with little to no access to ICTs, and more.

The government of Ghana has demonstrated its dedication to advancing digital innovation (Quaicoe, 2020: 4090). The Ministry of Communication in Ghana initiated the eGhana development projects to improve government departments, agencies, and institutions' efficiency, accountability, and openness through the use of online government systems (Abusamhadana, Bakon & Elias, 2021: 128). A supportive climate for innovation in a number of industries has been established in large part to the National Digital Transformation Agenda (NDTA) and the e-Government Strategy (Acheampong, 2017). Ghana has made progress with digitization in many ways such as the implementation of digital platforms for the provision of essential services such as the digital national identification card, e-justice, e-smart driver's license, Ghana post GPS, and electronic renewal of the National Health Insurance Scheme (Dzisah, 2022:

25). These projects seek to strengthen the digital infrastructure, encourage entrepreneurship, and improve service delivery. Similar to other developing countries, Ghana's environment for digital innovation is encouraging, yet there are obstacles to overcome, such as cybersecurity risks (Quaicoe, 2020: 4083). According to research, strong cybersecurity measures are required to safeguard sensitive data and digital assets.

2.4.8.3 Kenya

The government of Kenya recognizes the important role of digital technology in driving economic growth, and as a result, the government has set out a plan to digitize government operations and enhance service delivery through e-government (UNDP, 2022: 1). The government has explored various means of using technology to foster inclusiveness and increase citizen participation in public service delivery (World Bank Group, 2017: 1). The Kenyan government has digitized critical processes and systems such as the revenue collection systems, vehicle registration, and licensing systems, registration of death and birth, education systems among others (The Kenya National Digital Master Plan 2022-2032: 28). Kenya aims to transform Kenya into a newly industrialized country by introducing the Kenyan Innovation Ecosystem (UNDP, 2022: 7). The innovation ecosystem is driven by the vision 2030 identifies science technology and innovation as a driver for industrialization.

According to the Kenya's national digital master plan 2022-2032, Kenya was ranked at 116 on the United Nations eGovt index, ahead of Zimbabwe (at 126) but well behind Seychelles (at 76), South Africa (78), Tunisia (at 91) and Namibia (at 104). The country has high number of citizen that lack access to online government services like many other developing countries (World Bank Group, 2017: 1). Even so, Kenya has become a global pioneer in the development of mobile money and in raising the rates of financial inclusion since the introduction of M-Pesa in 2007 (Ndung'u, 2019: 2). The urban-rural split in Kenyan economy had a significant role in the money transfer industry's development and as a result the M-Pesa's ability to "send money home" was a convenient selling feature (UNDP, 2022: 1). M-Pesa was seen as a success because of the already-existing network of telecom agents selling pre-paid airtime that could be converted into a mobile money point of service (POS) and cash-in/cash-

out platform also contributed to its success. This simply led to Kenya becoming the one of the leading countries in Africa to enhancing inclusion of citizen into digital technologies with 70% of its population using a mobile commerce transacted using mobile money (Kingiri & Fu, 2019: 2). The M-Pesa innovation placed Kenya ahead of other developing economies in the region in the deployment and use of digital technology (Ndung'u, 2015: 2).

Kenya created in 2013 the Huduma Kenya programme to transform how public services are delivered in Kenya (Bandauko, 2022: 13). This is done by giving citizens access to a variety of information and services through one-stop shops that are centred on citizens' needs and integrated technology platforms through integrated service platforms and a "One Stop Shop" approach (World Bank Group, 2017: 1). Citizens and customers can access a variety of public services and information from a single location, eliminating the needless bureaucracy typically associated with public institutions (Nyaboke, 2018: 3). The Huduma Centres' innovative services are considered a game-changer and setting a high standard for Integrated Service Delivery (ISD) in the Sub-Saharan Africa because it offers the Huduma card and the app. The Huduma card is a prepaid card that may be used to access various government services such as the public transport as well as the app that makes services accessible via mobile devices (World Bank Group, 2017: 3).

2.5 CONCLUSION

The chapter covered the review of literature, theoretical framework and conceptual framework. The literature review focused on the research provided by various scholars on the relationship between digital innovation and municipal services. The chapter also provided the theoretical framework and the conceptual framework related to this study. On the discussion, the strategies that were created by the South African government to foster digital innovation were also outlined. From the discussion, South Africa has adopted several interventions on digital innovation has been adopted by the South African government to foster innovation, but challenges hinder the process of transforming municipal services. It became clear that digital innovation is vital in shaping services and solutions for challenges in developing countries. The next chapter discusses the research methodology used in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter reviewed the literature related to the impact of digital innovation on municipal service delivery. This chapter focuses on the methodology, research design and procedures that the researcher followed in the study. The study adopted a qualitative research method. The research methodology is mainly concerned with what and how the researcher collected data in this study. The chapter also present the relevant ethical considerations to this study, study area, data analysis procedures, research population, sampling method and the data collection instrument.

3.2 RESEARCH PARADIGM

A research paradigm consists of the overall ideas and concepts that influence a researcher's perception of the field and how they interpret and act in it. A paradigm forms the basis of a researcher's worldview because it includes condensed values and ideas that influence how the researcher perceives, understands, and behaves in the field (Pervin & Mokhtar, 2022: 420). Understating the paradigm when conducting research is necessary since the research questions and objectives are investigated based on the research paradigm. In this study, the researcher applied the interpretivism paradigm.

Interpretivism paradigm focuses more on the intricate details and context-related variables, because people can create deeper meanings and cannot be investigated in the same way as physical phenomena, it sees them as different from physical phenomena (Alharahsheh & Pius, 2020: 41). Interpretivism method does not involve flawless aims and does not depend on numerical or statistical examination of facts or evidence (Gichuru, 2017). Interpretivists realise that their study problems are social in nature and that the social world is a human construct with many characteristics that cannot be measured and seen statistically. Therefore, social constructions like language, consciousness, and shared meanings are the only ways to access reality (Darby, Fugate & Murray, 2019: 396). Interpretive research is particularly suited to

study human behaviours that are related to socio-cultural concerns since It is based on the notion that social reality is influenced by social backdrop and human experience (Pervin & Mokhtar, 2022: 420). Therefore, Interpretivism provides us with understanding of the intricate human aspects of digital innovation and can be facilitated by the useful insights and approaches (Gichuru, 2017). Interpretivist techniques improve our understanding of how digital innovations are viewed, adopted, and incorporated into people's lives and society at large by concentrating on subjective interpretations, contextual influences, and significant patterns.

3.3 RESEARCH DESIGN

A research design stipulates the plan or strategy that motivates the choice of participant, the data collection methods adopted, and the methods of data analyses to use (Maree, 2016). Kumar (2011) defined research design as a framework for an investigation that was created to find solutions to a specific problem or research question. Creswell and Poth (2016) posit that a research design is plans and processes for a study that range from general hypotheses to specific techniques for gathering and analysing data. The researcher's assumptions regarding the worldview, the investigational strategies, and the specific methods for gathering, analysing, and interpreting data should inform the final decision on the research design (Berndt, 2020). Research design is important in the sense that it provides the researcher with a structure that provides information on the aim of the research (Kottler & Sharp, 2018). In line with the above statement, a research design is crucial because it provides the researcher with a plan on how to gain more insight into how digital innovation affects local communities' ability to perform public services. In this study, the researcher adopted a descriptive research methodology.

Descriptive research design is concerned with studying specific individuals, groups, and situations and predicting their traits (Khothari & Garg, 2014). According to Graziano and Raulin (2004), this study method allows the researcher to focus the attention on the behaviours that would seem most interesting and relevant at the time. A descriptive research approach was employed to get precise data and build a clear picture of the phenomenon being studied. A descriptive research design was adopted

to describe factors associated with improving municipal service delivery through digitization of processes and the introduction of new approaches in the municipalities.

3.4 RESEARCH METHODOLOGY

Research methodology is regarded as the researcher's approach to solving the research problem and carrying out the research project (Khothari & Garg, 2014). Burns and Grove (2010) cited by Maela (2020) defined research methodology as methods in a study that involves the sample, design, environment, methodological constraints, and the methods for collecting and analysing data. The majority of studies typically take one of three approaches, which include mixed, qualitative, and quantitative methods (Muzari, Shava & Shonhiwa, 2022: 14).

Qualitative research involves exploring and comprehending the meaning that individuals or groups assign to a social or human situation (Creswell and Creswell, 2017). With the quantitative research method, the methods used to collect, assess, evaluate, and summarise research findings are structured in a configurable manner (McNabb, 2020). Harbers and Ingram (2020) state that procedures using mixed techniques combine elements of qualitative and quantitative approaches. utilising comprises utilizing both qualitative and quantitative approaches, merging the two in a single study, and making philosophical assumptions (Khothari & Garg, 2014). Therefore, it entails more than just gathering and evaluating both types of data; it also entails utilising both strategies simultaneously to make a study's overall strength better than that of either qualitative or quantitative research (Muzari et al., 2022). This study adopted a qualitative method approach.

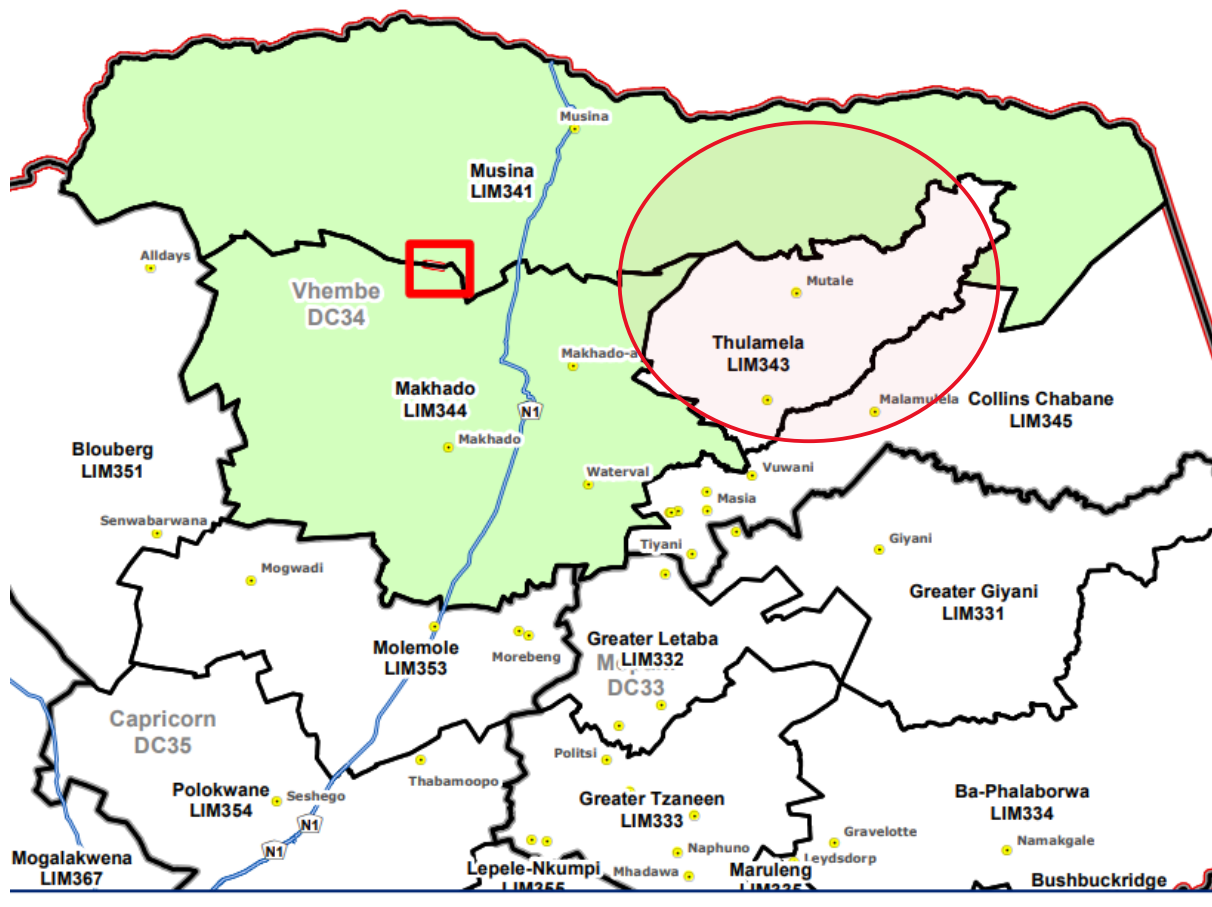
The qualitative research focuses on an understanding of human or social phenomena from multiple points of view and it gives a well detailed information about a problem (Pierce, 2008). In addition, Khothari and Garg (2014) argued that qualitative research is based on discovering the underlining motives that motivate the behaviour of people. Creswell (2021) discusses that qualitative research requires the use of various techniques such as interviews, observations and document analysis. This study used qualitative research methods to understand the relationship between digital innovation and municipal service delivery. A qualitative approach assisted the researcher to acquire in-depth information from the research participants.

The study used semi-structured interviews to collect primary data with the aim of learning about individual perspectives on the topic. An interview is a verbal or virtual interchange between two people or more with the purpose of inflicting information from the other person (Kumar, 2011). This method collects data through direct verbal interaction between individuals, making it effective for getting information from participants in their typical social settings (Muzari et al, 2022). A semi-structured interview is an interview that contains questions that are posed to define the topic that is investigated but allows the interviewer to discuss some topics in more detail (Hancock, 2007). An interview guide was used as an instrument or tool for this research. An interview guide is designed with a series of inquiries intended to elicit the participants' perspectives, sentiments, and opinions around a specific topic (Creswell, 2021). A semi-structured interview assisted the research to probe the participant to elaborate on their original responses to get an in-depth understanding about how digital innovation impact municipal service delivery.

3.5 STUDY AREA

The study focused on Thulamela Local Municipality which is located in Vhembe District Municipality of the Limpopo Province. Thulamela has 40 wards, and it is surrounded by Makhado, Musina and Collins Chabane local municipalities. According to the 2022 Census, Thulamela had an estimate of 575 929 people, and 142 527 number of households. The municipality has a high rates of poverty, a weak economic foundation, inadequate infrastructure, and significant backlogs in service delivery. The municipality is rural in nature and is situated in a small town called Thohoyandou.

Figure 4: Map of Limpopo Province



(Source: Municipal Demarcation Board, 2022: 232)

3.6 POPULATION OF THE STUDY

Goddard and Melville (2001) view the population of the study as “any group that is the subject of research interest”. Kumar (2018) stated that the population of the study is the population from whom information required to find answers to a research question is obtained. The study population in this context is the professional employees of the Thulamela Local Municipality. According to the 2022 Census, Thulamela Local Municipality comprises an estimation of 575,929 people, with 142,527 households. The municipality is responsible for the provision of the basic services to these communities under its jurisdiction.

3.7 SAMPLING

Kumar (2011) defined sampling as the process of choosing a sample from the sampling population to estimate or predict the frequency of a piece of unknown information, a condition, or a result pertaining to a larger group. In addition, a sample is defined as a final plan for obtaining a sample from a given population (Khothari & Garg, 2014). Goddard and Melville (2001) emphasized that it is necessary to make general findings on a study using a sample because it is not possible to study the entire population. Hence, due to time constraints, the study adopted a non-probability sampling to select the candidates employed by the Thulamela Local Municipality as the sample group. The selected professional employees of the Thulamela Local Municipality are believed to provide an understanding of how digital innovation has impacted their duties in providing basic services to the communities.

3.7.1 Sampling methods

According to Khothari and Garg (2014), a sampling method is a technique the researcher would adopt in selecting items for the sample. The process of choosing a sample is crucial, and it helps in offering guidelines on sample size to the researcher that is required to guarantee the level of confidence in the study findings (Berndt, 2020: 224). There are two types of sampling techniques: probability and non-probability. Probability sampling methods incorporate random selection to ensure that each case in the population has an equal chance of being selected (Lohr, 2021). There are several sorts of common probability approaches, including stratified, cluster, random, and systematic sampling (Berndt, 2020). According to Mweshi and Sakyi (2020), Common non-probability sampling methods include quota, purposive, self-selection, and snowball sampling. Quantitative research questions can be sampled using either probability or non-probability approaches, whereas qualitative research questions can only be sampled using non-probability procedures (Lohr, 2021). Therefore, the researcher adopted a non-probability purposive sampling method when conducting the study.

Kumar (2018) explained that non-probability purposive sampling is used when the number of elements in a population is unknown or the elements cannot be individually

identified. In a non-probability sampling method, the items for the sample are selected intentionally by the researcher. It is important that the researcher selects a sample that yields results favorable to his point of view (Khothari & Garg, 2014). The researcher employed a non-probability purposive sampling to intentionally select the respondent with knowledge and experience with digital innovation and its impact on the services provided by the municipality.

3.7.2 Sampling size

Sampling size refers to the number of items that are selected from the universe to constitute a sample (Khothari & Garg, 2014). In line with the above statement, researchers select the right sample size so that it is efficient. Aspects such as the budget and time frame are taken into consideration when selecting a sample size. The researcher anticipated to interview 20 participants but only interviewed 14 participants until data saturation was reached. Eleven male and three female permanent employees indicated by letters such as A, B, C, D, and so on participated in this study. They include officials from the Geographic Information Systems division, the IT department, the mayor's office, the municipal manager's office, the speaker's office, and other municipal departments.

3.8 PRE-TESTING

Pre-testing is testing out the research instrument before using it for actual data collection (Dawson, 2006). It entails critically assessing the respondents' understanding of each question and its meaning (Kumar, 2018). An interview was used in this study to collect qualitative data. The interview questions were tested on 3 respondents to check if they produced the desired result that the researcher desired. The researcher selected 3 respondents to interview as a test of the data collection tool. These respondents did not form part of the participants that took part in this study.

3.9 DATA ANALYSIS METHODS

Data analysis refers to the application of coding and other procedures to the field notes to identify patterns and draw conclusions to generate appropriate recommendations

(Khothari & Garg, 2014). In addition, data analysis involves transforming data into useful information by reviewing, cleaning, converting, and modeling data (Pierce, 2008). Qualitative data analysis methods were used to analyse data collected. Thematic analysis was used to interpret data in this study. Thematic analysis is qualitative research that scholars use to systematically arrange and analyze complex data sets (Dawadi, 2020: 62). It involves searching for themes that can include the stories found in the accounts of data sets. Qualitative data collected through interviews was analysed and presented narratively. The method involves evaluating the interview material to determine the primary themes that emerge from the responses provided by respondents or the researcher's observation notes (Kumar, 2014). Narrative analysis assists the researcher in tracking sequences, stories, or processes in an attempt to convey meaning in different levels (Maree, 2016). Thematic analysis was used to provide a summary of the themes of interest presented by the qualitative data. The meaning of the contents of the interviews were conveyed in a narrative form.

In the study, the following phases were adopted in the data analysis process.

- The interview questions were first created, and copies of these documents were printed, arranged, and ready to gather information from the respondents. The process was recorded using a voice recorder and in a form of field notes.
- The received data was read multiple times before being dissected and analysed. In order to determine the direction in which the information provided by respondents was going, the data was further examined to look for patterns and trends. The information was classified into sections (A, B, C), representing each respondent to maintain confidentiality and avoid mixing up the information.
- Thirdly, an extensive coding procedure was carried out in order to assess the main findings of the study objectives. Coding was used to obtain a formal representation of analytic thinking based on the key words. The information obtained was analysed for its credibility in order to establish an understanding of the data, including its utility and centrality. This also included assessing the relevance of the information to the study.
- Fourthly, the information was evaluated and analysed. The data was assessed to determine whether the literature from different scholars supported or refuted the facts.

- And lastly, following the evaluation and analysis of the data, a formal report was prepared and presented in narrative form based on the themes.

3.10 ETHICAL CONSIDERATIONS

Ethics is defined as a principle of good conduct that is considered correct to a specific group (Kumar, 2014). The ethical considerations uphold the values of respecting individuals' privacy and treating them with dignity (Muzari et al, 2022). It is further emphasized by Kumar (2018) to be unethical to cause harm to individuals, breach confidentiality, and improper use of information. It is important to consider and adhere to the accepted code of ethics and minimize the risks of causing harm to participants when collecting research data (Maree, 2016). The issue of protecting the participants' identities is an important ethical aspect. This includes obtaining letters of consent, obtaining permission to be interviewed, undertaking audiotapes, etc. The researcher applied the following ethical considerations when conducting data.

3.10.1 Permission to conduct the study

After deciding on the target population, it is vital to request permission to collect the study (Kottler & Sharp, 2018). Dawson (2006) stated that for one to gain access to the community that one wishes to study, it is important to seek permission to conduct research. To this study, the researcher requested permission from the University of Venda through obtaining an ethical clearance letter from the Research Directorate to conduct the study. The researcher further requested permission from the Thulamela Local Municipality. The employees were then given an insight on the project and were requested to participate in the study. The employees of Thulamela Local Municipality were given consent forms to sign to provide meaningful information.

3.10.2 Informed consent

Kumar (2018) stated that informed consent implies that participants are explained about the type of information required from them, how to participate in the study, the reason for conducting the study, and how the study impacts them in any way. It is important to inform the participant about the risks that might emanate from

participating in the study (Goddard & Melville, 2001). The researcher began the study by outlining to the participants, which mainly were men and women older than the age of 18. The researcher asked for their permission to take part in the study. The respondents were informed of the reason for the study before they could participate in it.

3.10.3 Voluntary participation

Kumar (2011) stipulates that participants in research are allowed to refuse to disclose some information that they do not feel to disclose, and they should not be put under pressure to participate in a study. The participants were not forced or tricked to take part in this study. The researcher did not force or pressure respondents to participate in this research.

3.10.4 Protection from harm

Kumar (2011) indicated that participants in a study should be protected from any form of harm, such as physical harm, psychological harm, emotional harm, embarrassment, and so on. According to Kumar (2018), there is a need to inspect carefully whether the involvement of the participants in a study will likely cause them any harm when collecting data from respondents. The researcher ensured that any plan or action that may cause any harm that could affect participants be prevented.

3.10.5 Right to privacy

Kumar (2018) maintains that the information provided by respondents needs to be kept anonymous. Sharing information about respondents with others for purposes other than research is regarded as unethical. Thus, the names of the participants are not known to ensure privacy and anonymity. The names of the participants were kept confidential because the interview guide used to collect data did not require them to pen their names.

3.11 CONCLUSION

This chapter focused on the research methodology, guidelines, and procedures that the study followed. Interview schedules were distributed to participants as part of the study's qualitative method approach to data collection. The study area, research design, target population, sampling strategies, and data collection and analysis procedures were all covered in this section. The results of the data analysis are outlined in the next chapter.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

The previous chapter discussed the methodology that was followed in this study. This chapter provides a summary and discussion of the study's results in relation to the literature reviewed in the previous chapter. This chapter will give the conclusions acquired from data collected after a discussion following face-to-face interviews with the Thulamela Local Municipality officials regarding their perceptions of digital innovation and its impact on municipal services in South Africa. This chapter will showcase the data obtained using semi-structured interview guides and the presentations of the responses from participants analysed using the narrative analysis method.

4.2 PRESENTATION AND INTERPRETATION OF QUALITATIVE DATA GATHERED FROM INTERVIEWS

This section presents data collected through interviews. The researcher anticipated to interview 20 officials of the Thulamela Local Municipality. However, interviews were conducted one-on-one with a total of 14 employees until data saturation was achieved. The researcher collected biographical information from the subjects using semi-structured interviews. Section A required participants to supply personal information on their gender designation and higher qualifications. The participants included 11 male and 3 female officials, which are permanent workers coded using letters like A, B, C, D, and so forth. They include officials in the IT department, the office of the mayor, the office of the municipal manager, the office of the speaker, the Geographic Information Systems division, and other divisions within the municipality. Their names were left out to protect their identities. The researcher employed an interview guide to facilitate her traversal of the data collection procedure, which contained nine questions. The nine interview questions required detailed explanations in order to be understood. Consequently, the participants needed to possess thorough knowledge

and a profound comprehension and engage in the real-world application of digital innovation within the municipal setting.

4.2.1 Analysis of data

Throughout the interview sessions with the respondents, the researcher recorded and made notes. This study was carried out to address these research questions, the relationship between digital innovation and municipal service delivery, the drivers of digital innovation in the local municipalities, the barriers to digital innovation in local municipalities, and the recommendations to enhance or promote digital innovation in the Thulamela Local Municipality. This section discusses the findings from the respondents' interviews, which were held at the Thohoyandou offices of Thulamela Local Municipality.

Table: Theme and sub-theme of the impact of digital innovation on municipal service delivery

Themes	Sub-themes
What is the relationship between digital innovation and municipal service delivery?	What is the status of digital innovation in Thulamela Local Municipality?
What are the drivers of digital innovation in municipalities?	What specific digital innovations have you observed within your municipality?
What are the challenges towards digital innovation in municipalities	In what way do you think digital innovation influenced the accessibility of municipal service delivery
What are the strategies that can be implemented to enhance digital innovation in municipal services?	How have the roles and responsibilities of municipal staff evolved with the adoption of digital innovations?

	Can you describe any collaborative efforts or partnerships that have been formed to support the implementation of digital innovations?
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Objective 1: Examine the relationship between digital innovation and municipal service delivery

Question: what is the relationship between digital innovation and municipal service delivery?

The first question was asked to determine the relationship between digital innovation and municipal service delivery.

4.2.1.1 The relationship between digital innovation and municipal

In response to the first question, participant N viewed digital innovation as the process of implementing technological devices and systems to speed up municipal service delivery. Similar sentiments were made by Layton-Matthews and Landsberg (2022: 59). These authors explained that digital innovation involves the use of technology to provide opportunities to enhance institutional practices, systems, and processes. Other participants specified that digital innovations can assist in helping the Municipality to achieve ambitious goals such as accessing the services on online platforms. Moreover, participants D, G, H, I, K, L, M and N supported this noting by stating that digital innovations speeds up the processes of providing municipal services to communities because digital innovations has allowed the Municipality to improve its connectivity to internet in form of Wi-Fi and devices that are given to official such as cell phones and laptops to allow them to work from wherever they are. The study found out that this has an impact on the work of the officials because they are able to do their work easier and it allows them to work remotely. Participant A expressed similar sentiment by stating that:

Digital innovations assists with regards to the issue pertaining to payments of municipal rates, where people could pay transfer without coming to the Municipality. Using online services assist the people to pay for theirs municipal

rates wherever they are without coming to the Municipality directly. This reduces the ques and risks of being roped.

Participants A, C, D, F, H, and I shared similar views as the above participant. The participants replied that digital innovations take the services closer to the people creating easy access to take the services closer to the people creating easy access to take the services closer to the people, take the services closer to the people, creating easy access to municipal services. On the other hand, participants B, E and F emphasized that digital innovations improve and strengthen communication between the communities and the Municipality. They argue that digital innovation speeds up communication between the citizens and the Municipality with the help of social media platforms. It is further observed by Nel-Sanders and Malomane (2022:4) that electronic access to government documents and decisions allows the public to engage with government institutions and contribute to decision-making. The study found that people are able to communicate something in time in instances such as rains flood and other disasters. Therefore, the use of digital technologies can speed up the process of getting help to those people. Participant B added the same sentiments by stressing that:

Digital innovations have a positive impact on municipal services delivery because it creates a channel for the Municipality to engage with the community easily. The Municipality is also able to circulate notices to stakeholders and communities on online platforms and hold online meetings. This saves a lot of time and funds.

In summary, participant I stated that the adoption of digital innovations in the municipality will assist officials to work easier and people will easily have access to services. The participants further indicated that in some municipalities, the majority of the services rendered by municipalities are accessible online, such as applications for jobs and tenders. From the responses above, the researcher found that the introduction of digital innovations affects municipal services by creating easy access to the services and speeding up the work done by officials in municipalities.

The findings reveal that digital innovation is crucial in enhancing municipal services, and the absence of public sector innovation can be linked to service delivery backlogs that lead to community unrest. It is further observed by Galushi and Malatji (2022:

120) that digital innovation allows the government to provide services efficiently and effectively anytime and anywhere to the public on any platform. The results are supported by findings from Nel and Masilela (2020: 36). The authors found that digital innovation is one of the fundamental building blocks of the fourth industrial revolution (4IR), and government must adopt transformative strategies to fully take advantage of the opportunities provided by the 4IR. This notion was supported by respondent L who stated that:

Digital innovations is important in improving municipal services because we are now in the fourth industrial revolution where everything needs to be moving to digital and to the cloud. Currently everything is system automated, so it is important to adopt the innovative processes because people cannot always travel distances to access service such as making municipal payments while they can do it wherever they are and submit the proof of payments to the municipality.

The study found that technological devices and systems will allow the officials to work smarter. On the other hand, participant J views digital innovations as a tool that can assist in ensuring that the right protocols are followed so that the government can curb constraints such as corruption. Similarly, Mathebula (2021: 18201) articulated that the adoption of new digital systems by government institutions would improve accountability of public employees. The participant further added that:

Digital innovation simplifies municipal service delivery and assists in fighting corruption by capturing the wrong doings.

From the responses above, the study revealed that when processes are done online, it will be easier to notice if the right procedures were not followed and corrupt officials will be revealed. Also, the responses from the participants highlighted their understanding of the relationship between digital innovation and municipal service delivery. The participants expressed the impact that digital innovation has on municipal services. The study found that digital innovation is crucial in enhancing public services. Furthermore, the absence of public sector innovation can be linked to service delivery backlogs that lead to community unrest.

Question: what is the status of digital innovation in Thulamela Local Municipality?

This question was posed to participants to understand the status of digital innovation in Thulamela local Municipality.

4.2.1.2 The status of digital innovation in Thulamela Local Municipality

With regards to the question, what is the status of digital innovation in Thulamela Local Municipality, participants A, B, G, L, and M stated that the Municipality is embracing and adopting digital innovation to improve respective municipal services. The participants emphasized that the use of technical machinery is growing in the Municipality because they are connected to the outside world through the use of the internet which assist them in coping processes and strategies that we can use to tackle similar problems. Participant L stated that they have noticed the use of modern technologies here and there especially in a form of gargets that are used by the officials to help them improve how they interact with the members of communities. The officials can interact with the local communities through many online platforms including social media networks. The results are consistent with the findings from Shava and Vyas-Doorgapersad (2022: 82). The authors emphasised that adopting the use of social media platforms improve the participation of the people in exchanging ideas and making recommendations on how to improve the services provided to them.

In response to the second question, the participant A pointed out that the Municipality is embracing digital innovations by opting for online meetings and processes. For example, meeting agendas and minutes are no longer printed but are circulated as online documents. This helps with saving a lot of money that was meant for printing paper. Participant G emphasized that:

Things are getting better every day and members of the community are happy with that. When people need services they get it easy. In a situation where people are not getting solutions to what they need or service delivery challenges, they normally call the Municipality for meetings to resolve matters that need to be resolved.

In line with the above, participants E, F,J and K pointed out that the Municipality is introducing digital innovations. However, the participant noted that the digital innovations are introduced at a slow pace and the municipality still has to improve the

rate at which digital innovations are introduced in the Municipality. For instance Participant F pointed out that:

The status of digital innovation in the Thulamela Local Municipality is still in the initial stages. The Municipality is trying to move with the times even though they are not where they want to be. The Municipality wants to improve the ICT infrastructure and introduce other new technologies so that service can be improved.

Participant J shared similar sentiments by stating that:

The Municipality is embracing technology but at a slow pace because it is situated in deep rural areas and priority is given to providing basic services.

In contrast to the above findings, participant I indicated that:

The Municipality is not embracing any digital innovations. The Municipality does not even have lifts to assist disabled people to reach to the offices in upper floors of their building.

Participants C, D, N and H shared the same viewpoint. They stated that the Municipality has not introduced any digital innovations to enhance municipal service delivery. Participant C responded that digital innovations are not embraced in the Municipality and the Municipality is still using manual processes that do not include modern technologies. The research found that the Municipality is not motivating the officials to come up with innovative measures to tackle challenges that prevent efficient provision of municipal services. Participant D had the same viewpoint. The participant stressed that the Municipality is not doing enough to move with the times and embrace the use of modern digital technologies. In addition, Participant H also stated that:

...no digital innovation are currently implemented, but the Municipality is in the process of improving the website and introducing an app for the Municipality which members of the community can be able to install in their cell phones so that if there are any service delivery requirements they can just locking to the app and report whatever incident wherever. So the app will improve communication between the municipality and the people.

In response to the question, the participants stated that the Municipality is embracing technology where possible. The study found that the Municipality cannot keep up with the frequent changing technology but try to introduce a few of the latest technology where possible. The study found that the Municipality is unable to adopt the modern innovations because it is situated in deep rural areas and priority is given to providing basic services. The researcher found that not much is done with regards to adoption of digital innovations due to constraints such as unavailability of funds and proper skills.

The study found that the Municipality is embracing the use of technology so that they achieve City status. One of the municipality targets is to transform into a city by the year 2030 and to promote urban regeneration. However, participant N stated that logical systems have not been applied to solve problems because the Municipality is still using the old methods of solving the problems. Moreover, Shava and Vyas-Doorgapersad (2022: 85) believe that the deployment of digital innovations in local government should be strictly monitored since they have the potential to disrupt service delivery by requiring public people to obtain digital skill training. From the finding above, the researcher can conclude that digital innovations in the Thulamela Local Municipality are adopted but at a slow and insufficient rate. More can still be done to improve the rate at which digital innovations are utilized.

Question: what specific digital innovation have you observed or been involved in within your municipality's service delivery processes?

The question was asked to find out if there are any digital innovations that participants have observed in the Thulamela Local Municipality.

4.2.1.3 Availability of digital innovations on service delivery processes

On the view of their observation or involvement in any digital innovations with the Municipality, participants B, E, G, J, L, and N expressed that they have noticed digital innovations adopted in the municipality. Participant L also replied that new machines have been introduced and modern laptops have been purchased that allow us to work faster and work from home. Participant B stated that new systems were adopted that change over time, and as a result, officials are required to undergo training and workshops to upskill them. Participant L also articulated that they have noticed digital

innovation used in processes such as voter awareness and training of municipal workers to allow a conducive environment. Participant E shared the same view and pointed out that:

We have done that at the software level, where we have improved our web services to allow content management in a way that the citizens are able to interact with us in real time. We are also moving to app developments that will improve engagements with the people.

Participant J responded that the municipality adopted a software service to allow content management so that citizens' participation takes place such as web development. On the other hand, participant G emphasized that:

Things are getting better every day and members of the community are happy with that. When they need services they get it easy. In a situation where people are not getting solutions to what they need or service delivery challenges, they normally call us for meetings, and in those meetings, we resolve matters that need to be resolved. People are satisfied because communication between the citizens and the Municipality has become easy. I was busy in a virtual meeting earlier and I think that technology is simplifying the work that we do.

Participants A, C,D, F, H, I and K share a different view point to the above. The participants expressed that they have not observed any innovations lately in the Municipality. Participant H shared the same sentiments and pointed out that:

I have not seen any but we are in the process of improving our website and introducing an app for the Municipality which they can be able to install in their cell phones so that if there are any service delivery required they can just locking to the app and report whatever incident wherever. So the app will improve communication between the municipality and the people.

From the responses, the researcher found that the majority of the participants have observed the implementation of digital innovations within the Municipality. Only a few of the participants had a different viewpoint. They indicated that they have not seen any digital innovations in the Municipality. Other respondents expressed that the Municipality is embracing digital innovations but at a slow pace. This clearly reveals that the Municipality is embracing the use of digital innovation reveals that the

Municipality is embracing the use of digital innovation, but not much is done because priority is given to providing basic service. This finding is consistent with the findings from Motloun (2020) that though smaller municipalities are moving to digitalization of their services, metropolitan municipalities are seen integrating innovative plans to grow their economies. This is done as a strategy to become smart cities to promote economic development and competitiveness through innovation (The Innovation Hub, 2016).

Question: Can you describe any collaborative efforts or partnerships that have been formed to support the implementation of digital innovations in municipal service delivery?

The question was asked to participants to find out if there are any efforts or partnerships that have been formed to support the implementation of digital innovation in municipal service delivery.

4.2.1.4 Collaborative efforts and partnerships formed to support the implementation of digital innovations in municipal service delivery

In response to the question above, participants A, B, M, E, G, H, J, and N have articulated that there are collaborative efforts or partnerships within the province and in other provinces that have been formed to support the implementation of digital innovations in the Municipality. The participants mentioned that the Municipality usually hires a service provider to run the service and train the staff because the private sector is easy to recognise the changes and improvements that can assist with municipal services. Participant G responded that;

There are skills training with the nearest Municipality and other institutions within or outside the province. The secretaries normally go for training many times as long as you identify that there are gaps here and there is this training that is provided in the University of Johannesburg or University of Pretoria, they normally give us approval to go and attend and that assists the Municipality when we come back.

Most of the participants mentioned that the Municipality would request external service providers to assist with training the officials. Participants E, G, H, J, and N made

examples of the collaboration that the municipality has with the nearest academic institutions, such as the University of Venda and Vhembe Technical Vocational Education and Training (TVET) College. Participant E also observed this collaboration and stated that:

I know that the Municipality has signed a Memorandum of Understanding with the likes of the University of Venda and the TVET colleges and lots of agreements are there that are allowing the citizens to be trained on certain technologies in those institutions. For instance, our councillors were also trained by the University of Venda months ago.

On the other hand, participants C, D, F, I, K, and L had a different point of view. The participants are adamant that they have not seen any collaboration efforts or partnerships to improve the adoption and the use of digital innovations in the municipality. One of the respondents shared that:

I have not noticed any digital innovation in this Municipality, so I don't see any collaborations that are taken to embrace digital innovation in this Municipality.

From the findings above, the researcher can conclude that collaboration is made by the Municipality to improve their digital skills, but not enough is done to introduce new innovations and to motivate the officials to create innovations that would assist the Municipality in improving their provision of municipal services. SALGA (2022: 4) stated that municipalities must establish new systems and ways of doing things through effective innovations that lift citizens' patterns of livelihood and adapt to rapid changes that can be challenging for outdated systems. In sum, the 2019 White Paper on Science, Technology, and Innovation (STI) emphasises the need for a policy framework that encourages the adoption and scaling up of innovative technology solutions to enhance government services. The findings highlight that it is important for municipalities to include the adoption of digital innovations in their plans.

Question: how have the role and responsibilities of municipal staff evolved with the adoption of digital innovations in service delivery processes?

This question was posed to participants to understand the effect that digital innovation has on the roles and responsibilities of municipal staff.

4.2.1.5 The impact of digital innovation on the roles and responsibilities of municipal staff

In response to the question, participants A, D, L, M and N noted that digital innovation has an impact on the roles and responsibilities of the municipal staff. The participants emphasised that when new systems are introduced, the staff needs to be trained so that they become familiar with the introduced system. When there is a new way of doing things, then the staff should know how to use it. Officials should also be given new, improved digital resources that enable them to work smart. Authors such as Mawela, Ochara, and Twinomurinzi (2017: 160) highlighted that the skills shortage has a negative impact on government institutions and causes backlogs in service delivery because of staff members who are unable to handle ICT challenges. Participant J is of the opinion that:

The roles and responsibilities change with the impact of the introduction of new technologies and officials are sometimes expected to do less or more.

Participant K also concurs with the sentiment made above. The participant emphasized that:

Digital innovations ensure a smooth working environment and good services that are fuelled by the use of modern technologies that are faster and more efficient. Therefore the staff have the responsibility to adapt to the new technologies so that they can utilize the platforms effectively.

In reaction to the question, participant C shared the same sentiments and pointed out that:

I have noticed how the approval of supply chain management processes, payments processes for services rendered by service providers have been changed and therefore the officials are required to adapt to the changes.

Participant E supports the view of the previous participant and stated that digital innovation affects the roles of the municipal officials. The participant further indicated that the introduction of modern technologies adds to the job descriptions of the officials adding the extra baggage which was not expected before. The officials are sometimes expected to work to certain time frames that they were not used to, which usually turns

out to be a challenge. The researcher also found that the use of modern technologies and modern innovations can improve the way in which communities participate in the processes in the Municipality which in turn will improve the services provided to citizens. This may impact the way in which officials tackle issues related to municipal service delivery. Participant G also shared the same view that:

I can easily coordinate the communication between the members of community and the different divisions in the Municipality while sitting in my office.

The other participant raised the view that the officials play an important role in implementing digital innovations. Participant J further emphasized that:

We are in the process of developing the app that will be used to request services from the Municipality. Therefore, if we develop that app then, whenever users come here they are the ones that should educate them on how to use the app and encourage them to use the app. So they can advocate for that app.

The above sentiments are consistent with the studies conducted by Shipalana (2019: 51) that, officials are essential change agents in managing and coordinating the deployment of innovative approaches. Roger (2003) also regards the social system, which includes employees' duties and tasks, organizational culture, and behaviours as the element that affects how innovations are distributed. Therefore it is important for municipal officials to enhance their skills when new digital technologies are adopted so that they encourage the members of communities to use them.

However, participant I indicated that most of the officials do not want to move from physical to digital services because of the fear of the unknown. The participant expressed concern that most of the municipal officials are old and not familiar with modern technologies, so it will be difficult for them to adapt. But, the participant noted that these might change given that the youth are being hired and are adapting faster to innovations.

Question: In what ways do you think digital innovations have influenced the accessibility of municipal services to residence?

4.2.1.6 The influence of digital innovations on the accessibility of municipal services

In response to the above question, most of the participants replied that the influence of digital innovation has been noticed in online payment services. The online payment services allow residents to pay for municipal services such as refuse removal, water and electricity wherever they are electronically or via retail stores. Participants D, H and C emphasized that digital innovations influence service delivery to be delivered correctly and in the right time frame, such as creating easy access to services like downloading forms, issuing some warning regarding disasters, and many other warnings that may need urgent attention of the municipal staff. Consequently, this serves as a mechanism to curb the issue of long queues. Participant B supported this notion by stating that:

We are encouraging the people especially those on the business antennary to use the Central Suppliers Database which is done online and they can use the system wherever they are to register on the Thulamela Local Municipality database wherever they are using the CSD application. They register on the system as business owners who provide goods and services to the Municipality.

However, participant E articulated that challenges do exist when providing services to the people because some of the systems are not necessarily satisfactory. The participant expressed that:

Members of the community expect some sort of microwave type of a service where they can click and something should happen immediately. And on our side we still need to shuffle and see what we can be able to do depending on the budget.

Participant F also supports the view of the response above; the participant raised the concern that the accessibility of digital innovation in processes of providing municipal services is hardly noticed because the Municipality is situated in too rural areas. The use of cell phones, laptops, and digital equipment for connectivity are not often used.

The results are consistent with findings from Abrahams and Burke (2022: 14), that funding for innovative initiatives in municipalities is still a challenge. The participant further pointed out that:

We are able to reach only those that have internet connectivity. Although we normally reach out to them through the IDP processes and meetings that are face to face to ensure that we reach all of them. But we can also connect through zoom and online meeting with those that have connection to the two ways that I have mentioned. So this would save us much time and money that the people do not have because we have the problem of unemployment.

Participant I shared a different view point to the above. The participant noted that Thulamela has not embraced the use of digital innovations. The participant further stressed that:

For those that have started with embracing the used of digital innovations in the Municipality, it is easy to access the Municipality because if we search on the website of municipalities such as city of Tshwane you get everything. If you want to report electrical faults, you do it online. Even the City of Cape Town. Most of the municipalities that are metropolitans, big municipalities, offer online services. But for the local municipalities, most of them still need to improve their services. I think local municipalities are not taken seriously enough to introduce those innovations. Maybe because they are deep in rural areas maybe the people there will not be able to use the digital innovations.

From the findings above, the researcher concludes that digital innovation enhances municipal services. The results are consistent with findings from Shipalana (2019: 14) and Motloun (2020: 58). The authors found that the adoption of digital innovations may address complicated service delivery difficulties and promote good governance in the public sector by facilitating collaboration, coordination, and communication among stakeholders. A similar influence has been noticed on the implication of digital innovations communication between the community and the municipality. However, challenges still exist that hinder municipalities from digitizing their services.

Objective 2: To determine the drivers of digital innovation in the South African municipalities.

Question: What are the drivers of digital innovation in municipalities?

The question was posed to participants to determine the drivers of digital innovation in South African municipalities.

4.2.1.7 Drivers of digital innovation in municipalities

In response to the question, respondent A stated that one of the drivers that influence them to adopt digital innovations is the need to save funds that are required on expensive manual processes. Many participants identified the increase in the introduction of the ICTs around as one of the drivers for digital innovation. The notion is supported by the findings from Dutta and Mia (2018) that the availability and quality of ICT infrastructure are major factors that determine digital innovation (Dutta & Mia, 2018). This increases the pressure on municipal officials to learn digital skills and embrace digital technologies. With regard to the question, participant L pointed out that one of the drivers of digital innovations is the everyday use of technology. Technology is widely used on an everyday basis and that encourages one to embrace digital innovations. The use of technological processes is mostly preferred by members of the community, and the need to please customers acts as a driver to adopt digital innovations.

Participant B emphasised that the municipality has to move with the times because technology is improving every day. There is a need to change so that the systems and processes used are not old and outdated. In response to the question, participant C identified other drivers and stated that the adoption of digital innovations is influenced by the changes in the work provided and the change in processes used in the Municipality. The heavy workloads require change in the way things are done. The services that are required have changed, and they require advanced processes and faster machinery. Participant D made similar remarks and expressed that:

The need to reduce the queues and paperless environment influences the need to change to digital processes to shorten the processes such as applications for stands.

On the other hand, participant E stated that the IT department in this Municipality is forced to embrace technology because of the realities of the technology criminals such as the cyber-attacks and hackers. The Municipality needs to keep up with the latest technologies so that the citizens are protected from any form of technical clichés or attacks that can take place within the municipality systems. In line with the above sentiments, respondent F had a similar view and pointed out that:

Some of the drivers of digital innovations is the need to improve service delivery using digital tools and the drive to cater for the people who are now living a fast life that involves digital processes. Also, we are driven by the introductions of new technologies in other municipalities that inspire us to change and to address the service delivery backlogs.

In line with the above, the study found that other phenomena, such as the outbreak of infections or pandemics, might influence institutions to change their processes and strategies. The participants also mentioned that the Municipality is also influenced by COVID-19 because, during the pandemic, officials were unable to provide services and had to improve the online presence and be able to work remotely.

In response to the question, participant H stated that municipalities are driven to adopt digital technologies by the emergence of Information Communication Technologies. The researcher found that the fourth industrial revolution is upon us, and everything needs to be moving to digital and to the cloud, and everything is system automated. So it is important because people cannot always travel to access services such as making payments while they can do it wherever they are and submit the proof of payment.

In response to the third question, the respondent I pointed out that:

the drivers for digital innovation is the need to fight the occurrence of challenges in the communities. Therefore digital innovations will assist in reducing the problem of corruption because if everything is done online, anyone is able to check on the system of how things are done. That means that corruption will be limited and any other thing that is not done correctly, because you know that everyone has access to that information.

The above response is consistent with the studies conducted by Galushi and Malatji, (2022: 119). The authors found that E-government services include increased public sector corruption reduction, increased openness in government operations, and increased citizen participation in politics. Xiao, Han, and Zhang (2022: 2) also found out that the successful implementation of digital innovations in local government can improve public service delivery, transparency, and overall governance. On the other hand, respondent M pointed out that the only thing that drives the Thulamela Local Municipality to adopt digital innovations is the lack of appropriate skills and resources that exists in the Municipality that hinder the success of adopted strategic processes. In response to the same question, respondent N stated that:

The Municipality is encouraged to embrace digital innovations to promote urban regeneration and achieve a city status by 2030.

With regards to the above, Maphangwa (2023: 26) observed similar findings. The author concurred that for municipalities to need to adopt innovative strategies to transform into smart cities. The study found that the need to achieve city status requires the use of effective and efficient methods that would enable the Municipality to provide services that are advanced and accessible to all beneficiaries. In addition, participants A, B, E, H, J, K, and L pointed out that the emergence of new technologies and the increase in the use of ICTs drive municipalities to adopt digital innovations. On the other hand participants A, C, D, F, and I emphasize that the needs and the nature of services required by the members of the communities influence municipalities to implement digital innovation in municipal processes. Participants C and N stated that the need to improve the skills and educational levels of the officials are drivers that influence municipalities to embrace digital innovations. In contrast, Participants G and M view the policies and municipal goals as the drivers of digital innovations in municipalities. From the responses above, the researcher concludes that the drivers of digital innovations include policies and legislature, educational and training dispensation, change in the preferences of the people, and the development of new ICTs.

Objective 3: To explore some of the barriers to digital innovation in the Thulamela Local Municipality.

Question: what are the challenges towards digital innovation in municipalities?

The above question was posed to participants to explore the barriers that disable municipalities to digitize the processes and services.

4.2.1.8 Barriers to digital innovation in the Thulamela Local Municipality

In response to the question, participant A stated that skills is a barrier to digital innovation in the Municipality. The participant further expressed that a lot of people cannot use the latest technologies such as voice recorders and laptops. Also, the fear of change is a problem in most officials, especially the old. They don't want to study further and learn new skills. On the other hand, participant B responded that the challenges include scammers. The use of digital innovations increases the chances of scammers corrupting the system for their personal use. Participant F raised the same concerns by stating that:

Some of the challenges that are disabling us to use the digital technologies is the issue of cyber securities. The attacks that can happen in the systems of the Municipality by outsiders. The Municipality might be attacked and the information might be tempered with.

The above findings were also observed by the African Union (2020). It was found that the prevalence of data privacy violations, cyberattacks, and cyber fraud globally has an impact on the digital economy's productivity, earnings, and customer trust.

From the responses, it was found that some of the challenges related to digital innovations are challenges of lack of network caused by loadshedding that may slow down the system. On the other hand, participants D, G, J, L identified the lack of appropriate digital resources or infrastructure as one of the barriers of digital innovation. Layton-Matthews and Landsberg (2022: 60) expressed the lack of ICT infrastructure as the greatest challenge hindering the processes of digitization. Mathebula (2022: 18201) also found that the only way that would allow officials to connect to the internet is through access to the right technical resources. Participant G further expressed that some of the challenges are not having airtime and Wi-Fi

connectivity and the right infrastructure becomes a challenge. Participant E also identified the barriers and replied that:

The modern technologies come at a high costs and to support and maintain those systems is costly.

Participants I and J expressed the same sentiments as the above participant. The participant I identified the matter of lacking funds from the management as a barrier to adopting digital innovations. The notion is supported by the Business Connexion Group (BCX) report (2020: 19) that the cost of cybersecurity is viewed as a reason that can hinder digital innovation in institutions. The participants further stressed that:

We as the IT department we want to move to the new technologies but when we explain to the management they don't even have the knowledge of the modern technologies so they don't provide the budget for us to implement whatever that we want to implement the improvements that will improve the lives of the citizens and the work done by the Municipality. So for them misunderstanding these modern technologies means that even the budget will be limited.

With regards to the question, participant I expressed that local municipalities are not taken seriously enough to introduce those innovations because they are deep in rural areas; therefore, the people there will not be able to use the digital innovations.

Participant K is of the view that some of the challenges include old and untrained officials that are not informed about digital innovations. The above statement is supported by Maremi, Thulare, and Herselman (2022), that the government can expand technology, but individuals in rural regions will still lag behind because they lack the awareness or literacy to use it. Participant M shared the same sentiment and further stated that:

The challenges include corruption and nepotism. The right officials with the right skills are not employed.

From the responses, participants A, D, K and N expressed that skills is the barrier for digital innovations in the Municipality. on the other hand, participants D, G, J, L and N have mentioned infrastructure and lack of resources as the barriers for municipalities to adopt digital innovation. From the findings, the researcher concludes that the

barriers to digital innovation include a lack of appropriate skills, fear of change, cybercrimes (scammers), lack of ICT infrastructure, and the high costs of innovations and their maintenance.

Objective 4: To make recommendations that will enhance and promote digital innovation in the Thulamela Local Municipality.

Question: what are the strategies that can be implemented to enhance digital innovation in municipal service delivery?

4.2.1.9 Recommended strategies to enhance digital innovation in municipal service delivery

In response to the question of the strategies that can be implemented to enhance digital innovation in municipal service delivery, the majority of the participants mentioned that strategies were implemented, however the strategies are not effective enough. Participant A mentioned that, the Municipality is already tackling the issue by awarding bursaries to the officials for them to study further and improve their skills. Also, the skills development framework is based on an employee's line of work and upskill them with skills that will assist employees who are experiencing challenges in their work. Participant E shared the same view by stating that:

we are already doing is one of the strategies that we use is to support the official to get more education and empower them with related courses that will improve their current status of education. And as you already know that today's schooling is very digital so it starts them to align them to the current technologies.

On the other hand, participant C stated that there should be a quarterly review of the digital policies if there are challenges. The participants further suggested that the infrastructure should also be improved. The participant emphasized the importance of including processes of digital innovations in municipal budgets. Shava and Doorgapersad (2021: 143) found that funding for digital infrastructure, smart city projects, and innovative public services could come from both local and international sources. On the other hand, other participants replied that they expressed that the municipality can improve its online system so that some of the services are rendered

online so that citizens can access the services online. The participant further mentioned that:

Municipalities should adopt online processes because during the covid-19 people could not access some of the services because the offices were closed but if we have the services online, that can assist us a lot. And the Municipality can generate revenue because if officials are not in the office, then everything stops and the Municipality does not generate revenue and even the people who are outside of town cannot pay for their rates.

From the responses, it was found that there is a need for the introduction of new and improved ICT infrastructure and the provision of funds for the introduction of digital innovations. Also, it was recommended that officials should be provided with digital systems workshops and training.

4.3 CONCLUSION

This chapter focused on data presentation, analysis, and interpretation. The analysis and interpretation were based on the data gathered from respondents via interviews. Participants who took part in the interviews were regarded to be information reach participants because of their daily roles and responsibilities. The information gathered from the interviewees was presented narratively. Using open-ended interview guides, the 14 participants were questioned on the impact of digital innovations on municipal service delivery. The next chapter explains the findings and suggests recommendations and conclusions for this study.

CHAPTER 5

FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The previous chapter analysed and interpreted the acquired data by discussing the responses of the sampled populations. This chapter outlines the study's primary results as well as recommendations made for actions that will enhance digital innovation in the Thulamela Local Municipality. A conclusion will also be derived from the research study's findings and suggestions.

5.2 MAJOR FINDINGS OF THE STUDY

The section highlights important findings that came from the research objectives of the study, which are: to examine the relationship between digital innovation and municipal service delivery, to determine the drivers of digital innovation in South African municipalities, to explore some of the barriers to digital innovation in the Thulamela Local Municipality and finally to make recommendations that will enhance and promote digital innovation in the Thulamela Local Municipality.

5.2.1 The relationship between digital innovation and municipal service delivery

On the relationship between digital innovation and municipal service delivery, it was found that digital innovation includes the implementation of technological devices and systems to speed up the processes of providing municipal services. The study revealed that digital innovations assist in accelerating municipal processes, which assist the municipality in achieving its goals. This is done by speeding up the processes of providing municipal services. Digital innovations have an impact on the work of the municipal officials because it affects have an impact on the work of municipal officials because they affect the rate at which they do their duties. It was found that digital innovations take the services closer to the people by creating easy access to basic municipal services. This is done by improving how the local communities participate in matters of the municipality by including them in processes

through social media platforms. The researcher also found that digital technologies assist in ensuring that the right processes are followed by officials to avoid challenges such as corruption because they improve the accountability of public employees. In addition, it was found that digital innovation assists the municipality save a lot of money, for instance, money that was meant for printing paper and meetings. This is because most of the meetings are done on an online platform. The study also found that digital technologies improved communication between the community members and the municipality. One of the participants expressed that there are plans put in place to improve communication between the community and the municipality by developing a computer application that will allow better communication. However, most of the participants noted that digital innovations are adopted but a lot still needs to be done. Some of the participants noted that the municipality is doing as much as possible to improve the skills of the officials by putting them in training and workshops.

5.2.2 The drivers of digital innovation on municipal service delivery

The findings revealed that the drivers of digital innovation on municipal service delivery include the need to save funds. This is because digital processes are less expensive than manual processes, which also need more time to execute. It was also found that the municipality is forced to embrace digital innovation because of the emergence of ICTs. Most municipalities are moving to digital services, which influence the municipality to also adopt the processes. This is done to assist in cutting the workloads that is induced to officials in municipalities. Digital innovations affect the processes that are followed by officials. This results in the officials working smarter and being more effective in their tasks. The findings reveal that the reality of cybercrimes influences the municipality to adopt modern digital technologies that will protect the information in the municipality and avoid cyber-attacks. It was also found that the other driver of digital innovation is the lack of appropriate skills and resources. This drives the municipality to adopt digital innovations because the officials are expected to provide services that are up to a certain standard as those offered by other municipalities. Therefore, it is required that the officials are skilled and have the appropriate resources to provide services that are up to the standards. The findings revealed that the municipality is influenced by the needs of the community members to adopt digital innovations. The increased use of digital technologies influences the

needs of the community. Therefore the community members expect the municipality to use digital processes to provide municipal services. the community members expect some of the services to be available on the online platforms which is mostly motivated by the convenience of their everyday living. It was also found that the goals of the municipality drives the municipality to embrace digital innovation. this is because some of the goals require digital technologies to be realised. One of the goals is to achieve city status by 2030.

5.2.3 The barriers to digital innovation in the Thulamela Local Municipality

On the barriers to digital innovation in the Thulamela Local Municipality, the study findings revealed that lack of appropriate technical skills is a major barrier to digital innovation in the Thulamela Local Municipality. this is because most of the officials are old and are not trained or educated. The study revealed that most of the old officials do not want to participate in digital processes because of the fear of the unknown. It was found that these officials do not want to study and upskill themselves. The study also revealed that a lack of digital resources and infrastructure hinders the municipality from embracing digital innovations. Some of the officials do have the skills and the drive to introduce digital innovations but are disabled by the lack of resources and ICT infrastructure. The researcher also found out that lack of funds is one of the barriers to digital innovation. the respondents mentioned that digital innovations are expensive and require a lot of funds to maintain. This hinders digital innovations as some of the digital innovations are not included in the municipal budgets. it was found that red tapes hinder the adoption of digital innovations because most of the officials in management positions who are responsible for the approval of the systems that are adopted in the municipality do not understand some of the digital innovations. As a result, they act as barriers to the adoption of digital innovations that would assist in enhancing digital.

5.3 SYNTHESIS OF RESEARCH FINDINGS

The key findings of this study research can be stated as follows:

- Digital innovations assist the municipality achieve its goals
- Digital technologies speed up the processes of providing municipal services

- Digital innovation impacts the work of the officials because they are able to do their work easier
- It takes the services closer to the people by creating easy access to municipal services
- The use of digital innovations assists in improving and speeding up communication between the municipality and the members of the community
- It assists in ensuring that the right processes are followed by officials to avoid corrupt activities
- Digital innovation improves the accountability of public employees
- It helps save a lot of funds that is meant for manual processes such as printing paper
- It saves a lot of money by allowing for online meetings
- There are processes put in place to introduce applications that allow better communications
- The municipality is not doing enough to improve the introduction of digital innovations
- The municipality is embracing digital innovations to achieve its goal of becoming a smart city
- Training is provided to employees of the municipality in collaboration with the academic institutions
- The driver to digital innovation includes the needs of the people, the need to save available funds, heavy workloads, increased emergence of ICTs, lack of digital skills and resources, poor ICT infrastructure, and the reality of cybercrimes
- The barriers that hinder digital innovation in municipalities include a lack of skilled officials, fear of change, increased cybercrimes, lack of digital infrastructure, lack of funding, and lack of digital innovation frameworks.

5.4 RECOMMENDATIONS OF THE STUDY

This section recommends the strategies that can be used to enhance and promote digital innovation in the Thulamela Local Municipality. The recommendations were derived from the relationship between digital innovation and municipal service delivery,

the drivers of digital innovation and the barriers of digital innovation on municipal service delivery and the recommendations to enhance and promote digital innovation in Thulamela Local Municipality. Many respondent have expressed their views on the implications of digital innovation on municipal services. It was found that digital innovation assists in speeding up the processes of providing services to the communities. The following recommendations were derived from the study:

- It is recommended that the municipality should introduce new and improved ICT infrastructure and provision of funds for introduction of digital innovations. This will enhance and promote digital innovation in the Thulamela Local Municipality; the findings reveal that there is a need for the introduction of new and improved ICT infrastructure and provision of funds for introduction of digital innovations.
- It is recommended that there should be awards for employees who come up with innovative strategies that seek to improve municipal services. Incentives should be created for employees who look for innovative methods that can be implemented in the municipalities. This will encourage officials to adopt innovative strategies and encourage the municipalities to invest in digital innovations. This can be done by including digital innovations in the development plans of the municipality and the budgets.
- It is also recommended that the municipality should target skilful employees during recruitment to tackle the issue of lack of skills in the municipality. This will assist the municipality when training their employees because intense training will not be required as the employees would have some sort of skills.
- Also, it is recommended that officials should be provided with digital systems workshops and training. The employees would improve on the skills that they have already acquired.
- It is recommended that the municipality should employ the youth who have skills to remedy the problem of lack of skills and the problem of old officials who are not willing to learn. With the high use of ICT and the changing times, it would be easier for the employed youth to incorporate digital innovations in the municipal service delivery processes. It is further recommended that the youth should be included in the decisions and management of the municipality.

- It is also recommended that the municipality form a committee that will focus on the introduction of innovative strategies that will enhance digital innovation in the municipality. The committee will also be responsible for fundraising to support measures to improve the digital infrastructure. This will assist in addressing the challenge of the absence of support from the management on matters of digital innovation.
- It is recommended that the municipalities should be commanded by the legislature to embrace the use of digital innovations. This can be in the form of that there should be a framework that guides municipalities on the type of digital innovation to adopt so that they are included in the budgets. In turn, municipalities will be monitored and advised on strategies to adopt to improve the rate at which they embrace digital innovations in the provision of municipal service.

5.5 RECOMMENDATIONS FOR FURTHER STUDIES

This study, with particular reference to the Thulamela Local Municipality, explored the impact of digital innovation on municipal service delivery. It is recommended that future studies focus on a comparative analysis of the digital innovations used by multiple municipalities. This may include the focus on different digital innovation mechanisms that are used in municipalities to enhance municipal services. This will assist municipalities with adopting strategies that work and successful implementation of policies that will enable the adoption of digital innovation. Furthermore, studies should be conducted to explore whether the adoption of digital innovations in municipalities exacerbates social equity, for example, to investigate if the digitization of municipal services caters only to the youth and those skilled in technology use. This will assist municipalities in assessing

5.6 LIMITATIONS OF THE STUDY

Some challenges were encountered when conducting this research. Firstly, the challenge was the costs associated with data collection processes. The funder needed funds for transport, printing of documents and living expenses. The other challenge was receiving approval from the first municipality (Makhuduthamaga Local

Municipality) that the researcher had selected as the population of the study. This caused delays that affected the completion time of this study. The other challenge was that the majority of the employees of Thulamela Local Municipality refused to take part in the study. Hence, only 14 employees willingly agreed to take part in the study instead of the proposed sample size of 20.

5.7 CONCLUSION

The study investigated the impact of digital innovation on municipal service delivery, focusing on the Thulamela Local Municipality, Limpopo Province. The first chapter of the study gave the background of the study and the problem statement to outline the importance of conducting this study. The problem statement made it clear that municipalities still battle with providing municipal services, and it is for this reason that municipalities are forced to embrace digital innovations to address the backlogs and regain the trust of communities. The chapter also presented the aims of the study, which was to examine the impact of digital innovation as a tool to enhance municipal service delivery. The chapter also presented the main objectives of the study, the research questions, the significance of the study, the delimitation of the study, and the definition of key terms.

The second chapter focused on the literature review from the literature and the theoretical framework. The Diffusion of innovation theory was applied to the study as the theory underpinning it. The conceptual framework was outlined in this chapter to understand the concepts used in this study. The literature review focused on aspects such as the role of digital innovation in local government, the strategies implemented by the government to promote digital innovation in South Africa, digital innovation as a driver for the Fourth Industrial Revolution, drivers and challenges towards digital innovation in the public sector and the state of digital innovation in selected countries and South African provinces.

The third chapter outlined the research paradigm, research design, and methodology. This was done to guarantee adherence to suitable scientific procedures. The chapter also presented the chosen study area, sampling method, data analysis, and ethical considerations that the researcher adhered to when conducting the research. The study examined the impact of digital innovation on municipal service delivery using a

descriptive research methodology and a qualitative method approach. A qualitative approach was adopted in this study because it allowed the researcher to examine the drivers and challenges to digital innovation in municipal service delivery. The study's sample of respondents consisted of workers from the Thulamela Local municipality. Interviews were used to gather data, which was then narratively analysed.

The fourth chapter presented an analysis of the data collected from the Thulamela employees. The data was then presented in a manner that provided meaningful explanations. The findings revealed that digital innovation is crucial in enhancing municipal services. Therefore, the absence of innovation in municipalities can be linked to municipal service delivery backlogs that lead to community unrest. Furthermore, it was found that digital innovations in municipalities are adopted but at a slow and insufficient rate. More can still be done to improve the rate at which digital innovations are utilized. The findings also highlight that it is important for municipalities to include the adoption of digital innovations in their plans and improve collaborations with institutions that will assist upskill municipal employees. It was found that the drivers of digital innovations include policies and legislature, educational and training dispensation, change in the preferences of the people, and the development of new ICTs.

Chapter five dealt with the findings regarding the main objectives of the study and the discussion of the results. The chapter also covered the conclusion and recommendations were proposed to solve the problem that was investigated. It is recommended that municipalities introduce new and improved ICT infrastructure and provision of funds for the introduction of digital innovations. It is recommended that municipalities prioritize employing officials who have acquired relevant skills and provide proper training to those who need the training to ensure that they stay relevant to the changing times. It is further recommended that incentives, such as awards, should be created for employees who look for innovative methods that can be implemented in the municipalities. It is also recommended that the municipality forms a committee that will focus on the introduction of innovative strategies that will enhance digital innovation in the municipality.

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Annexure A: Research Approval Letter



University of Venda

OFFICE OF THE DVC: RESEARCH AND POSTGRADUATE STUDIES

TO : MR/MS K.M MASEMOLA
FACULTY OF MANAGEMENT, COMMERCE AND LAW

FROM: PROF. N.N FEZA
DVC: RESEARCH AND POSTGRADUATE STUDIES

DATE : 08 OCTOBER 2024

DECISIONS TAKEN BY UHDC OF 08th OCTOBER 2024

Application for approval of Masters Proposal Evaluation Report in the Faculty of Management, Commerce and Law: K.M Masemola (11640186)

Topic: "The impact of digital innovation on municipal service delivery: a case of Makhuduthamaga Local Municipality, Limpopo Province."

Supervisor	UNIVEN	Dr. P.H Munzhedzi
Co-Supervisor	UNIVEN	Mr. H.H Takalani

UHDC approved the Masters Proposal



PROF. N.N FEZA
DVC: RESEARCH AND POSTGRADUATE STUDIES

FMCL/24/PDN/11

Annexure B: Ethical Clearance Certificate



University of Venda
Creating Future Leaders

Directorate: Research and Innovation
Private Bag X5050, Thohoyandou, 0950,
South Africa
Tel: 015 962 8313 / 015 962 8504
Date: 22nd July 2024

Enquiries: Ms. Vanecia Khoza
Contacts: vanecia.khoza@univen.ac.za

Name of researcher/investigator:
Ms KM Masemola
Student No:
11640186

RE: Amendment Request

The Research Ethics Social Sciences Committee (RESSC) has approved amendments of your project as follows:

Project title: The impact of digital innovation on municipal service delivery: a case of Thulamela Local Municipality, Limpopo Province.

Supervisor: Dr PH Munzhedzi
Co-Supervisor: Mr HH Takalani

Ethical clearance no: FMCL/24/PDN/11/1206

Type: Masters Research

Risk: Minimal risk to humans, animals, or environment (Category 2)

Approval Period: June 2024 – June 2025

Nature of Amendments: To amend the topic necessitated by change of place of study. It was a case study of Makhuduthamaga Local Municipality and now it is the case study of Thulamela Local Municipality.

Old topic: The impact of digital innovation on municipality service delivery: a case of Makhuduthamaga Local Municipality, Limpopo Province.

New topic: The impact of digital innovation on municipal service delivery: a case of Thulamela Local Municipality, Limpopo Province.

Name of the RESSC Chairperson of the Committee: Prof TS Mashau

Signature 



Creating Future Leaders

www.univen.ac.za

Annexure C: Letter to respondents

Enquiry: Masemola KM

Cell: 072 786 2873

Email: kopue.mitchel@gmail.com

P O BOX 350

MASEMOLA

1060

29 MAY 2023

Dear Sir or Madam

I am Kopue Mitchel Masemola, a registered Master of Administration Student under the Department of Public and Development Administration at the University of Venda, School of Management Science. I am required to conduct research to complete my study. My research topic is the impact of digital innovation on municipal service delivery in South Africa, a case study **of Thulamela Local Municipality**.

I humbly request you to be part of the study by participating in my research by providing me with information regarding the above research topic. The information you provide will be solely used for the study.

Thank you in anticipation.

Yours Sincerely,

.....
MASEMOLA KM

Student number: 11640186

.....
DATE

Annexure D: Consent form

FACULTY OF MANAGEMENT COMMERCE AND LAW

Department of Public and Development Administration

Statement of Agreement to Participate in the Research Study:

In terms of the ethical requirements of the University of Venda, I invite you to complete this form as an indication of your permission to voluntarily participate in this study.

I _____, hereby confirm that I have been informed about the purpose, procedures, and activities of the study. I have also received, read, and understood the written information (Participant Letter of Information) regarding the study. I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report. In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher. I was given full opportunity to ask any questions and I understand that participants can withdraw from the study at any stage and time, without giving any reasons. I understand that significant new findings developed during this research, which may relate to my participation will be made available to me.

I therefore hereby freely **give/do not give** my consent to voluntarily take part in the study as outlined.

Full name of participant

Signature

Date

Time

.....

.....

.....

Full Name of Researcher

Signature:

Date:

Annexure E: Permission letter Thulamela Local Municipality



Department Of Corporate Services

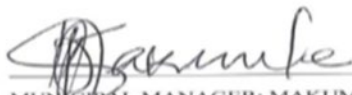
Private Bag X5066
Tlohozyandou
0950
Limpopo Province
Tel: 015 962 7500
Fax: 015 962 4020

Ref : 4/3/4/1
Enquiries : Mabasa N.H
Tel : 015 962 7514
Fax : 015 962 4020

To : Ms. Masemola KM
From : THULAMELA MUNICIPALITY
Date : 18 JULY 2024

Subject : REQUEST TO CONDUCT RESEARCH AT THULAMELA MUNICIPALITY

1. The above matter refers.
2. Kindly note that the permission to conduct research has been granted.
3. For more information please contact Human Resource Section.
4. Hoping that this will meet your favourable considerations.


MUNICIPAL MANAGER: MAKUMULE M.T.



THULAMELA
MUNICIPALITY

Annexure F: Research interview guide



THE IMPACT OF DIGITAL INNOVATION ON MUNICIPAL SERVICE DELIVERY: A CASE OF THULAMELA LOCAL MUNICIPALITY, LIMPOPO PROVINCE

This study is about the impact of digital innovation on municipal service delivery. I am requesting you to be part of the study by giving your perspective about the impact of digital innovation on municipal service delivery. Note that there is no right or wrong answer. Please put a (x) where you feel it is appropriate and answer the questions that follows:

Section A: Biographical details of respondents

1. Gender of respondent

Male	
Female	

2. Age of respondent

Less than 21 years	
22 to 30 years	
31 to 40 years	
41 to 50 years	
51 years and above	

3. Qualification of the respondent

Grade 11 and less	
Grade 12 (matric)	
Diploma/ degree	
Honours/ B Tech	
Masters/M Tech	
PhD	
Other	

4. position

--

Section B: The impact of digital innovation on municipal service delivery

In your view, what is the relationship between digital innovation and municipal service delivery?

.....

.....

.....

What is the status of digital innovation in Thulamela Local Municipality?

.....

.....

.....

what specific digital innovation have you observed or been involved in within your municipality's service delivery processes?

.....

.....

.....

Can you describe any collaborative efforts or partnerships that have been formed to support the implementation of digital innovations in municipal service delivery?

.....

.....

.....

How have the roles and responsibilities of municipal staff evolved with the adoption of digital innovations in service delivery processes?

.....

.....

.....

What is the impact of digital innovation on the roles and responsibilities of municipal staff?

.....

.....

.....

In what ways do you think digital innovations have influenced the accessibility of municipal services to residents?

.....

.....

.....

What are the drivers of digital innovation in municipalities?

.....
.....
.....

What are the challenges towards digital innovation in municipalities?

.....
.....
.....

What are the strategies that can be implemented to enhance digital innovation in municipal service delivery?

.....
.....
.....
.....
.....
.....

“Thank you for your participation”

Annexure G: Proof of editing

Editorial letter

This serves to confirm that I, Dr. TE Sikitime, attached to the University of Venda, Department of English Media Studies and Linguistics, have proofread a proposal titled: *The impact of digital innovation on municipal service delivery: a case of Thulamela Local Municipality, Limpopo Province*

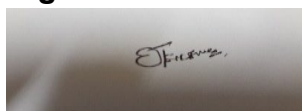
BY

KOPIE MITCHEL MASEMOLA

(11640186)

Editorial work focused mainly on technical precision and common errors relating to syntax, diction, word order, and formulation of ideas. Corrections and suggestions were made for the student to effect before submission.

Signature



Date 27 November /2024

Ext: 015 962 8262

Mobile: 0832561666

Email: Emmanuel.sikitime@univen.ac.za

BA (ed), BA (Hons) English, Univen, BA Communication Science UNISA, MA (SLS)
Stellenbosch University, PhD (English) Univen

Annexure H: Turnitin report



Digital Receipt

This receipt acknowledges that **Turnitin** received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author: Kopue Mitchel Masemola
Assignment title: The impact of digital innovation on municipal service deliver...
Submission title: Research document Masemola 11640186.docx
File name: Research_document_Masemola_11640186.docx
File size: 2.43M
Page count: 138
Word count: 40,491
Character count: 237,359
Submission date: 28-Nov-2024 07:49AM (UTC+0200)
Submission ID: 2502500409

The impact of digital innovation on municipal
service delivery: a case of Thulamela Local
Municipality, Limpopo Province

BY

KOPUE MITCHEL MASEMOLA
(11640186)

A PROPOSAL

SUBMITTED FOR THE DEGREE OF

MASTER OF ADMINISTRATION

IN THE

DEPARTMENT OF PUBLIC AND DEVELOPMENT ADMINISTRATION

FACULTY OF MANAGEMENT, COMMERCE AND LAW

UNIVERSITY OF VENDA

SUPERVISOR: PROF PH MUNDHLOU
CO-SUPERVISOR: DR IHT TAKALALI

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