FINAL REPORT

THE VIABILITY OF E-TECHNIQUES TOWARDS SERVICE DELIVERY IN THE LOCAL GOVERNMENT SECTOR

Submitted to

Local Government Sector Education and Training Authority

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LIST OF ACRONYMS

AI : Artificial Intelligence

AOEMA: Asia Oceania Electronic Marketplace Association

BRICS: Brazil, Russia, India, China and South Africa

CVOs : Community and voluntary organisations

DPSA : Department of Public Service and Administration

E : Electronic

ICT : Information and communications technology

IT : Information Technology

IOT : Internet of things

IRBM : Integrated Results-Based Management

ISMS : Information Security Management System

IT : Information Technology

LGIs : Local government institutions

MSP : Municipal service partnership

NDP : National Development Plan

NGOs : Non-Governmental Organisations

NIC : National Informatics Centre

OECD : Organization for Economic Co-operation and Development

PKI : Public Key Infrastructure

PPP : Public-private partnership

PSC : Public Service Commission

RSA : Republic of South Africa

SADe : Services and democracy

SDIPs : Service delivery improvement plans

SONA : State of the Nation Address

SPP : Sustainable public procurement

TSO : Third sector organisations

UK : United Kingdom

VR : Virtual Reality

UNDP : United Nations Development Programme

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EXECUTIVE SUMMARY

The delivery of goods and services to the citizenry by government by means of electronic and Internet-based methodologies is associated with efficiency and effectiveness while also ensuring economic use of scarce resources. Local Government as a sphere closer to its constituencies is therefore required to adopt e-service delivery as demanded by the Constitution of the Republic of South Africa, 1996 and its requirements are to be fulfilled. The advent of the Fourth Industrial Revolution necessitates that government institutions move away from the traditional and manual way of relating to the general public. E-service delivery, which is a relatively new concept in the South African context, needs to be viewed in the light of the umbrella concept of e-governance.

This Report deals with e-techniques related to service delivery in South African municipalities. Relevant findings in the literature are therefore divided into various parts with the aim of conceptualising, contextualising and unpacking concepts related to e-service delivery in local government. The concepts dealt with in the Report include government, e-government, e-governance, the digital divide and public-private partnerships. It is necessary to identify and explain these concepts in order to establish a common ground for discussion.

The policy and legislative framework underpinning e-service delivery is identified and explained. This part of the Report briefly discusses some of the policies and legislative frameworks relating to information and communications technology (ICT) and subsequently e-government and e-service delivery in South Africa. As the case is in the South African local government sphere, there is also a need to transform the policy dispensation, especially given the imminence of the Fourth Industrial Revolution and e-service delivery. This sphere includes the Public Service Act, 1994; State Information Technology Agency Act, 1998; Public Service Corporate Governance of Information and Communication Technology Policy Framework, 2012 and the Electronic Communications Amendment Act, 2014.

There are four pillars of e-governance that are critically important and relevant to South African municipalities given the geographic location for the majority of them. Such pillars are connectivity, knowledge, data content and capital. It is indicated that connectivity is required to connect the people to the services of the government. Further, there should be strong connectivity for effective e-governance to take place. One question is whether our municipalities have the capacity to raise the required capital to set up all the necessities for e-service delivery. This Report seeks to answer this and other questions.

Various types of e-governance approaches are identified and explained. These include a government-to-citizen e-government approach, government-to-business e-government approach, government-to-employee and government-to-government e-government approaches.

The Report also focuses on African and international experiences with e-service delivery. It does so by looking at an African perspective of e-service delivery, e-governance and e-service delivery experiences of a BRICS partner and international perspectives on e-service delivery. A cross-country comparative analysis research on e-government developments is essential for establishing international best practice in e-service delivery. It is costly to try to re-invent the wheel when there are countries who are already doing well.

From there, the Report provides empirical evidence of the viability of e-techniques or e-service delivery as it is commonly referred to. The Report then deals with the conclusions and recommendations of the study. These are:

- Research established that citizens do not receive the necessary lessons from their municipality about how e-services work, and the municipality does not try to obtain feedback from citizens on whether e-services are working better than a manual version of service delivery. It is recommended that municipalities should provide lessons to community members on how they can access municipal services online. Mass media can be used in this regard.
- Most of the research respondents (about 53%) indicated that their municipalities have no audit finding on ICT. It must therefore, be recommended that an ICT policy in municipal governance needs to be audited annually or frequently in order to keep up-to-date with the demands of community members and other stakeholders.
- Research established that most municipalities have challenges in information security. This is supported by De Lange, Von Solms and Gerber (2015) who argue that the general management of the security aspects of information and related technologies is generally not addressed properly in most South African municipalities. It is recommended that an effective municipal information security policy and good supporting policies, as two of the most crucial aspects of a good ISMS, should be developed and implemented by all municipalities. These policies should be directives that come from the municipal council; and a proper monitoring process should accompany these policies.

- Research findings show that municipalities are understaffed with personnel responsible for ICT matters. Therefore, municipalities should be capacitated with experienced and qualified people to enable them to provide e-services effectively and efficiently to community members.
- The analysis indicated that many of the respondents were male (70.6%) compared to females (29.4%) (n=5). It is recommended that the issue of gender be addressed in terms of the Employment Equity Act, 1998 (Act 55 of 1998) and relevant municipal laws. The idea is to redress the imbalances of the past in terms of gender, especially because women are the majority in most institutions in our country.
- Research reveals that some municipalities have challenges in relation to resources, especially finance. It can therefore, be recommended that municipalities budget for adequate resources, especially financial resources, to ensure effective and efficient e-service delivery.
- Research has established that some municipalities do not have proper server rooms. It can therefore, be recommended that municipalities, through the ICT manager, take reasonable steps to protect all ICT hardware from natural and man-made disasters to avoid loss and to ensure reliable ICT service delivery. ICT hardware under the control of the ICT function should be hosted in a server room or lockable cabinet. Server rooms should be of solid construction and locked at all times. The ICT department should retain an access control list for the server room. Access should be reviewed quarterly by the ICT Manager. All server rooms should be equipped with air-conditioning and fire detection and suppression mechanisms.

1. BACKGROUND

Since the late 1990s, all spheres of government around the world have been developing e-government systems. Public service delivery occurs at all spheres of government, but citizen-orientated services are mainly supplied by the local government. Municipalities are the closest form of governmental structure through which citizens feel the direct impact of government (Mawela, Ochara & Twinomurinzi, 2017). The majority of e-government services are progressively executed at the municipal sphere rather than at the national or provincial sphere of government. The introduction of electronic systems in the administrative and organisational aspects of municipal work is imperative for the effective and efficient delivery of public services. The knowledge about local context, the existing environment, opportunities and challenges for a specific municipality can develop a realistic e-government (Dzhusupova et al., 2010). A municipality is an essential institution in the local sphere of government, and must carry out critical functions that reach all members of the community in its area of jurisdiction.

Murenzi and Olivier (2017) argue that the provision of government services and information to members of the public has traditionally been through face-to-face interaction and the user of government services was obliged to physically visit government offices. Today, however, developments in ICT have brought about many changes in the way governments worldwide are able to provide government services and information to citizens. Many countries in Africa, including South Africa and Rwanda, have now adopted the use of e-government as one of the main delivery channels for public services and information.

There is a demand for governments to be more transparent and deliver services more rapidly and efficiently. There is also a willingness by governments to listen to their citizens and improve their service delivery. Many governments see e-government as the solution. E-government refers to the use of information and communication technologies in public administration. One of the manifestations of e-government is e-service delivery, which only occurs at local government level (Rodriguez-Bolivar, 2014). In this study e-government and e-service delivery will be used interchangeably.

Effective service delivery depends on good governance, which includes accountability, effective rule of law, transparency, participation and responsiveness. Good local governance leads to developmental local governance, which implies a government that works with various stakeholders to establish sustainable ways to improve general socio-economic wellbeing to improve the quality of life for its communities (Kemp & Vyas-Doorgapersad, 2020).

2. PROBLEM STATEMENT AND RESEARCH OBJECTIVES

According to Murenzi and Olivier (2017), there are increasingly violent community protests throughout the country because of failure to deliver services or poor service delivery; this remains a serious concern for government in South Africa. The total failure or partial failure to provide quality public services by municipalities in South Africa is often and principally associated with a lack or shortage of skills in municipalities. However, the lack or poor utilisation of e-government in the majority of municipalities might be another major cause of poor service delivery and the reason for failing to give the best possible value for money. In addition, as more government information and services are moved online, there is an increasing concern that a significant portion of the population, especially the poor and rural population, will be shut off from government information and services and therefore shut off from opportunities of employment, tenders, bursaries, health care, education and other services. This will probably worsen the existing economic inequalities and the digital divide, and will generate more community protests in the future.

With the above problem statement in mind, the research objectives of this study are to:

- develop a concept document on e-service delivery in the local government sector that should also entail stakeholders in the ICT sector
- explore the impact of e-service delivery in the local government sector
- examine the challenges faced by the local government sector in the implementation of e-service delivery
- unpack the skills essential in the carrying out of effective and efficient e-service delivery in South African municipalities
- propose the best model of e-service delivery, tapping into international and regional experiences
- prepare a research article to be published by the Local Government Sector Education & Training Authority in a recognised journal or magazine that has a national footprint on local government matters.

3. PROJECT DELIVERABLES

The project will be completed on or before 31 March 2021 in line with the following deliverables:

- Progress report based on an inception report, outlining preliminary findings of a desk-top review of available data and analysis related to this research project, with full bibliography
- A final research report corresponding with the research objectives (Arial 11 with 1.5-line spacing), incorporating feedback from the Local Government SETA. This report includes an executive summary and a full bibliography. In addition to this, a research article on this research project should be submitted, together with a final research report.

4. RESEARCH METHODOLOGY

The aim of this exploratory research was to determine the viability of e-techniques towards service delivery in the local government sector. We will present the procedure and describe how the data was collected.

4.1 Research perspective

In conducting this research, we made use of a structured questionnaire. This was in line with Thakur and Singh's (2013) statement that it is essential to make use of a structured research methodology to ensure the research has integrity (i.e. that it is reliable, valid and can be "reproduced"). Leedy and Ormond (in Thakur & Singh, 2013) argue that a research methodology is an operational framework in which the facts are placed so that their meaning may be seen more clearly.

A questionnaire was drafted after an extensive discussion with ICT specialists in the local government sector. We used the services of three experienced researchers to distribute the questionnaires to ICT managers or corporate managers in various municipalities in both inland and coastal areas. About 100 questionnaires were distributed through e-mails. Follow-up discussions were made through telephones/cell phones. Seventeen completed questionnaires were returned. The questionnaires were received from municipalities in the Mpumalanga, Limpopo, Free State, Western Cape, Northern Cape and KwaZulu-Natal provinces.

The choice of research approach is not only dependent on a researcher's epistemological position and pre-knowledge, but should also be influenced by the research question that will be set out (Yin, 1994). Different ways to address the matter while conducting the research exist. These can be divided into two main categories. First is deductive versus inductive and secondly qualitative or quantitative methods. The qualitative and quantitative methods refer to ways to treat and analyse the selected data. Induction is usually described as moving from

the specific to the general, while deduction begins with the general and ends with the specific (Burney, 2008).

According to Berg and Howard (2012), qualitative research is characterised as meanings, a concept, a definition, metaphors, symbols and a description of things. This definition clearly shows that qualitative research contains all the important tools that can evoke recall, which aids problem-solving. Qualitative data instruments such as observation, open-ended questions, an in-depth interview (audio or video), and field notes are used to collect data from participants in their natural settings.

The methods employed in data collection give a full description of the research with respect to the participants involved. De Vaus (2014) and Leedy and Ormrod (2014) argue that the participants' observation and the focused group nature of the qualitative research approach create wider understanding of behaviour. Hence, a qualitative research approach provides abundant data about real life people and situations.

We shall use the qualitative and partially quantitative research approach due to the fact that the nature of the problem is exploratory.

4.2 Limitations of the study

There are several weaknesses linked to this study. These include the following:
First limitation: the study is exploratory in nature and therefore the findings are indicative. Thakur and Singh (2013) are of the opinion that it is not the intention of exploratory research of this nature to be generalised.

Second limitation: owing to the objectives of the study, we were not able to interview all the stakeholders or beneficiaries of e-service delivery (such as citizens and service providers) and therefore were unable to determine the perceptions of these stakeholders about whether e-service delivery is effective.

Third limitation: because of the Covid-19 pandemic, most of the research respondents informed us that they preferred to receive the questionnaires by e-mail rather than a personal visit. This disadvantaged the study as we were unable to follow up on some of their responses.

5. SIGNIFICANCE OF THE STUDY

According to Naidoo and Kuye (2003), electronic technology will be a major force driving the South African public sector over the next few decades. Environmental pressures and business drivers necessitate transformation of the electronic model of service delivery. In this regard, the impact of the electronic model has confronted governments with an "adapt or die" scenario. Electronic technology has created a new market-place in which governments must operate. It has therefore become a major issue on policy agendas around the world and market-driven principles are now widely accepted in public sectors. For South Africa, to fall behind in technology and innovation would increase the gap between it and wealthier and more advanced economies. The world of electronic technology demands that the South African government rethink its role as catalyst for economic and social growth (Liebenberg, 2000).

Nevertheless, the government recognises the significance of the Internet for future social and economic success in South Africa as well as for improving service delivery (Naidoo & Kuye, 2003). To this end, various initiatives are being undertaken by government to promote the electronic model of service delivery in the Republic of South Africa. However, the key concern is whether government has the capacity to co-ordinate and understand the various issues and initiatives, especially in the area of the infrastructure that must underlie the development of the electronic model (Green Paper on E- Commerce, 2000).

According to Grabner Omahna IT Consulting (2019):

- governing is too costly and expensive: e-government has effective solutions for this problem as it could reduce the related costs and enhance government's effectiveness in spending money
- governing is inconvenient: e-government could improve and encourage the rate of participating and using of the public services. It could also receive feedback from people, and consequently enhance accountability for public officials
- governments are not transparent: e-government can satisfy the transparency expectations of their citizens and develop a better and stronger relationship with people and the private sector
- e-government is a common way of conducting government across the globe: more implementing of e-government means ease of use of public services for citizens, enhancing public service delivery, simplifying compliance of governmental laws for citizens, improving citizen engagement and public trust, decreasing fraud and improving cost efficiency for the government

- e-government could result in cost savings to people and companies: therefore, it is not surprising that policy makers and executives in the world are looking to embrace e-government, including the most developed to the least developed. E-government raises the standards of living and becomes a vital tool for governments and their citizens.

From the above expositions it can be argued that e-government is not merely a symptom of the digital revolution, but generates true advantages for governments, citizens, the private sector and all other stakeholders of government.

6. DEFINITION OF TERMS

In this section, the following concepts will be defined to establish a common ground for discussion.

6.1 Digital divide

The digital divide is defined by Chatfield and Alhujran (2009) as the gap between persons who have physical access to digital ICT, and those who do not, beyond the access to existing ICT infrastructure. The divide includes socio-economic (rich/poor); gender; geographical (urban/rural); racial (dominant majority/minority); and cultural (positive/negative) attitudes toward the Internet, its Western roots, and its cultural value implications.

6.2 E-government

E-government is the use of information and communication technology (ICT) to promote more efficient and effective government and facilitate more accessible governments (Abdelsalam, Reddick, ElKadi & Gama, 2012). Rucinsca and Fecko (2020) define e-government as an entire system that incorporates different services, of which e-services are only a partial element, together with e-management.

The World Bank (2015) is of the opinion that:

> *E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These*

technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.

In line with the above expositions, e-government refers to an Internet way of delivering goods and services across all government spheres and business (Palvia & Sharma, nd). Especially with information, e-government ensures a timely and better delivery of services to citizens. E-government uses ICT and other platforms to support government operations, public participation and other activities as they relate to service delivery. E-government ensures efficiency and effectiveness, facilitates increased access to government services, and ensures accountability to citizens (Apleni & Smuts, 2020). When government utilises ICT with the aim of improving service delivery, such is known as e-governance.

6.3 Governance

Wilson and Guya (nd) are of the opinion that governance can be unpacked through the following four dimensions:

- The capability of the state: the capacity to assess, plan, develop and implement innovative programmes to meet the needs of the local people
- Cooperative governance and the all-of-society approach: the cooperation between the three spheres of government and collaborative problem solving between local government and the actors that shape cities (communities, the public and the private sectors, and learning institutions)
- The political-administrative interface: the interactions between municipal administration and its councillors
- Public integrity: the set of ethical values and standards expected of public officials.

According to Mathebula and Munzhedzi (2017), governance refers to the exercise of political, administrative and legal power and authority in the management of public affairs. These authors argue that governance can be interpreted to mean the discharge of public affairs for the attainment of a ‘good cause’ towards the citizenry. Governance is also defined as an activity of governing for the purposes of ensuring efficient, effective and economic delivery of

services and the proper functioning of the state (Mathebula, 2017). However, governance is either bad or good.

6.4 E-governance

The United Nations Development Programme (UNDP) (Mawela, et al., 2017) defines e-governance as “the use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people”.

6.5 Smart governance

In the *Smart Cities Paper Series: Smart Governance in South African Cities*, Wilson and Guya (nd) are of the opinion that smart governance is one of the multiple components of a smart city, involving the use of innovation combined with digital technologies to improve government service delivery and societal inclusion. This paper series defines smart governance as the ability of government to make better decisions through the combination of ICT-based tools and collaborative governance for the purpose of achieving the developmental mandates.

6.6 Electronic service delivery

E-service delivery, also termed e-services, is defined by Kvasnicovaa, Kremenovaa and Fabusa (2016) as provision of non-material services by means of information and communication devices to recipients, resulting in their consumption of service or acquisition of property. Such services involve minimal human intervention and do not have viability in the absence of information technology.

According to Siddique (2016), e-service delivery refers to using the Internet as the main channel to improve e-administration, e-services and e-citizen initiatives. E-service delivery refers to the organisation of services in various fields in electronic format, organised with the application of ICT, without loss of time and transparency (Alguliyev, Yusifov & Gurbanli, 2018). Foko, Phiri and Mahwai (2014) regard e-service delivery as the transparent use of ICTs to facilitate the delivery of services provided by both business and governments to members of the public.

6.7 Public-private Partnerships

Sidorenko and Khisamova (2019) define public-private partnerships as types of partnerships, business representatives in implementing projects, from operating facilities and providing services on behalf of the state, to flexible methods of financing these services.

7. THE PURPOSE AND BENEFITS OF E-SERVICE DELIVERY

According to Foko, Phiri and Mahwai (2014), the purpose of e-service delivery is to use ICT to transform the way services are delivered, allowing spaces for formations of collaborations among key stakeholders. This helps local government to overcome the challenges of poor service delivery. E-government development very often aims to improve public service delivery capability, as well as public administration governance, transparency, and accountability through the development of e-government service delivery capability (Chatfield & Alhujran, 2009). ICT has become a critical component of municipalities in many developed countries around the world (Waller & Genius, 2015).

Mohamed and Xavier (2016) see many benefits of e-government in public administration. These include reduction of the wide gap in public interaction with the government and shortening the application process for varied licences, permits and approvals. With the installation of intelligent and systematic electronic databases at agencies, e-government makes government administration more cost-effective and public service delivery more efficient and effective, thus e-government is an essential reform for government. This is because e-government can greatly simplify and speed up government activities and service delivery. Finally, e-government can enhance the efficiency and effectiveness of the public-service delivery mechanism. Such benefits are especially so in the local sphere of government.

Alkhaleefah, Alkhaleefah, Venkatraman and Alazab (2010) cite the following benefits of e-government:

- citizen empowerment: e-government provides citizens with services and alternative modes of access to information and communication such as the Internet, call centres, fax, and kiosks
- efficiency and effectiveness gains: e-government allows for transformation of the public sector, which in turn changes government's business conduct by decreasing inefficiency and increasing effectiveness

- transparency and accountability: e-government allows the government to increase transparency with citizens by giving them access to information about government rules and policies. This creates an environment where citizens can hold government accountable for their actions
- improving quality of service delivery: placing government services online allows government and citizens to communicate and deliver certain services around the clock and with minimal time and money expended.

According to Amagoh (2016), the benefits of e-government include increased transparency and accountability, easy access to government information, improved efficiency, increased economic activity and improved democracy.

Asogwa's (2013) study demonstrated the ways in which various e-initiatives have transformed traditional administrative systems and practices, notwithstanding the nation's limited overall e-development. It also shows how e-innovations have helped tackle some complex challenges, thereby adding to convenience and benefits for service users. A major conclusion of the study is that although e-government is yet to make a breakthrough in governance and service delivery, the wheels of change have been set in motion.

According to Alshehri and Drew (undated), e-government allows people to access available government information at any time of the day. In addition, e-government will reduce costs and levels of organisational processes by streamlining and re-organising operating procedures, improve the performance of government agencies, and deliver effective and efficient public service to customers. It has great benefits regarding economising and improving of government's service operations, including efficiency and reduced transactional costs, and increases the transparency and services for citizens. Other benefits are that e-government reduces customer and institution time, effort and costs. It improves service delivery and citizens' satisfaction, increases users' ICT skills, Internet knowledge and computer usage, and the creation of new business and work opportunities.

E-governments result in less corruption, increased transparency, greater convenience, revenue growth and cost reduction. Other benefits include enhanced government efficiency, effectiveness and public service delivery, promotion of good governance, enhanced democracy and it has wider implications for growth and development of developing countries (Waller & Genius, 2015).

The study by Otieno and Omwenga (2016) shows that using e-government can change citizens' perception of poor public service, which results in gaining public trust and confidence through putting communities at the heart of public service initiatives. Their study identified the following benefits of e-government: e-service is a new way of promoting innovative, efficient, cost-effective and more transparent ways of serving the public. Benefits to the business and citizens include the creation of new business opportunities, citizen satisfaction, transparency in government, cost and time saving, simplified procedures, and improved accuracy, accessibility and institutional management.

Adjei-Bamfo, Maloreh-Nyamekye and Ahenkan's (2019) systematic literature review study found that government deployment of electronic and Internet tools promotes sustainable public procurement (SPP) towards the agenda of sustainable development.

A study was conducted by Siddique (2016) to explore the possibility of developing countries realising an e-government vision. The results reveal that although some countries have limited e-development, various e-initiatives have developed traditional administrative systems and practices. The study also shows that innovation has helped these countries tackle some complex challenges, thereby adding to convenience and benefits for service users. Their study demonstrates the ways in which different e-initiatives have transformed traditional administrative systems and practices. It also shows how innovations have helped in tackling complex challenges, adding to convenience for users of services.

According to Rucinsca and Fecko (2020), citizens and entrepreneurs benefited mainly from the 24/7 availability of the services since a submission can be made from any place and at any time, saving time with the reduction of physical visits to the local municipal office. Municipalities benefit from reduced overall administrative procedures and as a means for their own inter-organisational effectiveness. Municipalities benefit from the availability of a software solution, without having to deal with its development, administration and management. Municipalities also receive technical support from the provider, through a call centre.

8. POLICY AND LEGISLATIVE FRAMEWORKS UNDERPINNING E-SERVICE DELIVERY

There are various reforms that took place during the advance of the democratic dispensation in South Africa. Some of these reforms were economic, social and political. The ICT sector also needed some form of transformation that seeks to allow for efficient delivery of services. This part of the Report outlines and briefly discusses some of the policies and legislative frameworks as they relate to ICT and subsequently e-government and e-service delivery. As

the case refers to the South African local government sphere, there would also be a need to transform the policy dispensation, especially given the imminence of the Fourth Industrial Revolution and e-service delivery.

Odogwu (2014) is of the view that policy frameworks in this new wave referred to as e-government and service delivery are essential for the following reasons:

- regulation creates, limits and constrains a right
- a regulatory framework prevents abuse of a system
- it leads to consistency of behavioural patterns of both service providers and service users
- through regulations, responsibilities are allocated while duties are created or limited
- it enables government to set a standard that will benefit service providers and consumers
- regulatory frameworks promote order and control over service providers and users of services with regard to using the system.

Below are some of the policies and legislative frameworks that can assist in proper implementation of e-service delivery.

8.1 The Public Service Act, 1994 (Proclamation 103 of 1994)

The Public Service Act, 1994 defines e-government as the use of information and communications technologies in the public service to improve its internal functioning and to render services to members of the public. Section 3(1)(g) of the Act places an onus on the Minister of Public Service and Administration to establish norms and standards in relation to e-government. This is so as the Act recognises the need for e-government's potential to augment the delivery of services to members of the public. Given the fact that municipalities are not necessarily within the ambit of the Act, it lays a base for all public sector institutions to work towards the realisation and implementation of e-service delivery and e-governance.

8.2 Public Service Corporate Governance of Information and Communication Technology Policy Framework, 2012

The purpose of information and communication technology (ICT) is to enable the Public Service in its quest for service delivery. This is the position and the aim of e-service delivery

and e-governance, which are primarily aimed at augmenting service delivery and improving relations between municipalities and the general citizenry. This Policy Framework for the Corporate Governance of ICT is applicable to public administration in every sphere of government, organs of state and public enterprises as defined in section 195 of the Constitution, 1996. Section 195 of the Constitution, 1996 provides for values and principles of public administration. This Framework applies to local government as it does to other spheres of government and all other organs of State. The purpose of ICT is to serve as an enabler of public service delivery through, inter alia, achieving stakeholder value and ICT key focus areas. When the Corporate Governance of ICT Policy Framework, 2012 is effectively implemented and maintained, the following benefits are realised:

- The Public Service is positioned to improve delivery of the 12 strategic outcomes
- Improved achievement of Public Service-wide and departmental strategic goals
- Improved effective public service delivery through ICT-enabled access to government information and services
- Improved ICT enablement of business
- Improved delivery of ICT service quality
- Improved stakeholder communication
- Continuous improvement of business and ICT alignment
- Improved trust between ICT, businesses and citizens
- Lower costs
- Increased alignment of investment towards strategic goals
- Improved return on ICT-enabled investment
- ICT risks managed in line with the priorities and appetite of the Public Service and the department
- Appropriate security measures to protect the departmental and employee information
- Improved management of business-related ICT projects
- Improved management of information as it is managed on the same level as other resources, such as people, finance and material in the Public Service
- ICT pro-actively recognises opportunities and guides departments and the Public Service in timeous adoption of appropriate technology
- Improved ICT ability to learn and agility to adapt to changing circumstances
- ICT executed in line with legislative and regulatory requirements.

8.3 Public Service Regulations (2001) as amended

The Public Service Regulations (2001) as amended are usually issued in instances where government lacks clear policy guidelines to deal with a certain matter. It serves to complement and even give clearer details on regulations that already exist with Acts of Parliament. This Regulation provides for responsibilities of departmental heads in developing electronic communication and operational plans for ICT implementation in service delivery. This is in line with the provisions of the Public Service Act, 1994. However, the difference is that the latter places the onus on the responsible Minister to ensure the implementation of e-techniques for the improved delivery of e-services.

8.4 State Information Technology Agency Act, 1998

The State Information Technology Agency Act, 1998 is the authority for government ICT services. It gives the agency the responsibility of providing secure wide area networks that enable interdepartmental interactions, and interactions with citizens as well as businesses. Furthermore, the Act provides for the establishment of a State institution that carries the mandate of ensuring the secure management of State electronic information. It is for this and other reasons that this Act was put in place in respect of e-government and e-service delivery in the RSA.

8.5 Electronic Communications and Transactions Act, 2002

The above Act was enacted to facilitate and regulate electronic communications and transactions, develop a national e-government strategy for South Africa, and to promote access for everyone to electronic communication and transactions. Furthermore, it makes provisions for making and receiving payments electronically, as well as the issuing of licences or permits electronically. It also makes provision for the development of human resources in electronic transactions as well as preventing the misuse of information systems by users. The Act encourages the use of electronic means to give services to the citizenry. This is obviously an Act that was promulgated to facilitate the change from a manual way of doing things to e-service provision.

8.6 Electronic Communications Amendment Act, 2014

The above Act provides for the establishment by the Minister of Communication of an advisory council that advises the Minister on development and implementation of broadband policy. It

also sets further conditions for the provision of Internet services to schools and other social services institutions at a discounted rate.

8.7 Minimum Information Security Standards

These standards prescribe information security measures and how they should be applied with respect to classified documents. It replaces the previous guidelines for the protection of classified information. The security standards provide guidelines on who has access to what information and on the proper transmission and storage of classified documents. They also give clarity on the management of documents stored on computers, and finish with a full chapter on information security breaches.

9. FOUR PILLARS OF E-GOVERNANCE AND E-SERVICE DELIVERY

There are four pillars of e-governance. However, this is not to suggest that these listed and discussed below are the only pillars. The four pillars below are critical and relevant to South African municipalities given their geographic location. Such pillars are connectivity, knowledge, data content and capital (Singh, 2012).

9.1 Connectivity

Connectivity is required to connect the people to the services of the government. There should be strong connectivity for an effective e-governance (Mawela et al., 2017). Given connectivity challenges in rural areas of South Africa, connectivity as one of the major pillars of e-governance, has the potential to present major challenges, particularly in relation to e-service delivery. This means that citizens who are not properly connected will be unable to request and receive services from their respective municipalities. For example, amid the Covid-19 pandemic, the majority of services are conducted virtually. Doing things virtually presents many advantages including cost reduction, but it becomes problematic in instances of poor connectivity (Baquero-Hernandez, 2012). Therefore, municipalities who aim to accelerate services through electronic delivery need to invest in and ensure consistent connectivity.

9.2 Knowledge

Here knowledge refers to IT knowledge. Government should employ skilful engineers who can handle e-governance and e-service delivery in an efficient and effective way (Kanyemba,

2017). These engineers will also handle all kinds of faults that may occur during the working of e-governance. South Africa, especially in the public sector, is confronted with the challenge of a lack of critical skills (Fourie & Poggenpoel, 2017). This is also the case in relation to ICT practitioners. With this in mind, it becomes of paramount importance that practitioners with knowledge in the ICT sector are engaged and involved if municipalities are to enhance the delivery of basic services to the citizenry. Knowledge in this context, however, must also extend to the service users. This is so as services delivered by municipalities electronically need to reach the right target who need to have the full understanding of all systems put in place.

9.3 Data content

Data sharing refers to any kind of knowledge or information over the Internet (Mu, 2018). This implies that there must be a setting up of a database in each South African municipality. This database should have data content related to government services. Data contents of such databases must be transparent, accessible and user-friendly. Local government or municipalities have the tough task ahead of ensuring that all services, including basic services, be included in such databases. The Constitution of the Republic of South Africa (1996) provides for the mandate of municipalities, objects and sets of services as dictated by schedules found within it. This strongly relates to the pillar of ICT knowledge where experts are needed to build up content if municipalities are to move to e-service delivery.

9.4 Capital

Capital can be provided by public or private partnerships. It refers to money used by government to provide their services or to that sector of the economy based on its operation (Yadav & Singh, 2012). One question that needs to be posed is whether our municipalities have the capacity to raise the required capital to set up all the necessities as demanded for e-service delivery. This is contradictory to the notion that the majority of South African municipalities, especially those found in rural areas, are unable to raise their own revenue. Setting up ICT platforms for the delivery of e-services will require huge investments. Capital also includes infrastructure not necessarily for e-service delivery but that of accessing and receiving such services. It is also noteworthy that e-service delivery by South African municipalities demands investment in encouraging of desired skills for efficient and effective provision of services.

10. MEASURES TO BE CONSIDERED BEFORE OPTING FOR E-GOVERNANCE

According to Broome (2015), there is a detailed list of criteria and factors that are to be considered before opting for e-governance and e-service delivery. Such considerations are to:

- improve e-readiness in aspects of e-governance that include human resources, budgeting resources, inter/intra departmental communication flows, society's readiness
- invest in telecommunication infrastructure
- increase the Internet connectivity speed
- capacitate governmental human resources
- budget for resources
- create an e-business atmosphere that includes a legal framework and security of information
- start with a simple approach and as with the development of infrastructure and acceptance of e-governance among the various entities, functions can be added in stages
- involve top leadership
- promote awareness in the public arena of the importance and potential of e-governance
- encourage and support all departments
- maintain consistent implementation
- monitor assessment
- ensure security
- encourage the private sector
- start with planning locally, but keep the global user community in mind
- involve stakeholders such as high-tech companies, software houses and the banking sector
- adopt international standards and wherever possible minimise customisation thereby reducing the risk of software and compatibility problems.

It is necessary to take the above measures into account to ensure the efficiency and effectiveness of e-governance in municipalities in South Africa.

11. TYPES OF E-GOVERNMENT APPROACHES

Various types of e-government approaches exist. These types are identified and discussed in the paragraphs that follow.

11.1 Government-to-citizen e-government approach

The government-to-citizen e-government approach focuses on making information accessible to citizens online. This is referred to as a citizen-centric e-government when governments take further steps to provide online services organised around citizen needs (Munkuli, 2015). Many early designs of e-government websites organised the content, particularly the hyperlinks to government services, around the pre-existing structure of the ministry and its bureaucratic procedures (International Telecommunications Union, 2008). This confused citizens.

11.2 Government-to-business e-government approach

The government-to-business e-government approach focuses on strategies using ICTs to facilitate government interactions with the private sector to procure goods and services and to coordinate transactions from private companies (International Telecommunications Union, 2008). One such approach is known as electronic procurement (e-procurement). Because of the large number of purchases that governments make from the private sector, there is a need to develop faster and more cost-effective routines to handle the typical procedures for procurement. The typical tasks include material planning, sourcing, purchasing and contract management. E-procurement systems streamline the process of purchasing goods and services from the private sector through ICTs. They provide electronic catalogues or market places to streamline online ordering and payment, announce calls for tenders through electronic tendering solutions, and support online bidding (Moon, 2002).

11.3 Government-to-employee and government-to-government e-government approaches

A government-to-employee e-government approach focuses on relationships within government for employees to coordinate internal operations and improve the internal efficiency of business processes (Mawela, Ochara & Twinomurinzi, 2017). Very closely related, government-to-government e-government focuses on providing services to governments through intergovernmental relations. This includes activities to coordinate

stakeholders from the national, provincial, and local government in the case of a humanitarian or crisis response (Munkuli, 2015).

12. AFRICAN AND INTERNATIONAL EXPERIENCES OF E-SERVICE DELIVERY

E-governance as a new approach paradigm in Public Administration is confronted with many challenges in Africa. This is worsened by high numbers of illiteracy across the majority of African countries. The Global E-Government Readiness Report (2005) conducted by the United Nations reveals that achieving e-government in Africa is difficult because the continent has a poor telecommunication infrastructure and human development capacity. This makes it clear that Africa has a long way to go in building a successful base for e-governance in general and e-service delivery in particular. For e-governance to thrive and achieve service delivery goals, ICT infrastructure must be developed and maintained (Mu, 2018). Such infrastructures include phones, computers and Internet satellites.

12.1 An African perspective on e-service delivery

This part of the Report looks at the e-governance and e-service delivery approaches of various African countries with a view to identifying the best approach.

12.1.1 Nigeria

The Nigerian government in 2001 announced and declared ICT as a policy of national importance. This came after the realisation that government can only operate efficiently and properly with the adoption of electronic means to deliver services. This subsequently led to the enactment of the National Information Technology Development Act, 2001. It must, however, be taken into cognisance that e-service delivery mechanisms are different across all spheres of government, including state organs and agencies (Obiageli et al., 2020). E-governance plans in the Nigerian context are taken seriously to the extent that a Ministry of Communications Technology was established with the purpose of streamlining national plans in relation to ICT. This is not the case in the majority of African countries (South Africa included), and other developing economies globally.

The Nigerian National ICT Draft Policy (2012) was enacted by the Nigerian legislature with the aim of facilitating the implementation of e-governance initiatives; develop frameworks and guidelines for the development and enhancement of ICT in government; develop and

implement ICT training programs for public sector employees and coordinate the integration of e-governance network infrastructure and services.

Nweke (2007) is of the view that governance and service delivery based on ICT is likely to confer the following opportunities and benefits to the Nigerian civil service:

- It enables the public sector to strengthen good governance
- It creates a public service that is transparent and accountable
- It promotes a public sector that is productive and delivers maximum value for money for the taxpayers
- There is less time used standing in queues
- There is a reduction in errors.

According to Asogwa (2013), Nigeria has set up an e-government initiative, a National E-government Strategy for using ICT infrastructure to enhance public services. The expectation was that the strategy would enable the government to render efficiencies in the public sector, ensure productivity and economic growth, foster national competitiveness and lead to the attainment of the vision. The e-services envisaged did not seem to have much impact on public service delivery. The study found that e-government would achieve the following: faster access to government information, lower administrative costs, increased transparency in government ministries, and reduction in bribery and corruption. These opportunities are, however, threatened by low bandwidth and Internet penetration, inadequate ICT infrastructure and technicians, incessant power outages and technological obsolescence. Amagoh's (2016) study suggests that for e-government to succeed, the Nigerian government should address an unreliable electricity supply.

12.1.2 Burkina Faso

The Aden (Anshan, 2011) project was set up by the French Ministry of Foreign Affairs to help improve access to digital communications in certain African countries, including Burkina Faso. The aim was to establish and maintain access to the Internet and create local content. This project was established in collaboration with the government and other private stakeholders. This has become a trend whereby public-private partnerships (PPPs) are used as a new tool for delivering projects. The project on e-governance also supports disenclavement of communities in target regions (Fraser-Moleketi & Senghor, 2011). This is to ensure and encourage greater integration and public participation.

Mathebula (2015) is of the view that public participation is a powerful democratic process that has the potential to enhance effective and accountable service delivery. This is at the core of e-service delivery where transparency and good governance are key motivators. In accordance with Burkina Faso's Internet strategy, sixteen ADEN centres have been set up (Fraser-Moleketi & Senghor, 2011). Although their usefulness in aiding greater social integration is effective on the ground, they face several technological, financial and management challenges that threaten their survival just as with other e-governance initiatives on the African continent.

The Burkina Faso Government has since engaged in a reform of the public contracts sector (Harsch, 2016). This is because corruption in the public sector is mostly rampant in contracts entered into between government and private individuals and companies. The reforms have since resulted in the launching of a portal site for public contracts with the aim of making tenders available to the public and boosting transparency. However, many government processes are still carried out using printed material. This presents challenges according to Fraser-Moleketi and Senghor (2011) such as:

- a high number of agents still suspicious of digital documents
- the lack of use of ICTs by a large number of economic operators
- limitations in the government's computer systems.

12.1.3 Zimbabwe

E-government is not a new phenomenon in Zimbabwe. It is said to have started as early as 1972 when the Central Computing Services was created (COMESA, 2013). The adoption of the Integrated Results Based Management (IRBM) system in Zimbabwe in 2006 as an approach to public administration has sparked the importance of e-government. According to Munyaradzi (2012), the failure of public administration approaches led to the adoption of IRBM, which is thought to be effective and deals with an inefficient public administration riddled with red tape. There are several institutions in Zimbabwe that are involved in e-governance implementation and development (Munkuli, 2015). The Department in the Office of the President, the Cabinet, the Ministry of Information Communication Technology, and Postal and Courier Services are some of the major players in e-governance in Zimbabwe.

There are several policies and legislative frameworks underpinning e-governance and e-service delivery in Zimbabwe that are outside the scope of the current Report. The

Zimbabwean government has created notable initiatives through crafting policies and legislation that regulate and give strategic direction to e-governance development. However, it is clear that the regulatory framework reveals much that needs serious consideration. ICT infrastructure is an indispensable aspect of e-government development as it greatly affects the pace at which e-governance initiatives are implemented (Munkuli, 2015). Zimbabwe's ICT infrastructure is currently owned by both private and public entities and this includes both the backbone structure and the access network. This is a similar situation to the one identified above in the case of Nigeria. The weakness, however, is that the current base stations are mainly concentrated in towns and not remote areas (African Development Bank Group, 2012). Fibre optic cables are not yet fully developed (Munkuli, 2015).

Electricity is another important component that must be factored in when considering ICT infrastructural development as, without a reliable supply of electricity, all other efforts in ICT development will be futile. Similarly, South Africa has been faced with load-shedding that bears major impacts on ICT infrastructure development and functioning as ESKOM continues to fail to keep the lights on. Zimbabwe also does not have a reliable supply of electricity and this has a negative impact on ICT projects. Government has since engaged in some e-government projects that are proving to be beneficial but progress has been slow. The leadership appears to understand what needs to be done, as attested by the elaborate strategic documents they have produced, but there is a clear lack of commitment to implementing the projects (Munkuli, 2015).

12.1.4 Mali

Bon, Gordijin and Akkermans (2020) sought to describe a case of e-service innovation in a rural context. The study was conducted in Mali and a few neighbouring Sahel countries in West Africa, a region characterised by limited Internet access, strong diversity in languages, high illiteracy rates and limited purchasing power. There are contextual factors that pose significant challenges for development, feasibility, deployment and sustainability of e-services.

The study has shown that to develop useful, sustainable e-services and for value networks in a constrained environment, ICT developers, local users and business partners must work together, and address the needs of the local community. Due to the interdependency of socio-technical and business development, and because of the unfamiliarity of the users and business partners with e-services, the following three conditions must be met: social interaction, technical requirements analysis and business requirements analysis.

12.1.5 Kenya

In a cross sectional and descriptive design study conducted in Kenya by Matsalia and Waithaka (2018) to determine the impact of tangibility (the physical amenities, tools and look of employees) of ICT in quality service delivery, the study found evidence that tangibility of an ICT system had impacted on the quality of service delivery. Given that the tangibility of ICT had impacted positively on the quality of service delivery, the study recommended that the high level of visual appeal be maintained and enhanced.

12.1.6 South Africa

In South Africa, great strides have been made using e-government to simplify government procedures, improve access to information by citizens, and improve service delivery, as well as strengthening accountability and transparency (Matavire, Chigona, Roode et al. 2010).

According to Mutula and Mostert (2010), the South African government has an enabling environment in policy, infrastructure, and regulatory framework, ICT infrastructure and poverty alleviation programmes that would enable leveraging e-government to enhance service delivery to citizens. Despite these efforts, concerns about poor service delivery continue to be voiced. Service delivery should be enhanced beyond mere enabling of policies and legal frameworks to include mechanisms of monitoring and evaluation. National information infrastructure should be established to act as the backbone for service delivery. This would consist of physical infrastructure, such as Internet access points that extend beyond multipurpose community centres into convenient places such as public libraries, shopping malls, government offices, hospitals, clubs and relevant public places for citizens to use free of charge.

12.2 E-governance and e-service delivery experiences from a BRICS partner

12.2.1 China

The development of e-governance in China dates as far back as the mid-1980s (Mu, 2018). It was, however, only in 2002 that the State Council Informatization Office was established for the acceleration of e-governance and e-service delivery. As a result of e-governance, the Chinese government began embarking on e-procurement. The purpose of e-procurement is to facilitate the procurement of goods and services and to promote transparency (International Telecommunication Union, 2008). According to Mu (2018), the development of e-governance

in China followed the international environment that was already created by other countries. However, China is viewed as one of the pioneers of e-governance where the development of government websites serve as channels through which citizens can actively engage with their government (Lu, 2018).

Therefore, the Chinese population is expected to complete requests online without having to physically go to specific locations. This electronic way of relations between government and the people has the potential to provide high levels of efficiency. According to Baquero-Hernandez (2012), the Chinese government has for the past two decades made great strides in the development of e-government. Consequently, this has seen all levels of government starting to build websites in order to enable e-service delivery (Mu, 2018). However, China has its own challenges in the implementation of e-service delivery. Some of those challenges, according to Lu (2018), include:

- lack of proper and integrated project management
- unrealistic organisational goals
- offline processes need to be integrated before being captured electronically
- lack of control mechanisms and vision
- departmental coordination leads to efficiency challenges and restricts participation processes
- lack of appropriate government ICT policy
- lack of education about virtual tools (Baquero-Hernandez, 2012).

Despite the above-listed challenges, e-governance in China creates tools for boosting new ways to manage a country. According to Baquero-Hernandez (2012), e-governance in China has a positive impact on government issues as it improves transparency and efficiency in administration, increases public participation channels, and improves online procedures, information sharing and coordination between agencies.

12.3 International perspective on e-service delivery

In Bangladesh, Siddique's (2016) study explored whether a developing country can realise its e-government vision. The results of the study show that e-initiatives have transformed traditional administrative systems and practices. It also shows that e-innovators have helped tackle some complex challenges, thereby adding convenience and benefits to users of services.

A different study in Bangladesh sought to show how third sector organisations (TSO) can be incorporated into local service delivery while maintaining transparency, fairness and efficiency. The third sector includes community and voluntary organisations (CVOs) and non-governmental organisations (NGOs), charities, social enterprises and co-operatives. The study started by looking at the theory and practice of local service delivery and highlights the necessity of third sector involvement in such services. This study attempts to set out how the third sector can be incorporated into the stream of local service delivery. It also analyses the rationale behind the engagement of the third sector in this area.

Furthermore, the study also looks at suitable mechanisms to enable local government institutions and third sector organisations to meet community objectives while maintaining transparency, fairness and efficiency. The findings revealed that to involve the third sector in local service delivery, there should be some clear-cut standard procedures, and strategies including commissioning, partnership, competitive contracting and co-production. The conclusion was that, given the situation of local government institutions (LGIs) in Bangladesh, only co-production was a suitable mechanism for incorporating the third sector into local service delivery (Islam, 2015).

In Iran, e-government has been successful in curbing corruption (Saghafi et al., 2016). E-government initiatives in Kazakhstan have also yielded significant results in terms of curbing corruption (Sheryazdanova & Butterfield, 2017).

Mahommad and Xavier (2016) conducted a study in Malaysia to highlight the implementation of e-government in the local government, to determine the current implementation issues bedevilling e-government intervention in the local government system and to identify policy interventions for a speedier implementation process. The results revealed the importance of an integrated top-down approach to implementation for effective e-government implementation. The study concluded that local authorities need to be more equipped with adequate funding, skilled human capital, adequate ICT infrastructure, transformational leadership at the central and local levels, and a strategic roadmap for implementation.

In a study conducted by Muthu, Thurasamy and Alzahrani (2016) in Malaysia, e-government was introduced to improve the conveniences, accessibility and quality of services rendered to the public and businesses. The traditional method has been a subject of criticism by the public. This was due to the delay in processing and the inefficient feedback mechanism. The licensing department also experienced problems related to updating of licensing records, and circulation of applications for approval and collection of licence fees. E-licensing was then introduced as

an e-government initiative to enable users to apply for licences and manage transactions more effectively via the enabling technologies. One of the largest challenges that the government had to face was the digital divide in the community. In addition, it was not easy for local government to gain the confidence of citizens in using e-services, as they require that personal information be disclosed.

Inkinen and Merisalo (2014) conducted a study to determine the extent to which physical government is substituted by e-government and to what extent that substitution provides the potential for automation, resulting in employee cost savings in public administration. They found that in terms of improving democracy and participation, there are several innovative online services supporting citizen participation in policy formulation. In addition, the study also revealed the importance of improvement of hearing processes as an important topic on services and democracy (SADe) agenda to support participation.

The research question “How do developers perceive the role of e-government in the development process of democracy?” is answered by the following. The developers see the democracy aspect of e-government as a “potential” for participation and interaction with the existing government structures. The role of e-government in the development process of democracy was seen through new technical potential provided by ICT development.

Public participation contributed a great deal to e-government development. The established citizen panel and the large number of business organisations that were involved in the SADe projects highlighted the need to redesign the fundamental principle applied to government service provision according to the bottom-up principle. The findings highlighted the importance of not looking at governance only in a top-down fashion.

Chatfield and Alhujran’s (2009) cross-country comparative analysis research on e-government developments in the Arab countries and the world’s top e-governments in developed countries provides confirmatory evidence of the continuing digital divide.

With the increasing use of ICT by citizens and the initiation of e-government as a means of enhancing service delivery to citizens, Australian citizens can access official documents and provide their opinions and ideas regarding these documents. Although the citizen aspect was appreciated as a feedback channel, the larger societal considerations on education, well-being, and the quality of life through better governance and services were subordinate to the technological development paradigm and the search for efficiency (Chatfield & Alhujran, 2009).

13. STAKEHOLDERS IN THE ICT SECTOR

E-government development projects often involve several stakeholders including international donors, private-sector ICT vendors, and ICT investment partners, giving rise to large-scale complex projects (Chatfield & Alhujran, 2009). Goel, Dwivedi and Sherry (2012) note that for any successful implementation of an e-governance program, the role of key stakeholders is very important. The authors then give an overview of four key stakeholders who are involved in the successful e-governance program. They are political leadership, employees of the department, the internal IT department and IT service provider. They are described in the paragraphs that follow.

13.1 Leadership

Leadership includes political and bureaucratic heads of department. Their commitment is an important aspect of e-governance. Senior leadership provides the role of reformers who help e-governance initiatives to progress. Some leaders may come from the private sector where private partners may drive the whole initiative for the government. The politics of e-governance initiatives probably hold the key. E-governance projects have made slow progress in some countries because they do not serve the self-interests of the major stakeholders, especially senior public officials. The views of senior public officials are therefore of critical importance; hence the emphasis laid on the issues of leadership and commitment. Public officials, especially politicians, must be convinced that e-governance is in the long run of interest to the department, government and citizens.

13.2 Internal officials

Public officials are responsible for implementing changes that bring e-government programs to the government department. To do this efficiently and effectively they need to be trained. During this process it may be necessary to manage resistance to change that may arise due to fear of loss of power, position and an added workload. Computerisation requires skills and leads to an increase in productivity, which may make existing employees redundant. Employees should be made to see this as a growth opportunity rather than a threat. The quality and commitment of municipal officials play a major role in the successful implementation of an e-governance initiative. Two things that could prevent implementers from completing their assigned tasks are when implementers do not want to do what they are supposed to do and when they are not able to do what they are supposed to do.

13.3 Information technology service providers

The IT service provider is responsible for technical implementation of programs. E-governance programs are normally large programs that pose a huge program management challenge with multiple stakeholders. Project planning is required to ensure that all the necessary activities and dependencies are identified proactively. This will ensure that any unexpected demands are managed properly with common understanding between various stakeholders.

13.4 Information Technology Department/National Informatics Centre

Most state governments have a dedicated IT department responsible for the implementation of IT programs. This department acts as interface across multiple e-governance initiatives across the state. The department also reviews the IT strategic plan for each department and then approves the long-term road map for each department as well as the overall state. In addition, they ensure that proper knowledge management tools are used in such a way that experience gained in one program is shared across other programs so that mistakes are not repeated. In India, the National Informatics Centre (NIC) is a premier organisation of the Department of Information Technology, with a business mandate to steer information and communication technology (ICT) applications.

Ashaye and Irani (2019) note that the success of any e-government project implementation is largely dependent on government support and the resources available. This means that governments play an essential role, principally in the areas of legislation and regulations to control e-government activities.

Provision of funding is crucial as it improves the ICT infrastructure, provides excellent education and training for government staff, and improves the welfare of citizens. In addition, senior government officials and decision-makers would benefit from supporting the e-government concept to address the issue of the attitude of staff and resistance to change that normally occurs among public officials.

There are different activities and tasks, some more important than others, at every stage of the implementation of e-government. For instance, security, monitoring, updating and online promotions are essential tasks or activities to consider during the post-implementation stage. These activities are not necessary during the pre-implementation stage. During this preliminary stage, activities such as ensuring that the legislation and regulations that support

what was implemented are intact, as well as making provisions for the infrastructure, are more important.

14. PREPARATIONS FOR E-SERVICES

Voogd, Bac, Zaal and Andreeeva (2007) provide an overview of the main preparations that municipalities can make to ensure a successful start to the project-based approach to introducing e-services. Preparations begin with the orientation or vision. Introducing e-services can have a good impact on the organisation due to an increase in efficiency and a higher speed and accuracy in terms of communication. Creating enthusiasm within staff and management is also part of the strategic process. A step-by-step process of introduction is a more effective means of introduction than dropping e-services on employees all at once. A structural model to describe the vision in administrative areas where the Internet or ICT can have important roles is discussed below.

14.1 Society

Society in this context covers developments in local areas/communities that the municipality must cater for. Themes include employment, bridging the digital divide and mobility. Mobility details how people from specific areas will be able to work from home and/or places closer to home reducing logistics challenges. Bridging the digital divide addresses the risk of unfairness towards people who lack access or know-how to take advantage of the ICT benefits as compared to those who lack access and knowledge. A municipality can take on a role by encouraging Internet use. Experience can be gained by rolling out test software and services that can offer potential workers and users a chance to familiarise themselves with the Internet and relevant applications. Examples are citizens who cannot communicate online to collectively discuss initiatives in their areas of interest. These initiatives impact on communication between local government and locals in the planning of future residential districts.

14.2 Service

E-service delivery is about changing traditional methods of service delivery to more technologically advanced methods such as with the Internet. Information supply and exchange and transactions are made available through the Internet. The introduction of e-services also means the government has a better understanding of and capacity for service delivery. The Internet can also be developed for support of other initiatives and better understanding for the

municipality in terms of core processes. Customers see benefits in e-service possibilities and local government handling of customers via other channels. Constituents see better service and can see the process.

14.3 The internal organisation

The ICT revolution working in present day society is mostly focused on its core external communication. Local government will have to position itself away from divisional computerisation towards a more modern position where all office processes are closely connected to each other. This is one of the measures of a successful e-municipality. The ICT revolution is useful for interconnectedness as well as transformations in work and processes. Examples are the intranet and digital workplace. More employees can work digitally and gradually allow computer files to replace paper. The Internet also facilitates information sharing and direct communication with customers.

Politics and policy have a less efficient transformation in terms of ICT. Besides word processors and e-mail, most processes are harder to support with ICT infrastructures. There are visible changes, however. There have been numerous forums introduced by government where citizens communicate with government; something to note is Internet discussions. Multiple decision-making processes are formally centred on statutory regulations made before the Internet, and forums are not actually run by government but by other interested parties.

15. PREREQUISITES FOR E-SERVICE DELIVERY

Various prerequisites for e-service delivery exist. These prerequisites are identified and discussed in the paragraphs that follow.

15.1 Need for a management sponsor

The task of writing the long-term vision and practical conversion to an action plan must be first issued by a municipal authority, or ICT or communications specialist (Saha & Salehi-Sangari, 2010). This management support role in the process is crucial for good results. The appointed sponsor must truly embrace the process and be the messiah to other decision influencers. This means mastering the subject matter. The “sponsor” will believe in innovation. Innovation is defined as the development and implementation of new processes or procedures that are

subsequently different from existing ones; and that implies change through activity. It is the process of developing and executing new ideas (Mafunisa, 1998).

15.2 Motivated officials

Motivated officials with empathy for the subject matter are needed. These are generally found in information management or the area of services or citizen affairs. Most organisations have innovative thinkers and ambitious officials who believe in and want to help such an ambitious process (Saha & Salehi-Sangari, 2010). In any case, the administration must free up one or more officials to prepare the e-services process and to ensure officials feel involved with and committed to implementation. Because this is a long-term process with complex changes, it is also necessary to prepare a programme and a management structure (Kanyemba, 2017). Management may thus not come from an existing service or sector but be appointed to oversee the services. Appointing a programme manager at the level of existing directors is part of this. The team members from the organisation become members of the programme team and are given a specific role.

15.3 Team building

It is important for the members of the team to be enthusiastic and not to have a nine-to-five mentality (Knight, 2020). A nine-to-five job is one that one does during normal office hours, for example, a job in a factory or office (COBUILD Advanced English Dictionary, 2021). Certainly, in the first year, hard work will need to be put in to make the e-programme a success. The administrator generally will want to see quick results and this means creating a dynamic atmosphere in which team members are ready to invest best efforts (Kanyemba, 2017). This can be achieved by:

- positioning the team high in the organisation
- offering a temporary extra salary allowance
- involving members in important top meetings
- launching the team with fanfare via internal news reports
- lightening team members' other (non-programme) tasks.

Internal news reports play a major role in the sharing of information with all municipal officials for them to be kept abreast with new technological and municipal developments.

15.4 Infrastructure

For e-government to be implemented, certain components and preconditions must be fulfilled. In the Slovak Republic, the Digital Economy and Society Index (DESI) identified connectivity, human capital, the use of Internet services, integration of digital technology, and digital public services as the main areas to be considered and evaluated (Rucinsca & Fecko, 2020).

Rucinsca and Fecko (2020) sought to highlight experiences of the Slovak Republic in e-government, especially how small municipalities solve issues practically with regard to the provision of e-services, considering the factors, limits and preconditions they have in place. The aim was to present the organisational, administrative and legislative background of e-government and provision of e-services in the Slovak Republic, with the main focus on the practice of provision of e-services by the municipalities in the Slovak Republic.

Although large and small municipalities are facing the same obligations, they do not have the same potential. Bigger cities with bigger budgets and better organisational background can develop their own solutions and provide e-services more effectively. Small municipalities with fewer resources tend to move towards the usage of market-ready solutions. E-services must be simple and easily accessible for a wide audience of users (Alguliyev, Yusifov & Gurbanli, 2018).

16. SELECTION OF E-SERVICES

Voogd, Bac, Zaal and Andreeeva (2007) detail different ways of selecting e-services. These ways are identified and discussed below.

16.1 A citizens' survey

To determine what inhabitants of a municipality would prefer to receive, the municipality can utilise simple surveys. An aspect of note is that some inhabitants might not have Internet connection at home although the number has grown exponentially over the years; other options such as cafés and work places offer Internet connection possibilities. Apart from traditional questionnaire surveys, the municipality can also implement survey questions online. The website would need to consist of a search field and storage containing entered search terms. Municipalities can consistently analyse this information to quickly determine visitor demands.

16.2 Efficiency

As more questions receive responses online, physical communications are decreased, which in turn allows officials to be more efficient and managers to monitor work pressure more effectively. The number of questions in the current method of working should be assessed to choose which e-services to introduce. The questions that were asked more frequently can help to make a choice as to e-services, to place information on the website and to carefully update them.

16.3 Level of security

Security issues mean not all services can be handled online, which limits the levels of digitisation. Levels of security determine how the website digitalisation should be used.

Open form/data check

Situations where applicants fill in their information on digital forms are the lowest levels of security. The municipality, after receipt, verifies the applicants' identity with their official data and then responds via mail, telephone or post.

Personal login name with password

Codes are requested online by applicants which are then to be sent, after data verification, through the post to the applicant's home address. The username and password together allow access to online services. Municipalities can create and initiate the system themselves although nationalised systems allow for seamless integration throughout government services. During the verification process the identity verifier will send an SMS to the applicant's chosen phone number with a once-off verification code. Although municipal services are usually protected at this level, official documents are still required as they are used hand-in-hand with postal or desk delivery.

Biometrics

Biometrics refers to the use of phenotypical attributes of a person to confirm their identity instead of passes, keys, codes, photos, and passwords, which can be vulnerable to fraud. Governments such as that of Belgium are preparing and have initiated programs by inserting

chips into passports that store user data. A passport, together with a card reader and fingerprint scanner can provide strong security.

16.4 Payments

The municipality requests low payments for its products and services and these can now be collected online through bank created systems. The options are direct online banking, a single direct debit mandate or the use of giro collection forms. Direct and single direct debit are beneficial in that money is guaranteed and instantly received.

16.5 Monitor for e-municipalities

A beneficial method of improving local government decision making is using a monitor that can assess and score essential aspects of a digital service. Aspects and their functions are listed on the website with the expected realisation period. These models create positive competition between participants of the monitor. These models can be divided into subsections such as user-friendliness, transparency, service, personalised service and accessibility.

16.6 Consensus

Choosing e-services can also be administered by support levels. In some occurrences departments are reorganising or developing themselves, while others want to change to more modern processes. It can be beneficial to determine those with positive perceptions toward the use of e-services. Trying to force traditionalists to accept a new system can create a negative reaction in the rest of the organisation.

17 BARRIERS TO IMPLEMENTING E-GOVERNMENT

The potential benefits of e-government are yet to be fully exploited in developing countries. This is because many developing countries face significant challenges in the implementation of e-government. The challenges include lack of access to e-services, trust and security issues and technological barriers (Amagoh, 2016).

E-government in less developing countries faces slower progress or even stagnation because it encounters multiple and complex challenges. Although developed countries also face

challenges, they are more able to overcome them far ahead of developing countries due to a difference in Internet technological infrastructures and human resources. Overcoming these challenges is not always easy as strategies based on experience from developed countries may not be directly applicable to developing countries (Hassan & Shehab, 2011).

Changing working methods and habits is not easy especially if citizens and employees are not conversant with the electronic system. The digital divide within a nation, especially the urban-rural divide can also be an impediment to IT literacy (Mohammed & Xavier, 2016). The authors identified other challenges including financial barriers, the fear of a breach of privacy and confidentially, which may hold the public back from using e-government services, a slow Internet that may make it difficult for people to access the installed system, the cost of e-government applications, which require considerable investment in IT infrastructure, poor IT-literacy, absence of IT connectivity among the poorer segment of the populace who are largely concentrated in rural areas, a sizeable segment of the population that still prefers physical interactions in seeking public services over the counter.

Hassan and Shehab (2011) state that privacy and security risk barriers are serious concerns in the era of e-service that, if not properly managed, may pose a threat to the viability of e-services. There is a concern about the misuse of personal information disclosed on the web. The use of online financial transactions has become a serious concern in developing e-systems in the government context.

The above results are similar to those of a qualitative study conducted by Waller and Genius (2015) in Jamaica to highlight the barriers inhibiting the implementation of initiatives that seek to transform efficiency. The factors that undermine the use of ICT technical issues (infrastructure, privacy and security), social issues, and financial issues are described below.

Technical issues: ICT infrastructure hardware (telecommunication systems such as telephone lines, cable television). Although, many developed countries have invested heavily in ICT infrastructures, developing countries such as Jamaica, could not afford them. Privacy and security concerns included names, addresses, employment histories, and tax information. Citizens expect this information to be protected. Careful handling of personal information is essential to successful e-government applications.

In many developing countries, especially in rural areas, citizens still lag behind in their use of computers and access to the web. Some users perceive the Internet as being too slow or

unreliable for them to rely on, especially in the case of complex forms that must be downloaded or large volumes of data that must be exchanged (Hassan & Shehab, 2011).

Social issues: the digital divide refers to a state of unequal access to digital technology within a country. It is also a function of awareness and knowledge of ICT.

Financial issues: successful implementation of e-government depends on government's overall ability and willingness to spend on the necessary ICT and other related items, as well as the ability of the citizens to access ICT. Many impoverished countries and their citizens cannot afford this.

The findings of the above studies would seem to align with those of the study conducted by Twizeyimana, Larsson and Gronlund (2018) in Kigali, Rwanda. The challenges that they found included information infrastructure for e-government, social inclusion, governance, management, trust in the new system, and languages. Their challenges were, however, influenced by various contextual factors that include political support, the nature of the e-government project, implementation strategies, human and socio-economic development, existing information infrastructure, and operational capabilities. Despite a few associated challenges that they had faced, the adopted PPP approach to e-government implementation might have been a suitable catalyst for e-government success in the country.

Hassan and Shehab (2011) also found the following barriers:

- Legislative barriers: Legislative barriers arise from lack of a suitable framework that addresses submission of electronic documents and liability emerging from such documents. Electronic signature technology is accepted in some countries, but there are countries that find this to be inadequate. Legal issues that require physical presence and physical inspections may hinder the transition to e-services because some manual activities will remain in the workflow.
- Administrative barriers: Government administrators may be reluctant to introduce e-services because their development and deployment involve significant costs for hardware platforms, software development and licensing, salaries for e-service administration employees and help desk operations. Moreover, managers may find it hard to justify these costs to citizens.
- Cultural barriers: Some citizens have a negative association with e-services, preferring traditional paper-based channels. Lack of information regarding the web address

through which e-services are available also poses challenges. Language barriers could also be an impediment to the acceptance and use of e-service.

He, Zhang and Li's (2021) study identified infrastructural challenges such as lack of computer systems and their maintenance, issues of accessibility and availability of electricity and the Internet, as well as lack of IT personnel for systems upkeep.

A review of literature by Pangaribuan (2019) sought to summarise the challenges of e-government implementation in developing countries. The results show that e-government implementation in developing countries faces complex problems such as a lack of ICT infrastructure, lack of security and privacy of information, lack of proper planning, public awareness, cultural resistance, institutional and political resistance, and a lack of budgeting.

According to Asogwa (2013), Nigeria has set up a national e-government strategy for using ICT infrastructure to enhance public services. The expectation was that the strategy would enable the Nigerian government to provide faster access to government information, lower administrative costs, and reduction in bribery and corruption. These opportunities were threatened by low bandwidth and Internet penetration, inadequate ICT infrastructure and technicians, incessant power outages and technological obsolescence.

Otieno and Omwenga (2016) found the challenges to be poor ICT infrastructure, unreliable Internet connectivity, insufficient political leadership and change management strategies, ineffective strategy, policy and regulation on use of e-government services, low funding for development of e-government by government donors, mismatch between e-services required by citizens and those provided by government, low citizen awareness of existing services, low literacy and e-literacy skills among citizens, the high cost of Internet and e-government services, the high risk associated with Internet and e-services, low security and perceived trust in e-services, low citizen participation in government processes, and cultural issues.

18. ESSENTIAL SKILLS FOR EFFECTIVE E-SERVICE DELIVERY

For the proper implementation of e-service delivery, skills need to be developed and nurtured within local government in the RSA. However, these skills are not a framework but at least a pointer of certain crucial skills that are basic for e-service delivery in local government. Lee and Hirumi (nd) are of the view that the following are crucial skills for online and electronic delivery:

- interaction skills
- management skills and capabilities
- organisational design
- technological skills
- content knowledge
- teamwork skills.

The skills listed above must not be considered the only way and only skills for effective e-service delivery. Other authors have listed other essential skills that will be of paramount importance if South African municipalities are to successfully navigate through the provision of services electronically.

19. DRIVING FACTORS

Driving factors refer to the employees' ability to be able to adapt to the electronic environment (Waller & Genius, 2015). Waller and Genius advocate availability of ICT infrastructures and government willingness to use the technology. According to the study conducted by Muthu, Thurasamy and Alzahrani (2016), the following factors contributed to the employees' intention to use e-licensing:

19.1 Ease of use

Ease of use was found to be positively related to the intention to use e-licensing. Employees who find e-licensing easy to use, not cumbersome, and free of effort will develop an intention to use it. Training sessions should be conducted to change the perception of public officials who find it difficult to use.

19.2 Relative advantage

The results of the above study reveal that the relative advantage obtained from using e-licensing was positively related to intention to use it. The implication is that the users will use this system if it is able to provide more benefits than the traditional ways. E-licensing gives advantage to public officials in that processing of licensing can be done online at a faster rate and with less paperwork. Another advantage of e-licensing to the institution is that it enhances the quality of work and productivity.

19.3 Visibility/Observability

Visibility/Observability was also found to be a predictor of intention to use e-licensing. Employees would develop the intention to use e-licensing if they see their colleagues using the system. If they develop confidence to use the system, their intention to use it would be enhanced.

19.4 Convenience and satisfaction

Convenience and satisfaction of employees is regarded as the priority of the licensing department. Public officials who are aware of the benefits of e-licensing, such as time saving, cost-saving, speed, efficiency, convenience, easy accessibility, would enhance their usage intention. Public officials' attitudes towards e-government can be shaped through training programs. Users who are trained in using e-government systems are more likely to develop a positive attitude towards using the systems (Verkijika & De Wet, 2018).

The other factors that were found to significantly influence user attitudes towards e-government are performance expectancy, social influence, and perceived risk. Performance expectancy refers to the usefulness of e-government services. Similarly, citizens are also more likely to have a positive attitude to accessing e-government services that are deemed to be useful. It is recommended that government agencies focus on emphasising the usefulness of e-government websites and on how accessing e-government services could benefit citizens. It Is imperative that designers and developers of e-government systems make them easy to use. This is because ease of use is a significant antecedent of performance expectancy. This implies that a useful e-government will create a positive attitude towards it, and making the system easy to use will increase citizens' interest in it. Therefore, systems must be both useful and easy to use (Verkijika & De Wet, 2018).

According to Amagoh (2016), the following are the determinants of e-government diffusion: reliable electricity supply, perceived usefulness (better and faster services), perceived ease of use (easy to use and understand), relative advantage (better than face-to-face interaction with government), trust in the Internet, technological infrastructure, the digital divide and skilled human capital.

Amagoh (2016) further states that factors that promote e-government deployment and diffusion include trust; attitudes and beliefs; Internet and computer confidence; website design; and other innovation diffusion factors. Trust issues are divided into two categories. The first is

trust of the Internet (in terms of security and privacy), which is the belief that needed structural conditions are present on the Internet to enhance the probability of achieving a successful outcome in an endeavour. The second category, trust in government, refers to the public's assessment of government based on their perceptions of the integrity and capability of political authorities, government agencies, and political institutions to provide services according to expectations held by citizens.

20. IMPACT OF AND OPPORTUNITIES FOR PUBLIC E-SERVICE DELIVERY

There is no doubt that e-service delivery and e-governance confer opportunities on the public sector, including municipalities. Below, we outline the impact and opportunities of e-service delivery, which include cost reduction and efficiency gains, quality of service delivery to businesses and customers, transparency and accountability, increased capacity of government and improved quality of decision making.

20.1 Reduction and efficiency gains

Malhotra (2001) argues that ICT has considerable potential to contribute to efficiency gains and cost reductions for an institution. For example, over the years, the Public Service Commission of Kenya has relied on a paper-based system in recruiting and selecting candidates. In the past, this process has been taking eight months for new entrants and six months for serving officers. It is from this need that a web-based Recruitment and Selection Database System was developed. Because of the on-line system in place, the following have taken place because of e-services:

- cost reduction and efficiency gains
- quality of service to businesses and customers
- transparency and accountability
- increase in the capacity of government
- network and community creation
- promotion of use of ICT in other sectors of society.

Al-Kibsi et al. (2001) present as another argument that the appropriate application of ICT may possibly reduce the number of inefficiencies in processes by allowing file and data sharing across government departments, thereby contributing to the elimination of mistakes from manual procedures and reducing the required time for transactions.

20.2 Quality of service delivery to business and customers

Rhine (2001) observes that in the traditional model of public service delivery, the procedures are long, time consuming and lack transparency. However, electronic systems will not necessarily improve transparency as all this rests on the willingness of government to expose and show the actions of all its agencies. Applicants who wish to apply for a job in the public sector must fill out several application forms, must visit several different offices and spend a considerable amount of time. If a citizen wishes to be issued with a certificate or any other official document, he or she must travel to the central government office, go to different offices and spend a lot of time on a simple service.

The consequences are high costs and citizen dissatisfaction. The public e-service initiative, on the other hand, which puts government services online, thereby reducing the bureaucracy, offers round the clock accessibility, fast and convenient transactions, and obviously enhances the quality of services in terms of time, content and accessibility (Saha & Salehi-Sangari, 2010). Currently, amid the Covid-19 pandemic, various government services are accessed online and various platforms accessed virtually. This also directly reveals government's ability to save costs and time and costs for customers.

20.3 Transparency and accountability

Bhatnagar (2001) argues that public e-services help to increase the transparency of decision-making processes. In many cases public e-services offer opportunities for citizens to directly participate in decision making, by allowing them to provide their own ideas and suggestions in forums and on-line communities. If websites are designed carefully and openly, they can be valuable resources for transparency as citizens and other stakeholders should be able to see political and governmental information, rules and policies (Skenjana, 2019). Previously it was often necessary to go directly to governmental offices to obtain information, but now this information should be available on the web.

20.4 Increase the capacity of Government

Rinne (2001) argues that the use of ICT for the reorganisation of internal administration transactions, communications, and interrelationships and for easy information flow and transfer offers considerable opportunity to increase government capacity. Intranets allow different departments within the PSC to share databases of common customers and to pool skills and capacities of their members for problem solving. These facilities in turn will pledge

faster information flow and transfer, quicker and cheaper provision of goods and services, faster and better decision-making processes, and unplugged paper bottlenecks.

Knowledge-based or expert systems help to create a more responsive and guideline-based process. This approach assures benefits for businesses, which become both consumers of government services and providers of goods and services to the government. It also assures benefits to the PSC itself through reduced costs and spending, which could require lower taxes to finance it. A person requiring a service, on reaching the appropriate agency, can register in the computerised tracking system and receive an electronic ticket that indicates the services desired and the estimated waiting time (Kanyemba, 2017). They can receive at the same time different services that traditionally were separated, such as vehicle registration, driver's licence, identification card and unemployment insurance.

20.5 Improve the quality of decision making

The Organization for Economic Co-operation and Development (OECD) (2002) argues that strengthening the relationship between government and citizens could improve the quality of services by allowing government to tap wider sources of information, perspectives and solutions to meet the challenges of policy making under conditions of increased complexity. Community creation, forums, continuous interaction and communication between government and its citizens contribute further to the decision-making process. By means of active participation in political and government discussions, citizens can contribute their own ideas, and share their knowledge and information. This will in turn lead to building trust in government and improving the relationships between the government and the governed.

Considering citizens as governmental customers, listening to and understanding their needs and requirements, are essential for a better decision-making and service delivery process. The appropriate use of e-service by all governmental agencies and departments offers the possibility to make quick decisions thus to serve the community better (Mawela, et al., 2017). However, improvements in the speed and quality of service delivery depend greatly on the willingness of governments to be empowered with new information, the capability of staff members to process the large amount of information, the prevailing cultural values, as well as the motivation of governments to shift from a hierarchical public administration model to a flexible less centralised model.

21. EVALUATION OF E-SERVICE QUALITY

Electronic service quality is an important issue in the failure or success of e-government projects. It encourages and improves the productivity of governments and the relationships with users, and improves their satisfaction. According to Abdelsalam et al. (2012), improvements in public service delivery are especially important for developing countries where services are often not provided in sufficient amount and not delivered effectively. Evaluation of e-service quality is an intricate process because it relies on citizens' view, which is a hard to realise measure (Al-nidawi, et al., 2018).

The requirements of e-service evaluation are classified as follows (Alguliyev, Yusifov & Gurbanli, 2018):

- Facilitation of the use of e-services: this includes the provision of a name of a given service relevance, accurate registry of files in the e-service part of the official Internet portal and unrestricted use of this part by users without obstacles
- Facilitation of document submission: the provision of the acceptance of scanned files composed of applications and required files in electronic format, the acceptance notification to the sender, and the document review according to procedure and time specific to legislation requirements
- User informing: the expedition of information gathering regarding e-service provision for users and result presentation
- Integration facilitation: communication building for information exchange with other government departments purposed for e-service provision
- Security provision: taking necessary security measures to provide security of operations of the e-service section and securing personal information
- Presence of administrative regulation: information resource development by the government departments that handle service provision, and performance of the institutions taking part in service delivery must be described accurately with transparency for the public
- Payments for e-service: facilitating of payment opportunities in electronic formats in real time
- Use of e-signature: verification of e-service users, the presentation of applications and responses, and e-document signing before submission to central executive authorities.

According to Al-nidawi, Al-wassiti, Maan and Othman (2018), measuring service quality is difficult due to its dependence on citizens' views, which means different scales must be developed to measure electronic government service quality according to different fields of study. The authors identified features that can be used as scales for measuring e-government services. These features include:

- Systems availability: Denotes the desired technical functioning of electronic government sites with all links functioning as expected. The availability means 24-hour access every week is continuously ensured
- Privacy/security: A significant facet that alleviates fraud and other e-crime occurrences at all levels and improves citizen-government communication. Governments collect a large amount of citizen data, which requires them to secure the privacy of this personal data. To reach the required privacy and security levels, different security solutions such as Public Key Infrastructure (PKI), biometrics, digital signature and certificate, and encryption techniques, must be introduced
- Efficiency: This is essential for e-government service quality. Download speed and reaction times are necessary for citizen satisfaction from e-government efficiency
- Fulfilment: Ability to communicate with citizens about proper and informative service descriptions about electronic service is essential. False information can cause citizens to have negative perceptions. Flexibility in conducting e-services can help increase government-citizen trust levels
- Reliability: Reliability is one of the important facets of e-service value. It is integral to citizens being assured of government integrity in doing what they say they will do
- Information: E-service is seen as an info-driven service process. The information is integral for citizens to use e-services. The information should be short, simple to comprehend, relative and updated where any weak content may cause the citizen to leave the website
- Ease of use: This has a big impact on consumers' satisfaction and conduct. The website must be easy for citizens to use. Website functions should allow citizens to easily satisfy needs through easy navigation of the website.
- Website design: Design is important in facilitating website access and efficient e-service delivery. Disorganised website design may be confusing for citizens and result in them quitting the website. Research indicated that website design plays an important part in reaching desired customer satisfaction

- Interactivity: Interaction with citizens and provision of necessary assistance is important in creating citizen confidence in using the e-service. Interaction can keep citizens in communication and help them receive advice
- Responsiveness: Government should make provisions for efficient service to citizens via interaction channels as needed, which allows citizens to maintain positive perceptions while using e-government services. Several researchers have shown an important connection between prompt reaction and customer satisfaction.

22. E-SERVICE DELIVERY FOCUS AREAS

E-service delivery has various focus areas that need to be taken care of from the planning stage to implementation and the actual electronic delivery of services. Such are IT security, interoperability, reduced duplication, economics of scale and digital inclusion. These focus areas are discussed in the paragraphs that follow.

22.1 Information Technology (IT) security

An e-government initiative has to promote a web environment that is capable of protecting both electronic data and IT systems from unauthorised access and cyber-crime activities (Department of Public Service and Administration (DPSA), 200). Lack of assurance of such security may make people have cold feet when it comes to using online services. Various cases of cyber-crime have recently surfaced in South Africa, specifically in municipalities. For instance, the City of Johannesburg once encountered the theft of electronic information of its clients.

22.2 Interoperability

E-service delivery initiatives must pay attention to the integration of government IT systems. This is to allow the sharing and exchange of electronic information and data as well as transactions among other services through enablement of the “whole of government” search and queries. In other words, e-government should strive to enable IT systems of all government agencies to “talk to each other” (DPSA, 2001). In simple terms, the e-service delivery systems as they exist in government must be integrated. Upon the arrival of Covid-19 vaccines, the Minister of Health, Dr Zweli Mkhize, mentioned that other already existing systems will be used to assist in the vaccination process.

22.3 Reduced duplication

Through implementation of e-government initiatives including e-service delivery, government agencies, municipalities and officials must aim to reduce or avoid unnecessary duplication of functions through proper streamlining of processes and intra-governmental sharing of information (DPSA, 2001). Intra means “within” and therefore “intra-governmental relations” refers to the relations between the various structures within government institutions. The institutions are established in terms of formal legislation and their powers are conferred in order to create structures. Vertical and horizontal intra-governmental relations exist (National School of Government, 2017). There are currently major losses to municipalities due to duplication of activities necessitated by a lack of a proper system in place. An electronic system will serve better in ensuring that transactions and deliverables are identified earlier and that duplication is avoided.

22.4 Economies of scale

For successful e-government, there is a need for the development of IT skills that are vital to e-service strategies to minimise costs associated with hiring external IT skilled personnel (Fourie & Poggenpoel, 2017). This is in line with the provisions of section 195 of the Constitution of the Republic of South Africa (1996), which dictates that resources must be used efficiently, effectively and economically. The DPSA IT Policy Framework as reflected in the above further recommends that research be directed towards responding to service delivery matters through the use of advanced techniques that are cost-effective, efficient and provide speedy/timely services.

22.5 Digital inclusion

The DPSA (2012) in its Corporate Governance of ICT Policy Framework adds the digital inclusion pillar to the original four pillars identified in the DPSA (2001) Framework. It is argued in this Framework that successful e-government cannot be achieved without ensuring that people are empowered through information and communication technologies. Hence people need to have the right access, skills motivation and trust to confidently have online interactions and transactions. Thus Naidoo (2012) argues that bringing e-services to the citizens effectively is a challenging process especially in a country where most people lack proper infrastructure and resources, worsened by inequalities in access to technology. It thus calls for more creative ways of extending e-services to remote rural areas through development of user-friendly

connection mechanisms such as a mobile Internet, Internet kiosks, wi-fi hotspots, and fibre Internet to facilitate online interaction.

23. THE 4IR, E-GOVERNANCE AND E-SERVICE DELIVERY

The Fourth Industrial Revolution (4IR,) commonly known as Industry 4.0, presents both challenges and opportunities for governments across the world (Lee, Yun, Pyka, Won et al., 2019). This relates particularly to how different spheres of government, especially local government, which is a sphere closer to the people, render services or fail to do so. South African municipalities are no exception to those challenges and prospects. The challenges more especially relate to how governance structures, policy paradigms and service delivery needs to transform and befit the 4IR.

The introduction of rapid technologies dictates that government, its agencies, structures and entities transform from their traditional way of doing things if they are to meet their service delivery and other constitutional directives (Badimo, 2019). Information of Things (IoT), Robotics, Artificial Intelligence (AI), Virtual Reality (VR) and other “disruptive” technological shifts define how government relates to the general citizenry in relation to service delivery (Nalubega & Uwizeyimana, 2019). There is no doubt therefore that compliance or noncompliance of the 4IR is not a discretionary substance matter.

This Report aims at interrogating how electronic techniques could be used to aid service delivery in the South African local government arena and hence the need to look at the concept of the 4IR as a dominant paradigm in governance and public administration practice. Therefore, we interrogate the 4IR and how local government “fits in” in terms of the development of the practice of public administration and the acceptance thereof. The Report does this by firstly, attempting to unpack the concept of the 4IR. This is done through briefly reflecting on the first three industrial revolutions in order to properly contextualise the 4IR. It is also the aim of the Report to reflect on both the drivers and challenges of the 4IR. This, however, is not to assume that the 4IR only presents challenges, as some of the inherent benefits will be outlined.

Central to the argument presented in this Report is the relationship between service delivery and mostly basic service delivery and the 4IR within the context of South African municipalities. This section of the Report questions how e-techniques of delivering services can aid in responding to the needs of the people through goods and services as dictated by the Constitution, 1996 and how to ensure good governance, efficiency and effectiveness.

23.1 Contextualisation of the Fourth Industrial Revolution

Before the 4IR, there were three successive industrial revolutions that took place. One is therefore tempted to question the popularity of the 4IR and not the other revolutions. This the Report will explain at a later stage. The first industrial revolution took place between the years 1760 and 1840 (D'Ambrosio, 2018) in Great Britain and spread across Europe and the United States of America (Nalubega & Uwizeyimana, 2019). It is an era whereby human efforts and heavy reliance on animal power were replaced with mechanical power (Badimo, 2019).

The first industrial revolution resulted in rapid industrialisation. This was an era in which a country engaged in a process of transforming the economy from being agriculturally-based to being characterised mainly by the manufacturing of goods and the rendering of services (Chappelow, 2019). The first industrial revolution was then followed by the second industrial revolution, which began in the 1850s and ended at the beginning of the twentieth century with the main innovations being electricity, aeroplanes, cars, wireless and wired communication, among others (Nalubega & Uwizeyimana, 2019).

To date, cars, aeroplanes and wireless communications still critically shape the public administration practice and the delivery of services in all spheres of government. For instance, in occurrences of load-shedding, the South African economy loses billions of rand while the public purse is used to bail out state companies such as Eskom. Lastly, the third industrial revolution, which was characterised by the Internet, ICT and digitisation followed (Badimo, 2019). D'Ambrosio (2018) terms this revolution the "digital revolution" or "information technology revolution".

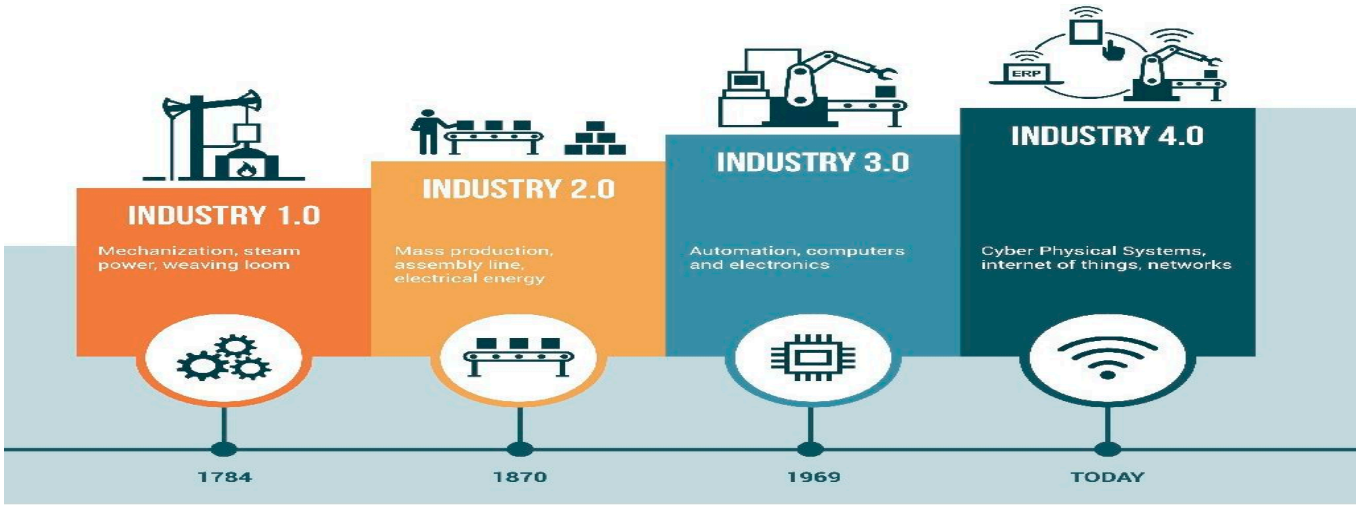
The 4IR is fundamentally different from the three previous revolutions as it is characterised by new sets of technologies that bear the potential to fuse the physical, digital and biological worlds (Levin, 2018). For Badimo (2019), the main difference between the 4IR and the other revolutions is the pace of change, that is to say, the other revolutions were not as rapid as the 4IR is. Hence other authors tend to refer to the 4IR as a rapid and disruptive revolution.

The 4IR, unlike the other revolutions, is characterised by its high levels of integration and sophistication that significantly contribute to societal transformation and global economies (D'Ambrosio, 2018). The integration needs to be long-term, especially in areas of technology and capacity development globally (Nalubega & Uwizeyimana, 2019). The 4IR is a disruptive technology with a blurred line between physical, digital and biological spheres.

The above is supported by Badimo (2019) who holds the view that the 4IR is the "concept of blurring the real world with the technological world …" This then means that all realms and aspects of life including local government operations and service delivery are tremendously affected and shaped. The questions therefore are: how is it different from the other revolutions and why has it gained more traction than the others?

Mckinsey (in Levin, 2018) views the 4IR as an unavoidable trend of automation, digitisation and data exchanges in various sectors, characterised by cyber-physical systems, IoT and cloud computing. When coined together, a more comprehensive definition of the 4IR is the one adopted by Lee et al. (2018) who hold that the 4IR is the radical change occurring when information technology thrives across all industries with features such as creative connection between technology, market and government. Below is a visual reflection of the successive industrial revolutions as they took place.

Figure 1: Visual reflection of successive Industrial Revolutions



Source: (CadM, 2020).

It is therefore worth interrogating some of the push factors and costs of the 4IR.

23.2 Drivers of the Fourth Industrial Revolution

The 4IR is driven by factors that possess various challenges. It must be noted that the drivers and challenges of the 4IR outlined below are not the only factors. There are various factors that need thoughtful consideration if the South African local government is to fully take advantage and ensure the maximisation of the 4IR and some inherent benefits such as that of optimally delivering goods and services to the general citizenry within each municipality's

area of jurisdiction. Such drivers are identified by Manda and Dhaou (2019) and discussed in the paragraphs that follow.

Information Communication Technology infrastructure

As with the previous revolutions, technological infrastructure is of critical importance for the purposes of ensuring enhanced communication systems during the 4IR. It is, however, argued that South Africa is lagging behind in terms of ICT infrastructure that embraces and facilitates the 4IR. Nxumalo (2019), for instance, holds that both government and the private sector are not on a par with their counterparts in terms of communication, energy, transport and technology infrastructure. He argues that South Africa is still and will remain stuck in the third industrial revolution. This is an unfortunate situation as the 4IR confronts and seeks to modify all aspects of people's livelihoods, particularly in relation to how they relate to government in terms of goods and service delivery.

Levin (2018) is of the view that to turn the situation around, government needs to learn from success stories on technology and innovation adoption journeys from pioneering nations. One such nation is China, which is South Africa's partner in BRICS and doing significantly well in ICT. This is one way in which South Africa can achieve ambitions such as the building of "smart cities" as advocated in public policies and the National Development Plan (NDP) (Vision 2030). According to Wilson and Guya (nd), the smart city approach has been recognised for its wide-ranging principles and flexibility that allow cities to tailor approaches to the local and national challenges confronting them.

Countries considered to be smart have adapted the smart agenda to respond to local challenges (Mosco, 2019). Wilson and Guya (nd) argue that South African cities need to interpret the smart city concept to respond to their local challenges, in particular, service delivery, poverty, inequality and poor technology. In both the 2019 and 2020 State of the Nation Addresses (SONAs), President Ramaphosa stressed the role that smart cities and the 4IR could play in managing the challenge of urbanisation in RSA. The smart city vision, which is presented as the solution to challenges confronting the RSA, is one of the high-speed rails and fast technology.

Manda and Dhaou (2019) view ICT infrastructure such as broadband connectivity as an enabler for effective communication between government and its people, integrating people, systems and machines. Metropolitan municipalities such as the City of Tshwane and Cape Town have already made significant strides in extending their ICT infrastructure and ensuring

access to the general citizenry. This will go a long way in curbing unethical practices and enhancing “social accountability” (Badimo, 2019) in the public administration practice. This is in line with the aspirations of many South African municipalities, which is to augment the delivery of services electronically (e-services).

Education and training dispensation

Skenjana (2019) posits that education models and methods need to evolve as the skills requirements shift as a result of the 4IR. This subsequently demands appropriate educational policy responses. In the words of Levin (2018), the 4IR is centred around “knowledge and skills-intensive production”. This necessitates that policy makers revisit the education systems, especially the Public Administration curriculum as offered in institutions of higher learning, as the demand for highly skilled labour in the public administration practice will increase (Manda & Dhaou, 2019). Therefore, government needs to promote not only research and development but also the setting up of new talent and education programmes aligned to the 4IR (Levin, 2018). South Africa is already confronted with a “failing education system”, which has a bearing on its global competitiveness (Mathebula, 2018; Mathebula, 2020).

The let-down by the educational system and that of the Public Administration curriculum to address governance and service delivery challenges is further seen in the failure of scholars to theorise and seek to promote a discipline that talks directly to local realities (Mathebula, 2018). Despite all these, the 4IR presents a new dawn that government needs to take advantage of and use new sets of technologies and infrastructure to ensure the transformation of the education system (Kayembe & Nel, 2019). This means the refocusing of resources and investment in this sector if South Africa is to become a global competitor.

Policy paradigm and innovation

Manda and Dhaou (2019) argue that policy and legislative reforms are imperative prerequisites as countries transcend into the 4IR as they equal the governing of a more complex and smarter environment. The 4IR requires that new policies and regulations be enacted and speedily implemented in order to quicken the positive impacts of the new technologies while minimising unintended consequences (World Economic Forum, 2018). The question that needs to be answered relates to whether legislatures possess such capacity for what can currently be referred to as a “legislative overhaul”. The World Economic Forum (2018) is of the view that policy paradigm shifts must be viewed as the shared responsibility of all sectors of the economy. The South African Government accepts that the 4IR will disrupt

current existing policies and therefore calls for an urgent development of data- and technology-related policies as a starting point (Corporate Governance of Information and Communication Technology Policy, 2018). Areas of focus according to Manda and Dhaou (2019) include trade relations, and securing enterprise and personal data, which can all be achieved through policy and legislative frameworks.

Responsiveness and strategies

Guidelines in terms of strategies on how government needs to respond to the 4IR need to be clear and specific (Lee et al., 2018). In order to ensure that there is coherence and inclusivity, strategies must address the needs of all sectors of the economy. The Presidential Commission on the Fourth Industrial Revolution in South Africa concedes that there is currently no existing strategy on how to ensure inclusivity and the implementation of the 4IR, and calls on the private sector and civil society to play active roles to help in strategy development (RSA, 2018).

While strategies and partnerships are important between various actors of policy making, civil society is confronted with capacity challenges (World Economic Forum, 2019). However, the development of strategies makes organisations and, in this instance, public institutions be more creative and irrepressible. For Lee et al. (2018), strategies are meant to ensure the governance of technological transformation, leadership and capacity development.

23.3 Challenges confronting the Fourth Industrial Revolution

The 4IR presents some of the challenges that government must grapple with and resolve before swimming into an ocean of disruptive technology. Some such challenges are identified and explained hereunder.

Job losses and unemployment

South Africa is already grieving massive unemployment rates in its history since the advent of democracy, with the youth being the culprits. The 4IR is thought to bring about further job losses and a complete replacement of the labour force (Manda & Dhaou, 2019). There is no doubt that the 4IR will result in a pragmatic shift in labour-intensive to a more knowledge and skills-intensive production (Levin, 2018). According to Nalubega and Uwizeyimana (2019), substituting human labour with technology and its machinery will result in technological unemployment. This will exacerbate increased inequality, which is already one of the pressing

South African challenges. Technologists and economists continue to express the perceived effects in the impact of the 4IR on employment opportunities. These effects, according to Manda and Dhaou (2019), are worsened by an economy that is struggling to grow and create new job opportunities or even protect existing ones.

Skills deficiency

Skills deficiency or shortage means that demand for certain skills exceeds the supply for such skills (Daniels, 2007). There is, however, a tendency in public administration to define skills deficiency without considering issues of productivity and service delivery capabilities of government's executive institutions. The skills possessed by the workforce of an institution form an integral part and a determining factor on whether organisational strategies and objectives will be achieved (Mkhonza & Letsoalo, 2017). It is therefore necessary that skills gaps be identified in time so that such are addressed timeously.

In countries such as South Africa, e-readiness levels cripple transformation towards smart cities (Manda & Blackhouse, 2016). Skills gaps in South Africa are intricately associated with the past apartheid education policies such as Bantu Education (Daniels, 2007). If the country needs to be a global competitive player in the 4IR, capacity building for public officials is more important than ever.

Infrastructure backlog

According to Manda and Dhaou (2019), developing countries are not only confronted by societal challenges, but technology and infrastructure challenges. "Africa's lack of legacy infrastructure" could prove to be a hindrance in the "new global economy" for the purposes of facilitating the 4IR (du Preez, 2019). The 4IR bears immense potential to influence the way infrastructure is designed, developed and delivered and therefore calls stakeholders to implement effective strategies and create an enabling environment (World Economic Forum, 2019). However, in African countries there are numerous infrastructure challenges. Many of them pertain to the manufacturing sector, transport, telecommunication, and electricity (du Preez, 2019). This can only be summed up as closely relating to Africa not yet ready for the revolution. Hence Nxumalo (2019) describes Africa and South Africa as being stuck in the third industrial revolution and not ready for the 4IR.

Security and privacy

Security and privacy have become one of the major concerns in the 4IR era of technology (Manda & Dhaou, 2019). The City of Johannesburg, a metropolitan municipality in Gauteng, South Africa was recently hacked by invaders who threatened to release consumer information if a ransom was not paid in the form of bitcoins (Molosankwe, 2019; Sicetha, 2019). This kind of incident is one of the challenges that the 4IR presents, not only to corporates but also government institutions and individuals. Of course, the 4IR is associated with new challenges such as "e-security of enterprises and personal data" that necessitate regulation through policies and legislation (Zhou, Liu & Zhou, 2015).

According to the World Economic Forum (2018), security is related to the protection from unauthorised utilisation, access, disclosure, disruption, modification or destruction, while privacy, on the other hand, is the management of risk associated with the creation, collection, use, processing, storage, maintenance, dissemination, disclosure or disposal of personal data. From this, one can already see that security and privacy cannot be solely addressed through legislative frameworks, but also through information technology systems that are tightly secured.

23.4 Public service delivery and the 4IR in South Africa

The discourse and deliberations on the state of service delivery in South Africa is unavoidable. Government faces numerous challenges delivering services characterised by a lack of responsiveness to requests by service clients (Mawela, Ochara & Twinomurinzi, 2007) and failure to deliver the basics as required in terms of the Constitution, 1996. Since the 4IR changes the way we live, work and relate to one another (Levin, 2018; Badimo, 2019; Nalubega & Uwizeyimana, 2019; Manda & Dhaou, 2019; World Economic Forum, 2019), the question that this research then poses is how does the South African public sector change the ways of providing goods and services to the public. This also needs a brief integration of the Public Administration paradigm of e-governance and a new concept of e-participation.

Just like the 4IR, e-governance conveys benefits such as fighting corruption and increasing efficiency and transparency. On the other hand, e-participation refers to the use of online methods for developing and maintaining relationships between government and citizens that assist public administration to better meet the needs of the citizens, creating a more economically efficient bottom-up approach, thus ensuring that all relevant stakeholders are involved in the process of decision making (Vrabie & Tirziu, 2016). Of course, this is public

participation of the 4IR, a duty which the South African Constitution (1996) places on public administration to facilitate and ensure that the citizenry is actively involved in governance issues.

According to Nalubega and Uwizeyimana (2019), the 4IR threatens government operations such as defence, agriculture, environmental protection and public transport. This therefore means a shift in policy approaches and implementation. In this era, policy making that is adaptive and human-centred becomes a prerequisite for this revolution (Broekaert & Espinel, 2018).

It is in this revolution that social media platforms such as Facebook, Twitter and WhatsApp can be used to facilitate public policy-making processes whereby the citizenry is actively involved in decision-making and service delivery initiatives. This is so that citizen and stakeholder engagement are critical in law-making and regulation for effective governance (Campbell, 2017), particularly in the 4IR. Badimo (2019) asks whether the South African public sector shapes its policies and transformation agenda in order to address service delivery challenges rather than worsening them.

This question is critical as Nalubega and Uwizeyimana (2019) are of the view that the 4IR can bring about “enormous benefits”, coupled with increased efficiency and effectiveness in government in relation to how it delivers services to the people. According to Badimo (2019), the 4IR has the potential to rapidly transform and realign the public service delivery process in the South African public sector. These views are supported by Naidoo (2012) who holds that technological advances bear a great potential for South Africa as they may assist in better delivery, procurement, efficiency and communication between government and the citizens.

24. FINDINGS AND ANALYSIS OF THE RESEARCH

The findings and analysis of this study are discussed in the paragraphs that follow.

24.1 Demographic data

Table 1: Profiling of respondents (N=17)

Characteristics	Category	Frequency	Percent
Municipality name	Mogalakwena	1	5.9
	eDumbe Local Municipality (LM)	1	5.9
	Nkangana District Municipality (DM)	1	5.9

	Bushbuckridge LM	1	5.9
	Victor Khanye LM	1	5.9
	Emalahleni LM	1	5.9
	Mbombela LM	1	5.9
	Steve Tshwete LM	1	5.9
	West Coast DM	1	5.9
	Ehlanzeni DM	1	5.9
	Vhembe DM	2	11.8
	Makhado LM	1	5.9
	Tsantsabane LM	1	5.9
	Matjhabeng LM	1	5.9
	Winelands DM	1	5.9
	Nkomazi LM	1	5.9
Province	Limpopo	4	23.5
	Western Cape	2	11.8
	Northern Cape	1	5.9
	KwaZulu-Natal	1	5.9
	Mpumalanga	8	47.1
	Free State	1	5.9
Gender	Male	12	70.6
	Female	5	29.4
Qualification	BTech IT	3	17.6
	System and Network Engineer	2	11.8
	BSc Computer Science	3	17.6
	MBA	1	5.9
	BSc Informatics	1	5.9
	Diploma in ICT	3	17.6
	BSc Honours Computer science	2	11.8
	Diploma in Local Governance	1	5.9
Age	26 - 35 years	1	5.9
	36 - 45 years	14	82.4
	46 - 55 years	1	5.9
	46 - 65 years	1	5.9
Position in the municipality	IT manager	14	82.4
	Assistant Chief Information Officer	1	5.9
	Chief Information Officer	1	5.9
	Web Administrator	1	5.9

For credibility purposes, the research respondents, as depicted in Table 1 above, were profiled by their municipalities, educational qualifications, gender and age.

As illustrated in Table 1 above, each municipality had one respondent except for Vhembe district, which implies each municipality contributed 5.9% (n=1) towards the data. In terms of provinces, the majority of respondents, 47.1% (n=4) were from Mpumalanga, followed by 23.5 % (n=4) from Limpopo, the Western Cape with 11.8% (n=2). Northern Cape and KwaZulu-Natal each had 5.9% (n=1).

The analysis also indicates that many of the respondents were male (70.6%) compared to females 29.4% (n=5). Most of the respondents attained a BTech IT (17.6%), Diploma in ICT (17.6%), and BSc Computer Science (17.6%) compared to other qualifications: System and Network Engineer (11.8%), MBA (5.9%) and BSc Informatics (5.9%). It is essential to ensure that the issue of gender is addressed in terms of the Employment Equity Act, 1998 (Act 55 of 1998) and other relevant legislation. The idea is to redress the imbalances of the past discrimination in terms of gender, especially because women are the majority in most institutions in our country, including in municipalities.

The majority of the respondents (82.4%) were in the age group 36 to 45, 5.9% of respondents were in the age group 26 to 35, 5.9% were in the age group 46 to 55 years and 5.9% of respondents were in the age group 46 to 65 years. Of the respondents, 82.4% were IT managers, 5.9% were assistant chief information officers, 5.9% were chief information officers, and 5.9% were web administrators.

24.2 Number of ICT Personnel

Table 2: ICT Staff in Municipalities

Characteristics	Mean	Standard deviation	Minimum	Maximum
Number of ICT personnel within the municipality	7	5	1	20

The above findings illustrate that the mean number of ICT personnel within the municipalities was seven with a standard deviation of five, a minimum of one and a maximum of 20. This shows that municipalities are understaffed with personnel responsible for ICT matters and therefore need to be capacitated with experienced and qualified people.

24.3 Relevant ICT policies and strategies

Table 3: ICT Data

Subject	Categories	Frequency	Percent
Does your municipality have an ICT strategy or long-term ICT strategy?	Yes	16	94.1
	No	1	5.9
Does your municipality have relevant ICT policies?	Yes	17	100
	No	0	0
Does your municipality have proper network infrastructure (Local Area Network (LAN) & Wide Area Network (WAN)?	Yes	17	100
	No	0	0
Does your municipality have a properly equipped server room?	Yes	15	88.2
	No	2	11.8
Are your municipality applications and software licences valid or up-to-date?	Yes	14	82.4
	No	3	17.6
Does your municipality deploy security software or equipment to secure institutional information?	Yes	16	94.1
	No	1	5.9
Does your municipality have any audit findings on ICT?	Yes	8	47.1
	No	9	52.9
Is your municipality use an enterprise solution, e.g. Enterprise R P system?	Yes	8	47.1
	No	9	52.9
Does your municipality have a Business Continuity Plan (BCP) to recover critical information in the event of disaster?	Yes	11	64.7
	No	6	35.3
Do citizens attain the necessary lessons from your municipality about how e-services work?	Yes	6	35.3
	No	11	64.7
Does your municipality try to get feedback from citizens on whether e-services are working better?	Yes	7	41.2
	No	10	58.8
Are e-services sustainable?	Yes	10	58.8
	No	7	41.2

According to 94.1% of participants, as depicted in Table 3 above, the municipalities have ICT strategy or long-term ICT strategy. The findings further reveal that all (100%) municipalities have relevant ICT policies. As illustrated in Table 3, all (100%) municipalities have proper network infrastructure.

Having an ICT policy is of particular importance as the ICT managers in municipalities have the responsibility to drive change. All municipalities should adapt to the demands posed by the 21st century and the 4IR. ICT policy is one of the documents that form the ICT culture of the municipality and influence the development of ICT capability and ICT literacy at the municipality. ICT policies consist of various sections that stand as a roadmap for staff to follow.

ICT policies in organisations should also form a vision for the whole organisation and therefore should be partly constructed by various members of staff who are part of the ICT committee (Hilkemeijer, 2021).

24.4 Properly equipped server room

To the question "Does your municipality have (a) proper(ly) equipped server room?" the majority (88.2%) agreed while 11.8% disagreed (see Table 3 above). In most municipalities, applications and software licences were valid or up-dated according to 82.4% of the respondents. Eden District Municipality's *ICT Security Controls Policy* (2017) provides that:

- the ICT manager must take reasonable steps to protect all ICT hardware from natural and man-made disasters to avoid loss and ensure reliable ICT service delivery. ICT hardware under control of the ICT function must be hosted in server rooms or lockable cabinets. Server rooms must be of solid construction and locked at all times
- the ICT department must retain an access control list for the server room. Access must be reviewed quarterly by the ICT Manager
- all server rooms must be equipped with air-conditioning, fire detection and suppression mechanisms
- a maintenance schedule must be created and maintained for all ICT hardware under the control of the ICT department. Maintenance activities must be recorded in a maintenance register
- server rooms must be kept clean to avoid damage to hardware and reduce the risk of fire
- cabling must be neat and protected from damage and interference.

It can also be stated that no ICT equipment may be removed from the server room or offices without authorisation from the ICT Manager.

24.5 Audit findings on ICT

The majority, 94.1%, as depicted in Table 3 above, mentioned that the municipalities deploy security software or equipment to secure institutional information, while most of the respondents, about 53%, indicated that their municipality has no audit finding on ICT. It must be argued that an ICT policy in municipal governance needs to be audited annually or frequently in order to keep up-to-date with the demands of community members and other stakeholders.

In addition, the ICT's strengths have to be enhanced, weaknesses have to be addressed, opportunities need to be exploited and threats have to be addressed. In this regard, Hilkemeijer (2021) argues that after the long-term aims of the organisation for ICT have been set, the next step is to audit the organisation's current policy. Ensure that the organisation's position and what factors influence it from the outside are known. The opinions of the staff on the current policy concerning how well it reflects the quality and extent of municipal governance with ICT across all municipal services should be gathered.

It is a good idea to present the audit in two different ways: a *detailed audit* and a *summary audit***.** A detailed audit should be thorough and comprehensive to enable administrative control to be exercised. The summary audit is not as meaningful as the detailed one to municipal employees. Hilkemeijer (2021) is of the opinion that "the summary audit should express the contents of the detailed audit in a form useful to municipal employees and all relevant stakeholders to whom a detailed audit would be confusing and, possibly, meaningless.

24.6 Business Continuity Plan (BCP)

The results show that only 64.7% have a business a continuity plan (BCP) to recover critical information in the event of disaster. It can be argued that municipalities must make a business continuity plan part of their ICT policy as the recovery of lost critical information is crucial for effective e-service delivery.

24.7 Necessary lessons from municipalities about how e-services work

Table 3 above indicates that a large number of respondents (64.7%) revealed that citizens do not receive the necessary lessons from their municipality about how e-services work, and the municipality does not try to obtain feedback from citizens on whether e-services are working better. This is in line with the research conducted by Vivier, Seabe, Wentzel and Sanchez (2015), which indicates that there appears to be a dearth of sufficient information exchange between local municipalities and residents in South Africa.

The diverse composition of communities, and particularly high levels of poverty and inequality, make it difficult for local government to understand and meet the needs of all residents. Such differences in experience and resources require different information-gathering, communication and engagement approaches. Conventional participation mechanisms are also plagued by numerous constraints that have been widely acknowledged across the

literature. Some scholars highlight the exclusion of certain groups, especially the poor (Masiko-Kambala, Gorgens & Van Donk, 2012).

24.8 Sustainability of provision of e-services

To the question ”Are e-services sustainable?” the majority, 58.8%, indicated “Yes” while 41.2% stated otherwise. It can be argued that e-services can only be sustainable if there is a properly equipped server room, up-to-date ICT strategy or policy, relevant resources (including ICT personnel, finances and proper ICT infrastructure) and frequent auditing of ICT governance in municipalities.

24.9 Services municipalities are providing online

Table 4 below shows the services offered by municipalities online; 17.6% of the respondents indicated that their municipality was not offering online services, 5.9% mentioned “e-billing and leave”, 5.9% indicated “municipal online statement viewing of pre-paid electricity purchases (and) SCM quotation submissions”, 5.9% revealed that there was “retrieval of billing statements and municipal accounts viewing, forms and other information of supply chain and more”, 11.8% mentioned that “Retrieval of billing statements and municipal accounts viewing, forms and other information of supply chain and more”, 5.9% indicated that “e-procurement, e-recruitment, fraud alert, MS teams, collaboration”, 11.8% mentioned “electricity and accounts”, 5.9% indicated the “financial system self-service”, 5.9% the “website and tourism app”.

From the above information, it is clear that some municipalities have started offering various services online. This indicates the desire by some municipalities to adapt to changing circumstances, changing with the times. It can be noted that the majority of municipalities surveyed indicated that they are not offering any e-service. The reason for this is not clear.

Table 4: Services offered by municipality online

Subject	Category	frequency	Percent
Which services is your municipality offering online?	None	3	17.6
	e-Billing, leave	1	5.9
	Municipal online statement viewing Pre-paid electricity purchases SCM quotation submissions	1	5.9
	Retrieval of billing statements and municipal accounts viewing, forms and other information of supply chain and more	1	5.9
	e-Procurement, e-Recruitment, fraud alert, Ms Teams collaboration	2	11.8
	Advertisement of tenders, jobs and other legislative documents for compliance through website	1	5.9
	Electricity and accounts	2	11.8
	Financial system self-service	1	5.9
	Website and tourism app	1	5.9

24.10 Services municipalities intend to provide online

On the services that municipality intend to offer, 5.9% indicated none, 5.9% stated “online application (recruitment, bidding, traffic, waste management, valuation)”, 11.8% indicated “own application for communication and services, and information sharing”, 5.9% mentioned “e-community participation”, 5.9% indicated “IDPs and budgets for public comments, new updates on current issues”, 5.9% mentioned “prepaid water, online community participation”, the other 5.9 indicated “committee and meeting management”, another 5.9% mentioned “self-service portal for consumers”, 5.9% indicated “financially, electricity and pre-paid water” and 5.9% indicated “design of website”.

Municipalities have identified several services that they intend to develop online. However, municipal councils and therefore management should ensure that their municipalities are well prepared to ensure a successful start to the project-based approach to introducing e-services. The municipality can encourage members of the community to use the Internet.

Table 5: Services municipality intends to offer online

Subject	Category	Frequency	Percent
Which services do the municipality intend to offer online?	None	1	5.9
	Online application (recruitment, bidding, traffic, waste management, valuation)	1	5.9
	Own application for communication and services, and information sharing	2	11.8
	e-community participation	1	5.9
	IDPs and budgets for public comments, new updates on current issues	1	5.9
	Prepared water, online community participation	1	5.9
	Committee and meeting management	1	5.9
	Self-service portal for consumers	1	5.9
	Financial, electricity and pre-paid water	1	5.9
	All main systems	1	5.9
	Design of website	1	5.9

24.11 Types of e-techniques used by municipalities

To the question, “Which e-technique is the municipality using to improve service delivery?”, 11.8% mentioned virtual council meetings, 5.9% indicated “none”, some mentioned “Currently we have utilised WhatsApp groups, SMSs and emails”, some 5.9% indicated “Ms team collaboration”, 5.9% mentioned “social media e-technique”, 5.9% indicated “virtual council meetings”, 5.9% indicated “consumer accounts by SMSs, mms and email upon arrangement”. “virtual council meetings and interviews” was chosen by 59% of the respondents who responded to the questionnaire of this study.

From the above analysis, it is clear that most municipalities use various platforms or e-techniques to ensure efficiency and effectiveness in rendering services to community members. The Table shows that virtual council meetings are commonly conducted by municipalities, which is essential to avoid the spread of the Covid-19 pandemic.

Table 6: E-technique used by municipality to improve service delivery

Subject	Category	Frequency	Percent
Which e-technique is the municipality using to improve service delivery?	None	1	5.9
	Smart digital	1	5.9
	Currently we have utilised WhatsApp groups, SMSs and emails	1	5.9
	Ms team collaboration	1	5.9
	Social Media e-technique	1	5.9
	Virtual council meeting	2	11.8
	Consumer accounts by SMSs, mms and email upon arrangement	1	5.9
	Virtual council meetings and interviews	1	5.9

24.12 Challenges confronting municipalities in providing e-services

Table 7: Challenges faced by municipalities

What are the challenges your municipality is facing in implementing e-service delivery?	Categories	Frequency	Percent
Infrastructure	Yes	7	41.2
	No	9	52.9
Information security	Yes	5	29.4
	No	11	64.7
Resources (finance)	Yes	11	64.7
	No	5	29.4
Lack of ICT skills	Yes	5	29.4
	No	11	64.7
	No	7	41.2

The results revealed that the majority of respondents, about 53%, have no infrastructure challenges compared to 41.2% who did. Furthermore, 64.7% indicated that they have challenges in information security. This is supported by De Lange, Von Solms and Gerber (2015) who argue that the general management of the security aspects of information and related technologies is generally not addressed properly in most South African municipalities. This is obviously a concerning situation as highly valuable and sensitive information is processed in high quantities by municipalities and the loss in the confidentiality, privacy and integrity could result in disastrous consequences.

According to De Lange, Von Solms and Gerber (2015), the functions and responsibilities of municipalities are to provide various services to the local citizens. These services include electricity, water, sewage and sanitation, and refuse removal. All of these services are nowadays rendered by utilising ICTs to some extent. In providing these services municipalities rely heavily on information and related enabling technologies, the need to protect these resources properly is clearly a notable concern.

The protection of information and related technologies is normally referred to as information security. When referring to information security, it is generally accepted that this term includes, not only the information itself, but also the technologies and systems involved with information processing, usage and transmission. Three key elements collectively contribute towards the safekeeping of information in the context of information security: confidentiality, integrity and availability. It is important that the process of information security be properly managed; and this is usually conducted through a process of information security management.

An effective municipal information security policy and good supporting policies are two of the most crucial aspects of a good ISMS. These policies should be directives that come from the municipal council; and a proper monitoring process should accompany these policies. Therefore, proper awareness of the roles and responsibilities among members of the municipal council is needed to ensure the effective implementation and functioning of these policies. Additionally, a clear understanding of the benefit of effective information security management is also crucial; and it would form part of any good ISMS.

25. CONCLUSIONS AND RECOMMENDATIONS

It is highly inconceivable to think of the fact that there are citizens who are of the view that the 4IR is discretionary and depends on whether governments can choose whether to accept or reject it. Just like globalisation, the 4IR needs to be accepted and coupled with a pragmatic shift in policies and structures of administration. Although the 4IR has implications on, among others, job losses, there are benefits in terms of speeding up service delivery, curbing corruption and promoting efficiency and effectiveness, which are what public administration lacks in a country such as South Africa.

Inasmuch as the 4IR will have an impact in almost all realms of life, public administration practice needs to set up speedy transformation agendas in terms of policy shifts and the necessary infrastructure. This will go a long way in ensuring that not only the South African government but all administrations around the world deliver their constitutional but also their

socio-economic, political, legal and other mandates. Developing economies stand to benefit tremendously in terms of efficiency and bettering the lives of the citizenry.

Anomalies such as corruption will also be minimised as governments shift from traditional way of delivering services to more technological avenues with proactive systems for detection and prevention of corruption. It was argued that the ICT sector also needs some form of transformation that seeks to allow for efficient, effective and economic delivery of services.

The policies and legislative frameworks as they relate to ICT and subsequently e-government and e-service delivery were then briefly discussed. As is the case in the South African local government sphere, there would also be a need to transform the policy dispensation, especially given the eminence of the Fourth Industrial Revolution and e-service delivery.

Clear perspectives on the benefits of e-service delivery were provided, which include, better service delivery to local communities, greater convenience, cost reductions and revenue growth, as well as shorter application processes for varied licences, permits and approvals. The study also gives an overview of the main preparations that municipalities can undertake to ensure a successful start to the project-based approach to introducing e-services as well as the preconditions to implementing e-government.

International and African perspectives on e-service delivery were highlighted. It was argued that achieving e-government in Africa is difficult because the continent has poor telecommunication infrastructure and human development capacity. This makes it clear that Africa has a long way to go in order to build a successful base for e-governance in general and e-service delivery in particular. It can be concluded that for e-governance to thrive and achieve service delivery goals, ICT infrastructure must be developed and maintained.

From the above expositions the following recommendations can be ventured:

- Research established that citizens do not receive the necessary lessons from their municipality about how e-services work, and the municipality does not try to obtain feedback from citizens on whether e-services are working better. It is recommended that municipalities should provide lessons to community members on how they can access municipal services online. Various mass media can be used in this regard.
- Most of the research respondents (about 53%) indicated that their municipalities have no audit findings on ICT. It must therefore be recommended that an ICT policy in

municipal governance needs to be audited annually or frequently in order to keep up-to-date with the demands of community members and other stakeholders.

- Research established that most municipalities have challenges with information security. This is supported by De Lange, Von Solms and Gerber (2015) who argue that the general management of the security aspects of information and related technologies is not addressed properly in most South African municipalities. It is recommended that an effective municipal information security policy and good supporting policies, as two of the most crucial aspects of a good ISMS, should be developed and implemented by all municipalities. These policies should be directives that come from the municipal council; and a proper monitoring process should accompany these policies.
- Research findings show that municipalities are understaffed with the personnel responsible for ICT matters. Therefore, municipalities should be capacitated with experienced and qualified personnel to enable them to provide e-services effectively and efficiently to community members.
- The analysis indicate that many of the respondents were male (70.6%) and fewer female (29.4%) (n=5). It is recommended that the issue of gender be addressed in terms of the Employment Equity Act, 1998 (Act 55 of 1998) and relevant municipal laws. The idea is to redress the imbalances of the past discrimination in terms of gender, especially because women are the majority in most institutions in our country, including municipalities.
- Research revealed that some municipalities have challenges in relation to resources, especially finance. It can therefore, be recommended that municipalities budget for adequate resources, especially financial resources, to ensure effective and efficient e-service delivery.
- Research established that some municipalities do not have proper server rooms. It can therefore be recommended that municipalities, through the ICT manager, should take reasonable steps to protect all ICT hardware from natural and man-made disasters to avoid loss and ensure reliable ICT service delivery. ICT hardware under control of the ICT function should be hosted in server rooms or lockable cabinets. Server rooms should be of solid construction and locked at all times. The ICT department should retain an access control list for the server room. Access should be reviewed quarterly by the ICT manager. All server rooms should be equipped with air-conditioning, fire detection and suppression mechanisms.

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Note:

RESEARCH PROJECT SIGN-OFF SIGNATURE

Research Partner Name: MJ Mafunisa Consulting

DIRECTOR

PROF. JOHN MUTUWAFHETU MAFUNISA

ANNEXURE A: QUESTIONNAIRE

Dear Sir/Madam

Please note that MJ Mafunisa Consulting is commissioned by LGSETA to conduct a scientific study on **THE VIABILITY OF E-TECHNIQUES TOWARDS SERVICE DELIVERY IN THE LOCAL GOVERNMENT SECTOR.**

Please assist by responding to the questions below. Your response will be treated as confidential as anonymity is emphasized.

BIBLIOGRAPHICAL INFORMATION

Municipality name: _____ Province: _____

Gender: _____ Age: _____

Qualification: _____ Experience in ICT: _____

Position in the municipality: _____ Number of personnel within the municipality: _____

Number of ICT personnel within the municipality: _____

1. Does your municipality have ICT strategy or long-term ICT strategy?	1. Yes	2. No
2. Does your municipality have relevant ICT policies?	1. Yes	2. No
3. Does your municipality have proper network infrastructure (Local Area Network (LAN) & Wide Area Network (WAN)?	1. Yes	2. No
4. Does your municipality have proper equipped server room?	1. Yes	2. No
5. Are your municipality applications and software licenses valid or up-to-date?	1. Yes	2. No
6. Does your municipality deploy security software or equipment to secure institution information?	1. Yes	2. No
7. Does your municipality have any audit finding on ICT?	1. Yes	2. No

8. Is your municipality using enterprise solution e.g. Enterprise RP system?	1. Yes	2. No
9. Does your municipality have Business Continuity Plan (BCP) to recover critical information in the event of disaster?	1. Yes	2. No
10. Do citizens get the necessary lessons from your municipality about how e-services work?	1. Yes	2. No
11. Does your municipality try to get feedback from citizens on whether e-services are working better?	1. Yes	2. No
12. Are e-services sustainable?	1. Yes	2. No

Which services is your municipality offering online? _____

Which services do the municipality intends to offer online? _____

Which e-technique is the municipality using to improve service delivery? _____

What is the capacity of WAN connected? _____

What are the challenges your municipality is facing in implementing E-service delivery?

1. Infrastructure (connectivity) ☐
2. Information security ☐
3. Resources (finance) ☐
4. Lack of ICT skills ☐
5. Other _____