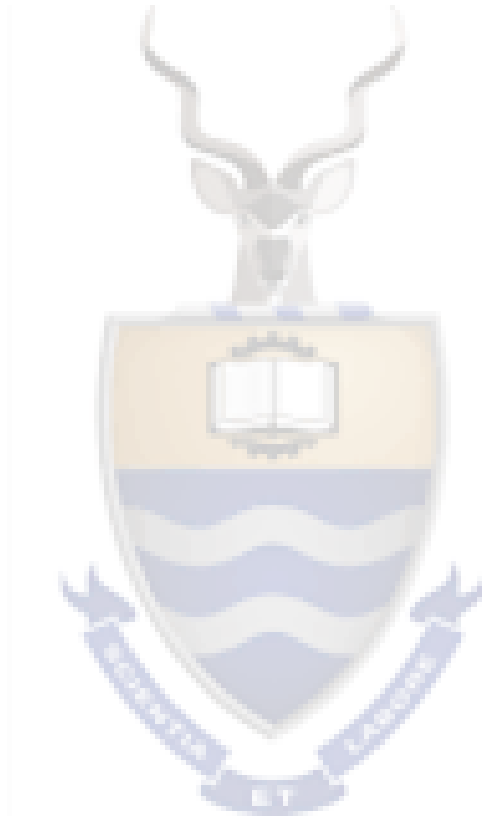


ASSESSING THE DPSA'S, AND PARTNERS', PERSPECTIVES ON DIGITALISATION FOR IMPROVING EFFICIENCIES IN THE SOUTH AFRICAN PUBLIC SECTOR



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A research report submitted to the Faculty of Management, University of the Witwatersrand, in 50% requirement of the requirements for the degree of Master of Management (in the field of governance and public policy)

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Abstract

The purpose of this research was to explore the perspectives of public sector officials placed in the e-Government Services and Information Management unit of the DPSA, and partners, who are responsible for coordinating and drafting the Digital Government Policy Framework, on the implementation of digitalisation in the context of improving public sector efficiencies. This was justified as important because, the attitudes and perceptions of policy developers about digitalisation will influence the directionality of policies they develop on the implementation of digitalisation or the digital transformation agenda more broadly. The research primarily questioned what the perspectives of these officials are on the implementation of digitalisation in the context of improving public sector efficiencies in South Africa. The study adopted qualitative research methods. Semi-structured interviews and case studies were adopted to respond to the research questions. The main findings were that there is a need for government to strengthen the legitimacy of government digital transformation through releasing decisive political will; there is a need for elevation of the position of the Chief Information Officer in government departments; and lastly there is a need for the establishment of a central agency that will guide transformation of public service administration to perform important functions required to successfully transition to a digital government. The study concludes by emphasising the risks at local, regional, and international levels that the South African government faces if the urgency to act is undermined.

Declaration

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Management (in the field of Governance and Public Policy) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree examination in any other university.



Nompumelelo Precious Lukhele

30 March 2023

Dedication

To my father Chief Sphiwe Jimmy Lukhele, whom in the very few years I knew him for, I saw him do three things. He loved South Africa and 'her' people, he loved his family, and he passionately advocated for the education of an African child...

R.I.P 1950-2001

*...Lukhele, Mhlant'wendlunkulu, Mmbodzi, netitfukutfuku tawo,
nina waboNkosi nabomavev'emvula!*

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Acronyms

3IR	Third Industrial Revolution
4IR	Fourth Industrial Revolution
CIPC	Companies and Intellectual Property Commission
CPSI	Centre for Public Service Innovation
DCDT	Department of Communication and Digital Technologies
DGPF	Digital Government Policy Framework
DHA	Department of Home Affairs
DPSA	Department of Public Service Administration
DSI	Department of Science and Innovation
DTPS	Department of Trade and Postal Services
EGPF	Electronic Government Policy Framework
GITOC	Government Information and Technology Council
ISAD	Information Society and Development
MPSA	Ministry of Public Service and Administration
OECD	Organization for Economic Cooperation and Development
PNC	Presidential National Council on Society
SARS	South African Revenue Service
SITA	State Information Technology Agency

1. CHAPTER 1: INTRODUCTION

The attitudes and perceptions of policy developers about digitalisation will influence the directionality of policy (Plesner & Justesen, 2022). This study aims to understand how South African digital governance policy makers at the Department of Public Sector Administration (DPSA), and partners which are currently drafting the Digital Government Policy Framework (DGPF), think of the digitalisation of government processes to improve government efficiencies. This is because, although they act at a micro level, their individual perspectives, positive or negative, are likely to shape digital transformation for the public sector, at a macro level (Vasilescu, Serban, Dimian, Aceleanu & Picatoste, 2020).

The study focuses more broadly on their perceptions around digital transformation. Given the context, this includes the digitisation process which precedes digitalisation.

1.1. The international digital transformation landscape in recent history

The 2016 G20 Summit engagements held in Hangzhou on *the new production revolution and innovation policies* re-ignited discussions on building the government digital agenda. At the time of these discussions, some countries had commenced positioning themselves as digital governments and had started harnessing the benefits of transformed public service administration.

In 2017, the G20 Roadmap for Digitalisation was developed and adopted by the G20 countries (OECD, 2019). At different speeds, these countries have been developing their innovation and digital government policies (Jonathan, Hailemariam, Gebremeskel & Yalew, 2021). According to the Digital Economy and Society Index (2021) report, Malta, Estonia, Finland, and Denmark are currently ahead of many European Union (EU) countries, each scoring over 90 points on the key enablers for public sector digital transformation.

Although the intention has been there for many years, South Africa continues to have a public sector that is largely not digitalised both internal to government and in the delivery of public services (Cloete, 2012; Blom & Uwizeyimana, 2020). According to the CISCO report (2019) of digital readiness, South Africa is behind some of its middle-income peers, and also behind some emerging economy countries.

1.2. A brief South African legislative background

As stated above, there have been efforts to digitally transform public service administration in South Africa. The Department of Public Service Administration (DPSA) are currently in the process of drafting the Digital Government Policy Framework (DGPF) which will guide the required deliverables and activities to transform public service and administration. This draft framework is an update of the 2001 Electronic Government Policy Framework (EGPF) which was published by the DPSA (DPSA, 2001). These two policies are important for this study.

As South Africa continues to attempt equipping the public sector to achieve higher digital competitive levels, it is important to understand the kind of thinking that is existent amongst the officials responsible for driving the digitalisation agenda for government.

1.3. Problem statement

It is necessary to explore and understand how officials in the e-Government Services and Information Management unit of the Department of Public Sector Administration (DPSA), and partners (DCDT, SITA and CPSI) who are responsible for the drafting of the Digital Government Policy Framework (DGPF) think about the implementation of digitalisation in the context of improving public sector efficiencies. This includes the thinking of experts from the CSIR. The CSIR is a research and solutions developing support organisation for government which reports to the DSI.

This draft policy framework, together with its predecessor, the 2001 Electronic Government Policy Framework (EGPF) have been mandated to guide the activities and deliverables that are required to digitally transform the South African public sector. It is

therefore important that the philosophical understandings of the core team involved in policy development are understood at a niche level. This is because these perceptions are likely to translate into the final policy; ultimately guiding the digitalisation direction of the country.

The problem statement is informed by an argument made by Plesner and Justensen, (2022) stating that if policies are not well designed the frustration they may embody is carried down. In numerous cases policy implementation takes place without any prior consultation with stakeholders that are expected to implement the policy (Gofen and Lotta, 2021). Therefore, the study finds it important to understand the values, beliefs, assumptions, predispositions, and attitudes of the DGPF policy makers on the use of digitalisation to improve public sector efficiencies because these are likely to infiltrate into and be reflected by the final policy. The rationale further holds that, positive attitudes are critical to the digitalisation process, especially where adoption is concerned (Vasilescu et al., 2020).

The improvement, or not, sense of urgency, or not and ultimately positive direction and international digital competitiveness, or not, of the South African public administration and service depends, to some extent, on each of the actors' individual attitudes and perspectives. McBride, Misnikov and Draheim (2022) place emphasis on understanding the perspectives of public sector officials at an individual level using an interpretivist approach.

Therefore, the research gap is that, there is a paucity of studies that explore the perceptions of South African public sector officials on digitalisation for the improvement of public sector efficiencies using an interpretive paradigm. McBride et al., (2022) advocate the use of an interpretative paradigm.

1.4. Research purpose

The purpose of this research is to explore the theoretical perceptions of public sector officials placed in the e-Government Services and Information Management unit of the

DPSA, who are responsible for coordinating and drafting the DGPF, on the implementation of digitalisation in the context of improving public sector efficiencies.

1.5. Primary research question

What are the perceptions of officials from the DPSA and partners on the implementation of digitalisation in the context of improving public sector efficiencies in South Africa?

1.5.1. Secondary questions:

- a. What is the relative progress of digital governance in South Africa?
- b. What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies?
- c. How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation?
- d. Do officials generally express a need for the implementation of digital transformation in and by government?

Table 1: Research questions and objectives

Research Questions	
What are the perceptions of officials from the DPSA and partners on the implementation of digitalisation in the context of improving public sector efficiencies in South Africa?	
Investigative Question(s)	Research Objective(s)
Sub question (i) What is the relative progress of digital governance in South Africa?	To understand how the South African public sector is performing in relation to other countries and its progress in line with the aims of the 2001 e-government DPSA policy
Sub question (ii) What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies?	To understand if the officials are generally positive or negative about the use of digital technologies to improve public sector efficiencies
Sub question (iii) How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation?	To understand if the public officials understand these issues and how they speak of them within their organisations across government, societies and/or their personal lives
Sub question (iv) Do officials generally express a need for the implementation of digital transformation in and by government?	To understand if there is an urgency amongst public officials to improve the public sector both internally and externally through public service

The table above shows the above main research question, the sub-questions as well as what the sub-question's objective is.

2. CHAPTER 2: LITERATURE REVIEW

The literature review is separated into four parts with interrelated goals. The first part sets the scene by explaining concepts that are commonly used in the digital government environment, at a more macro level. It also discusses theoretical underpinnings of digital transformation with a focus on the two frameworks, and one model that are of importance in this study.

The second part presents and discusses specific pillars that are important in the implementation of digitalised work as well as in the deployment of shared digital infrastructure for citizen utilisation. This part also discusses elements to these pillars that influence individual's perspectives and technological adoption.

The third part of the chapter reviews two European and two African digital government case studies; these are Denmark, Estonia, Rwanda, and South Africa. The aim is to understand the relative progress of each country in achieving digital governance. The fourth and last part presents a summary and discussion of the two policies by the DPSA on the implementation of digital governance.

2.1. Digital government conceptual landscape

In both academic and grey literature, concepts of the government digital transformation discourse are often used loosely and interchangeably as if synonymous in ways that often conflate or confuse their meanings (Vial, 2019; Gong, Yang & Shi, 2020). It is evident that at both global and national levels, there is a need to reach consensus on the conceptual meanings of these terms to ensure that states understand each other at an international policy engagement level, and they also understand each other at a local policy and implementation level.

In addition to the hindrance to achieve interoperability, these multiple meanings pose risks to the academic legitimacy of digital transformation. This is because it reduces its methodological and cognitive soundness (Wenzel & Wil, 2019). Therefore, as the digital transformation agenda continues to become prevalent across the globe, it is important that policy makers, academics, and scholars consistently ground all relevant spoken or written concepts in theory.

Although 'legitimacy and correctness' are subjective and relative, it can be argued that disciplinary plasticity ought to be maintained in any field to ensure a structured production of results (Wenzel & Wil, 2019). This will positively contribute to education and problem solving for governments, students, and all humanity.

This section discusses; the third and fourth industrial revolutions, the digital transformation, e-government and e-governance, digital government and digital government, digitisation, and digitalisation, and lastly, innovation.

2.1.1. The third and fourth industrial revolutions

The Third and Fourth Industrial Revolutions are two separate but related periods. Both are also known as the Digital Ages or the Digital Revolutions because they mark an era whereby digital systems rose and became prevalent. The means of production during these periods are skewed towards the use of technology to achieve productivity (Kaplinsky, 2021).

The technocentric Third Industrial Revolution (3IR) rose around the late 60s to early 70s (Xu, Xu & Li, 2018). The succeeding Fourth Industrial Revolution (4IR) which is often defined in lines of connecting technology to people rose from around 2011 and is understood as the current era (Schwab, 2017; Kaplinsky, 2021; Philbeck and Davis, 2018).

The distinct feature of the 4IR is the extraordinary capabilities of emerging technologies which present nations with opportunities which could never have been predicted

(Schwab, 2017). However, these uncharted fields also pose many known, and unknown risks which cause concerns amongst various groups (Kaplinsky, 2021).

Governments across the globe are presented with new policy and regulatory challenges of a very unusual calibre as they engage in dialogues to better understand the 4IR. They often must strike a difficult balance between minimising risks whilst benefitting from the presented, and still rising technological advancements.

Artificial intelligence, which is not necessarily new to the 4IR, is gaining more abilities in the era. This includes advanced machine learning presenting systems that are able to mimic humans and nature (biomimicry), communicate to each other (interoperability and internet of things), recognise patterns, and many other unlimited capabilities that are built in the digital systems (Schwab, 2016; Xu et al., 2018; Kaplinsky, 2021).

2.1.2. Digital transformation

There currently is no consensus in the definition of digital transformation (Gong, 2020). At government level, the term 'government digital transformation' is often defined using envisaged impacts, activities, or benefits (Kattel & Mergel, 2019). After reviewing 23 unique definitions of the term, Vial (2019) defines digital transformation as "A process where digital technologies cause disruptions triggering strategic responses from organisations that seek to alter their value creation paths while managing structural changes and organisational barriers that affect the positive and negative outcomes of this process."

Research by Matt, Hess and Benlian, (2015) whose framework is used later in the study, is also part of the list reviewed by Vial (2019). Matt et al., (2015) define digital transformation from a strategy perspective as "A blueprint that supports companies in governing the transformations that arise owing to the integration of digital technologies, as well as in their operations after a transformation." One may indeed argue that the circularity of the transformation word makes the definition unclear.

Though reasonably good, the definition by Vial (2019) is arguably complex which also causes confusion and exposes it to different interpretations. It can be simplified as; an ongoing application of digital technologies by government to create value changes whilst managing risks (Researcher, 2023).

2.1.3. e-Government and e-governance

Electronic government (e-government) refers to the use of information communication technologies (ICT) as a platform for government to communicate with and provide services to citizens and businesses (Malodia, Dhir, Mishra, & Bhatti, 2021). In literature, this follows the ability of government to use ICTs to improve its internal structures and operations (Twizeyimana and Andersson, 2019). This implies therefore that, a government that has merely deployed ICT systems internally, is not an electronic government. It is a government that has IT systems. It becomes an electronic government when these systems are for outreach. Electronic government increases the transparency and outreach of government services (Twizeyimana and Andersson, 2019). Additionally, although transparency is increased, e-government is 'government centric' and unidirectional.

On the other hand, e-governance refers to the use of ICTs to improve the quality of government services to the public, the quality of information dissemination, and of common operations (Blom and Uwizeyimana, 2020). The benefits of e-governance include enhanced citizen participation, efficiency of government systems, cost reduction, citizen empowerment, and informed government decision making processes (Adeodato and Pournouri, 2020). E-governance can therefore be understood as bidirectional and quality oriented.

The key differences between e-government and e-governance are that the former implies a transition to the utilization of ICTs as a tool to increase government's outreach in terms of service and information provision. The latter implies the use of ICTs in the transformation and support of the functions and structure of the system for the sake of

enhancement, quality, and efficiency of government processes and engagements with users (Janowski, 2015).

2.1.4. Digital government and digital governance

To the OECD, which South Africa and many other governments are member states of, digital government refers to a government that uses ICTs to achieve their policy goals by adopting good governance principles (OECD, 2020). In the literature, some scholars and governance bodies do not explicitly define digital government but refer to its benefits or parts (Janowski, 2005; Clarke, 2020; Erkut, 2020). What can be deduced however is that digital government employs comprehensive strategies and is more policy facing in the government's urge to solve societal, political, and economic pressures (Janowski 2015; Clarke 2020). Such a government is user centric, unlike electronic government which is more ICT-centric. It also moves away from technical structures to the processes involved at all levels (Erkut, 2020).

Digital governance is a framework for the establishment of clear accountability, roles, and decision-making authorities for an organisation's digital presence (Welchman, 2015). This concept therefore encompasses the establishment of norms, institutions, standards, and regulations that shape and guide the development and deployment of these technologies.

2.1.5. Digitisation and digitalisation

Digitisation can be defined as the process of converting or translating analogue data into digital data that is recognizable by a computer (Xu et al., 2018). Previously, especially before the 3IR and the introduction of computers, governments mainly used analogue representations, and physical papers and files in business operations, however with the introduction of computers papers were converted to soft copies that could be stored electronically (Kaplinsky, 2021). This transition was done through the digitisation process. The main benefit of digitisation is that information becomes more available and easily accessible to both government internal and external stakeholders.

Digitisation, together with smart digital technologies enable digitalisation (Barnewold and Lottermoser, 2020). Digitalisation is a process primarily concerned with the improvement of an organisation's business processes in a way that creates efficiency. It has benefits such as waste minimization and the automation of work and processes, increased productivity, and value creation broadly (Hassani & Silva, 2018; Muktiarni, Widiaty, Abdullah, Ana & Yulia, 2019).

The OECD defines digitalisation as, the utilization of data, networks and digital technologies or artificial intelligence technologies in a way that changes the ways that business processes and activities are conducted, which as a result, creates new activities (OECD, 2018).

Digitisation differs from digitalisation in the sense that the process of digitisation does not in any case imply the improvement, redesign, or changing the existing processes. This implies that if the government processes were inefficient before digitisation, they will most likely remain inefficient after digitisation. The only change is that the documents, information, or data become digital and thus accessible all (Barnewold & Lottermoser, 2020).

2.1.6. Innovation

Innovation, which refers to novel ideas which lead to the development and diffusion of new and/or improved technologies, or systems, or 'things' is a term commonly used in the public sector (Valenduc and Vendramin, 2017). In light of digital government within the context of the 4IR, digitalisation can be seen as an innovation depending on novelty of the improvements that it presents. Also, because at every horizon scan, governments are agreeing that new discoveries are made on the unending capabilities of artificial intelligence in the systems, the term innovation will continue to be a part of the digital transformation agenda. Its differentiator therefore can be understood as its underpinnings to being 'novel', 'new and/or improved'. Again, Innovation is time bound. Meaning that what is perceived as an innovation today, loses that status once its mainstreamed or common.

Digitalisation differs from innovation in that digitalisation can change the nature of an innovation ‘processes’ and spur further innovation (OECD 2018). The novelty of digitalisation is around the collection and exploitation of big data in ways not entirely comprehensible to the human mind (Valenduc & Vendramin, 2017; Kalim, 2021).

2.2. The Digital Government Evolution Model

To aid understanding on how some of the concepts on 2.1 fit together, an article on the evolution of digital government by Janowski (2015) is used. It suggests that such an evolution varies across countries but generally moves towards more complexity, contextualisation, and specialisation in a similar way to the process of evolution that leads to changes in cultures and societies. In the description of this evolution as experienced by many governments seem to indeed follow this route (Twizeyimana, Larsson, & Grönlund, 2018; Goede, 2019; Matedwa and Belle, 2021).

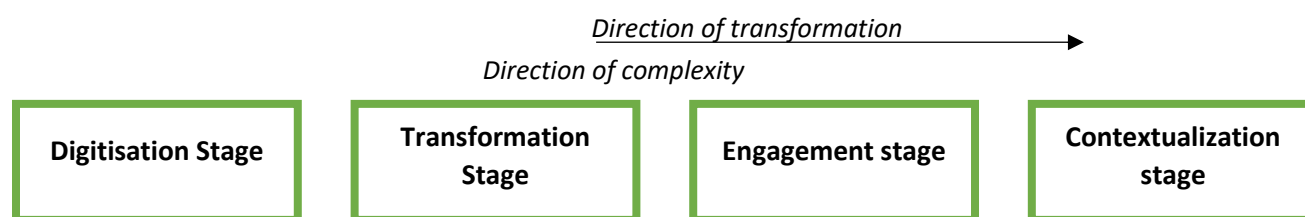


Figure 1: Digital government evolution model (Janowski, 2015)

This model uses three binary variables to further characterise the phases. The variables are in the form of questions to whether: i) digitisation adds to the structures of government internally, without disrupting them, or if the implied transformation affects the internal working and structures of government; ii) whether the transformation is only internal and does not affect external stakeholders, or if it transforms the internal structures and working of government and also affects government’s relationships with external stakeholders as business, citizens and others; and iii) whether the transformation is dependent on a specific application context of either the country, location or sector, or if the transformation is rather independent of context. The binary variables would either be negative or positive for each stage as shown later in this section on Figure 3 below.

STAGE	APPLICATION CONTEXT	CHARACTERIZATION		
		Internal government transformation	Transformation affects external relationships	Transformation is context-specific
Digitization	Technology in government	no	no	no
Transformation	Technology impacting government organization	yes	no	no
Engagement	Technology impacting government stakeholders	yes	yes	no
Contextualization	Technology impacting sectors and communities	yes	yes	yes

Figure 2: Digital government evolution model and characterization (Janowski, 2015)

2.2.1. Digitisation stage

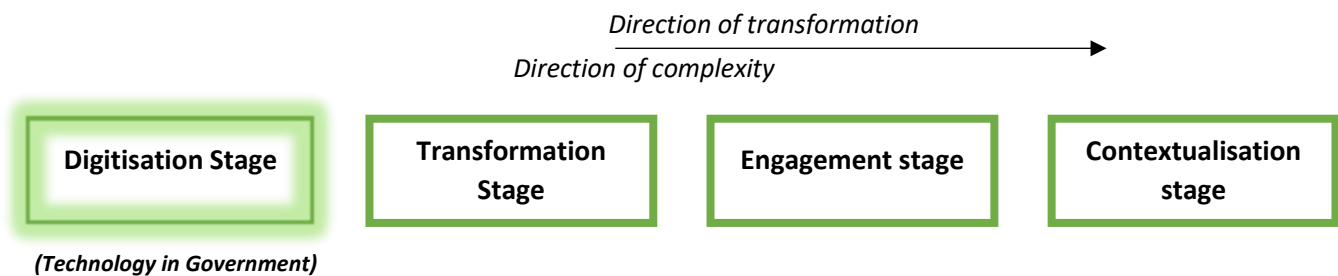


Figure 3: Digitisation stage of the digital government evolution model (Janowski, 2015)

The digitisation stage involves the introduction of the use of technology in government internal structures and working. This includes the designing, development, and operation of technological infrastructure as well as the development of technological capacities, capabilities, and an enabling environment. Governments at this stage often offer one-way communications to citizens and are technology centric and driven (Barnewold & Lottermoser, 2020).

Governments that are on this stage also constantly report on projects for ensuring that information is in electronic formats, user friendly websites are designed and developed, and that technological infrastructure to enable a digital government are being developed (Mayedwa & Van Belle, 2021). The binary characterisations, mentioned in Figure 3, are all negative for this stage which means that through digitisation is taking place, there is no internal government transformation that is being achieved, the external relationships are not affected nor is there any transformation that is context specific (Jawnoski, 2015). No new efficiencies are born in this stage (Barnewold & Lottermoser, 2020).

2.2.2. Transformation stage

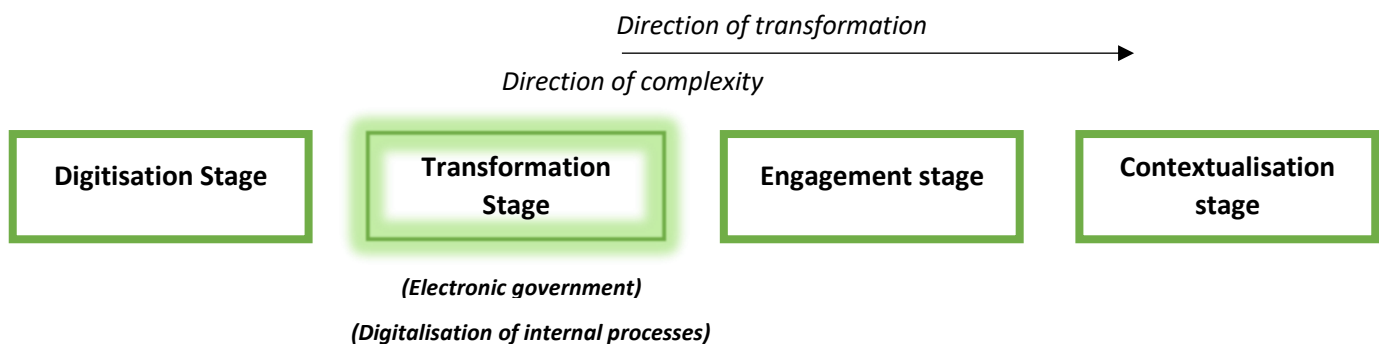


Figure 4: Transformation stage of the digital government evolution model (adapted from Janowski, 2015)

The second stage is the transformation stage which involves the introduction of e-government. This stage is driven by any government administration reform in pursuit of efficiency, simplification, effectiveness and rationalization of processes and other reform related goals (Janowski, 2015). Therefore, digital technologies are deployed on this stage for the improvement of internal processes, working practices, and structures of those reform seeking government organisations (Vial, 2018).

Transformation takes place internal to a single organisation but is not limited to this as it may be a whole of government arrangement which would therefore comprise of all sectors and levels of government. In South African literature, this is referred to as government to government (G2G) (Blom & Uwizeyimana, 2020). The expected impact to businesses and

citizens is indirect in the sense that interactions with government likely become improved and efficient.

The main enablers of these improvements are technological and digital environments, as well as the capabilities and structures that would have been established in the preceding digitisation stage, this can also be understood in the sense of how digitalisation is enabled by digitisation as discussed in section 2.1.5 above (Barnewold & Lottermoser, 2020). Government who are on this stage can be identified through reporting on initiatives for organisational change and change management, development aligned to stage of growth models, good project management, and the sharing of information and interdepartmental collaboration across government (Janowski, 2015).

The transformation stage aligns with the definitions of digitalisation on the section above. Vial (2018) however does not mention the term digitalisation in explicit terms. In the current study digitalisation of internal processes is understood to be categorised in the transformation stage together with e-government.

2.2.3. Engagement stage

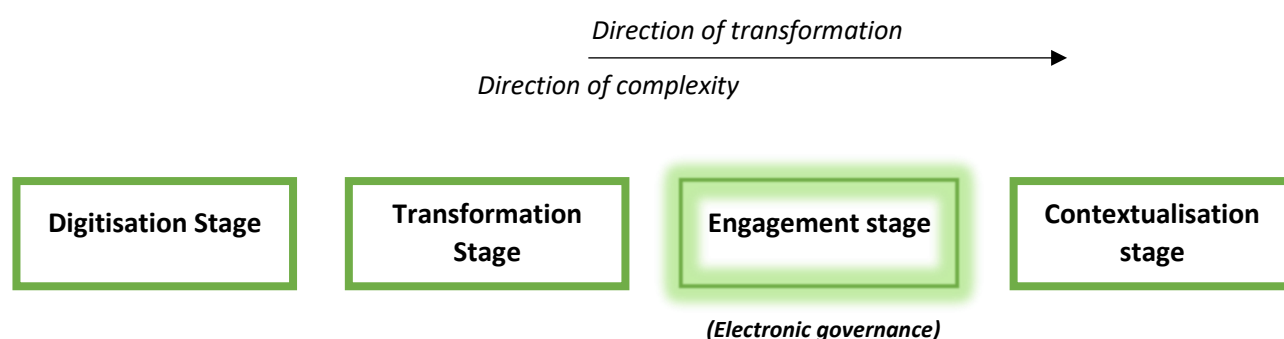


Figure 5 :Engagement stage of the digital government evolution model (Janowski, 2015)

The engagement stage relates to the literature reviewed on e-governance (see 2.1.3). The focus of this stage is on the use of digital technologies for the transformation of the relationships of government with civil society, business, and other non-government actors

which is also known government-citizens, and government to business (Mayedwa and Van Belle, 2021).

On this stage, the type of transformation pursued is for increasing the effectiveness, accessibility, and convenience of public service delivery systems for external users. It is also to promote the engagement of citizens on civil and political affairs, to realise public policy goals of high value, and to develop a knowledge-based economy and society (Janowski, 2015). Governments pursuing e-participation goals and goals relating to achieving bidirectional communication with government by citizens as businesses (Raudla, 2021)

The engagement stage can also be understood as one for promoting open government and 'digital by default' principles (Schou & Pors, 2019). The former playing a profound role in building trust between government its constituency, citizens, and businesses through its ability to increase transparency and accountability of government and public service provider's processes and operations (Gkinko & Elbanna, 2023). Digital trust is an imperative in attaining a successful digital government as discussed later in this section. Digital by default principles refers a principle where the interaction of citizens and business with government is facilitated using ICTs through mandatory self-services (Schou & Pors, 2019).

Expected initiatives in this stage involve projects for increasing the adoption of ICTs to interact with government. This can be efforts towards digital by default principles, projects that increase participation and engagement by citizens with government through the given digital platforms, projects to promote an open, transparent, and accountable government; and lastly, projects for building trust and managing cultural changes (Janowski, 2015). This stage often suffers some levels of exclusion although it may seem as if countries are advancing very well (Schou & Pors, 2019; Koiranen, Koivula, Saarinen & Keipi, 2020). It is always important to review countries carefully.

2.2.4. The contextualisation stage

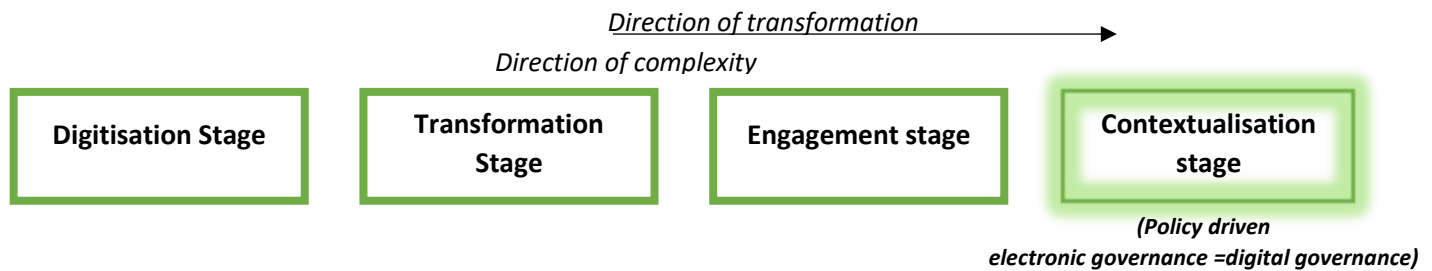


Figure 6: Contextualisation stage of the digital government evolution model (adapted from Janowski, 2015)

The fourth and last stage is the contextualisation stage which relates to policy- driven e-governance. This stage aims to join development to context specificity (Jankowski, 2015). It seeks to ensure that digital government supports municipalities, districts, cities, provinces, or any other territorial areas in their public policy specific developmental efforts. This stage places the outcomes of its preceding stages at the service of development and public service. It positions digital government as a vehicle for the achievement of social, economic, political, and cultural developments for any given territorial unit (Clarke, 2020).

The initiatives for investigation of this stage are inclusive of digital government in different economic sectors, for addressing the needs of marginalised and/or vulnerable groups, addressing specific policy relevant issues, in addressing national problems such as corruption etc. Characterisation wise, the applied transformation affects internal working process, relationships with stakeholders, and is also specific to a particular context.

2.3. Influential factors on the adoption and implementation of digitalisation in G2G and G2C structures

Investigations of meanings, workings and consequences of the digital age transformations and innovations ought to be viewed through societal, cultural, political, and economical lenses to identify, analyse, and understand the possible influences of

these aspects on the resultant views on the establishment of the digital agenda (Salminen & Hossain, 2018).

The attitude element is a major driving force of acceptance. In the digitalisation literature, or more broadly on the digital transformation discourse, some of the critical factors to consider during the implementation of transformational goals that are often discussed are around; addressing issues related to digital division, cybersecurity, ensuring privacy, addressing skills requirements through upskilling and reskilling, addressing readiness or maturity levels, building digital trust, and building digital infrastructure and leadership (Vasilesc et al., 2020). Governments who have managed to positively package these issues often succeed in the realisation of a digital government in relation to states that neglect some or all of the stated influencing issues (Raudla, 2021).

Proponents of digitalisation highlight the growth opportunities that are presented by digitalisation considering improved government efficiencies (Kaplinsky, 2021). Sceptics, on the other hand raise the risks of digital technologies to profoundly alter the intrinsic fabrics of work and society in ways that may bring peril to humankind. At the pivot are some social science scholars, acknowledge that although digitalisation presents progression economically, the use of these digital technologies may be pervasive and invasive in ways that bring emotions of social anxiety, insecurity, and threats (Salminen and Hossain, 2018). The relationship between technology and the user therefore must be studied, understood and the user heard and protected. People must be at the centre of the implementation of any digital solutions.

2.3.1. Cybersecurity and privacy concerns for a digital government

The changing nature of work due to digital transformation reforms that lead to digitalised work has become a salient public and policy issue (Salminen & Hossain, 2018). Some of the common concerns of heightened importance are issues on the safety of the systems for use, but also in terms of safeguarding and protecting organisation information, and people's personal information (Vargulis, 2021).

How can the introduced digital technologies be made continuously secure? This is an important policy question. Governments need to ensure that parallel to developing the digital agenda for users at both G2G and G2C levels, a comprehensive cybersecurity agenda is also built on a continuous basis (Aagaard & Pedersen, 2022). The last point on continual and agile actioning is an imperative given that the landscape of artificial intelligence changes rapidly in ways that advances and complicates the nature of cybersecurity attacks.

The golden raw material in the 4IR is data. Scammers devise many creative ways of exploitation and abuse of data; they can hold users' and states' sensitive information at ransom for manipulation purposes and many other reasons. Therefore, as governments become digitalised and enforce mandatory policies as *digital by default* policies, they also expose workers and citizens to security and privacy related risks (Adeodato & Pournouri, 2020). It is thus, the responsibility of the state to ensure that human's rights are centralised and protected. Some countries that have experienced cyber-attacks look in to blockchain technologies to tighten security measures (Hardy, 2022).

Although in developing countries the balancing of finances for cybersecurity requirements with other service demands proves to be a challenge (Cisco, 2019; Twizeyimana et al., 2018); if governments do not prioritise and openly communicate their regulatory, legal, and ethical-use standards to users, they face the risks of low digital trust and confidence in the systems that they introduce (Leitneu and Steinmuler, 2019). This means that users will develop negative perspectives and not use the systems as scholars have noted (Van Laar, van Deursen, van Dijk & de Haan, 2019; Vasilescu et al., 2020; Maglaras et al., 2020; Karpiuk, 2021).

2.3.2. Attaining digital trust for successful digitalisation

'Can I trust this system?' or 'Is this system trustworthy?' are different questions but they both arguably birth the concept of digital trust, an important digital policy related question. Literature reveals that, in the digital age digital trust has become one of the most important

pillars of success for any digital government (Horgan, Hackett, Westphalen, Kalra, Richer, Romao & Montserrat, 2021, Launer, Çetin & Paliszkievicz, 2022).

What does trust look like in digitalised government work? There are some scholars who approach this topic in the context of working environments to understand the driving dynamics to either high or low trust levels in the context of digitalised work (Gkinko & Elbanna, 2023). It is understood that, shifts in trust are often found to be interrelated with many other aspects as skills, previous exposure to digital technologies, perceived personal risk of use, involvement in change management processes, issues of digital division, and others (Plesner & Justensen, 2022).

The use of algorithms to learn, analyse and use human digital behavioural patterns to offer recommendations has left some employees questioning the possibility and extent to which their digital footprints can be traced, if they are being surveilled or profiled, whether these technologies can be trusted and who owns the data collected by the algorithms (Launer et al., 2022). Further to the need of trustworthy technologies, there are also concerns as to whether employees can trust each other, their IT departments which are becoming more powerful, their employers, and vice versa for the latter (Vasilescu et al., 2020).

Developing transparent processes, effective communication, and tight security measures to protect workers, businesses and citizens has evidently produced higher levels of digital trust (Adeodato & Pournouri, 2020; Vargulis, 2021; Gofen & Lotta, 2021; Malodia et al., 2021 Aagaard & Pedersen, 2022). Governments therefore need to ensure that these are in place to attain high digital trust at both G2G and G2C levels.

2.3.3. Understanding digital division

Although the digital transformation agenda holds promise for social interaction, individual sovereignty, and global integration, it also exposes inequality cracks in systems. These inequalities can polarise individuals or communities based on varying socio-economic and political factors as ethnicity, region, class, and political affiliation factors (Reisdorf, Blang & Dutton, 2019; Van Dijk et al., 2020). The digitalisation of work also follows the

same tread where it can differentiate between; the well-resourced, well spatially located, and well intellectually capacitated individuals, departments, and municipalities from those who have low maturity or readiness levels. This naturally leads to some systems working better than others (ibid, 2020).

Digitalised work in the digital transformation context has also changed the way that work productivity is understood (Reisdorf et al., 2019). The discrimination between 'who is productive' and 'who is not productive' are increasingly attributed to 'who has the ability to use certain technologies' and 'who struggles to use them', or 'who has access to these technologies' and 'who does not'. This means that those that cannot catch up due to digital division, stand the risk of being unfairly or discriminated and losing in certain opportunities because of the new views on how productivity is understood in the digitalised work. Digital division is therefore a major risk in the digital transformation discourse (Van Dijk, 2020).

Digital division as a concept, was defined by the OECD in the early 2000s as the gap witnessed across varying socio-economic statuses whereby individuals, businesses, geographic areas, households at different levels have differing opportunities to access and use ICTs and internet for a variety of opportunities (OECD, 2001).

These gaps are two. The first gap is in accessing the required information technology. The second is a gap in the ability to use the technologies. The latter gap may be attributable to an individual's motivation, skills, and the capability to use digital technologies (Mariscal, Mayne, Aneja & Sorgner., 2019). The issue of public service motivation is extensively discussed in the public administration discourse (Gofen and Lotta, 2021; Banuri & Keefer, 2016; Hassan, Zhang, Ahmad & Liu, 2021; Van der Wal, Mussagulova & Chen, 2021) and on related behaviour (Bertelli & Racucci, 2022). The urban rural divide is largely related to varying socio-economic statuses between individuals, departments, and municipalities, which is also in turn associated to digital division (Van Deursen et al., 2019; Van Dijk et al., 2020).

Where either digital gap is evident, employees or citizens are likely to have negative attitudes and perceptions on the implementation of digital transformation, and as a result feel that either themselves, their organisation and/or the state are not ready for such

transformation (Van Dijk et al., 2020). To some appreciable extent, digital division can be political. Plesner and Justensen (2022) observes that public officials seem reluctant to make big decision about digitalisation, especially if they could be political. Nonetheless, governments need to study and understand the ways in which digital division expressed itself in their countries and address that as they implement digital transformation initiatives. Governments must be inclusive and empower people, leaving no one behind.

2.3.4. The shifting landscape of skills

Digitalised work causes changes to the labour market in response (Vasilescu et al., 2020). The implications of digitalisation on the labour force need to be understood (Van Laar et al., 2019). The availability or nonavailability of the required skills determines the level of readiness for an organisation to implement digitalisation with optimal performance. Therefore, organisations ought to prioritise the development of strategies to reskill and upskill current employees, and to bring in other skill sets to the organisation (Warhust & Hunt, 2019).

The use of algorithms to digitalise processes, and to some extent automate work implies changes in the organisational structure posing a threat to some occupations such as manual, clerical, routine, and jobs that may require creative problem solving though the use of pattern recognition (Arntz, Gregory & Zierahn, 2017; Muktiarni et al., 2019). More high-end skills, technical, and managerial jobs are likely to experience growth (Cedefop, 2018; Warhust & Hunt, 2019). In areas where the automation of work is necessary, unlike in Germany where automation served a different purpose, literature often advises organisations, the public sector included, in developing countries to devise strategies to ensure a 'just transition' whereby officials are skilled to operate the machines or are repurposed to perform other duties in the organisation (Vasilescu et al., 2020). This means that, Government must study who will be the losers and who will be the winners in terms of skills required for the transition and come up with strategies on how to minimise the risks for the groups perceived to be losing.

Governments must also understand that perspectives on the level of readiness are important both at an individual level (where skills are involved), and at an organisation level (where institutional arrangements are concerned). These perspectives sum up several socio-economic, technological, cultural, and political views on the public sector digitalisation and gives an idea on whether officials are likely to adopt and use these technologies (Valenduc & Vendramin, 2017).

2.3.5. Leadership for maintaining the legitimacy of the digital transformation agenda

The development of strong leadership for digital governance is important for driving a successful digital government. It is also important for the required pillars for building a digital government to be understood from a public service transformation angle. This requires strong collaboration and coordination across government (Mayedwa & Van Belle, 2021).

Building and maintaining the legitimacy of the public sector digitalisation agenda is highly dependent on the ability of authorities to develop the required solutions, and to offer good governance. The perceived value of a functioning public sector, and the provision of the quality public services are justifications for legitimising the agenda (Nwaiwu, 2018). How authorities in leadership position's view and prioritise the implementation of digitalisation is important for the legitimisation of public sector digitalisation.

2.4. Part 3: The Technology Enactment and Digital Transformation Theoretical Frameworks

2.4.1. Digital Transformation Framework

The Digital Transformation Framework by Matt et al., (2015) seeks to understand and explain organisational digital transformation dynamics, which also can be used to understand digital government dynamics. Nwaiwu (2018) echoes the arguments of the framework stating the importance of centralising digital transformation for the prioritisation

of the integration of coordination, implementation, and prioritisation of digitalisation. Figure 7 below shows the four pillars of the framework which, irrespective of the organisation, have evidently remained constant as requirements for digitalisation (Matt et al., 2015)

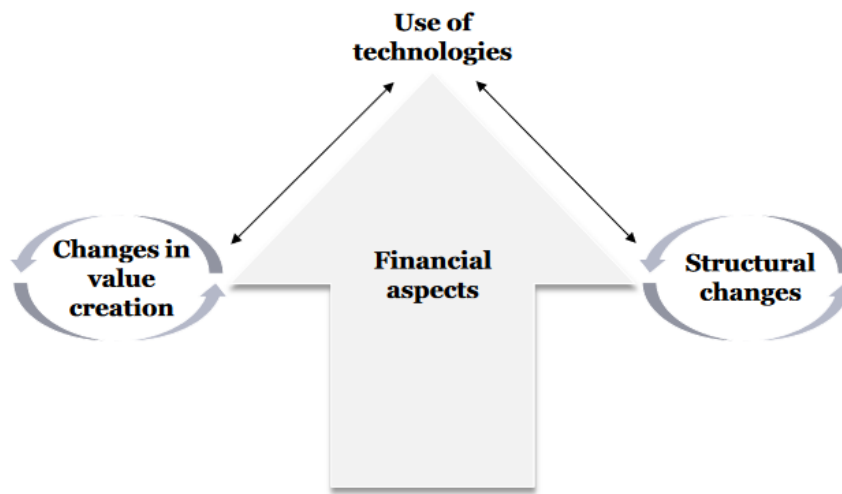


Figure 7: Digital Transformation Framework (Matt et al., 2015)

At the core of the model is a belief that, to understand the foundations of digitalisation, it must be explained from the four building blocks of digital transformation which are; the *use of technology* which is for assessing the attitudes of the organisation towards digital technologies as well as their ability to adopt them. Additionally, it assesses the strategic IT position of the organisation to either seek to be first movers in solutions development or if the organisation seeks to adopt such technologies (Nwaiwu, 2018).

The *value creation* pillar addresses the impact that the introduced digital technology strategies in turn introduce value changes to the organisation's value chain. The *structured changes* pillar focuses on the changes to the organisation's setup that are required to provide adequate basis for the accompanying opportunities (Matt et al., 2015).

The financial element assesses the urgency of the organisation to act towards the digital transformation agenda and also the ability to fund it (Nwaiwu, 2018). Some countries that struggle with the implementation of their digital strategies often report high budget

constraints (Twizeyimana et al., 2018; Mayedwa & Van Belle, 2021). The ability to finance truly is an enabler and driver of the digital transformation agenda. The most critical, according to Matt et al., (2015).

2.4.2. Technology Enactment Framework

The revised Technology Enactment Framework as seen on Figure 8 presents a dynamic process rather than one of predictive outcomes. The core of the framework lies in its distinguishing of objective technologies (which is the hardware, software, and or networks) and how actors perceive these technologies (technology enactment) (Schellong, 2007).

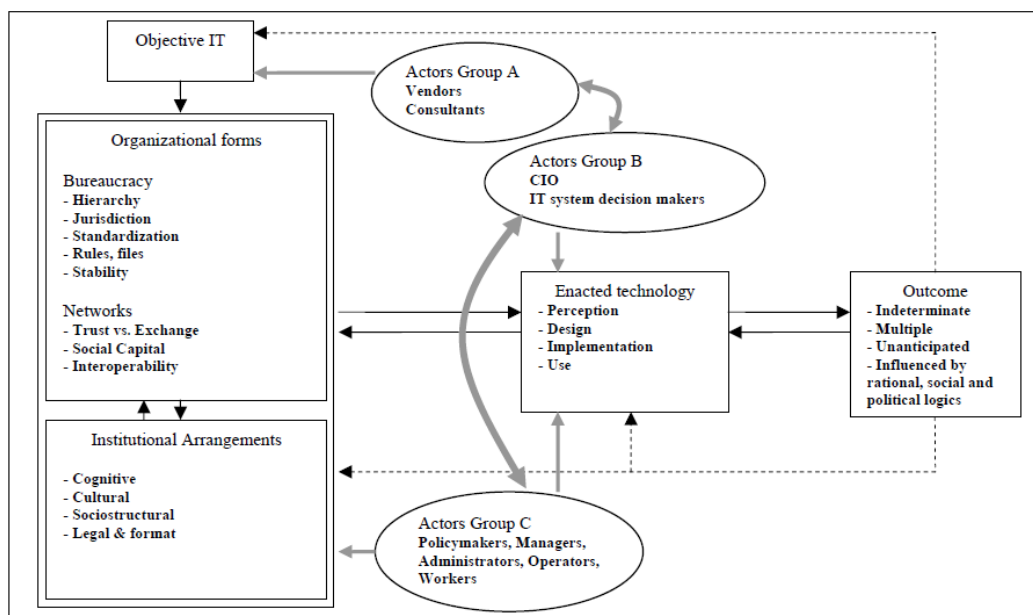


Figure 8: Revised Technology Enactment Framework (Schellong, 2007)

The Technology Enactment Framework has four elements which are; perception, design, implementation, and use. This enactment is mostly affected or influenced by the perceived use of the technology. This refers to the organisational forms as seen in Figure

8 categorised as bureaucracy and networks. These speak to collaboration and interoperability, which is the sharing of information across people and systems (Fountain 2001).

The perception and behaviour of actors according to the framework, are also influenced by institutional arrangements involving cognitive and socio-cultural dynamics amongst others. The last pillar addresses outcomes which affect all the other parts of the framework but they themselves are influenced by enacted technology and other logics (Fountain, 2004).

The revision of framework includes the actor groups (A, B and C) which seek to represent some public administrators that are important to note. Actors B and C influence technology enactment much stronger and directly than actor A group which has a more indirect influence (Shellong, 2007). The revision seeks to bring to the fore the importance of Chief Information Officers (CIOs), policy makers, managers, and workers to all the other parts of the framework.

2.5. Case studies: Exploring the progress of digital government and governance in the public service administrations of Denmark, Estonia, Rwanda and South Africa, and the use of digital technologies in public health contexts.

This section of the literature review seeks to roughly sketch the evolution of digitalised public sectors to highlight their key central policy milestones, outcomes, and government arrangements that have led to their success. Denmark and Estonia were chosen as examples from the developed north, and Rwanda and South Africa from the developing south.

Despite some of the major differences between these countries to South Africa such as population size and economic status, these countries are used as examples for the purpose of capturing lessons from their processes, activities, outcomes, strategic policies and interventions.

For each of these cases, one public health example is used for contextualisation purposes to understand how the state responds using its digital apparatus in specific contexts. The cases pay special attention to benchmark categories as human capital development, connectivity, integration of digital technologies, and digital public services which are common measurements in Europe (DESI, 2021).

2.5.1. Case study 1: Denmark's digital journey and public health case

Denmark maintains a highly comprehensive and digitalised public sector administration (Aagaard & Pedersen, 2022). With a very ambitious digitalisation agenda, Denmark remains one of the most successful digitalised public sectors at a global extent. The DESI index (2022) confirms this in terms of the performance of Denmark among European countries.

The OECD runs a digital government index (DGI) to measure the following digital government dimensions and rankings: 5th position for digital by design, 6th for open by default, 12th for government as a platform, 2nd for data driven public sector, 1st for user driven, and 15th for proactiveness (DGI, 2020). This index has consistently placed Denmark in the top 5 among OECD countries overall.

For these reasons, Denmark can be considered a country from which many other states driving digital reforms for their public administrations, can learn from.

a. Key milestones and digital infrastructure

The digitalisation journey for the Danes commenced in 1968 when public authorities developed a unique personal registration number, referred to as the CPR, to manage insurance tax through digital systems without any ambiguity. Between 1970 and 1980, there was a focus of developing ICT systems for various sectors of government administration such as hospitals, police stations, clinics, and others (Plesner, 2022).

Progressing to 1985, the government developed a unique identifier number for businesses. This number is referred to as the CVR, it is similar to the CPR. However, this

number was created with the intention of assisting government to handle value added tax (VAT) (Scupola & Mergel, 2022). From 1990 to 1999, public authorities focused on the development of administrative systems to support public administration efficiency and improve precision (Greve, 2018). These systems have a dual objective, on one hand it is to improve calculations, on the other hand it is to enable automation (Plesner, 2022).

In the year 2000, the Danes launched the country's first national strategies for digital public administration. This was followed by the formation of the Digital Task Team in 2001 which was mandated to investigate how IT systems could be used to benefit both citizens and businesses. Further, to recommend governance mechanisms which could be deployed in the areas of digital governance across all sectors (Greve, 2018).

The shared digital infrastructure includes the unique keys called mitID (my ID), a bidirectional communication obligatory digital post (Digital Post), the NemLogin (easy Login) which is the gate way for access to government, and lastly the nemSMS (easy Text messages) which public authorities use to send notifications to citizens and businesses (Plesner, 2022).

There is also a Shared Data Program which functions on principles of shared data to allow citizens to download any data they may need. Relevant agencies are obliged to upload appropriate and updated data to this portal (Plesner, 2022).

b. Key outcomes

The two main outcomes achieved by the Danish government are the establishment of digital services infrastructure that is consistent and logical for the use of citizens and businesses in contact with government. Secondly, they managed to place the 'digital by default' policy in action.

The *digital by default policy* is a policy that makes it mandatory for citizens and businesses to use the given portals and digital infrastructure when they want to communicate with government unless the specific user actively opts not to do so. In the case of the latter, the citizen or business is still catered for as allowable by policy. As far as trust goes, over

70% of Danes indicate that, they have confidence in the public sector to handle their personal information (Scupola & Mergel, 2022).

The latest and ongoing outcome involves the achievement of *digitally ready legislation* to remove ambiguity from legislation thereby enabling the provision of digital support to administrative processes; allow authorities to use technologies to develop public services; and allow for the establishment of frameworks for cohesive digitalisation across the board (Agency for Digitalisation, 2018).

c. Government arrangements and structure

The Denmark administration is largely decentralised with highly empowered local governments. Structurally, it is a three-tier formation with local, regional, and central government levels. A large share of the labour force is employed in the public sector. The public sector is viewed as an attractive employer in Denmark mainly because it is not politicised and does not exercise cadre deployment (Greve, 2018).

The central government has 18 ministries with just over 100 agencies. This level of government is responsible for studying trends and setting policy direction for government (Plesner, 2022). The next level of government is the regional government. This level has 5 regions that are responsible for hospitals and setting some of the industrial policies (Greve, 2022). The regions are reliant on government for funding.

The last and largest level is local government, which consists of 98 units, these are responsible for the delivery of services to the public including child and elderly care provision. The special administrations consist of 12 police stations and 22 court districts (Plesner, 2022).

d. Digital governance

The digitalisation of the public sector in Denmark is based on well-organised and strong collaborations between the three tiers of government administration and the private sector (ibid, 2022). The agency responsible for public sector digitalisation is called The Agency

for Digitisation. This agency sees to the development and funding of digital solutions, and the development and facilitation of legislation for digital governance (The Agency for Digitisation, 2022). This agency reports to the Ministry of Finance (Plesner, 2022). In other words, in Denmark the responsibility for public sector digitalisation rests with the Ministry of Finance.

e. Challenges and concerns

Despite the great overall achievement of the Danes in establishing a digitalised public sector, there are still some challenges and concerns that the authorities face and work on in a continuous manner for further improvements of their public sector administration.

The first is digital inclusion. Even with a population of about 90% of citizens being digitally enabled, some citizens with special needs, or difficulties using new technologies still require the state to proactively find ways of ensuring they are not left behind. The municipalities play a significant role in this regard by offering support and guidance to these citizens on a continuous basis (Ejersbo & Greve, 2016).

Other issues include the large costs of IT projects. The Danes report that some of the projects tend to go way beyond the planned budgets due to over optimism and less realism in planning. Flawed digital systems and immature technologies are also of concern as the planned benefits tend to not realise leading to increases in workloads and workload burdens for public officials (Plesner, 2022).

f. Denmark's public health system: the progress of digitalisation

Denmark has a Universal Health Care (UHC) system (Schmidt, Schmidt, Adelborg, Sundbøll, Laugesen, Ehrenstein & Sørensen, 2019). This means that the state is primarily responsible for the provision of health care for all citizens. The Danes authorities seek to achieve better health for all citizens by using health data and digital coherence in the health sector (Bak et al., 2022).

The three tiers of government and entities, led by regional government, collaborate when it comes to healthcare provision. There is aboard for health information technology consisting of member states from the Health Ministry, the Regions, Local government, the Agency for Digitalisation, and the Danish Data Authority (Plesner, 2022).

The country's Digital Health Strategy was launched in 2018 which was premised on digital health data that has been collected from citizens for over 40 years (ibid, 2022). The public uses some developed health care solutions such as the Sundhed.dk (Health.dk) portal where they are required to use their unique identifier to view or download their medical records, tests, information on medication, and other uses. Danes trust their government to handle their medical records ethically (Schmidt, et al., 2019).

The Danish government reports that, having digital platforms already in place made it easy for the state to communicate with citizens and businesses at the break of the Covid 19 pandemic (Bak et al., 2022). This was effectively done through the Digital Post and nemSMS. They further report that their digital health platforms also helped them to run analysis of the number of people who were vaccinated. Vaccines passes were shared with citizens via these platforms allowing or denying citizens entry into public places like restaurants and bars at the peak of the virus as a mechanism to curb the spread of the virus (Plesner, 2022). The post and SMS digital facilities also assisted the government in conducting research to roughly evaluate how many people were interested in vaccination judging from the number of people who would open their communications to read as these digital platforms have the capability to detect such activities (ibid, 2022).

2.5.2. Case study 2: Estonia's digital journey and public health case

Estonia enjoys the status of having developed the best digital public service in the Europe (DESI, 2022). The OECD's DGI (2019) ranks the country between 15 to 20 among its EU competitors on the dimensions of; digital by design (ranking 18), open by default (ranking 6), government as a platform (ranking 23), data driven public sector (ranking 15), user driven (20th position), and proactiveness (20th position). This index places Estonia 18th position in composite score.

a. Key milestones and digital infrastructure

The journey of e-Governance in Estonia started in 1996 with the development of the Tiger Leap Initiative to roll out IT systems across the country (Goede, 2019). The Estonian's journey to a digitalised public sector has been driven by the need to achieve increased public administration productivity, effective utilisation of state financial resources, and overall improved delivery of public services to citizens and businesses. This led to the development of the first Public Administration Development Concept (PADC) paper in 1999 to guide the agenda to public reform and modernisation with the mentioned goals at the core of the mandate. The Public Administration Reform Programme was then formed in 2001 to see this mandate through (Ernsdorff & Berbec, 2006).

The implementation of the Public Administration Reform Programme resulted in the use of information technologies in the public administration gaining prominence. The programme focused on five strategic areas around; the development of reforms for strengthening local and regional governments; ensuring that public administration is citizen-oriented; defining clear managerial roles between the various ministries and agencies and to increase cooperation between them; minimising differences between terms of employment of the private and public sectors; and the reformation of budgetary processes, the management of public finance and the development and enforcement of internal auditing (Ernsdorff & Berbec, 2006).

The modernisation of Estonia's public service administration generally did not take a linear approach, other modernisation initiatives were already taking place prior to the development of the PADC and 2001 programme. For instance, in 2000 e-Tax services were already rolled out in the country as well as the e-Cabinet application, and the Estonian government had ensured that all schools in the country had access to the internet in 1998 (Goede, 2019). The Estonian government maintains strong partnerships with the private sector in achieving many of its own goals for the benefit of all (Hardy, 2022).

The year 2001 also marks the year in which a significant milestone was reached. This speaks to the development of the X-Road application which is the backbone of the Estonian's public service (Salter, 2020). This platform is accessed by residents, private and public institutions using their unique digital identifier (E-ID) and PINS for access and signature. X-Road is made of an amalgamation of 360 security tight databases and offers a total of 2000 electronic services ranging from the filing of taxes, reviewing of medical records, vehicle registration, banking, and others. These PINS are two sets of pins, the first used for identifying the user and the other for the user to sign electronically (Hardy, 2022).

In 2005, Estonians had the option to vote online (i-voting). The system only requires the first pin to authenticate the user and their eligibility to vote (Drechsler, 2018). The system is comprehensible enough for voters to trust, it also assures privacy for voters thus building on trust (Raudla, 2021). With every succeeding national election, the number of voters that opt to use the online system increases (Drechsler, 2018). In 2007 the Estonians experienced cyber-attack and developed cybersecurity measures to safeguard their users, followed by more fortification through blockchain in 2008 (Hardy, 2022).

In 2014, the country was the first in the world to develop e-Residency, which is a way of offering entrepreneurs non-physical residency in Estonia but allows them to start a business and invest in Estonia (Goede, 2019). The e-resident obtains an e-ID but cannot use it to access the country physically.

The seamless services roadmap was developed in 2018 as a proactive government's approach to minimise bureaucracies in communicating with government, and in 2019 the Government AI strategy was launched to outline and regulate ethical use of AI in government and by private entities (Estonia Government, 2023).

b. Key outcomes

The outcomes of the Estonian government include the successful establishment of digital infrastructure with high acceptance and use levels (Aagaard & Pedersen, 2022). The e-

Cabinet saves government officials 4 and a half hours for meetings that used to take 5 hours now taking 30 minutes (Estonia Government, 2023).

Secondly, the public administration performance has improved greatly due to digitalisation, thirdly the country enjoys the status of being first movers with e-Residency and the successful implementation of it thereof where investments in Estonia have increased (Goede, 2019).

c. Government arrangements and structure

The Estonian government stresses and exercises the decentralisation of functions to governments at lower levels, to the private sector and to civil society members (Estonia Government, 2022). Structurally, this state is also a three-tier government with a national or central level government, the regional government, and the local government (Estonia Government, 2023).

National government (or central government) has 11 ministries and 33 administrative agencies, boards, and inspectorates. There are 6 courts, and other special administrators as the national archives and prosecutors' offices. The national government is largely responsible for policy development. Regional government has 15 counties. They support country governors and play the supervisory role over local government legislation (Estonia Government, 2022).

The local government has a total of 241 units, 202 are in rural areas and 39 are in cities. These units are at the face of service delivery responsible for the provision of education, public works, local road maintenance, primary health care, and health care (Estonia Government, 2022). Local units are dependent on central government for funding (Estonia Government, 2022).

d. Digital governance

The responsibility to facilitate the development of digital or information systems, and policies for the public sector in the field of informatics in Estonia rests with the Ministry of

Economic Affairs and Communications. The Ministry is assisted by its agency called the Estonian Informatics Centre (Kilvits, 2019).

Another critical player is a Non-Profit Organisation (NPO) called the eGovernment Academy which was established in 2002 with a knowledge transfer aim to policy makers, and information and communication technology specialists (Kattel & Mergel, 2019).

e. Challenges and concerns

The Estonian digital journey is not without any challenges. One of the challenges relates to digital exclusion. Internet usage in Estonia is at 96% with a 4% not being included some evidence shows that this is mainly senior citizens. Another issue relates to poor internet strength of connectivity in the rural areas (Leppiman, Riivits-Arkonsuo & Pohjola, 2021).

The last for the purpose of this paper, is the challenges faced with the tax handling system which is no longer suitable given the constantly changing work patterns and lifestyle of the constantly moving digital age (Estonia Government, 2023).

f. Estonia's public health system: the progress of digitalisation

Estonia has what we can call an 'almost' universal health care coverage which covers 94% of the population and does not cover for all treatments and procedures. Nonetheless, this system works effectively (Metsallik et al., 2018). They use a system called the Estonian National Health Information System (HIS) which centralises the storage of patient's health care records. Health care providers are connected to this system (Goede, 2019).

The Estonians report that 99% of their health data is digitised and that 97% of discharge letters are shared to a central database using this system. Through this system, patients can view and download their medical records (Metsallik et al., 2018). This system is connected to x-Road and allows paramedics to access the medical records of patients in case of emergencies to save the patient's life in an informed manner and through the

enabled use of telemedicine thereby eliminating the time to travel to the hospital before receiving healthcare (Goede, 2019).

The e-Health system also handles paperless medical prescriptions and a total of 99% of medical prescriptions are e-prescriptions shared with patients using this system. The Estonians are on a continuous journey to achieve complete personalised medicine using genome data about an individual, their families and medical history to prescribe personalised treatment plans and procedures with the aim of timeous prevention of illnesses as breast cancer (Pashayan, 2020).

During the Covid 19 outbreak, Estonia already had a response advantage due to already established and well-functioning digital infrastructure (Raudla, 2021). This includes e-schooling, e-cabinets, digital facilities for the applications of social insurance benefits, medical e-prescriptions, and citizens connected to the internet which easily enabled working from home arrangements during the time (Salter, 2020). In many ways before the outbreak, Estonians could get assistance and communication from government without physical presence.

2.5.3. Case study 3: Rwanda's digital journey and public health case

Rwanda sets an example for many least developed and middle-income countries in the developing south when it comes to the implementation of digital government initiatives. Driven by a need to meet citizen's needs, improve the efficiency of government administration, increase transparency, and progress the country out of the least developed country category, Rwanda has embedded an intention to use ICTs to achieve these policy goals (Bakunzibake, Klein & Islam, 2019).

Rwanda has received the attention of many international actors globally and remains a highly ambitious African digitalised government representative in the world (Twizeyimana, 2019). For this reason, their journey radiates lessons worth capturing.

a. Key milestones and digital infrastructure

The progress of digital government in Rwanda can be traced to the development of the National Information and Communication Infrastructure plans (NICI) plans in the year 2000 (Twizeyimana, 2019). This was a set of three plans called NICI I to III which aimed to fluence the desired digital government transitions by 2015. The plans also sought to develop and put in place the necessary legal and regulatory frameworks to permit the building of ICT infrastructure to achieve government goals (Twizeyimana et al., 2018).

In 2007, the 'Umucyo' system was developed. This is a web-based e-government procurement system which allows local and international bidders to bid online (World Bank, 2023). Through the system, advertisements, contract management, framework agreements, evaluations, inspections, and agreements are also conducted.

The backbone of e-government in Rwanda is an application called iRembo which is translated 'gateway' in English. This application was developed in 2014. It is accessible in three languages, the domestic Kinyarwanda, French and in English. iRembo offers about 100 public services online including the payment of traffic fines, application of childbirth certificates, downloading documents, apply for national ID and ePassport's online, and others (Bakunzibake et al., 2019).

In 2016, the Smart Rwanda Masterplan (2016-2020) was developed which aims to further improve government accessibility by digitalising the government to have self-services available to citizens and businesses around the clock for free and paper-less. Another aim of this masterplan was to ensure that by 2018, at least 25% of all government services are available online (Twizeyimana, 2019). Other major digital infrastructure includes their telecommunication networks, fibre optic, submarine cable and the Integrated national data centre.

b. Key outcomes

Rwanda has managed to improve efficiency of government and there is reduced corruption and collusion amongst bidders during procurement. The use of iRembo has

also led to saved time for citizens to spend with their families, that is time that used to be spent in long queues and multiple visits to government offices (Bakunzibake et al., 2019). Interestingly, the Rwanda government has also created jobs for agents because of the digital transition. These agents are known as ‘digital ambassadors’, their role is to help bridge the digital divide gap by assisting citizens who do not have computers or cannot use the app.

Rwanda has also managed to build strong partnerships with the private sector on the modernisation approach which catalyses Rwanda’s progress to the attainment of digitalised public services (Twizeyimana et al., 2018).

c. Government arrangements and structure

Rwanda is also a decentralised state with an aim to empower local government who are at the face of service delivery as per its policy on National Decentralisation Policy that was adopted in 2000 and revised in 2012 (Williams, 2016). Although Hasselskog & Schierenbeck (2015) conclude that power is centralised to elite politicians. Nonetheless, different from the countries we have discussed thus far, Rwanda has two levels of government, National or Central government and Local government (Bakunzibake et al., 2019).

National government is responsible for policy development and the local governments are responsible for practice of policy. There are 17 central government Ministries with about 48 agencies. Local governments have 30 districts each with a governor responsible for ensuring that the initiatives done at local level reflect national priorities (Twizeyimana, 2019). The local government is responsible for basic service delivery, data collection and schools. Planning and budgeting are also responsibilities of the local government (Rwanda Government, 2023).

d. Digital governance

The ministry responsible for public sector digitalisation in Rwanda is the Ministry of Information Technology and Communication (MITEC) with its agency the Rwanda Information Agency. Other stakeholders involve private-public partnership members, the Ministry of Local Government with its representatives from all 30 districts (Twizeyimana et al., 2018).

e. Challenges and concerns

Some of the challenges faced by Rwanda include social inclusion as some citizens do not have the skills to use the app, some places are not well connected, or in some cases many citizens do not own a computer. As stated above, the government has employed agents who assist citizens in established community centres, to try bridge the gap (Karim et al., 2021). The government has also ensured that the app is available in the three prevalent languages in the countries to eliminate language as a fuel to digital division (Twizeyimana, et al., 2018).

Digital trust is also an issue in Rwanda. Some citizens do not trust the new systems. Other concerns are issues around getting the right skills to manage the systems and to govern and develop suitable implementation strategies and legal regulations (Twizeyimana et al., 2019). The country however continues to actively seek for solutions towards these challenges.

g. Rwanda's public health system: the progress of digitalisation

One of the first countries in Africa to have an 'almost' universal health insurance is Rwanda. The country has a community-based system called Mutuelle de Sante in which about 80% of the population is covered (Binagwaho, 2019). Patients pay a certain amount to the insurance as a mutual health contribution. The country also keeps electronic health records for HIV patients (Binagwaho, 2019).

The e-Health system can also be used for hospitals to register the birth of children and in 2 hours, the parents can download their child's birth certificate. This saves the parents

the plight of 4 physical trips to 3 public sector offices which would be likely to take a total of 4 days (Government of Rwanda, 2023).

During the first year of the Covid 19 outbreak, the Rwandan government resorted to social media to communicate with the public. WhatsApp messages were sent, and the twitter platform used to communicate official releases to the public to avoid or curb misinformation and false information from other parties (Twizeyimana et al., 2018).

The e-health system in Rwanda promises more growth in the near future in that, the country has formed a partnership with Babylon to build the telemedicine capacity in Rwanda. They have also partnered with a company from Silicon Valley called Zipline to use drones to deliver blood, medication, and vaccines to hospitals in few minutes, saving health care providers hours of waiting to save the life of a patient (Nisingizwe, Ndishimye, Swaibu, Nshimiyimana, Karame, Dushimiyimana & Law, 2022).

2.5.4. Case study 3: South Africa's digital journey and public health case

In the turn of the 21st century, South Africa was ahead of all developing countries in e-governance. A decade later, the country had lost its competitive edge, moved at a snail's pace, had unclear governance arrangements and as a result, has been overtaken by other countries that are less developed than itself (Cloete, 2012).

There have been many multidirectional, same intention initiatives, multiple leaders with many overlapping responsibilities in the South African government. Some reviewers suspect all this has substantially contributed to the loss of direction, loss of leadership, policy hiatus and eventually, the country being an e-government laggard (Blom & Uwizeyimana, 2020).

a. Key milestones (the policy environment)

Digital governance related discussions in the public sector emerged about 70 years ago in South Africa. However, 1998 marks the year that South Africa accepted and formally committed to realising e-government for improving government effectiveness (DTPS,

2017). This imperative was declared by the Presidential Commission on the transformation of the public service in the late 90s (PRC, 1999). This followed the publication of the Batho Pele White Paper which advocated for a human centric approach in all efforts to transform public service. Batho Pele is a Sesotho phrase for 'people first'. The Department of Public Service and Administration (DPSA) led the process of developing the Batho Pele Principles (Naidoo, 2012).

The PRC conducted research and recommended that by 2003, all government structures must have transitioned entirely from paper-based administration to the use of electronic systems (PRC, 1998, section 6.9.9). Out of the PRC recommendations, the State Information and Technology Agency (SITA) was established to continuously deliver on IT procurement and the provision aspects of the transformation (Cloete, 2012). The DPSA was given responsibility of the overall administration of, and policy development for ICTs in government and of managing SITA (DPSA, 2001). In the country, government priorities adopted by any structure in the Presidency are often regarded as high priority directives.

In 2001, the DPSA developed the Electronic Government Policy Framework which envisaged a digital future for the public sector (DPSA, 2001). The aims of this policy were to improve the public service in interaction, improve management internally, eliminate any duplications in the delivery processes of government, and to focus on the overall productivity, cost effectiveness, systems interoperability, cybersecurity, and economies of scale (DPSA, 2001). This policy has been under review and refinement for over a decade (*see 2.6 for the summary of the 2001 published Electronic Government Policy Framework, and 2.7 for the unpublished review of the 2001 policy called the Digital Government Policy Framework*).

The Government Information and Technology Council (GITOC) was also established in 2001 which is a body that comprises of CIOs from each National Department as well as from each province (GITOC, 2011). GITOC reports to the Ministry of Public Service and Administration (MPSA). Its role, as iterated in the DPSA (2001) e-government policy, is to coordinate IT initiatives in government, raise IT awareness, eliminate duplications, determine IT research questions, and to lead in skills audits and research to advise on the required skill in the public sector to strengthen e-government. Additional to this, the

GITOC has been mandated to give direction to SITA. SITA is an entity of and reports to the Department of Communications and Digital Communications (DCDT). The DCDT plays a leading role in policy development for data and cloud, ICT integration, 5G spectrum establishment and others (DCDT, 2021).

The GITOC produced no tangible fulfilment of their expectations because of some reported politics about the structural defects where there were disagreements on the legitimacy of the appointed person to assume the chairperson role (Cloete, 2012).

In 2002, the Presidency formed a Presidential Council on Information Society and Development (PIAC on ISAD) as well as the Presidential National Council for Society (PNC), these were given the mandate to investigate the status of ICT in the country, this includes receiving and analysing reports from departments as DPSA, Health, Education and Home Affairs on their progress (PNC-ISAD Plan, 2010).

In 2004 the Batho Pele Gateway which is a central government information services portal was established under the leadership of the DPSA (DTPS 2017). In 2011, GITOC published a government wide National ICT Strategy (GITOC, 2011b), this document offers no concrete steps as to how the e-government initiative should progress in their 2011. The latest is the 2017 National e-Government Strategy with a rather interesting aim to digitise public service whilst ensuring an inclusive digital society and economy (DTPS, 2017).

b. Key outcomes

Although mainly sporadic and disintegrated, South Africa has made some progress in the e-government and e-governance areas. Internally, government has attempted the automation of back-end office administration and management that is often referred to as 'government to government', as well as the front-end service delivery office which is sometimes called 'government to citizens or businesses (Mhlanga & Moloi, 2020).

Internally, the Personnel and Administration System (PERSAL) is an integrated human resources and salary and personnel system that has been in operation since 1990 has

improved management and integrates well with other systems. To improve government financial management and accounting generally, government has since 1995 been using the Basic Accounting System (BAS). To manage moveable assets, the Logistical Information System (LOGIS) is used since 1998. Data on personnel, human resources, logistics, and financial can be downloaded from a data warehouse system that has been in operation since 1997 called Vulindlela (Abrahams & Burke, 2022).

In 2001, the Digital Health Information System (DHIS) was mainstreamed in government for the collection of routine data from across various public health facilities nationally. Other systems which improve data accessibility in health include the National Patient Registration System (NPRS) and the National Health Information Repository and Data Warehouse (NHIRD). There is also a system for managing inmates in terms of data collection and storage called the Integrated, Inmate Management System (IIMS) (Abrahams and Burke, 2022).

In 2005, the Integrated Financial Management System (IFMS) was created to modernise or update the systems dealing with financial, supply chain, human resource management and business intelligence (ibid, 2022).

From a 'government to citizens' or 'front-end office' perspective, the 'Batho Pele Gateway' which likely refers to the 'e-Services website' has saved South Africans time in that most government services links can be found in centrally (Cloete, 2012). These are links to services on child registration, tax filing, vehicle registration, business registration, licensing bookings, and others. However, some of these links are not fully functional.

Carreira and Mtshali (2019, as cited in Abrahams & Burke, 2022) list two fully functional systems. The first is the South African Reserve Service (SARS) portal, which is used for tax returns has saved south Africans money and time as their fully functioning, partly automated system. Another system is the Companies and Intellectual Property Commission (CIPC) system used for registering any type of business in South Africa, this system allows the completion of the registration in less than fifteen minutes also saving citizens and business time and money (Sithole, 2019).

e-Learning, which entails the virtualisation of learning in a way that links teachers, students and learning programmes using ICTs (Blom & Uwizeyimana, 2020), is one of the outcomes. Since Covid 19 e-education has been strongly motivated (Mhlanga and Moloi, 2020). At tertiary education level, public universities, since the Covid outbreak, improved access by granting laptops and data to eligible students. Universities also have self-service portals for students (Mhlanga & Moloi, 2020).

The Metropolitan Municipalities at local government tend to do well in e-governance compared to the national government with systems that improve the interaction between government and citizens (Blom & Uwizeyimana, 2020). There are also Thusong Centres, which are one stop centres where citizens can get assisted in several government services in one place (Twinomurinzi, Phahlamohlaka & Byrne, 2012). These are in many local municipalities, and they save citizens the time and money of visiting many different departments.

Some scholars report that these outcomes are negligible in comparison to the progress that other countries have achieved (Abrahams and Burke, 2022)

c. Government structure

South Africa is a three-tier government with National Government, Provincial Government and Local Government. The Local Government is in turn divided into 44 Districts Municipalities, 8 Metropolitan Municipalities and about 226 Local Municipalities (South African Government, 2022).

National government is responsible for setting policy direction, the provinces oversee Local Government and Local Government is at the face of service delivery responsible for the basic service delivery (South African Government, 2022).

d. Digital governance and government arrangements

As noted in the section addressing the South African e-government policy environment, the national responsibility is not clear cut to one department. The DPSA is however,

mainly responsible for driving this agenda within government and establish norms and standards for improving efficiency in service delivery (DPSA, 2021). The DPSA's GCIO is responsible for creating an enabling environment for the deployment of digital technologies for public administration. This is the Government-to-government perspective, done in collaboration with the CPSI, SITA, and DCDT (DPSA, 2001).

The DCDT is mandated to lead the country to a digital economy. They also collaborate closely with SITA, to offer state digital services and run projects in the 4IR space to roll out broadband and unlock digital economy, at a national level (DCDT, 2021). SITA itself, hosts many of the government databases and is thus a vital player in building digital government in the country (Cloete, 2012). The CPSI is responsible for the development of new models for the improvement of service delivery which will result in efficiency, effectiveness, and quality (CPSI, 2022).

From literature as seen in the section on the policy environment above, in addition to the mentioned, other players include as the DSI, CSIR, DTPS, GITOC, Presidency, the MPSA and possibly others. At a provincial level the Government of the Western Cape and the Government of Gauteng are also critical players, so are their metropolitan municipalities.

e. Challenges and concerns

Although schools in the private sector have advanced in this area, there is evidence that public schools are challenged because of lack of basic enabling infrastructure. This shows the general connectivity and device access challenges in the country between the haves and have nots.

At a governance level, there are high contestations in this space, there is evidence of lack of political leadership, vague and inadequate frameworks, and low trust in government systems by citizens due to poor cybersecurity measures in the country (Blom & Uwizeyimana, 2020).

f. South African's health system: the progress of digitalisation

South Africa is working towards a Universal Healthcare Coverage (UHC) through the implementation of the National Health Insurance (NHI) (Kasilo, 2019). This is within the mandate of the National Department of Health (NDoH) and seeks to ensure the efficient, effective, equitable and affordable delivery of health to all citizens. The NDoH has launched the Digital Health Strategy which seeks to reorganise and improve public health by deploying digital health systems (NDoH, 2019).

The country has seen the deployment of some digital systems by the Department improving internal efficiency as well as in the front-end offices. Some include, the Health Patient Registry System (HPRS) for registering health information for patients in all areas of the country, it validates the information with the Department of Home Affairs National Identification System (HANIS) through a South African 13-digit identity number. A total of 59 million people have been successfully registered as of the March 2021 in the system (Abrahams & Burke, 2022).

More work is done at a district level where the Digital Health Information System (DHIS) is used for the registration of patients, the National Health Information Repository and data warehouse (NHIRD) is used for data storage, a system to manage chronic medication dispensation called the Centralised Chronic Medicine Dispensing and Distribution (CCMDD) system is also used, and lastly, a maternal referral system called MomsConnect is also used (ibid, 2022).

During the Covid 19 lockdowns, the government developed and used the Electronic Vaccination Data System (EVDS) to manage the roll out of the vaccination programme. The system would keep track of the payment of vaccines by government, stock availability, and adverse events. The government would mainly communicate Covid 19 information on social platforms as Twitter, send one directional SMSs, automated calls, and address the nation on television.

2.6. Summary of the DPSA's Electronic Government Policy Framework of 2001

In 2001, the DPSA published an e-government IT framework to guide the development of e-government in South Africa. The policy alludes to a necessary transition to the fourth

industrial revolution through its reference to participating in the ‘new digital economy’ which places the use of digital technologies at the centre of modernization.

Further, in conceptualisation, the policy envisages transformation firstly in e-governance, which refers to the government’s internal operations and interactions between one government body to another across national, provincial and municipalities. This is also referred to as government to government (G2G). Secondly, in the mode of service delivery by government to citizens. The DPSA foresaw electronic, bidirectional communication services which would encourage the participation and engagement of citizens through electronic platforms. This is also known as government to citizens (G2C) in literature and other policies (DTPS, 2017; Blom & Uwizeyimana, 2020). Third and lastly, a transformation in how the government does business with, or partners with the private sector (procurement processes, tenders, and others). Which is referred to in the policy as e-business. In some literature, this is referred to as government to business (G2B) (DPSA, 2001).

2.6.1. Intended policy benefits

The policy envisaged the creation of value through the implementation of e-government in that, there would be increased productivity in comparison to the use of traditional methods in public administration. Additionally, there were perceived benefits in the reduction of costs from the elimination of repetition of tasks and the reduction of the time spent on performing a task, Lastly the implementation of e-government was aimed at achieving improved service delivery in a way that is inclusive, ensures privacy and offers value for money.

2.6.2. Policy focus areas or intents

The policy lists four focus areas which are also seen as the pillars of e-government or pathways to achieve the policy benefits listed above (see Figure 9). The areas are firstly, the *interoperability* of government IT systems, social networks, and data as well as the application of a whole of government approach. The policy intended to achieve

interoperability and ensure the inclusion of the 80% previously digitally neglected citizens of South Africa by 2003.

Secondly, achieving interoperability in a way that does not compromise *IT security* concerns nor expose systems or people to malicious attacks. Security IT measures should have functions to avoid, deter, prevent, detect, recover, and correct any security issue and should be able to apply these to people, the physical IT environment, infrastructure, applications, and information levels. The policy intended to achieve the 30 minimum security concerns by 2003.

Thirdly, using government's IT buying muscle to encourage the development of a local IT industry, which the policy refers to as the *economies of scale*. The intended policy outcome for this focus area was government work that is cheaper, smarter, and more efficient by 2003 and government being a consumer of at least 51% of local IT goods to support the envisaged local IT industry.

Fourth and lastly, the *elimination of duplications* of IT functions, projects, and practices seeking to 'reinvent the wheel' and thereby save money from these practices as well as having removed the collection of information more than once from citizens, and increased access to government information by 2003.

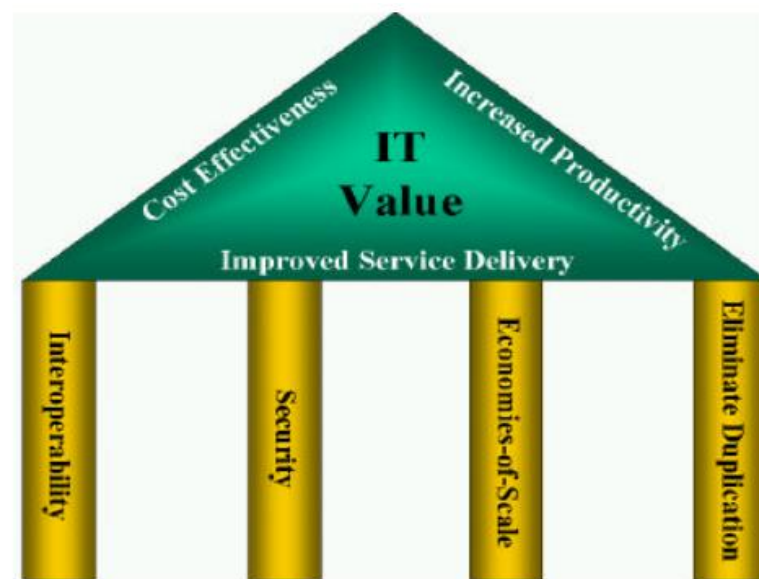


Figure 9: Key focus areas and benefits of the South African eGovernment Policy Framework (DPSA, 2001)

2.6.3. Sustainability of the key policy focus areas

To sustain the focus areas, the policy mentions the cruciality of developing the requisite skills and ethical codes of conduct for all IT professions to avoid any cyber criminality. The skills development programmes were planned to also be extended to basic education levels for schools to ensure the provision of IT skills provision and e-education to previously neglected communities.

IT research programmes by identified government bodies were also planned and aimed at developing government needs based on IT foresight. Lastly, coordination and monitoring across government, society, and non-government organisations (NGOs) on the implementation of the policy.

2.7. Summary of the DPSA's draft Digital Government Policy Framework

In addition to the EGPF (2001) which some scholars conclude has failed to deliver on its intended goals (Blom & Uwizeyimana, 2020; Mayedwa & Van Belle, 2021) and failed to effectively report on any progress of the implementation of the policy (Mhlanga and Moloi, 2020), the DPSA are currently in the process of drafting the Digital government Policy Framework (DGPF). This is a document that has not been officially published. It however builds firmly on the organisation's 2001 e-government policy and is therefore used in the current research to acknowledge the revisitation of the e-government concept and work by the DPSA. It is stressed that the policy framework is currently a draft.

The purpose of this draft document is to outline an approach which digital transformation of the South African public service ought to follow. The DPSA is identified in the policy as the department to drive e-government as well as all matters on information management, innovation, reform, transformation, and any other efforts towards improving the efficiency and effectiveness of the public service. The policy bases this on the Public Service Amendment Act of 2007, which mandates the DPSA as such (DPSA, 2022).

In the policy, e-government and digital governance are used interchangeably to mean the same thing where neither are defined. However, in line with the definition by the OECD (2020), the policy defines a ‘digital government policy framework’ as “a policy instrument designed to help governments identify key determinants for effective design and implementation of strategic approaches for the transition towards digital maturity of their public sectors.”

The objectives of the draft policy framework are i) to establish and institutionalize all the required governance mechanisms, ii) identify key technological requirement, iii) improve coordination in government, iv) identify norms and standards, v) offer direction to departments on areas they should focus on. The policy framework’s remit covers national departments and provincial departments.

Through research and stakeholder consultations, the DPSA and partners identified challenges that the South African government faces in its implementation of digital government. These are listed in the draft document as issues with weak governance and leadership for the digitalisation agenda, insufficient funding for e-government programmes, a disjointed public service, lack of digital thinking in government, and lack of digital platforms that are government wide. The policy framework has an implementation plan which is still a draft and incomplete by the time of draft retrieval.

2.8. Mandates of the identified key partners in the implementation digital governance in South Africa

Both the EGPF (2001) and draft DGPF (2022) acknowledge that although the DPSA leads, there are other players on the South African e-government space. A crucial department named on both policies is the Department of Communications and Digital Technologies (DCDT) which is responsible for the development of policies at a national level to enable, facilitate, and regulate electronic communications and transactions that are in interest of the public (DCDT, 2022).

The State Information Technology Agency (SITA) is the implementing agency of the DCDT responsible for the management and procurement of state information technology

infrastructure to enable the public sector to deliver on its mandate efficiently and effectively (SITA, 2022).

The Centre for Public Sector Innovation (CPSI) which is a public sector organisation serving as an implementing agency of the DPSA, is also an identified stakeholder in the government digital transformation space. The CPSI is mandated to develop models that are innovative, sustainable, and responsive for the improvement of service delivery by the public sector (CPSI, 2022).

Additionally, the Council for Scientific and Industrial Research (CSIR) which is an entity of the Department of Science and Innovation (DSI), is an important research council that often produces research and solutions that benefit government's goals. The role of the institution is to develop, localize and diffuse technologies with the aim of accelerating the prosperity of South Africa (CSIR, 2022).

There are other key actors that are mentioned in the literature review. The methodology section explains why the analysis is only limited to the DPSA, DCDT, CPSI, SITA, and the CSIR.

Both the draft and published digital transformation policy frameworks of the DPSA build on the 1995 White Paper on the Transformation of the Public Sector (Ministry for the Public Service and Administration, 1995). As well as on Chapter 6 of the Presidential Review Commission of 1996 which identifies the potential of Information Communication Technologies (ICTs) to transform public sector operations and improve service delivery (Presidential Review Committee Report, 1996).

Additionally, the DGPF aims to be implemented within the provisions of the Protection of Personal Information Act of 2014, the Electronic Communication and Transaction Act of 2002, the State Information and Technology Act of 1998, the 2016 Public Service Regulations, and the South African 1996 Constitution (DPSA, 2022).

3. CHAPTER 3: METHODOLOGY

In this chapter, the researcher describes the steps and processes undertaken to achieve the study objectives. Though not strictly in the linear design assumed by Denzin & Lincoln (2003), their research design model was used by the researcher to approach the methods and to offer the outline for reporting. The model has seven steps which are also guided by theory as depicted on Figure 10.

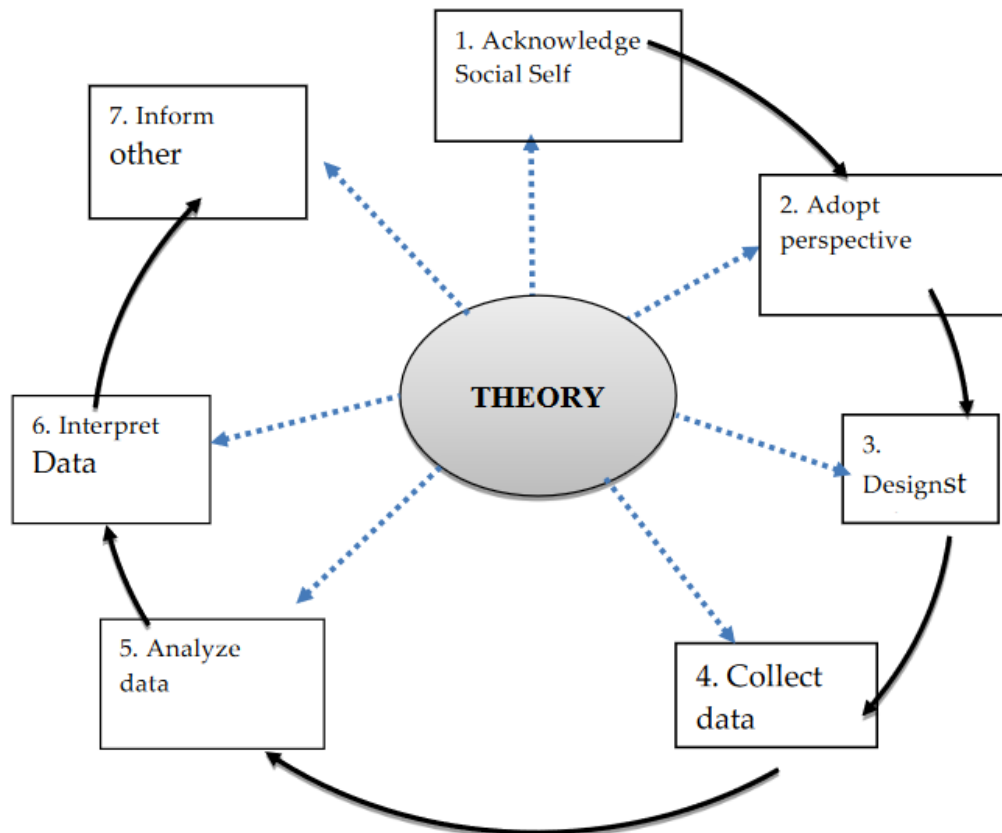


Figure 10: Qualitative research design process (Denzin & Lincoln, 2003)

In the application of this research design process, the researcher also applied an agile approach whenever necessary which allowed working on more than one stage at a given

time and to return on other stages whenever necessary. Qualitative research does not have to be linear (Neuman & Guggenheim, 2011).

The chapter further states the limitations of the study and the research ethical standards upheld by the researcher with regards to anonymity and concludes the section.

3.1. Acknowledging the social self and adopting a perspective: introspective

The process of acknowledging the social self is an important starting point for any researcher as a self-assessment of who the researcher is and how their position may be perceived or influence the research. The researcher is a newly appointed Policy Specialist at the National Advisory Council on Innovation. A council that advises government through the Minister of Higher, Education, Science and Innovation, and Parliament on issues of science, technology, and innovation. Previously the researcher was employed as a project manager at the Department of Science and Innovation (DSI) where she mainly worked with municipalities to assist them in the adoption and use of technological innovations for the improvement of service delivery and the improvement of participation through electronic participation (e-participation).

The researcher had the privilege of having worked on project that involve the modernisation of government administration. This experience places the researcher at a position to understand the workings of government dynamics and the nexus dynamics at which government and the society meet. The researcher however, actively applied the frameworks identified in the study as a lens through which to ground her perspective ensuring that what she knows (her experience) does not create blind spots to new knowledge.

3.2. Designing the study: research approach and paradigm

The qualitative research is a form of social enquiry that uses words and meaning to collect and analyses data (Bryman, 2016). As suggested in the literature review, there is a paucity of studies on the digitalisation discourse which employ interpretative methods

(McBride et al., 2022). The current study sought to contribute to that knowledge gap. The study, therefore, was qualitative research which adopted an interpretive paradigm to explore the perceptions and attitudes of the DPSA's e-Government Services and Information Management unit, and partners (DCDT, CPSI and SITA), on the implementation of digitalisation to improve public sector efficiencies. Experts from the CSIR and a business analyst expert from the DSI have been added to the participant list.

The qualitative enquiry that the researcher made was 'What are the perceptions of officials from the DPSA and partners on the implementation of digitalisation in the context of improving public sector efficiencies in South Africa?'

In contrast to the qualitative approach used by the researcher is quantitative research. This is a form of research which makes a statistical enquiry and uses numbers to understand the world (Atkinson, Coffey & Delamont, 2001). The researcher rejected quantitative research because the nature of the enquiry she made sought to benefit from the individual conceptualisations and meanings that respondents would attach to digitalisation or the digital transformation agenda broadly in the South African Public Sector. The power of the approach is that it illuminates areas that were otherwise in the blind spot in available literature (Bryman, 2016).

The interpretive paradigm focusses on the subjective 'meanings' that people give to reality (O'Donoghue, 2018). It accepts reality and knowledge as social constructs which are products of how the human mind interprets their experiences and the world (Bryman, 2016). Each respondent in the study were encouraged to speak their mind and their own views about any issues on digitalisation as well as on questions around trust and readiness at sectoral and individual levels and the meanings they attach to these which would contribute as an inductive approach to knowledge allowing the emergence of new theories, concepts, and ideas (Bryman, 2016).

In contrast, the positivist research paradigm is objective and believes that knowledge is already exist, it is factual and can be discovered and studied though the use of numbers in scientific methods (Alharahsheh & Pius, 2020). It was deemed unsuitable for the research because it is deductive and is over reliant on numbers.

The researcher found that the qualitative approach allowed flexibility during the interviews which permitted her to follow up on certain questions to further explore the underlying values, attitudes, or beliefs of the interviewee. This was as advised by Bryman (2016).

3.3. Designing the study: making a qualitative enquiry

As stated in point 3.2 above, the enquiry made by the researcher was qualitative. It is expressed in Table 2 below as the primary research question (also see chapter 1). The research objectives were developed in line with each secondary research question with the aim of tracking what the researcher seeks to understand by asking that question (Grønmo, 2019). These were linked to the research methods and the theoretical frameworks to be used. A theoretical framework in research is very important as it guides the inquiry (Bryman, 2016).

Table 2: Research question, sub-questions, and methodology

Research Questions and Methods			
What are the perceptions of officials from the DPSA and partners on the implementation of digitalisation in the context of improving public sector efficiencies in South Africa?			
Investigative question(s)	Research Objective(s)	Research Method(s)	Theoretical framework(s)
Sub question (i) What is the relative progress of digital governance in South Africa?	To understand how the South African public sector is performing in relation to other countries and its progress in line with the aims of the 2001 e-government DPSA policy	Literature review case studies of Denmark, Estonia, Rwanda and South Africa	Digital evolution model (Janowski, 2015)
Sub question (ii) What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies?	To understand if the officials are generally positive or negative about the use of digital technologies to improve public sector efficiencies	Semi structured interviews	Digital Transformation Framework (Matt et al., 2015)

Sub question (iii) How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation?	To understand if the public officials understand these issues and how they speak of them within their organisations, across government, societies and/or their personal lives	Semi structured interviews	Digital Transformation Framework (Matt et al., 2015)
Sub question (iv) Do officials generally express a need for the implementation of digital transformation in and by government?	To understand if there is an urgency amongst public officials to improve the public sector both internally and externally through public service	Semi structured interviews	Technology Enactment Framework (Fountain, 2004)

Initially during proposal development stage, the researcher had proposed two frameworks which covered the implementation and conceptualisation of digital transformation in the public sector. The researcher later introduced a model in the literature review which would assist with understanding the progress of Denmark, Estonia, and Rwanda in comparison to South Africa, there were slight overlaps with the Technology Enactment Framework (see table 4).

3.4. Designing the study: choosing a theoretical framework(s)

The enquiry by the researcher sought to understand perspectives of the target officials across digital transformation. That is from conceptualising to its implementation without limiting responses to one of the two sides. This was because as found in the literature that was reviewed before selecting a framework, there seemed to be an uneven distribution of progress across the public sector with organisations as the South African Reserve Service (SARS) performing ahead of many in the country (Carreira & Mtshali, 2019 as cited in Abrahams & Burke, 2022). Additionally, this choice was informed by the knowledge that the DPSA is faced with both tasks to an appreciable extent.

The DPSA through the policy must conceptualise what e-government or digital in South Africa ought to be understood, further to this the DPSA has to implement these changes in the public administration and service (DPSA, 2022). Lastly, the decision to study both

implementation and conceptualisation was influenced by the relationship between the two whereby conceptualisation may reflect some predispositions, values, attitudes and values and these affect implementations. Plesner and Justesen (2022) put it that these perceptions affect the attitude to adopt or use technologies in any organisation. In this case, to also have the urge to afford the level of urgency required in the implementation of the policy.

As such, the Digital Transformation Framework (Matt et al., 2015) was the chosen framework for the conceptualisation of digitalisation. Matt et al., (2015) argue that for the prioritisation of organisational digitalisation, digital transformation has to be centralised. This influenced the interviews as well in that the questions were relaxed as explained in the experience of the researcher section. This framework as seen in Table 2 assisted the researcher to respond to research sub questions 2 and 3.

For the implementation segment of e-government, the Technology Enactment framework by Fountain (2004) was chosen. This framework was chosen mainly because of its focus on the influence and importance of certain actors as chief information officers in the implementation and also because it would challenge interviewees to really think of the types of information technologies that are required, what works and what does not work in terms of legislation. This framework as seen in Table 2 assisted the researcher to respond to research sub questions 4.

Of all the reviewed and rejected frameworks in the journey of choosing theoretical frameworks for this study, two are worth mentioning as they were identified as possibly useful for related studies. These were the Actor Network Theory (Heeks & Standforth, 2007) and the Structuration Theory (Whittington, 2010). The Actor Network Theory focusses on the socio-economic middle ground and networks (Heeks & Standforth, 2007). This framework was however rejected for this study because of its view that equates machines to humans. The current study was looking for a more human centric framework which would focus and priorities human views about technologies without personifying technologies.

The Structuration Theory (Whittington, 2010) is highly digital government specific. It focusses on the importance of information in the organising societal institutions and

explains how structures exist the way that actors apply them (McBride et al., 2019). This is a possibly useful theory, it was however rejected because it is a relatively aged theory given that the views of e-government may have over the years changed dramatically. It is however, though rejected for this study, a seemingly insightful theory.

3.5. Data collection: positioning the literature review

The literature review can be a powerful source of data for qualitative research (Grønmo, 2019). To partly respond to research question 1 which sought to understand the progress of the South African e-government, the literature review was positioned to also provide findings to understand the progress that of South Africa has made in relation to Denmark, Rwanda, and Estonia.

The Digital Evolution Model by Janowski (2015) was adopted and its four phases explained. Definitions from the literature review and the case studies were juxtaposed against the definitions and descriptions of the model to understand which stage each of the four countries constantly reported on.

The literature review also delves into the details of what each digital government looks like from digital infrastructures to polices and institutional arrangements. Only four case studies were chosen, two from Europe (Denmark and Estonia), and two from Africa (Rwanda and South Africa). The EU cases were chosen due to their well recorded high performance in digital government implementation (Adeodato & Pournouri, 2020; DESI, 2021; Vargulis, 2021; Aagaard & Pedersen, 2022). Rwanda has been chosen for a similar reason in Africa.

The vast differences in population sizes were noted. The comparison between objects that are similar (apples and apples) is acknowledged and not undermined by the researcher. The position of the researcher is that the chosen cases can be used for gathering lessons and deducing insights of what a successful e-government entails. Forging such comparisons in research is allowed as moderate generalisations (Bryman, 2016).

3.6. Data collection: preparing for and conducting interviews.

As acknowledged, the actual process of the methodology did not take the linear approach assumed by Denzin and Lincoln (2003) though convenient for reporting. The first part of preparation for the interviews took place during the project design stage where relevant sites and subjects were selected as advised by Bryman (2016).

3.6.1. Sampling: Selecting relevant site(s) and subjects

The researcher used purposive sampling. Purposeful sampling is a strategic non-probability type of sampling which does not work on random-selection basis, instead strategically selects respondents for the research based on qualities that will assist the investigator to answer the research question or set of questions.

At an organisation level, for context sampling the DPSA was deliberately chosen as a primary organisation because the policy conceptualisation and implementation lies largely with them (Vyas-Doorgapersad, 2020). For the secondary respondents, the researcher reviewed the DPSA policies to map the stakeholders following which the researcher reviewed the mandates of all the mapped public sector organisations. A propriety list was then drawn and limited to five organisations.

The priority list entailed that the DPSA is the main respondent, the DCDT is also a major stakeholder and is assigned 2nd rank. The SITA was chosen as an entity for the DCDT and because of its mandate assigned in the policies, it was ranked 3rd. The CPSI was chosen due to its mandate. The CPSI was chosen due to its relevance and because it is the relevant entity for the DPSA, it was ranked 4th priority position. The DSI was excluded in interviews because the researcher works for the organisation, however the CSIR which is an entity of the DSI was chosen because of its mandate. The CSIR was prioritised at 5th. The reason for priority setting was to ensure that the organisations that researcher prioritises these interviews to give meaning to the research. To verify the list, the researcher approached the DPSA's main coordinator of the policy and the order was confirmed (see Table 3).

The researcher then proceeded to request for permission letters from the heads of organisations. CSIR officials and the one official from the DSI were approached as experts.

Table 3: Organisation priority setting and permission letter acquisition.

Priority	Organisation	Permission requested	Permission received	Signed by head of organisation?
1 st	DPSA	12/10/2022	8/11/2022	Yes
2 nd	DCDT	16/10/2022	23/02/2023*	Yes (with conditions)
3 rd	SITA	20/10/2022	1/12/2022	Yes
4 th	CPSI	17/10/2022	18/10/2022	Yes
5 th	CSIR	Non applicable	Non applicable	Non applicable
6 th	DSI	Non applicable	Non applicable	Non applicable

It is worth noting that the CPSI was incredibly responsive. The only delays experienced in attaining permission was with the DCDT which was the only organisation that requested an agreement to be signed by both researcher and supervisor in line with their ethics codes. The permission letter was received on the 16th of November 2022 but permission to use the letter and to conduct interviews rested on signing of the agreement which experienced delays. The three parties had to discuss and agree on all the clauses thereby causing delays. Due to the priority setting, it was important for the DCDT to be included in the study. The date of approval on the 28th of March, three days before submitting which presented time challenges for the researcher to include the DCDT.

Although in the literature review there were other government bodies that were noted as important stakeholders, exclusions had to be made by priority setting. Exclusions to participating organisations were made due to vast disparities in the unit of analysis, others because of limited time given for the researcher to finalise the project. These are; The Department of Home Affairs (DHA), Department of Trade and Postal Services (DTPS),

Gauteng Government, SARS, Metropolitan Municipalities, and the GITOC. These, and others, are however also key players in the space.

Since purposive sampling is prone to researcher bias, which is a type of bias where the researcher influences the research by judging who can participate (Grønmo, 2019). This bias was controlled by researcher in that, when requesting for the permission letter, she also requested the office of the head of organisation to suggest 3 or 4 participants that are working in the relevant area. The suggested were the only officials in that organisation that the researcher approached and interviewed on the dates on Table 5.

3.6.2. Data collection: The research Instrument and application

The study adopted semi-structured interviews as the main approach for data-collection. In preparation, the researcher had written down a set of open-ended questions and themes which were influenced by the research sub questions and theoretical frameworks as seen in Table 4. There were 9 subthemes. Four were from the Digital transformation Framework and five from the Technology Enactment Framework. Some questions, as seen in the table had parts that would respond crosscut across some sub questions.

This table was used for ensuring that the questions asked are somewhat linked to the research questions. In analysis the thinking was broadened to allow the emergence of new themes and more abrasive cross cutting relationships to appreciate that vast possibilities of what can be found exist (Bryman, 2016).

Table 4: Process of linking questionnaire questions to the research questions, frameworks, and themes/pillars.

Sub question	Question No.	Framework(s)	Framework theme(s)
Sub question (ii) What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies?	5.3	Digital Transformation	Structured changes
	6.1	Digital Transformation	Financial aspects
	6.2	Digital Transformation	Financial aspects
	7.1	Digital Transformation	Value creation
	7.3	Digital Transformation	Value creation
	10.1	Technology Enactment	Enacted technology
Sub question (iii) How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation?	4.1	Digital Transformation	The use of technology
	4.2	Digital Transformation	The use of technology
	4.3	Digital Transformation	The use of technology
	5.1	Digital Transformation	Structured changes
	5.2	Digital Transformation	Structured changes
	5.4	Digital Transformation	Structured changes
	5.5	Digital Transformation	Structured changes
	10.1	Technology Enactment	Enacted technology
Sub question (iv) Do officials generally express a need for the implementation of digital transformation in and by government?	6.1	Digital Transformation	Financial aspects
	6.2	Digital Transformation	Financial aspects
	6.3	Digital Transformation	Financial aspects
	7.1	Digital Transformation	Value creation
	7.2	Digital Transformation	Value creation
	8.1	Technology Enactment	Objective value creation
	9.1	Technology Enactment	Operational forms
	9.2	Technology Enactment	Operational forms

	10.1	Technology Enactment	Enacted technology
	11.1	Technology Enactment	Enacted technology
Additional (cross cuts with literature review)			
Sub question (i) What is the relative progress of digital governance in South Africa?	9.1	Technology Enactment	Operational forms
	9.2	Technology Enactment	Operational forms

By design, a semi-structured interview is an approach where the researcher has pointers or questions to guide the discussion without being restrictive on how the respondent should answer (Kennedy & Edmonds, 2019). Therefore, the interview encouraged a free discussion style of engagement. The researcher took the lead and asked open-ended questions. In areas where the researcher felt the respondent did not understand the question, the researcher would gently guide them by asking a follow up question or by rephrasing the question.

In terms of the application of the research instrument, interviews were either in person or virtual using Microsoft Teams based on the preference of the interviewee. The interviews took place as on Table 5 below.

Table 5: Details on interviews date and mode

Source	Organisation	Date of Interview	Mode
Respondent 0	DSI (expert)	17/02/2023	Virtual
Respondent 1	DPSA	30/11/2022	Virtual
Respondent 2	CSIR	23/11/2022	Virtual
Respondent 3	CSIR	25/11/2022	Virtual
Respondent 4	CSIR	24/11/2022	Physical
Respondent 5	CPSI (expert)	24/11/2022	Physical
Respondent 6	CPSI (expert)	02/12/2022	Physical
Respondent 7	CPSI (expert)	21/12/2022	Physical
Respondent 8	SITA	20/12/2022	Virtual
Respondent 9	DPSA	13/02/2023	Physical
Respondent 10	DPSA	16/02/2023	Physical
Respondent 12	DCDT	Pending	Pending
Respondent 13	DCDT	Pending	Pending
Respondent 14	DCDT	Pending	Pending

Online meetings were recorded (sound and video) and transcribed, physical meetings were also recorded using a good quality recorder. All respondents consented to being recorded. The researcher conducted all the interviews except for the DCDT because of experienced delays explained in point 3.6.1 of this section. Only one official from SITA was interviewed, this was a very senior official.

3.7. Process of data analysis

Thematic analysis was the strategy used to analyse the data from the transcripts. Thematic analysis is a process of identifying, extracting, analysing, and interpreting frequent or recurring categories, codes, terms or expressions from data or responses (Bryman, 2016).

The researcher used a free online qualitative data analysis programme called Taguette. The researcher enquired on a discussion community of researcher on Research Gate to find out the type of reliable programmes that researchers often use. Taguette came strongly recommended.

The researcher identified core themes from scrutiny of the data in the programme, the same iterative process followed to identify the subthemes. The thematic analysis was assisted by using a method developed by the National Centre of Social Research in the UK (Ritchie, Spencer & O'Connor, 2003) where a matrix in excel was used to create an index comprising of themes and subthemes. The independent variable on the table is the interviewee reference number and the dependent variable will be the themes. For the literature review, the researcher used themes rising from the case studies of each reviewed country.

3.8. Process of data Interpretation

The analysis will be done through the lenses of the frameworks indicated on Table 4 for the semi structured interviews, and for the cases studies through the use of the Digital Government Evolution Framework and where possible through the Technology Enactment Framework as Table 4 indicates likely overlaps.

3.9. Commitments: Feedback on findings

Participants were alerted that results from the report, once approved by the University will be shared with themselves. The researcher has committed to present the findings of this report to each of the organisations once the University has published the report.

3.10. Ethics: Upholding ethical standards

Prior to the interviews, the Consent form and Participant Information Sheet were shared to the participants as required of the research by ethics. Before starting the researcher would always briefly introduce herself, maintain a friendly voice and body language

throughout the interview. The researcher would go through the form with the participant to ensure they are comfortable with each line item. Assure the participant that there are no wrong or right answers, additionally, the researcher ensured to reiterate to the participant that their participation would be anonymised in the report. The researcher kept a notebook, but highly limited note taking during the interviews as this would disturb the flow of the discussion. The researcher would only note down information like mentioned policy names. She would briefly state what she was noting down and why.

4. CHAPTER 4: FINDINGS

4.1. Chapter Introduction

This chapter presents the findings section to this study. The study identified the need to explore the perspectives of public officials at the DPSA, and relevant public sector organisations on the implementation of digitalisation to improve public sector efficiencies. The study did that by investigating the responses to the following three sub-questions: i) What is the relative progress of digital governance in South Africa? ii) What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies? iii) How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation? and, iv) Do officials generally express a need for the implementation of digital transformation in and by government?

As stated in the methodology section, sub-question 1 was investigated through literature review case studies whilst sub questions 2-4 were investigated through semi structured interviews. This section presents the findings in two parts, the first part presents the findings from the case studies. It does this by using the Digital Transformation Model. The second part presents findings from the semi-structured interviews. The section is thereafter concluded by a summary of the findings.

4.2. PART 1: Findings from the literature review case studies

In the literature review, the study presented Denmark, Estonia, Rwanda and South Africa as case studies of digital governments. The aim was to roughly determine the relative progress of South Africa's digital governance by using the Digital Evolution Model. The findings are as follows.

4.2.1. Findings from the Denmark case study

The researcher found that, most of the infrastructure in Denmark is public facing to allow government engagements with the public (see Figure 11).

These include the CVR and CPR which are digital IDs for citizens and business respectively (Scupola & Mergel, 2022); the obligatory Digital Post which allows for bidirectional communication between government and citizens, the NemLogin which allows citizens access to government services.

Unidirectional communication is established using NemSMS. The health case study shows that the systems have capabilities that allow government to conduct research on public interests, as the researcher writes, taking from Plesner (2022) in the literature review:

“The post and SMS digital facilities also assisted the government in conducting research to roughly evaluate how many people were interested in vaccinations judging from the number of people who would open their communication to read because these platforms have the capability to detect such activities” (Researcher, 2023)

For internal efficiencies, the case study shows that this was a focus of public authorities in the years 1990 to 1999:

“Public authorities focused on the development of public administrative systems to support public efficiency and improve precision.” (Greve, 2018)

It is also found that automation was enabled during the same years in Denmark. That is, between 1990 and 1999.

With regards to legislation, it was found that Denmark is implementing the *digital by default policy*. There is also an ongoing effort by public authorities to achieve digitally ready legislation to remove ambiguities and supports administration processes. Additionally, the health case study shows that Denmark has launched their Digital Health Strategy and thus enabled the use of Sundhed.dk, a health platform.

In terms of leadership and collaborations, the researcher found that the Danes have established an agency specifically for the development and funding of digital solutions as well as for the development and facilitation of legislation for digital governance purposes (i.e., the Agency for Digitalisation, 2022):

The researcher further found that the Danes built their digital government infrastructure on strong partnerships with the private sector, and on strong collaborations within government. In terms of challenges, the researcher found that the two main issues are around digital inclusion and the large amounts required for financing large IT projects.

Other indicators of progress entail the high level of trust that Danish citizens have for government, the researcher found that:

“70% of Danes have confidence in the public sector to handle their personal information.” (Scupola & Mergel, 2023)

With regards to contextualisation, the researcher finds that Denmark has a Universal Health Care system, and that they successfully use their digital infrastructure in the context of improving health efficiencies and supporting engagement with and amongst users (patients and doctors).

4.2.2. Findings from the Estonia case study

Findings from the Estonia case study entail that the country has made progress in developing effective digital infrastructure. Most of the infrastructure that the researcher found are systems for public engagement (see Figure 11):

The researcher found that government to government digital infrastructure include e-Cabinet that was in use by the year 2000. Infrastructure used for engaging public and businesses in Estonia include the x-Road which was developed in 2001 and forms the backbone of digital Estonia, the e-ID which is a digital ID, a voting platform called i-Voting which has been in place since 2005, and possibly others.

With regards to legislation, the researcher found that the country saw the introduction and prominence of IT systems in government in 1999 which was a process initiated by the Public Administration Development Concept (PADC) paper. Estonian public services are mainly digital by default, unless required otherwise by a user.

In terms of leadership and collaborations, the researcher found that the lower government in Estonia is functional and empowered. The private sector and civil society partner with government to realise state priorities on digital transformation:

“The Estonian government stresses and exercises the decentralisation of functions to governments at lower levels, to the private sector and to civil society members.” (Government of Estonia, 2022).

Further in terms of leadership, it was found that the Estonians have formed an agency for the development of digital systems and legislation, the agency is called the Estonian Informatics Centre. There is also an NGO called eGovernment Academy that has been reported as a critical partner to the Centre:

“Another critical player is a Non-Profit Organisation (NPO) called the eGovernment Academy which was established in 2002 with a knowledge transfer aim to policy makers, and information and communication technology specialists.” (Kattel & Mergel, 2010)

With regards to challenges, the researcher found and recorded three main challenges which are digital exclusion, poor connectivity in rural areas which is driven by service providers, and some outdated systems which require reinvestment.

For contextualisation, it was found that Estonians have an ‘almost’ Universal Health Care system that covers about 94% of the population and uses a digital health system called the Estonian National Health Information System (HIS). It is also found that 99% of the health data of Estonians is digitalised. They also report that telemedicine has been enabled:

“This system is connected to x-Road and allows paramedics to access the medical records of patients in the case of emergencies to save the patient’s life in an informed manner and through the enabled use of telemedicine thereby eliminating the time to travel to the hospital before receiving healthcare.” (Goede, 2019).

The state is currently working on personalised medicine through the use and analysis of digital health records:

“The Estonians are on a continuous journey to achieve complete personalised medicine using genome data about an individual, their families and medical history to prescribe personalised treatment

plans and procedures with the aim of timeous prevention of illnesses as breast cancer.” (Pashayan, 2020)

4.2.3. Findings from the Rwanda case study

Of the literature reviewed, the researcher finds that Rwanda mainly reported initiatives on digitisation and some for public engagement (see Figure 11).

The researcher finds that the reform to digitalise public administration in Rwanda was triggered by the National Information and Communication (NICI) plans one to three. This permitted the building of ICT infrastructure in government and by extension digitising. Again, legislation-wise, the researcher finds that there is a Smart Rwanda plan which took over the NICI plans and aims to further improve public service administration to improve efficiencies.

In terms of digital infrastructure, the researcher found the Umucyo system which is used for local and international bidding and procurement since 2007, the iRembo system which is the backbone of e-government in Rwanda, and the eHealth system. These are mainly for public engagement.

The challenges that Rwanda faces in relation to the realisation of digital government include digital division, a high number of people with no computers, and digital trust issues as many of the citizens do not trust some of the systems that government uses for public engagement. The government has introduced digital ambassadors to assist citizens and businesses around digital division in terms of either access and or use.

In terms of leadership, the Rwandan government has established a body called the Rwanda Information Agency to lead public sector digital transformation. It is also found that the government of Rwanda forms strong partnerships with the private sector to realise public-service digitalisation for public interests. This agency is found to be collaborating strongly with the local government through the Ministry of Local Government.

For contextualisation, the researcher found that the health case revealed that Rwanda has an ‘almost’ universal health system coverage which covers 80% of the population. The researcher found that the digital health activities mainly involve the registration of HIV positive patients and child births. The researcher also finds that Rwanda promises more digital growth in the future as it forms strategic partnerships internationally:

“The health system in Rwanda promises more growth in the near future in that, the country has formed a partnership with Babylon to build the telemedicine capacity in Rwanda. They have also partnered with a company from Silicon Valley called Zipline to use drones to deliver blood, medication, and vaccines to hospitals in few minutes, saving health care providers hours of waiting to save a life of a patient.” (Nisingizwe et al., 2022)

4.2.4. Findings from the South African case study

In terms of digital infrastructure, the researcher found digital technologies that set to improve internal efficiencies and or effectiveness (see Figure 11).

The literature review findings map the PERSAL, BAS, LOGIS, and IFMS. The Vulindlela system which is a data warehouse, as well as the Digital Health Information System (DHIS), the National Registration System (NPRS), the National Health Information Repository System (NHIRD), and the Inmate Management Systems which all involve the digitisation of information.

From a government to citizen perspective, the researcher finds the SARS system, and the CIPC system for registering companies which the latter is for engagements with business and citizens who seek to register their businesses. SARS system is relatively more contextualised and interoperable.

With regards to legislation, the efforts to digitally transform the public sector were found to pull from various policies and strategies. The responsibility, however, is found to formally rest with the DPSA which has been mandated to provide policy direction and strategy for digitally transforming public administration. This responsibility led to the publication of the eGovernment policy framework of 2001. The procurement, provision, and maintenance of the required information technologies to government departments was mandated to the SITA. The SITA, was found to not necessarily report to the DPSA, but to the DCDT.

In terms of leadership, at a national level, the researcher mapped and found that the GITOC, DTPS, the MPSA, DPSA, DCDT, by extension to the latter two the CPSI, and SITA; as well as the Presidency through the Presidential Council on Information Society and Development (PIAC on ISAD) and the Presidential National Council (PNC), to a lesser extent, the DSI and the CSIR, all have mandates that either relate to the digital transformation of the public sector, or to the development or demonstration of general ICT advancements in the country or to the public sector, or have mandates that allow them to so do one way or another. It was also found that the data that is mainly required, sits with the Department of Home Affairs (DHA).

In terms of collaboration, found that there is a poor collaboration culture across the three tiers of government and in terms of performance the researcher found uneven performance and that the Metropolitan Municipalities tend to do reasonably better in e-governance than the rest of government:

“The Metropolitan Municipalities at local government tend to do well in e-governance compared to the national government with systems that improve the interaction between government and citizens.”
(Blom & Uwizeyimana, 2020).

The main challenges that the case study reveals include digital division, low digital trust, high contestations in the digital transformation space, policy hiatus, and poor security measures. Thusong centres were found as an initiative to assist with digital division to some extent.

With regards to contextualisation, the health case revealed that South Africa currently does not have a Universal Health Care coverage but has launched the Digital Health Strategy which also allows the digitising of patient information. The systems used to register patients are the Health Patient Repository System (HPRS), the National Health Information Repository and Datawarehouse (NHIRD) and others at a district level. There is not a lot of digital activity found in the public health except digitising efforts.

The findings on the systems or infrastructure have been arranged on Figure 11 below. The figure visualises the systems from each of the case studies in the pillars of the Digital Government Evolution Framework Model for discussion in chapter.

The figure shows that South African SARS, Momsconnect and CIPC systems are some of the systems used at the engagement stage, there are no systems found at the contextualisation stage from the data that the researcher reviewed, there may however be such systems.

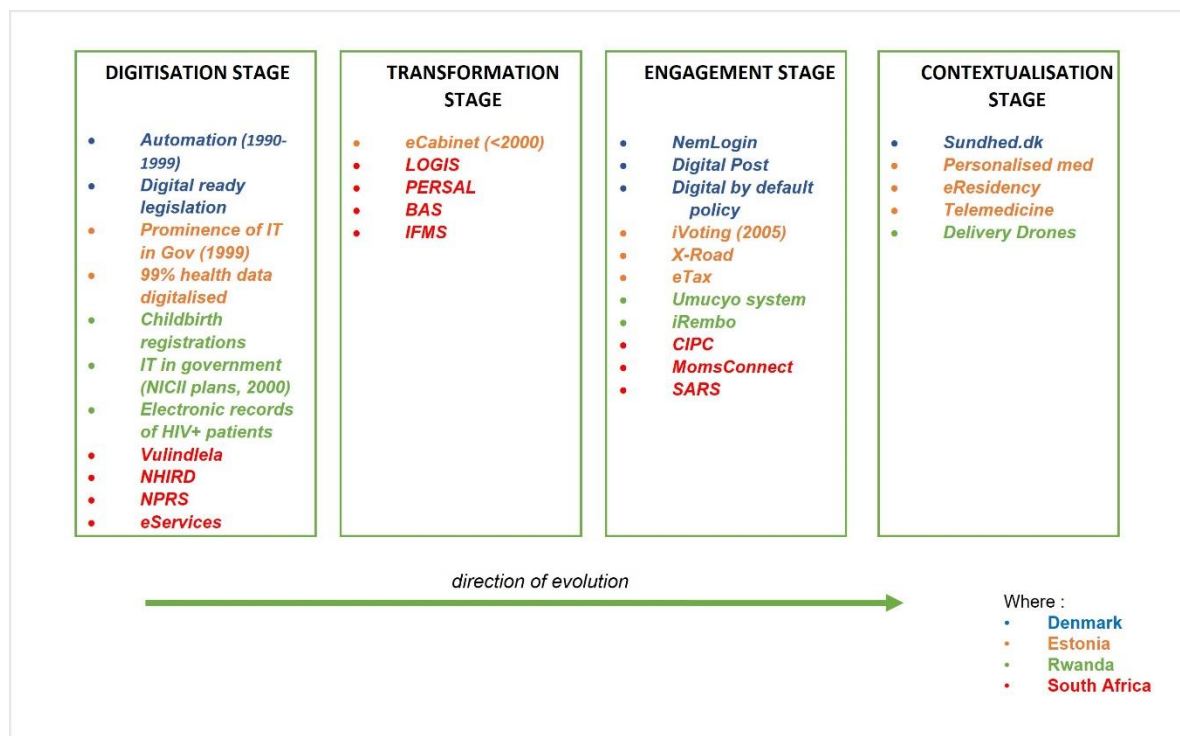


Figure 11: Systems from case studies in the Digital Government Evolution Model (adapted from Janowski, 2015)

This finding is to achieve a sense of the initiatives that each government's activities on each of the stages and how South Africa is relatively performing to answer the research question on relative performance but also to draw lessons for recommendations.

4.3. PART 2: Findings from the Interviews

This part presents findings from the semi-structured interviews. It presents these in terms of the pillars of the Digital Transformation, and the Digital Government Evolution Framework. It also introduces themes that rose in the interviews that fall outside of the two frameworks.

4.3.1 Themes related to the Digital Transformation Framework

a. *Perspectives around perceived value creation*

This theme includes all views raised by participants on the perceived value creation because of digitalising work specifically, or of digital transformation more broadly, in the context of improving public sector efficiencies. The theme also includes perspectives on the use of robots and algorithms to automate work. The theme consists of tags or codes on artificial intelligence, value from existing digital technologies, innovation, algorithms, and the Fourth Industrial Revolution (4IR) as the participant may have understood it.

The researcher found that participants generally express that there are existing pockets of excellence across the country, some of which they have experienced through service delivery by other government actors, and others that they drive themselves or by other actors in their organisations:

“I will make an example because I went to renew my license and I went to the Gautrain, so they have kiosks, Gauteng department, they have kiosks in Gautrain stations. It took me, I think 10 minutes to renew my license.” (Participant 10)

Participants were generally positive about the use of artificial intelligence, robots, algorithms and digitalised work, participants also realise the urgency to act and benefit from the opportunities that are presented in the digital age:

“My response will be based on what we have seen so far in, here in South Africa, in the public sector. A charity organisation called umm, I forgot the name, Right to Care. Sorry, Right to care. They started the pilots in one of the Gauteng hospitals and the pharmacy. The pilot was pharmacy automation, so the robot was the one that that fetches medication from the pecks. So, pharmacists were no longer fetching medicine from the pecks, so you'd have a patient interacting

with the pharmacist and the pharmacist would punch whatever medication is required the robot would fetch it so it gave pharmacists enough time to counsel the patient and interact with the patient.”

(Participant 5)

“You know there's huge benefits to all of the whole digitalisation focus. You know you get real time data in real time. As I said, we shouldn't underestimate the power of data. Data it is really is the new oil. If we can as South Africa, if we can actually figure out how to use data to advantage. Not just collect but use all kinds of interesting techniques to then start making decisions around now in the future.” (Participant 3)

Participant 6, who worked on the Right to Care project that Participant 5 mentioned, also discussed this project with so much reward in their voice as this was a project that both the participant and their colleague had worked on, the participant stated that:

“I had the privilege of walking in the pharmacy and because we assisted them with implementing one of the products. Actually, my colleague, but these were not even me. I was walking with (name of the colleague) into the clinic. People stood up and they clapped. And I couldn't understand. And they said, you know, we're not interested in overtime payment. We're interested in being with our families. And what this project meant is that we could finish by three or four with our work, everything done. Now we can go to our families now I can go do shopping before I go home.....” (Participant 6)

The researcher finds that these officials generally want to make a change in the lives of people.

Officials also raise that the state fails to participate in the Fourth Industrial Revolution, it will happen without South Africa and the country will be left behind:

“It doesn't really matter what my perspective is actually, because it's gonna happen (laughs). It's gonna happen! (emphasises with a serious tone). You either, you either kind of join this, you know. You well, you have no choice. You have to stay part of this world that's moving so rapidly because you can't...., If you get left behind, you get left behind at all levels!” (Participant 3)

“The bigger vision for the South African government is adoption of 4IR we can't afford to be left behind but if we do not adopt these new technologies, we are definitely going to be left behind as a nation, well, maybe a continent in general as Africa, we missed out on the third industrial revolution as a result, we are one of the poorest continents in the world. So if we miss out on the fourth Industrial Revolution again, we are going to remain where we are and the only way we can do it is if we prioritise and spend on new technologies and adopt. This is the only way we can participate in the fourth industrial revolution. There's no other way.” (Participant 0)

The researcher also discovers some initial blind spots on the assumption that efficiencies in the public sector may be evenly welcomed across the board. The researcher finds that there could be links between the currently inefficient systems, corruption, and the lack of political will as participants made these linkages:

“You know, there are inefficiencies of the way that government works right now. Certain people, because where there are cracks, there are money leakages- money leakages- money leakages, and the fact that we cannot trace these things. Which is empowered by

us doing things manually. Paper and the silos, you know.”
(Participant 7)

“(laughs sarcastically)Let me be brutally honest with you. People have got a lot to benefit from a government like South Africa. What I mean by that is the inefficiencies of government becomes a business for somebody else right? Yeah? And then it also becomes extra income for some officials. As I said to you, unless they say, there's political will to change those things, the way we do those kinds of things. Umm, then we will never change. We will have, we will continue to have those particular problems. Unless we yeah, unless we make conscious decisions to do things in a certain way. Then we'll never be able to do it.” (Participant 8)

Participant 8 said the above statement with some level of disempowerment and disappointment.

The theme excludes delving in the depths of interrelated themes. Findings on this theme were linkable with codes on risks that were related to AI, 4IR, and automation. Officials often raised issues around risks and contextualisation:

“....but then you also have an AI enabled future where everything we do is controlled by AI and not necessarily by the companies and we see elements of that as well. Where, for example, when you apply for a loan at the bank. Or at a company like Woolworths or so and I'm using these just as examples not to single them out. That process of application for a loan is linked to an AI process there is no longer a person behind, so they would link up with a credit. Go pull your credit record. They would look at your spending. And then they will say you qualify for this or not. Not looking at the context of

what happened, for example with the credit period that you may not even be aware and that you may have been listed unlawfully or whatever, and now. But AI just decides. So, if you just leave it then you are disempowered. If you take it up you say OK, let me follow up let me pull a credit report. Oh well I didn't know about this let me apply. Three months later, you put it through the same AI system and it approves. You haven't changed. Nothing has changed, but the AI is controlling your access to credit.” (Participant 6

“They asked me why do I hate automation? I said to them, I don't hate automation. I also don't want it to be our focus. I want us to remove it because it's the focus, so we took the wording from Germany and we want to apply it in a different environment. It's not fit for purpose. It's not fit for purpose!” (Participant 5)

This theme also had close linkages to financial aspects, and structured changes which are also discussed in this section.

b. Perspectives on experienced or necessary structured changes

This theme includes codes on required skills and how their introduction will affect the structure of organisations in the sense of organograms. The researcher finds that participants often digressed to discussing staff repurposing and the opportunities that the digital agenda presented, whenever they were questioned on required structured changes, they would not discuss the specific risks much. The researcher finds that officials are generally very positive concerning the structured changes:

“Yeah, I mean if you speak to labour people, they'll talk about this fear of jobs that are going to be lost. But if you really look at it, people will get enough time to, because you don't, you won't have someone

who will be data capturing for example. Because if you automate then there are certain responsibilities that will be cut off the paper-based responsibilities so that person might have to be retrained to do something more valuable, you know? Yeah, so that can affect structural changes in a positive way.” (Participant 5

“That (structured changes) will enable that individual to then move to a more fulfilling and a more challenging role. And I think that's where we have got a biggest challenge, so you know if we don't have appropriate opportunities in other words, appropriate economic growth to accommodate that replacement. Then it will be a threat, but if we are able to create an environment in which, and this was exactly the topic within our mining industry before our project and we interviewed quite a bit of people in the mining context, so I do think if we are able to create those opportunities..... Even if it means you skill people in a manner that they can now do online work coming from offshore opportunities.”

(Participant 2)

The theme also includes other structured changes that participants experienced in the context of the Covid 19 period. Some participants report regress to previously normal conditions with time:

“....the other part is that, we are regressing in terms of the culture of digitalisation. We were working from home and all that, we performed well and all, that now we are back. We have to be in the office 24 Hours, 8 to 8 hours, Monday to Friday...” (Participant 9)

Interrelated themes include value creation in the context of repurposing replaceable job holders to more meaningful positions.

We also found that structured changes ought to see the upgrading of the level of CIOs to levels of more authority for decision making, although, the CIO currently feels burdened in the way that Departments currently understand government digital transformation:

“The key structural changes would be the elevation of the role of a government CIO to a very senior position so that they can be able to have the power to change things, right? Because the lower they are, the less effective they will be in ensuring that they can transform their department. That's the first part.” (Participant 8)

“We spoke about that digital transformation also changes the way that people are doing their jobs. So, there's going to be reskilling. There must be (the) redesigning of jobs as (to) what this job profiles and or whatever and it's not in my area but it's my agenda. So that's why you get systems that they say, they're not like projects....IT projects failing. It's because the IT person is driving technology agenda. And there's no one who's driving the business agenda. And it's going to fail” (Participant 10)

Participant 10 implied that departments expect the CIO to drive the digital transformation agenda and IT officials are not well suited to drive change management processes. The participant later stated that HR should be driving the change management agenda, not the IT department.

c. Perspectives on the use of technology

This theme looks at the attitudes of officials towards the adoption of digital technologies. It includes influencer codes as digital trust, views on digital division, network accessibility, and perceptions on digital technologies. The researcher finds that where people feel

negatively on these influencing factors, they are not likely to use the technologies, and the reverse is true where officials see the value or feel safe using it:

“.... they are scared that they will be told their account will be cloned. They will be hacked and other, their personal information will be leaked and all that.” (Participant 9)

Participant 9 showed compassion when stating that in some instances, people are ‘scared’ to use these technologies because they worry that maybe they will be hacked:

“Yeah, but, but do you know where the irony is? Umm, you know where the irony is? Where is it? Public servants to the highest level, I don't care, Minister president, State security, people are very comfortable with the private cloud. People are comfortable sharing sensitive documents on WhatsApp. It's a private. Google, Google Drive, Gmail. They would easily send you something sensitive via Gmail. But when you at corporate level when you coming as CIO and say I'm implementing this club then they start asking. You all these questions? Is it safe? And they're not going to hack me, but when you're on Gmail and WhatsApp, you never ask those questions.” (Participant 7)

We also find that users reject the systems when they feel it monitors them:

“We have got a daily Microsoft-forms thing that you have to sign to say whether we are working from home or working in the office or we are somewhere in the field. And people are hating that thing because it, they feel it monitors them. Whereas from an

administrative or supervision times side of things it allows you to be effective in your decision making knowing that also.” (Participant 5)

We also find that people need to trust the digital technologies and the users behind them to be able to use them freely, Participant 9 indicated excitedly that this issue is important the country however needs to deal digital IDs first:

“Digital trust is a difficult problem. However, there have been a lot of there's a lot happening around digital trust and blockchain. It's an area that I'm very, very interested in and that we have built up some expertise. So, I think digital trust will be sorted out once we have digital identity sorted out, because if you know who you, who you're talking to for sure, then you're able to trust information that comes from them.” (Participant 3)

We also find that change management is necessary, important, and required for the successful acceptance of digital technologies in organisations, and that there is currently a lack of it:

“Adoption is one of the biggest challenges in government. Simple solution you struggle. You struggle to get people on board. That's why I said for me, I think one of, that's why I think transformation must be at an organisational level where we understand that here's going to be change management that is needed and by change management, we're not talking about IT sending emails. Because that is what our change management looks like....’This is (the) new what what, what what’.... And IT (department) does not deal with peoples mindsets.” (Participant 10)

“One of the key things that needs to happen is change management right? You need to make sure, you prepare the environment which you are trying to transform for the change that is coming and the impact of the change to all key stakeholders so that they can understand what this means, what impact it will have, and what value it will add to both the affected people and the environment.”
(Participant 8)

“At institution level, then you actually start having business process owners. Even at departmental level there are business process owners. Right now those people, if they are not involved in the transformation of their own processes. You're going to have a problem, because now they're going to feel as if we are imposing things onto them and the biggest thing and one of the most critical things that we've always said, and we've always put ahead (in this organisation) was ‘Let people be involved. Make them feel involved in the transformation of their processes’. (Participant 7)

The theme excludes views on technologies that are yet to be introduced in the organisation but reads from contemporal conditions and experiences. General positivity was found. The theme links to other themes as value creation, and Enacted Technology Framework themes as those around cognition, and issues with leadership and regulation.

d. Perspectives on financial aspects

This theme includes codes around the financing of the implementation of digitalising work in the public sector. The specific codes are on areas where savings could be attained and on how officials generally feel about the prioritisation of financing the digital agenda in government. The researcher finds that participants generally feel that this is necessary and that there are no perceived financial issues in South Africa that may hinder the digital

agenda. Findings stress that if the agenda is linked to value then it would easily be funded:

“Yeah, I think for me it's you need to be sure that that investment is turned into value creation. Then it becomes a non-argument. If you know, if you just as in a number of projects, if you digitalise and that is not end up creating value, then obviously it's, then we don't have money for that. It's as simple as that”. (Participant 2)

“So, Finance becomes an issue when you don't show the value of what you're trying to do. But the moment people understand the value that that the changes you're bringing in or are bring to that particular environment. Then there won't be an issue of finances. They will be in a position to redirect finances to that particular task. So, it's easy, I know most people will tell you about budget constraints, the cost of technology, but ultimately the benefits be worth the investment and you must show them that.”
(Participant 8)

This theme does not include any academic funding models, it only includes possible models that officials thought of during the interview. This theme is tightly linked to codes on organisational culture of the Enacted Technology Framework.

4.3.2 Themes related to the Enacted Technology Framework

a. Perspectives on organisational forms and institutional arrangements

This theme combines findings on organisational forms and institutional arrangements. The former includes codes on leadership, and the main actors' activities and attitudes, existing politics, and the policy environment. The researcher finds that participants

discuss these codes as factors that are necessary for the successful implementation of the digital agenda in government but are not enforced nor regulated thus leaving it to each department to implement according to their leader's levels of interest:

"Even with this new policy that is being developed, if it's not being enforced, then it all it will do is that it will enable people who are willing to adopt but those who are not willing, then it won't do anything for them like we see with all other policies"

(Participant 0)

".... the second part is there needs to be proper governance structures within departments that are geared towards ensuring that digital transformation happens. So let me explain if for instance, it it's done piece meal, then it will take long to happen, but it is done as a deliberate strategic intent, and it's been governed and monitored at the highest levels of the particular department. Then it will happen. There needs to be buy in from all the if you call it a within department, we call them from all the branches, right? There needs to be buy in from there and there needs to be support at the leadership level from the DG and probably from the Minister of that particular department." *(Participant 9)*

The researcher also finds that the leaders in this space may have too much power:

"If you look at the OECD at one stage, had this part of foresight that we earlier spoke about these digital scenarios where one scenario is about enabled empowered individuals, the other scenario is where the state is the platform of providing these and where the downside of that can be quite a lot of control of the state over individuals and freedom and so on". *(Participant 6)*

“Then you have the counterbalance where you have private companies and which we also see in playing out becoming too powerful where your big providers of network services of data warehousing services of platforms Facebook and Twitter and Amazon and so on with these platforms become monopolies in that space and where they then control, and that's where the Cambridge Analytica example comes. In as well. And then. And all of these, have a bit of a dystopian element to them, but then you also have an AI enabled future where everything we do is controlled by AI.”
(Participant 6)

Leadership, or political will is found to be necessary to enable digital transformation in the public sector:

“It's a complex environment, so it's not just one reason, it's not just leadership, it's not just finances, it's not just access to technology; it's not just training. It's a bit of a combination of all of those things you know. But leadership is probably a decisive thing because someone needs to from a leadership perspective, we need to start enabling people to use, take the necessary budgeting decisions and so on so that's a very long answer to your question.” (Participant 6)

“We will never see that Z83 form going away until somebody says in government that enough is enough. Let's automate this process or until the citizens of South Africa rebel and say we will never use these forms anymore. Those kind of issues there must be a trigger for the change to happen. But the most important one is the political will.” (Participant 8)

“They all have the same strategy of decisiveness. We have very deliberated all the successful countries across. Whether you look at

Korea at Denmark at China at the Netherlands, even the UK. Although this system is a little bit more fragmented like ours and so on, but you see decisive leadership.” (Participant 6)

On policy the researcher finds that there are both contestations and policy hiatus and non-relevancy, people are generally aware of the 2001 e-government policy:

“You know, I think we we as government, we... we are the problem. Internally, we are the problem. And our policies sometimes are a problem. By this I, I, there's... There are regulations or legislations that are hindering us to move in, especially on internal processes.” (Participant 10)

“Hey, we've been talking about e-government since the early 2000s and now we in 2023 and we really have not moved much further, you know? You know, seriously, you know. So yeah, so it's something that has to be done. It has to be done or we get left behind. It has to be done or our citizens struggle.” (Participant 3)

“There is a national e-government strategy and roadmap, there is the national integrated assets white paper. At the DPSA there is an e-government policy of 2001? But the question is it, is it still relevant? No it's not.” (Participant 9)

“I think the way in which policy and regulation works currently (laughs) is, you know just doesn't work with the technology, especially in a digital technology digital transformation environment, because the technology moves too quickly for traditional government policy processes, OK, so there needs to be new ways of actually developing policy, and I think there's some there's some

good examples that are out there with regard to new ways of kind of developing policy.” (Participant 3)

With regards to networks, it is found that there are many silos in the system and that perhaps interoperability or collaboration could be encouraged through incentives:

“Yeah No, it is.... It is quite poor and it is quite poor. We do not have that (Interoperability) It's, uh, we work in silos as government, as a government sector, and even at national level, even at the provincial level and municipality level for example, where people you find someone who is employed and still applying for an RDP house and there's no way of a South African and the Fair Housing Department to verify whether this person is employed or not” (Participant 0)

Yeah no, and you know. I also believe that there is concerted efforts that is needed to get beyond that. And I think the key issue is the key performance indicators of individuals in those silos. So you're not incentivised to collaborate and at least unless you are incentivised, you're not gonna, it's not gonna. Even within the CSIR, is always a good example, units are measured on the financial outcomes. I'm currently running a collaborative project with about three or four other units clusters, and it is difficult to do that because if I want to use some of my investment funding to fund individuals in another cluster, I get pushed back from my management team definitely, but you can't, you can't spend our PG on them, right? So how do we collaborate if we can't do that? (Participant 2)

Private sector is an important partner, but not trusted because of officials' previous experiences with them:

"But in terms of what you are asking in relation to the trust between government and the private sector. Personally, I don't trust them because I've seen at some point I've, I was investigating around issues that they have to do with the post office. The post office will tell you that they have rolled out infrastructure in these areas when you go there, you will not find them. The same way with the service provider that has to do with digitalisation. They will tell you that they have rolled out the infrastructure, but when you go there you will find the 2G network." (Participant 9)

The researcher also finds that the private sector is reported to sometimes not respect legislation as Participant 7 stated with annoyance in his voice, but there a need to regulate the private sector as Participant 9 stated:

"There is a cloud directive that says our data should sit in South Africa, India, or China. I raised it with her (the Minister) and she was baffled. And she was like no, that can't be true. And luckily, luckily I had two other CIOs in the room who said actually Minister, it is true. Our Teams data is sitting in Ireland not in South Africa. And she said, no, it can't be right. But then again, my point is, let's respect the legislation." (Participant 7)

"Well, the government generally they don't...That's why there's legislation. They do not trust that the private sector can't regulate itself. They don't believe that. That's why there's legislation to ensure that there is enforcement." (Participant 9)

“Yes we can then collaborate with the private sector, but I would not on any day given the opportunity... I would not on any day leave it to the private sector to lead the process (of developing public digital infrastructure) no. They can come and sit with us, where again we feel we don't have capacity. And then we can um obviously, we will talk about IP issues one day because once you start sitting with them and you start giving them insights.” (Participant 7)

Due to the limitations of this framework, an interrelated pillar on government readiness was created and includes the performance of government from the perspective of the provincial level and municipalities. We find that the high fragmentations and poor collaborations across the three tiers of government continue. It was also found that the performance of municipalities depends on where they are located:

“They (metropolitan municipalities) are far ahead. They have Department of Gauteng and how they're doing well. The same way with the Western Cape. They have automated their services. So how doing it's, it's far ahead, but then? When you look at Limpopo, Mpumalanga and Northern Cape and all that, they're in terms of access online services” (Participant 9)

“...I'll say again that we work with those 3 little spheres of government, and there's also those disparities. For example, you will have, say, eThekweni municipality where they are taking advantage of a simple technology like WhatsApp. To communicate with their citizens where citizens can report a pothole using WhatsApp and then you have other municipal. That most municipalities that do not have any communicating or platform that can allow them to interact and communicate with citizens. So, in those municipalities, people still

have to call a call centre and wait just to report a pothole.”
(Participant 5)

The theme is related to the use of technology and the nature of digital division in South Africa.

b. Enacted technologies

This theme views the delicate interrelationship between the perceptions of digitalisation of government work, and implementation. It looks at the nuances in tags or codes around knowledge and the definition of terms to make sense of how officials understand and discuss the need to transform the public sector to bring about public sector efficiencies, and how they express the need to implement digital transformation.

The researcher finds that officials feel both empowered and disempowered in some instances which are nuances expressed across this section.

The researcher all finds that, officials mainly believe that the country does not have to be a first mover, officials can learn from first movers, adopt, and contextualise technologies and policies:

“South Africans were very good to take something and then add value to it. We're very good at that. If you look at our Constitution, if you look at many of the things that we're not the first people with it, but we took it. And we refined it. In a way that makes sense for us. So many of the things that we've done is. We've done exactly that. Sometimes we've failed dismally with that, but and many of the cases where we tried to do. It is the.” (Participant 6)

"It's probably not such a bad thing not to be a first mover. You can learn from other portfolios. Then if you if you are geared to that, if you understand that you need to learn from portfolios, and if you are going to be learning from it. Again, you know it needs to be appropriate to what you're trying to achieve so. We definitely don't have enough funding to do the kinds of R&D that's happening elsewhere, which puts us with, you know, with it's a good or a bad thing, It puts us in that position of having to adopt from elsewhere." (Participant 2)

The researcher also finds that officials consider the burden on the citizen and show emotions when discussing the failing system:

"I think people yeah people are afraid of the change; you know it's any change makes people insecure. You don't quite understand yet how it's gonna affect you. So I think that there's I would say there's a lot of worry, I would say there's a lot of insecurity, Nervousness about this change because it's this big thing that's been built up. And people don't quite know what to expect or how to affect them, so I think it's very much insecurity across the board and across any organisation across the country. If people have heard about digital transformation, so yeah I would say there's no one's excited about it. I am! You know a few people are excited. Other people are worried and not sure how it's gonna affect them. Will it affect my job? Will it affect? Will it cost more money than I can afford? Will it take, you know, will it eat up all my data? You know, if I have to apply online to get my child into a school, you know. Well, I know what to do, how to do it? I've never done this before. You know, so yeah, I think there's. There's a lot of nervousness and insecurity. Is is my judgement." (Participant 3)

Why don't you zero rate those things. So, but if I can tell you the response from our Minister, yeah.... (mxm)... well, and we clap hands when we hear Indonesia saying 'Our citizens access our sites for free' This is what me is advising you to move towards and you've given me a response. (Participant 7)

On the latter quote, 'mxm' is a tongue clicking sound that people in South Africa often make to show that they are irritated or frustrated.

The findings on the citizen are presented in the interrelated theme below on objective technologies and outcomes.

c. Perspectives on objective technologies and outcomes

This theme combines views on objective technologies and the outcomes. The latter includes codes on current regimes and silos which are understood as outcomes of systems that exist or pre-existed, created for protection:

"...In the first, If you go to the security agencies and so on. There's the reason why everything is behind two or three or four firewalls or whatever protection they have and why they compartmentalise work because that's the way. Even if you're in a private sector where there's highly contentious research happening. Going to Coca-Cola in terms of the formula that they are using, they compartmentalise. To make sure nobody has the full view of everything, and that's how you enable security." (Participant 6)

We find that the silos have led to too many actors in the space with crosscutting, duplicated or contested functions:

“I’m saying these two are in a sense, at the core of the DCDT is a technology ministry. Nothing else. At the core of it, it’s actually the same technology! If the STI part is sitting at DSI? This this (emphasises) particular department is completely the technology where it has nothing else because information has been moved out to the GCIS. It has been moved out of it, the so it doesn’t have anything. It’s actually technology. It’s ICT. Right, so it’s sitting right there so it could actually, for all intents and purposes be the same thing as the DSI.” (Participant 4)

“There’s a policy making problem and how we are configured. It’s also a problem because you end up fighting for the space between DPSA and DCDT. We end up doing that and then that delays the development of these policies. It has been a serious problem when it comes to the policy development. So I think there must be a clear vision. In terms of, a clear vision and clear mandate. Wo must do what? What is it that the DCDT can do? What is it that it must be simplified and clarified?” (Participant 9)

Consequentially, these silos and regimes previously contributed, and continue to contribute to the experienced digital division and trust concerns discussed in the next chapter.

The researcher also finds that digital division possibly needs to be rethought and redefined in the South African context, as access may not necessarily depict affordability, the cost for getting help in South Africa is high:

“Yeah, I will make an example of, some process I remember my father. I don’t know what he was doing some, some years ago. My mother passed away and then he needed to claim from GEPEF, but I think it took him like a year. Sending him right and forth and whatnot and whatnot,

and he had to pay lawyers and whatnot and you think (emphasis) when this is happening to someone who does not have money! (Intense emphasis) Then the person cannot do anything.” (Participant 10)

“...for me, that's a big step step to achieving a whole lot of things because now ‘Hhey mngani ubonile kune maposts’. Where are they? They're online.... Because people, again with the little that they have.... With the little that they have, they would rather have R20 data for WhatsApp to last them the whole month for communication purposes because at least that is what they can afford the citizen is burdened.’ (Participant 7)

The English translation for the Siswati sentence, *‘Hhey mngani ubonile kuna-maposts’* is *‘Oh friend did you see that there are posts’*. The statement by Participant 7 brought silence for some seconds for the researcher who at that moment felt speechless to this finding which she knows is a reality of many as a similar case is heartfully found presented by Participant 10, which also left the researcher empathetic to ordinary South Africans on the ground.

A rising theme that falls outside of the pillars of both frameworks but can be linked to outcomes was also found. This theme is on the citizen and their human rights:

“So, you see these kinds of things were human rights come under fire to use one element you know. So, government need to make sure that we do not overregulate and not kill the innovations but that we regulate appropriately to prevent abuse from some of the big companies we see the current debate on blockchain now unfolding. How do you protect the interest of communities and citizens that are not necessarily that clued up about what's happening in the technology sphere?” (Participant 6)

“So, in fact, it doesn't matter whether we say they should come and set up the data centres in South Africa so that the data of South African citizens should be stored in the territory of South Africa. Because in fact, if the US wants it... they can get it. And China is the same, so the fact that we have Huawei here sitting up its stuff and everybody else sitting up their data centres. It doesn't matter. Those countries can still get them if they want” (Participant 4.)

For objective technologies, it is found that participants raise themes related to requirements in terms of both technology devices, shared digital infrastructure, research for foresight, security infrastructure, connectivity, digital IDs and others as covered in other themes, here we will only present findings on need for foresight to inform policies:

“And one of the other things that I've noticed with our policies is that I think little research is done. In the sense that, it's difficult to pick up ‘What are we supposed? What are we addressing?’ So, SA policy must have a purpose. What is that we want to achieve by this policy, we want to achieve it because of 12345.” (Participant 10)

“I think the problem is that we. We we don't do research. Our research is stone piece. It's not consolidated. We cannot actually don't have a foresight.” (Participant 9)

d. Findings on actor groups contrasts and linkages

The initial mapping of the participants in line with the Enacted Technologies Framework (Figure 12) showed that the contribution of knowledge to objective technologies and to enacted technologies would likely be from the participants as mapped in line with the model's description of actors.

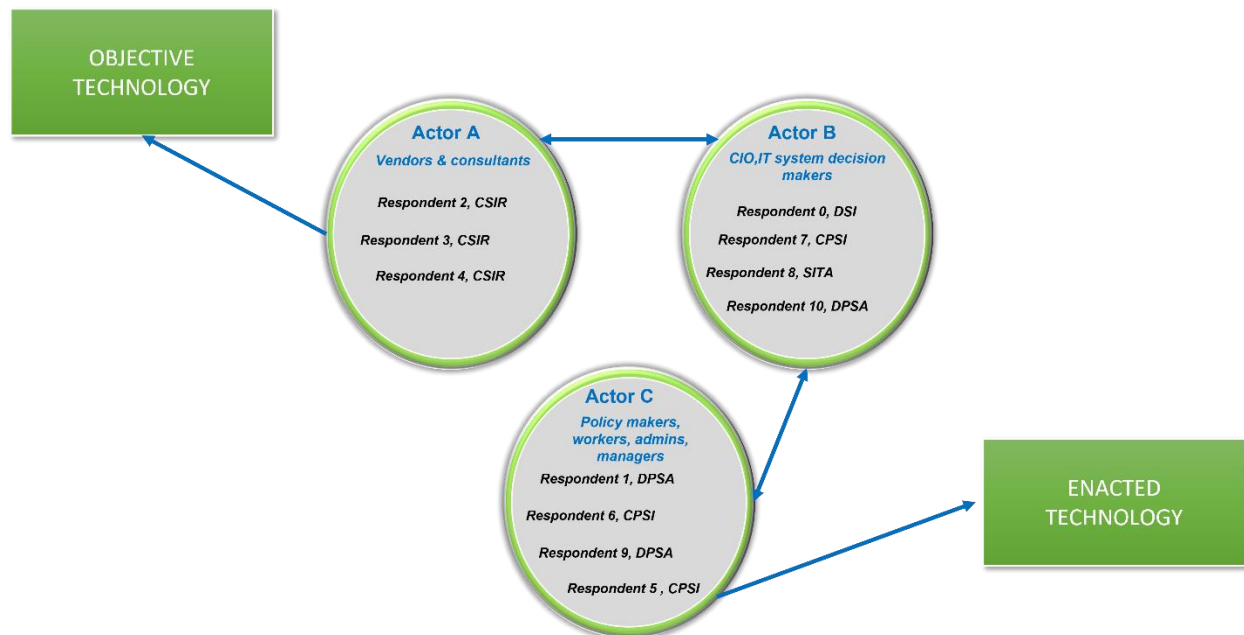


Figure 12: Interview groups mapped in Actor Groups

The researcher finds that participants or respondents in Actor group B contributed more to codes that were related to objective technology, and participants or respondents that were classified under Actor groups A and C contributed relatively more to policy issues and enacted technology views, and a total of over 90% of the respondents across groups described their work as mainly or partly strategic with technical (see Appendix 1).

5. CHAPTER 5: DISCUSSION

5.1. *Chapter Introduction*

This section discusses the findings of the study to answer the research question and sub questions. The study had set out to explore the perspectives of public officials at the DPSA, partners and relevant public sector organisations on the implementation of digitalisation to improve public sector efficiencies. It sought to do this through asking the following sub-questions: i) What is the relative progress of digital governance in South Africa? ii) What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies? iii) How do respondents address issues of trust, digital divide, and readiness in the context of public sector digital transformation? and, iv) Do officials generally express a need for the implementation of digital transformation in and by government?

The study used two main theoretical frameworks, the Digital Transformation Framework, and the Enacted Technologies Framework, within which the previous section on results have been presented against. The study further used the Digital Government Evolution Model for a brief case study analysis of digital government in four countries.

The key findings for the case studies were that digital activities in South Africa are relatively sporadic, not well coordinated, and largely at the digitisation stage. The key findings for the semi structured interviews were that there is a lack of decisive leadership, lack of interoperability and centralisation of digital governance, low digital trust, poor collaborations, and the existence of silos in the African digital government system.

This section discusses the findings in the order of the research questions and uses the themes in the findings section.

5.2.1. What is the relative progress of digital governance in South Africa?

To answer this question, the researcher will discuss the digital infrastructure, legislation, leadership, networks, digital trust, and health cases as per the findings section, through the Digital Government Evolution Framework and give the verdict as the final response to the question.

a. Digital Infrastructure, legislation, and leadership

The data suggests that in relation to Denmark, Estonia and Rwanda, South Africa lags with regards to firstly, important digital infrastructure. The South African eServices website, as seen in Figure 11, performs at a digitisation stage in relation to x-Road, NemLogin, and iRembo which are more advanced in terms of their functionality. The South African website has relatively poor functionalities and is mainly used for keeping electronic policies and links to other government websites. This is concerning because this type of infrastructure serves as the backbone of digital government as seen with the other reviewed cases. The literature suggests that if the organisation or country is mainly concerned with keeping electronic formats, it is likely on the digitisation stage (Janowski, 2015).

Both Rwanda and South Africa report mainly on the registration of citizens for their health cases, which is another indication of performing at the digitisation stage. These activities do not create any efficiencies therefore they bring no transformation. In comparison, the European cases are relatively more advanced with health data being digitised and being able to unlock other opportunities as telemedicine and personalised medicine. This means that for South Africa and Rwanda to reach those levels of advancement the countries need to move their health sectors past the digitisation stage. This supports the Digital government evolution model which suggests that each stage is dependent on the success of the previous stage (Janowski, 2015).

There are however systems as the CIPC and the SARS systems which are arguably high performers in South Africa. These systems are from two different Departments. The CIPC from the Department of Trade and Industry, and the SARS systems from the Department of Home Affairs. Both these systems are public facing and not for government internal efficiencies. The ones that are driven by the DPSA which are for internal efficiencies are old systems reported under the transformation stage. This shows us that, whilst Denmark, Estonia and Rwanda have centralised their digital governance, South Africa's digital performance happens in a haphazard manner, and that the DPSA has no real control over this space.

b. Digital ID, digital trust, and partnerships

Denmark and Estonia have enabled digital ID and report high levels of trust. This relationship shows to be important as revealed by the literature (Raudla, 2021). Whilst on the other hand, Rwanda, and South Africa report low levels of trust. From the data that the researcher has reviewed, it is not clear if Rwanda has digital IDs, but South Africa does not have digital IDs. Both however suffer low digital trust levels. It is often argued that building digital trust is very important for any state seeking to achieve digital government goals. Without it, there is no enabling environment (Vasilesc et al., 2020). To link this to the Digital Government Model, Janowski (2015) argues that whenever the focus is on building digital trust, then the entity under discussion is under the engagement stage. For South Africa to enjoy high levels of trust digital IDs may need to be enabled. Given this, again on this level, South Africa is likely on the digitalisation stage, with some systems on the engagement stage. So is Rwanda.

c. Health cases

As already alluded above, Denmark and Estonia are able to use digital infrastructure in highly contextual sectors as in assisting the government in health-related policy intents. The data suggests that Rwanda is relatively advanced than South Africa, it is arguably functioning across various stages from the digitisation stage to some levels of

contextualisation. South Africa however is as suggested by the data mainly on the digitisation stage

.

d. Verdict: The Digital Government Evolution Model

The model is limited in that it assumes linearity in the progression of digital evolution. Which is arguably not the case as we have found, the data presents complexities which require nonlinear analyses or metrics. The model is not a perfect fit to interpret the data of this research. Nonetheless, it is good for understanding the 'general' evolution and we respond to the question as follows.

Putting all the reviewed aspects into consideration and understanding them from the lens of the enacted technology framework, as found possible in the methodology section, a general response would be that South Africa is behind the European cases, as anticipated, and also behind the African cases study.

South Africa reports projects that are mainly at the digitisation stage of the model. It can be that it is mainly at the digitisation stage with some indications that in other instances it performs at the engagement stage. This is similar to the reports of Rwanda, but Rwanda is arguably ahead of South Africa in that it has the necessary requirements such as strong leadership, partnerships, coherence in governance and policy, well in place. While South Africa still lacks many of those.

This response agrees with the 2019 findings of the CISCO report (CISCO, 2019). The researcher makes this claim on the basis of the data that suggests that, unlike the other case studies, South Africa lacks the necessary enablers such as digital ID, clear leadership and clear roles, clear legislations, and strong partnerships with the private sector or non-government actors. These claims are also in line with the findings of Blom & Uwizeyimana, (2020).

5.2.2. What are the views of public sector officials on the implementation of digital transformation to improve public sector efficiencies?

a. Value creation, structured changes, and risks

Firstly, the data suggests that officials' views generally hold that they see the value that is presented by and/or promised by digitalisation in the context of improving public sector efficiencies. Officials also expressed that they see value in structured changes which they consistently linked to skills.

The skills component in the findings agrees with the literature by both Cedefop (2018), and Warhust & Hunt (2019) which explained that officials that are in lower positions are at the risk of losing their jobs. It is interesting however that the South African officials mainly highlighted the positive aspects to this. Expressing mainly that, these changes create an opportunity to repurpose the functions of low skills individuals for them to lead more meaningful jobs. They also suggest from an 'assistive' technologies point of view that these technologies are here to help people. Therefore, workers will experience efficiencies which will save them time to spend as quality time with their families. Which one may argue is what really matters as alluded by Participant 6.

Secondly, the officials' views hold that, South Africa is already digitally active although in a fragmented manner. The data suggests that there are 'pockets of excellence' in the country that they have been exposed to either as primary or secondary agents. This could explain the general enthusiasm or positivity that the researcher found when interviewing the officials. The literature suggested that officials that have been exposed to digital technologies tend to have positive views about its implementation because they have seen the value (Plesner & Justensen, 2022).

Thirdly and profoundly, the views of the officials hold that, in implementing the digital agenda in government and across the country, there should be considerations of risks related to power. The state, private sector, or the technologies themselves should not be made to be powerful in ways that will infringe on human rights. These are interesting governance points, although not covered in the literature review, these are important governance and government debates that are somewhat presented in the works of philosophers Mark Bevir (2011) and Smart (1994) who investigates the major works of the philosopher Michel Foucault.

This means that users are weary of this third point. The data suggested that officials or users do not use the technologies when they feel it possibly monitors them, or when they are not clear on what the technology does. This finding also supports the literature on Enacted Technology Framework which states that perception affects digital trust (Fountain, 2004).

b. Financial aspects and political will

The views of officials concerning financial requirements to implement the digital agenda are that there are adequate funds in the system to implement the digital agenda in government and for the citizens. Officials believe that there are many areas in the systems which are inefficient and can benefit from this agenda resulting to savings that can be used for value creation. They also believe that financing the digital agenda is important and should be prioritised.

The data suggest that the issue with the implementation of the digital agenda is not the lack of finance in South Africa, it is the lack of decisive leadership or political will to implement.

The data partly opposes the literature by the Digital Transformation Framework which suggests that financial aspects are central to the successful implementation of the digital agenda. It agrees in that, yes the finances are important however they will not kick-start

the process if there is no political will. This is perhaps the reason why many fragmentations in the system, in terms of implementing the digital agenda, are experienced.

c. The use of technology and change management

The deduced views of officials concerning the use of technology are that the attitudes of users are generally positive, however this is highly uneven across the sector as there are many dependencies to this. The data suggests that some of these dependencies are related to digital division, and exclusion of business processes owners in development stages.

As suggested in the literature, digital division can be understood in terms of access to the required information technologies, and in terms of the ability to use these (Van Deursen et al., 2019). The data suggests the same, it shows that officials who have not been using these in government either do not have access to the technologies, as in the case of some municipalities, or they do not use the technologies because they do not know how to use them. The latter speaks on instances as suggested in the data whereby users themselves are not ready or do not have the 'know how'.

The views of the officials also hold that there is a need for change management in the system which will include business owners in the design and development stages to ensure that they use the technologies. This point suggests that well-oiled inclusive change management builds digital trust. This agrees with Plesner & Justensen (2022) who made the connection between well managed change management as a requirement to build digital trust.

The literature on the evolution of digital transformation in government by Jawnoski (2015) suggests that organisation that are on the transformation stage, which is stage two of his four stages, often form initiatives on change management. This could possibly mean that at a departmental level, some organisations may be at the model's stage 2. However, at

a national government level (if government is measured as a whole), it is possibly on stage 1. These arguments are furthered in the part of this section that discusses a response to the study's research sub question 1.

5.3.3. How do respondents address issues of digital trust, digital divide, and readiness in the context of public sector digital transformation?

Participants generally centralised the users when speaking to issues of trust, digital division, and readiness. The users are seen as the citizen at a government to citizen level, and the internal users at a G2G level. The participants would show emotions in their responses around these issues. They would mainly show emotions of compassion for the users where digital division is involved, annoyance or frustration where systems are failing people on the ground, a need to protect the citizen.

Officials would also generally show zeal to work to achieve public sector efficiencies through digital transformation. They would also generally give the researcher the sense that South Africa is very powerful, in many instances, the researcher would feel that this was mixed with emotions of powerlessness. The data suggests that this powerlessness is a result of the lack of leadership to legitimise the agenda. To respond in detail, below:

a. Addressing issues on digital trust

Participants feel that issues of digital trust can be strengthened through the use of Digital IDs which would assure users of the validity of the 'person on the other side' of the device. The South African ID can possibly serve as a Digital ID. Participants feel it is highly important to think of human rights and include good values to digital technologies that are introduced to people. For the latter, we found in the literature review that if the values that the digital technologies are coded with are not well communicated, users tend not to trust the technology (Plesner & Justensen, 2022).

Further, the participants were generally compassionate that users have some 'fears' around the adoption of the technologies as far as surveillance and generally cyber security and privacy are concerned. In the literature review, it was found that users generally worry about their digital footprint and their misuse and abuse (Launer et al., 2022). We also find that these must be managed through open processes, and good change management practices (Schou & Pors, 2019). There were also a few instances where the researcher felt that in some cases, the participants were impatient or baffled by why users lacked trust for government systems but generally trusted 'big-name' service providers and the private sector.

b. Addressing issues on digital division

Participants would speak to issues of digital division with mainly the citizen centralised. The data suggests that officials may be feeling that they are failing citizens through the ill-functioning of the current system across government. This is further discussed in the readiness section. The data however suggests that there is 'despair' in areas where the ruthlessness of digital division is experienced. This point highlights the nature of digital division in the country which further polarises the haves from the have nots which the rural urban division also follows (Van Deursen et al., 2019).

Data also suggests that there may be a tendency to underestimate digital division in that, service providers may overstate their achievement, and that the quality of connection, or 'use' may not be taken into consideration. For example users being connected to the internet for social purposes may be misinterpreted for users having access to opportunities on the web for looking for a job or access to government services. The data suggests that this is not the case, there is a need to review and relieve the citizen from the high costs of 'getting help'.

The data suggests the presence of a burdened citizen that public officials show compassion for but are not very empowered to address the issues on the ground with more decisiveness. This is again, possibly because of the lack of political at higher levels. The researcher implies this because, the literature review it is found that public officials

may show reluctance to make big decisions about digitalisation especially if they suspect the decisions could be political (Plesner & Justensen, 2022).

c. Issues on readiness

Officials differentiate between the readiness of government and the readiness of citizens. These issues link closely to the issues of digital division and those of digital trust as discussed above.

On the issues of government readiness, the data suggests an uneven distribution of readiness across the sector and that there is a strong relationship between readiness and digital division as suggested in the literature review (Vasilesc et al., 2020). The data suggests that many municipalities are 'left behind' and officials have addressed these issues showing concern.

The issue of readiness is also seen varying at an individual level, where some officials are more ready than others, generally all the participants were found to be confident, perhaps because of their skill sets as the organisations nominated people who were already working on digital transformation related portfolios to participate in the interviews. Such participants are generally expected to be at a higher maturity level (Warhust & Hunt, 2019).

5.3.4. Do officials generally express a need for the implementation of digital transformation in and by government?

The data suggests that, officials express the need for the implementation of digital transformation in government administration and at government to businesses/ citizens level with the ultimate goal of improving public sector efficiencies. The data also shows the following concerns, requirements, and considerations to be addressed to ensure the successful implementation of this agenda.

a. Organisational forms and institutional arrangements: Policy and governance

With regards to policy and governance, participants expressed that there is a strong requirement for digital government policy and governance functions to be centralised to one body or agency of government to achieve more policy coherence and better governance and coordination across the system.

The data suggests that officials are aware of the 2001 DPSA policy framework on e-government, but the implementation of this policy has not been very effective since its launch. The perceived failure of this framework could be as a result of the high contestations and overlapping functions with regards to what the specific roles of the DPSA, the DCDT and other bodies of government should be. The literature revealed that in implementation, Denmark, Estonia, and Rwanda each have a central body which serves as a home for the policy and authority to digitalise in government (Plesner, 2022; Kilvits, 2019; Twizeyimana et al., 2018).

The data also suggests that the current environment is not enabling for digital transformation and that incentivising digitalisation efforts in could lead to more activities and cooperation in government. These could be areas that the proposed governance agency would focus on. This would enable data sharing and interoperability which the data suggests is currently difficult to achieve as the system suffers fragmentation and low trust levels across itself (government to government).

The elevation of the CIO is also supported as the data suggests that it is necessary. The data further shows that the CIOs or officials in Actor group B contributed more to objective technology views in a knowledgeable manner. This means that the country can benefit from them, some participants raise this in the findings as well. The current research supports their elevation. The findings also suggest that the sample from the CSIR likely falls as actor group C. This makes sense because of their high positions and strategic work. The researcher agrees with her initial assumptions that the CSIR is likely a vendor or consultant, the sample however is at a more strategic level which places them in Actor C but the organisation at a macro level, retained as Actor A. The private sector as

Microsoft and local companies that the Participants made inference and reference to, are also Actors A but have not been included in the study.

b. Organisational forms and Institutional arrangements: Networks

The policy suggests that strong networks are important for the successful implementation of the digital agenda. Given this, the private sector ought to be better regulated to reinstate trust in the system both at local and international government private sector levels.

These could also be overseen by the suggested central governing body or agency for digital government. It would be important for this agency to practice high transparency (Schou & Ports, 2019).

Secondly, concerning networks at an international level with other government. The data suggests that South Africa is not under pressure to be first movers. Officials seemed comfortable with adopting technologies and policies but stress the need to achieve high contextualisation.

c. Enacted technologies and Objective technologies

The previously suggested need for research for foresight in South Africa could also be a function of the agency. With regards to objective technology, the data suggestions on poor research suggest that the technology moves fast, and government struggles to catch up because government's response rate is slow. This could mean that government traditional structures may need to be rethought and redesigned in the new digital age as suggested by Matt et al., (2015), to fully benefit from opportunities of this age. The data suggests that there is regress in some organisations to return to previous conditions. This suggest that the system in some instances may struggle to contain the change perhaps because it is not designed to do so.

With regards to enacted technologies, the literature revealed that the perceptions of users are strongly linked to what they know, or do not know (Fountain, 2004). In agreement with this, the data suggests that the need for government to build knowledge systems around the definition of concepts in ways that are highly context specific to South Africa.

d. Outcomes

The data suggest that the implementation of digital transformation currently, its failures and or fragmentations are the result of legacy systems related to previously encouraged silo-work, previous regimes that created the vast differences of inequality, strong regimes created by powerful service providers, as well as political indecisiveness.

The outcomes of all these, whether intentional or not, have contributed to the failure to implement the digital transformation, have led to burdened citizens, others being left behind, and the country lagging in digital competitiveness.

5.4. Limitations of the study

The presented findings and discussion build on data that lacks the views of officials from the Department of Communications and Digital Technologies (DCDT). The researcher experienced delays as explained in the methodology section. The data is available but could not be incorporated in time for submission with the University. As shown in the priority list in the methodology section (Ranked 2), the DCDT is a highly critical player, and the study could benefit from the views from the DCDT.

The second limitation of the study is that the study participants are all highly skilled and well experienced officials who do strategic work. This means that the views of the officials could be biased. This bias was a blind spot to the researcher in that, she tried to control the bias of selecting who should participate herself, by requesting the organisation to nominate interview participants. The organisations all selected arguably specialised individuals who were already working in the digital transformation related portfolios. The study could benefit from the views of officials who do jobs that face threat in the Fourth Industrial Revolution era and officials who perform technical work.

5.5. Recommendations

Based on the study results and discussion thereof, it is recommended that:

- a. Government strengthens the legitimacy of the implementation of the digital agenda through decisive leadership and political will at the highest levels of government. It is suggested that this is a directive or statement to position digital government as a key policy priority that is released by the President and relevant Ministers. If this is not done, the status of implementation may not change.
- b. The level of the Chief Information Officer is upgraded and standardised across government to afford them more decision-making power. It is suggested that heads of departments lead this activity with their job evaluations committees and experts to review the appropriate level for CIOs to levels that will afford them more power. If this is not done, CIOs will continue to operate at levels which affects peer to peer discussions and will continue to operate at management levels which undermine the importance of their contribution which is vital for organisational change.
- c. An agency is established to lead the governance and implementation of digital transformation in government. It is suggested that the functions of the agency include:
 - Building the required shared digital infrastructure including digital ID.
 - Providing policy direction for all of government.
 - Providing research and foresight in the space of digital government.
 - Centralising the benefits and protection of the citizen.
 - Ensure public trust in government digital technologies.
 - Ensure healthy public sector participation in government.

If this body is not established, or an existing body repurposed to serve as the proposed body, government faces the risk of the continuation of duplications, confusions, policy hiatus and indecisiveness that currently exist in the system.

5.6. Conclusion

This section sought to respond to the research questions to the study. The report has successfully responded to research sub-questions 2-4 through the Digital Technology, and Enacted Technology Frameworks. These two frameworks had minor and manageable gaps. Although the section gives a response to research sub-question 1, it was concluded that the Digital Government Evolution Model was not suitable. Where the frameworks fell short, the researcher successfully used the literature to deduce meaning and draw conclusions. The section also successfully presented the limitations of the study and provided the recommendations.

Overall, the purpose of this research was to explore the perspectives of public sector officials placed in the e-Government Services and Information Management unit of the DPSA, and partners, responsible for coordinating and drafting the Digital Government Policy Framework, on the implementation of digitalisation in the context of improving public sector efficiencies. This was justified as important because, the attitudes and perceptions of policy developers about digitalisation will influence the directionality of policies they develop on the implementation of digitalisation or the digital transformation agenda more broadly.

The main findings were that there is a need for government to strengthen the legitimacy of government digital transformation through releasing decisive political will; there is a need for elevation of the position of the Chief Information Officer in government departments; and lastly there is a need for the establishment of a central agency that will guide the transformation of public service administration to perform important functions for a digital government.

Finally, this work presents an urgent need and plea for government to act by practicing political will and decisive leadership at the highest levels of government. The risks to the

continuing hiatus in e-government related policies will lead to government failing its citizens at various levels.

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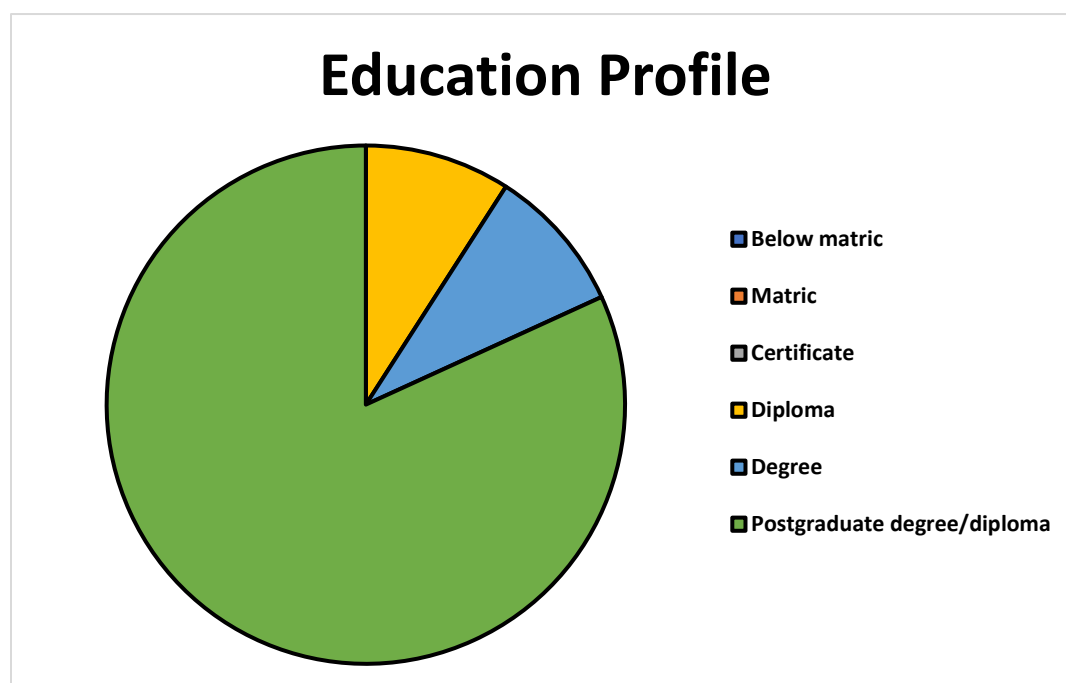
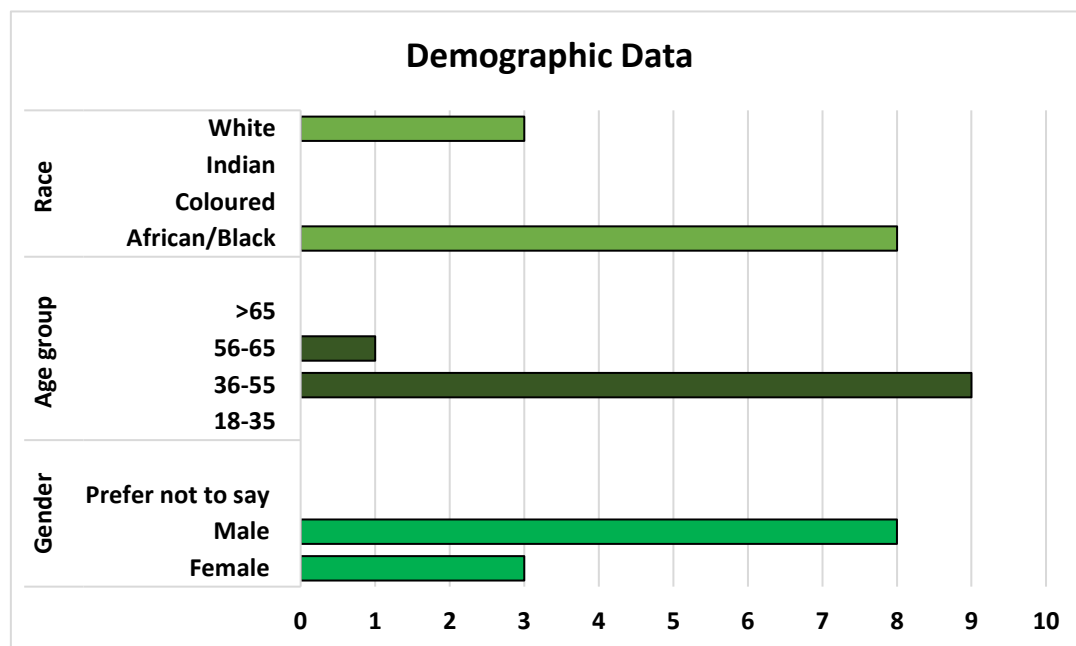
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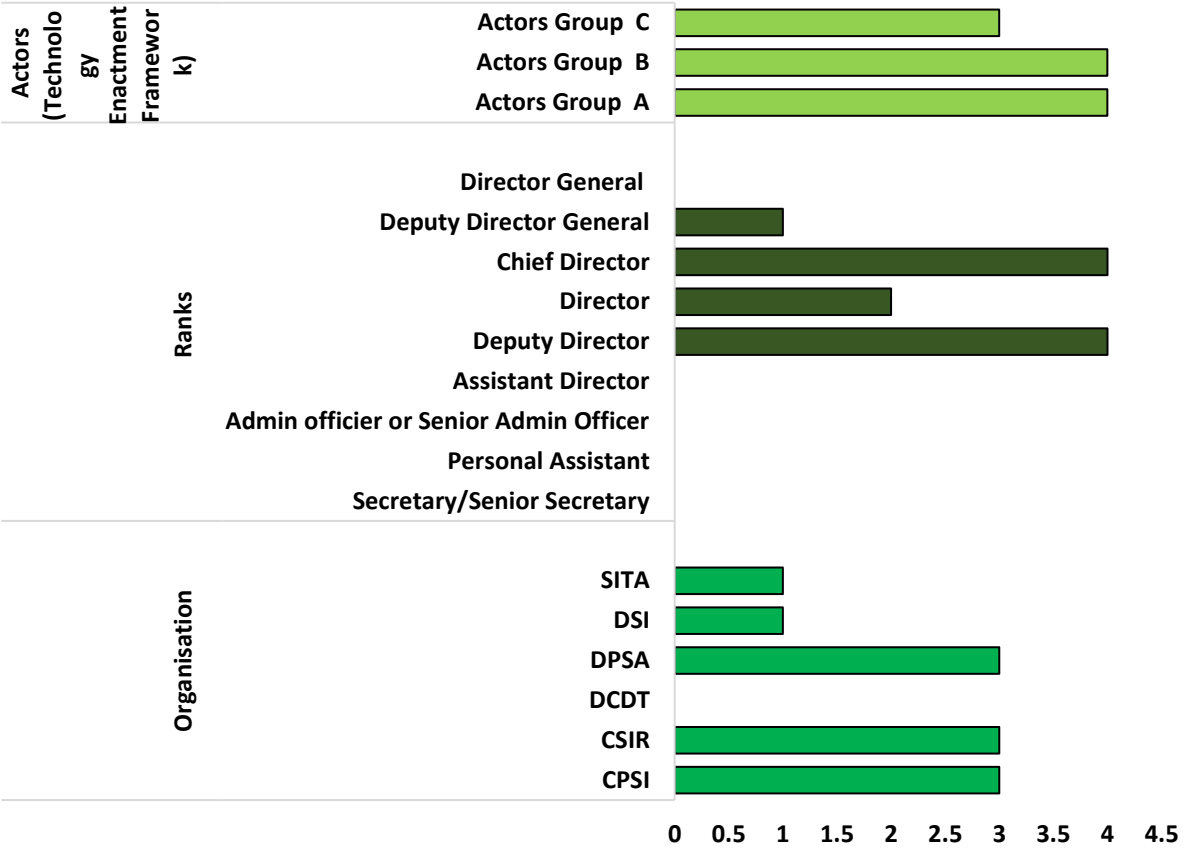
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APPENDIX 1 : DEMOGRAPHIC DATA, EDUCATION PROFILE, AND ORGANISATIONAL PROFILE OF INTERVIEW PARTICIPANTS



Organisational Profile



Appendix 1: Anonymised participant information and actor groups

Participant	gender	age	race	education level	nature of work	rank	organisation	actor group (Fountain, 2004)
10	female	36-55	African/Black	Postgraduate degree/diploma	strategic, technical, core IT, CIO	Senior Management Staff	DPSA	B
2	female	36-55	White	Postgraduate degree/diploma	strategic	Senior Management Staff	CSIR	A
7	male	36-55	African/Black	Diploma	core IT, technical, CIO	Middle Management Staff	CPSI	B
6	male	56-65	White	Postgraduate degree/diploma	strategic & supervisory	Senior Management Staff	CPSI	C
5	male	36-55	African/Black	Postgraduate degree/diploma	strategic and research	Middle Management Staff	CPSI	A
4	male	36-55	African/Black	Postgraduate degree/diploma	strategic	Senior Management Staff	CSIR	A
3	female	36-55	White	Postgraduate degree/diploma	strategic	Senior Management Staff	CSIR	A
8	male	36-55	African/Black	Degree	strategic, managerial	Senior Management Staff	SITA	B
1	male	36-55	African/Black	Postgraduate degree/diploma	strategic	Senior Management Staff	DPSA	C
9	male	36-55	African/Black	Postgraduate degree/diploma	strategic	Middle Management Staff	DPSA	C
0	male	36-55	African/Black	Postgraduate degree/diploma	strategic, business analytics, IT procurement	Middle Management Staff	DSI	B
TOTAL	11							

