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EVALUATING THE INFLUENCE OF DIGITAL TRANSFORMATION KEY DRIVERS IN SOUTH AFRICA'S PUBLIC SECTOR: A LITERATURE REVIEW

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Abstract

Digital Transformation has been used as a tool to improve public service delivery around the globe. As a result, there are key drivers, like technological advancements, policy and regulatory frameworks, leadership capabilities, human capital development initiatives, and external pressures that seem to play significant role in order for such a transformation to be successful. The purpose of this study is to investigate these key drivers in the South African public sector from 2018 to 2024. This is a qualitative study where data was collected using the systematic review approach from journal articles, conference articles, and textbooks published from 2018 until 2024. The empirical literature was retrieved from databases like Google Scholar, Scopus, Zenodo, EBSCO, Sabinet and Emerald to address the three objectives of the study. The funnel approach was also used to review the literature from global, regional (Africa) and local (South Africa) perspectives. The findings from the study revealed the essential strategic actions like addressing keeping up with technological advancements, policy and regulatory frameworks, leadership capabilities, human capital development initiatives as well as addressing external pressures.

Keywords: Digital Transformation, E-Government, Artificial Intelligence, Digital Skills, Digital Challenges, Digital Impact.

1. INTRODUCTION

1.1 Background

The concept of digital transformation (DX) encompasses the integration of digital technologies into all areas of public service, fundamentally changing how these services operate and deliver value to citizens (Lips, 2024). In South Africa, the public sector's journey toward digital transformation is shaped by various key drivers, including technological advancements, organizational readiness, and environmental factors (Modiba & Kekwaletswe, 2020).

The South African public sector faces unique challenges in its digital transformation efforts, largely stemming from the legacy of apartheid, which has resulted in persistent inequalities in access to technology and digital literacy (Chomunorwa, 2023). The COVID-19 pandemic has further exacerbated these disparities, highlighting the urgent need for effective digital strategies that can bridge the digital divide (Mhlanga & Moloi, 2020). As noted by Chomunorwa (2023), the pandemic has catalysed a shift towards digital solutions in education, underscoring the necessity for inclusive policies that address the multi-layered digital divide affecting various sectors, including public administration.

The Seybold Report
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Evaluating the influence of key drivers of digital transformation in the South African public sector requires a comprehensive understanding of the interplay between technology, organisational dynamics, and socio-economic factors. As the public sector continues to evolve in response to these challenges, it is imperative to develop strategies that not only promote digital adoption but also ensure equitable access to digital services for all citizens.

1.2 Scope

The scope of this literature review focuses on examining the key drivers of digital transformation within the public sector, specifically in the South African context. This review encompasses studies published from 2018 to 2024, in order to better understand, examine, and clarify these specific concepts, a literature review was conducted, relevant theories were studied, and a conceptual framework was built (Stroumpoulis & Kopanaki, 2022).

1.3 Definition of Digital Transformation

According to Westerman et al. (2014), digital transformation involves integrating digital technology into all areas of a business, fundamentally changing how organisations operate and deliver value to customers. It requires leveraging new technologies such as artificial intelligence, cloud computing, and data analytics to reimagine processes, products, and services. Leadership in digital transformation is crucial for creating an agile environment conducive to change (Ly, 2023). Organisational transformation aligns strategy, shapes culture, optimises processes and develops skills (Philippart, 2022). These two elements are intertwined and mutually reinforcing, essential for organisational prosperity in the digital age. Digital transformation goes beyond operational or functional changes and involves a fundamental overhaul that affects the business model and core strategy (Spyridon & Kapotas, 2023).

2. PROBLEM STATEMENT

Digital transformation has become a critical agenda for public sector organisations worldwide, including in South Africa, where there is a growing emphasis on leveraging technology to enhance service delivery, improve efficiency, and foster transparency. However, despite significant investments and strategic initiatives aimed at driving digital transformation in South Africa's public sector, the adoption and implementation of digital technologies have been uneven and fraught with challenges (Agafonova et al., 2021); Hofisi, 2023; Komna and Mpungose, 2024; Nurfadilah, 2024).

This study seeks to identify the key drivers of digital transformation and their influence within the South African public sector. By focusing on the interplay between these key drivers the research aims to provide insights that can inform more effective and cohesive digital transformation strategies (Nurfadilah, 2024; Shibambu, 2024).

The findings will contribute to a better understanding of how to navigate the complexities of digital transformation in the public sector, ultimately leading to improved service delivery and enhanced public trust in government institutions.

The Seybold Report
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3. AIM AND OBJECTIVES OF THE STUDY

3.1 Aim of the Study

The aim of this study is to identify and evaluate the influence of key drivers on the digital transformation efforts within the South African public sector.

3.2 Objectives of the Study

- To identify and categorise the key drivers of digital transformation in the South African public sector.
- To evaluate the challenges and barriers associated with the key drivers of digital transformation in the public sector.
- To assess the impact of these drivers on the implementation and success of digital transformation initiatives in South Africa's public sector.

4. OVERVIEW OF DIGITAL TRANSFORMATION IN THE PUBLIC SECTOR

4.1 Global Trends

4.1.1 GovTech Solutions

The concept of GovTech encompasses a wide range of technologies, including artificial intelligence, machine learning, cloud computing, and open data platforms, aimed at modernizing public services and making them more accessible to citizens (Nose, 2023; Nikiforova, 2021; Kysh, 2022; Hoekstra et al., 2023).

The role of information and communication technologies (ICTs) in public sector reform has been widely discussed, with Bannister and Connolly (2014) emphasizing how various GovTech solutions have been instrumental in enhancing service delivery and efficiency in government operations. Mergel (2016) further explores the emergence of digital service teams in government, highlighting their role in implementing GovTech solutions that improve public services and foster greater citizen engagement. Kettunen and Kallio (2020) provide a comprehensive review of digital transformation in the public sector, underlining the critical role of GovTech in facilitating this transformation across various government functions. The OECD (2021) report offers insights into different GovTech initiatives undertaken by member countries, showcasing the use of technology to improve government performance and service delivery on a global scale.

Bertot, Jaeger, and Grimes (2010) discuss how GovTech solutions, particularly e-government and social media platforms, have significantly contributed to enhancing transparency and accountability within government operations. Dunleavy and Carrera (2013) also highlight the transformative potential of digital technologies in public administration, with GovTech playing a central role in modern governance. He and Wang (2021) introduce GovTech as a new paradigm in public administration, focusing on its implications for improving service delivery and citizen engagement. Khan and Miah (2021) systematically review various GovTech solutions, analysing their impact on public sector innovation and providing examples of best

The Seybold Report
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practices from around the world. The World Bank (2020) offers a practical guide to digital government, detailing how GovTech solutions can be leveraged to enhance public service delivery. Bertot and Jaeger (2014) focus on the role of social media as a GovTech tool, reviewing its impact on citizen engagement and government transparency. Together, these sources provide a comprehensive understanding of how GovTech is reshaping public administration, improving service delivery, and fostering greater engagement between governments and citizens.

4.1.2 Artificial Intelligence and Big Data

The integration of artificial intelligence (AI) in governance has been a focal point of recent studies, with Bodemer (2023) providing a comprehensive analysis of AI's role in policy development within the German government. The study emphasizes the need for trust and transparency in the adoption of AI technologies, particularly in sensitive areas such as public healthcare administration. Similarly, Atabekov (2023) explores the implementation of AI in public functions, highlighting the current practices and uncertainties surrounding AI's role in public policy. This research points to the necessity of establishing clear frameworks to guide the application of AI in governance.

In examining the relationship between corporatization and AI in public sector organizations, Veronesi et al. (2022) suggest that corporatization may lead to reduced AI engagement, which can impact administrative efficiency and service delivery. This finding is particularly relevant for public administration as it seeks to balance organizational structure with the adoption of advanced technologies.

Data governance plays a crucial role in organizing information for trustworthy AI applications, as explored by Janssen et al. (2020). The rise of big and open linked data (BOLD) is highlighted as essential for enhancing public sector capabilities through AI and big data analytics, enabling more informed decision-making processes. Additionally, Xia (2023) discusses the application of AI in optimizing resource management within industries like geological exploration, illustrating how AI can be used to analyse large datasets and generate efficient strategies.

AI's broader applicability in public administration is further demonstrated by its role in promoting environmental sustainability, as well as in healthcare, where Mucci (2024) highlights AI's transformative potential in improving patient care and public health administration. However, the risks and challenges associated with AI in public administration, particularly ethical concerns, are explored by Sobrino-García (2021), who examines the use of predictive analytics in Spain.

The need for reliable and transparent AI systems is emphasized by Wong et al. (2022), who discuss the challenges of participatory governance in the context of AI adoption. Finally, Robles & Mallinson (2023) advocate for a cohesive governance framework for AI in public administration, highlighting its potential to enhance service delivery and improve citizen engagement through personalized experiences.

The Seybold Report
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4.1.3 E-Government Services

The shift towards e-government services is a significant trend, with countries like Estonia leading by example through advanced IT development and digital public institution practices (Corbos et al., 2024).

The quality of e-government services is a critical area of focus, as highlighted by Albar et al. (2017), who emphasize the importance of understanding service quality attributes that are specific to e-government. They note that while some attributes may overlap with those of e-commerce, others are unique to government services, making it essential to tailor service delivery to meet user expectations in the public sector. Similarly, Mensah et al. (2017) identify key factors that influence citizens' intentions to use e-government services, such as perceived usefulness and ease of use, underscoring the importance of user acceptance in the successful implementation of e-government initiatives.

Fan and Yang (2015) contribute to this discussion by exploring the integration of online and offline services in e-government. They propose a model that assesses service quality from the user's perspective, emphasizing the need for a seamless experience across different service delivery channels. Napitupulu (2014) examines the challenges and success factors associated with e-government implementation, suggesting that addressing technology adoption challenges is essential for improving service delivery and efficiency.

Additionally, Onumo et al. (2017) investigate the relationship between e-government services and cybersecurity, finding that advancements in e-government are closely linked to improvements in cybersecurity measures, which are vital for ensuring the safety and integrity of digital public services.

Public perception and trust are also significant factors in the success of e-government, as Bhattacharya et al. (2012) propose a multi-item scale for assessing e-service quality in government portals. Their study emphasizes the importance of transparency and trust in fostering citizen engagement with e-government services. In terms of global trends,

The adoption of GovTech in public sector helps expand social assistance coverage, particularly benefiting vulnerable populations in emerging markets (Nose, 2023).

Yoshida and Thammetar (2021) explore the relationship between GovTech and Civic Tech from a global perspective, emphasizing the collaborative nature of developing online public services and the importance of open data and stakeholder engagement. Finally, Hu et al. (2012) provide a comparative analysis through a hierarchical model of e-government service capability, offering empirical evidence on the factors that contribute to effective e-government implementation across different contexts.

4.1.4 Internet of Things

The integration of Internet of Things (IoT) technology in the public sector has been explored extensively in recent years, with numerous studies highlighting its potential to revolutionize public service delivery and governance. Velsberg et al. (2020) demonstrate how IoT can enhance public sector innovation through smart public services, specifically in the context of

The Seybold Report
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winter road maintenance in Estonia, showing improvements in efficiency, effectiveness, and transparency. Sidek et al. (2022) extend this discussion to the role of IoT in facilities management, emphasizing its importance in developing smart cities and transforming public services.

In terms of governance and regulation, Sadeghizadeh et al. (2022) investigate the relationship between IoT innovation and governance, emphasizing the need for effective IoT governance to ensure stakeholder well-being. Kennedy (2016) and Coardoş et al. (2019) discuss the broader implications of IoT for government regulation and propose frameworks for smart governance, respectively.

Lastly, studies by Guenduez et al. (2020) and Ishengoma et al. (2022) present conceptual models and analysis of citizen participation in smart government and the integration of Artificial Intelligence of Things (AIoT) in the public sector, highlighting the drivers and barriers to its adoption. These diverse studies collectively illustrate the multifaceted impact of IoT on public sector innovation, service delivery, and governance.

4.1.5 Blockchain

The application of blockchain technology in e-government has been explored extensively, with various studies highlighting its potential to transform public administration by enhancing data integrity and security. Ahmad et al. (2021) discuss the design of a blockchain immutability framework specifically tailored for e-government applications, emphasizing the technology's role in ensuring data integrity and addressing current challenges associated with its implementation in the public sector. Similarly, Lykidis et al. (2021) explore the use of blockchain in e-government services, noting how its decentralized nature can significantly improve the security and transparency of interactions between citizens and government entities, thereby boosting public trust and service delivery.

The adoption of blockchain-based identity management systems in the public sector is another area of focus. Sung & Park (2021) emphasize the importance of building trust and understanding user acceptance to facilitate the successful implementation of these systems, which can enhance security and streamline public services. The governance of blockchain systems is also critical, as discussed by Meijer & Ubacht (2018), who analyze the balance between trust and control in public administration. Their findings suggest that effective governance frameworks are essential for the successful deployment of blockchain technologies in government.

A practical illustration of blockchain's potential in public administration is provided by Khan et al. (2022) through a case study on the Dubai government. Their study demonstrates how blockchain can transform government processes, particularly in areas such as identity certification, trust establishment, and digital contract execution, thereby improving overall efficiency.

The Seybold Report
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4.1.6 Case Studies

- **Denmark**: Denmark's approach focuses on modernizing legacy systems to meet EU standards, emphasizing change management and progressive strategies (Corbos et al., 2024).
- **Estonia**: Estonia is renowned for its exemplary digital public administration, leveraging IT advancements to streamline services and improve governance (Corbos et al., 2024).
- **Romania**: In response to the pandemic, Romania accelerated its digital transformation efforts, highlighting the importance of building trust in digital institutions (Corbos et al., 2024).

4.2 Regional Context

4.2.1 Rwanda's digital transformation Framework

According to (MICT, 2021), the Smart Rwanda Master Plan (SRMP), which focuses on transforming key sectors such as governance, education, health, finance, trade and industry, and agriculture is central to Rwanda's DX journey. Their plan relies on three main enablers: ICT governance and management, digital talent development, and widespread broadband access (MINICT, 2021). The Rwanda Digital Acceleration Project, which aims to increase access to broadband and enhance digital public services is one of the key initiatives under this framework. The project seeks to strengthen the digital innovation ecosystem and boost the country's digital economy (World Bank, 2021).

Overall, Rwanda's digital transformation strategy is designed to leverage technology to drive economic growth, improve public services, and create new opportunities for its citizens, thereby positioning the country as a leader in digital innovation on the continent.

4.2.2 Nigeria's Digital Transformation Strategy

Nigeria's Digital Transformation Strategy involves analysing factors within the technological, organisational, and environmental domains that influence the adoption and implementation of digital technologies (Ji & Li, 2022). The strategy includes initiatives such as the National Digital Economy Policy and Strategy and the National Broadband Plan, which aim to expand digital literacy and broadband coverage (Li et al., 2022). The Nigerian government has also implemented the Nigeria e-Government Master Plan and supports start-ups and tech entities to optimise government operations and boost service delivery (Nwozoret al., 2022). Nigeria's approach to digital transformation serves as a model for other African countries and developing nations, emphasising the importance of a balanced approach to technology, organisational strategies, and environmental factors (Abdullateef et al., 2022).

4.3 South African Context

4.3.1 Chronological journey of South Africa's digital transformation

Figure 1 depicts South Africa's digital transformation journey since 1995. The timeline highlights the progression of significant policy initiatives related to digital transformation and

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ICT governance in South Africa.

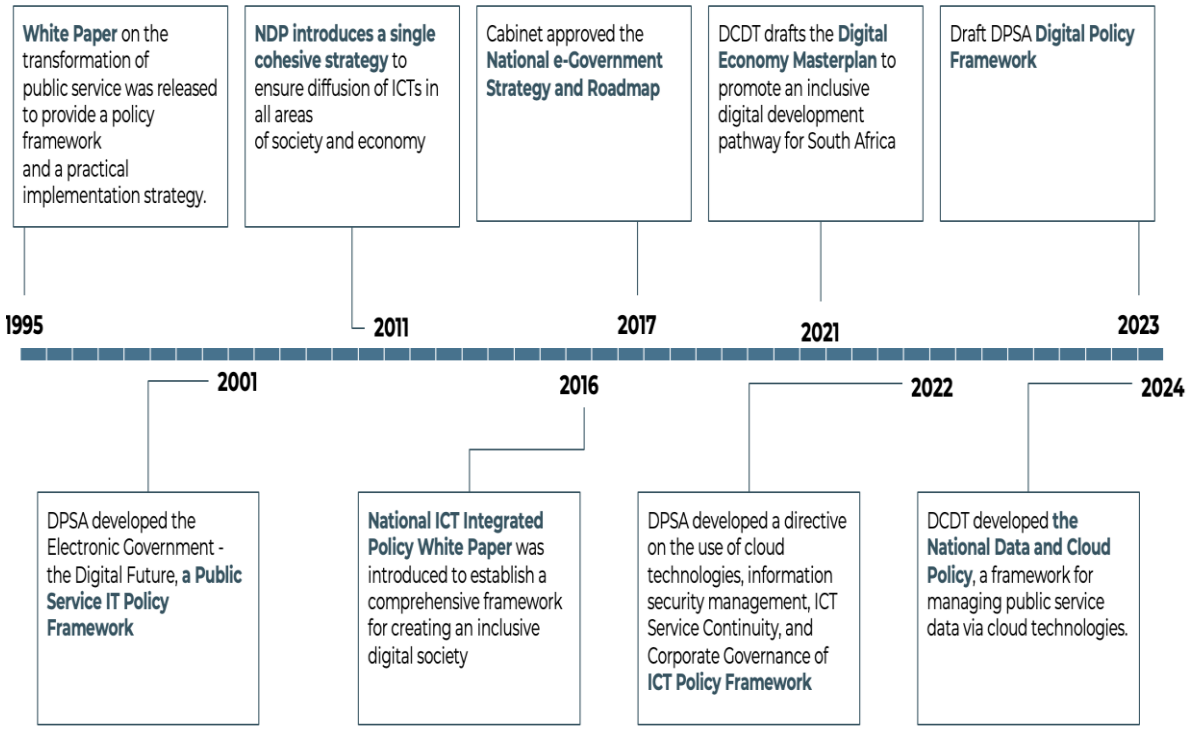

Figure 1: South Africa's digital transformation journey

Source: DCDT (2024)

The journey begins in 1995 with the release of the White Paper on the transformation of public service, which provided a policy framework and a practical implementation strategy for improving public service delivery. In 2001, the Department of Public Service and Administration (DPSA) developed the Electronic Government - The Digital Future, establishing a Public Service IT Policy Framework. Fast-forward to 2011, the National Development Plan (NDP) introduced a cohesive strategy to ensure the diffusion of ICTs across various sectors of society and the economy. In 2016, the National ICT Integrated Policy White Paper was introduced, aimed at creating an inclusive digital society.

By 2017, the National e-Government Strategy and Roadmap was approved by Cabinet, further advancing digital governance initiatives. In 2021, the Department of Communications and Digital Technologies (DCDT) drafted the Digital Economy Masterplan to promote an inclusive digital development pathway for the country. Following this, in 2022, the DPSA introduced a directive focused on cloud technologies, information security management, ICT service continuity, and corporate governance within the ICT framework. Most recently, in 2023, the DPSA Digital Policy Framework was drafted to further guide the public service's digital transformation, followed by the National Data and Cloud Policy developed by the DCDT, setting a framework for managing public service data through cloud technologies.

The Seybold Report
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4.3.2 The Overview

Figure 2 presents a Digital Public Infrastructure Index chart that scores various countries on a scale of 0 to 5.

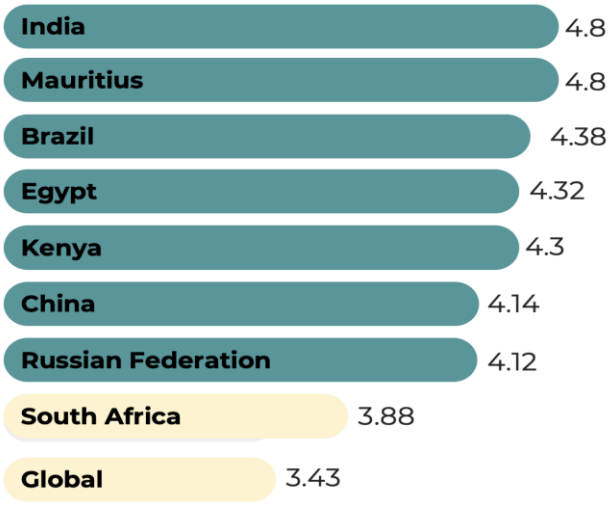

Figure 2: Digital Public Infrastructure Index [0 - 5]

Source: DCDT (2024)

The countries with the highest scores are India and Mauritius, both scoring 4.8. Brazil follows with a score of 4.38, while Egypt scores 4.32, and Kenya scores 4.3. China and the Russian Federation score 4.14 and 4.12, respectively. This data reflects that even though South Africa has a score of 3.88, which is low abut above the global average of 3.43, it has made significant strides in digital transformation, even though it continues to grapple with challenges such as digital inequality, infrastructural limitations, and a skills gap (Botha & Van Zyl, 2019).

The SA Connect initiative aims to provide high-speed internet access to the majority of the population, but rural and underserved areas remain particularly vulnerable, struggling with limited connectivity (Department of Communications, 2020; Mkhize, 2018). By 2027, the government intends to ensure 100% broadband coverage, as stipulated in the National Development Plan. The government's ambitious targets include connecting all households and businesses to broadband internet, with 80% of South Africans expected to have basic digital skills and 40% with advanced skills by 2030 (DCDT, 2024).

Efforts to address the digital divide have been bolstered by the National e-Government Strategy and Roadmap, which seeks to transform public services through digital technologies and improve infrastructure roll-out. The strategy envisions an inclusive digital society and improved citizen quality of life, with all government services accessible online by 2030 (DPSA, 2017; DCDT, 2024). Coordination among government departments and the State Information Technology Agency (SITA) is crucial to this vision, with policy reforms, digital infrastructure improvements, and ICT industry participation essential to delivering on these objectives. The strategy also promotes digital identity systems, online payment gateways, and the

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implementation of a National Digital ID to prevent fraud and improve trust in digital platforms (DPSA, 2017; DCDT, 2024).

Moreover, the broadband policy plays a pivotal role in bridging the digital divide and fostering universal access to digital services (Msomi, 2023). The Draft National Data and Cloud Policy supports this by enhancing digital infrastructure, particularly cloud computing services, aimed at fostering digital sovereignty and increasing local data processing capacity (Mhlanga & Hofisi, 2023). However, issues of affordability remain a barrier to achieving widespread digital access, with economic challenges and gender disparities further exacerbating the problem (Shuaibu et al., 2023; McMenemy, 2022).

The COVID-19 pandemic underscored the need for digital transformation, highlighting the importance of networks, infrastructure, and digital skills for both citizens and businesses (Ngoqo, 2023). Efforts to achieve universal broadband access by 2030 are ongoing, with government initiatives pushing for public access to fibre networks, as well as affordable and equitable digital services (DCDT, 2024).

Despite these efforts, digital transformation in South Africa faces considerable hurdles. Komna and Mpungose (2024) reveal that SITA, as the custodian of the government's Information and Communication Technology (ICT) systems, continues to struggle with legacy systems, poor service delivery, and overlapping mandates with other state-owned entities. Their research reveals that, while advancements in AI, IoT, and cloud computing are being made, legislative barriers, leadership gaps, and a lack of skilled resources hinder progress. Their study suggests that effective stakeholder engagement and resource alignment are crucial to overcoming these challenges, with lessons that can inform broader public sector transformation (Komna & Mpungose, 2024).

4.3.3 Digital Transformation Pillars in South Africa

To ensure a comprehensive digital transformation, the South African government has established six key pillars to guide the process:

1. *Digital Access and Connectivity*: Aiming for 100% broadband connectivity by 2027, with a focus on inclusive network coverage and high-speed access, particularly in underserved areas. The consolidation of state-owned fibre infrastructure and collaboration with spectrum licensees and private partners will play a significant role in achieving this goal (DCDT, 2024).
2. *Digital Services and Platforms*: By 2030, all government services are expected to be accessible online. Initiatives like the e-Government Portal and the modernization of the South African Post Office Trust Centre into a highly secured Public Key Infrastructure are essential components in this transformation (DCDT, 2024).

The Seybold Report
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3. *Data, AI, and Emerging Technologies*: The development of a Government-Wide Centralised Data Repository will facilitate data-driven governance and innovation. AI technologies will be implemented across various sectors to enhance service delivery and prevent challenges such as financial crime (DCDT, 2024).
4. *Digital Citizen Empowerment*: Ensuring that 80% of South Africans have basic digital skills by 2030, with a focus on creating digital learning platforms and facilitating digital entrepreneurship (DCDT, 2024).
5. *Cybersecurity and Data Privacy*: Investment in cybersecurity research and development is vital to protect digital assets and enhance trust. The development of a robust cybersecurity ecosystem will mitigate threats and improve compliance (DCDT, 2024).
6. *Industry Partnerships and SMME Empowerment*: Collaboration with small businesses and start-ups will drive innovation and contribute to economic growth. Policies supporting the participation of SMMEs and youth-owned businesses in the digital economy are critical to ensuring inclusive growth (DCDT, 2024).

4.3.4 Key Stakeholders

The success of digital transformation in South Africa hinges on the active participation of several stakeholders. The National e-Government Strategy identifies key stakeholders in South Africa's digital transformation journey. The Department of Communications and Digital Technologies (DCDT) leads the charge by setting the vision and policies for digital access and e-Government. It works closely with other departments, including the Department of Public Service and Administration (DPSA), responsible for managing the transformation of government processes, and SITA, which handles IT infrastructure and supports the roll-out of digital services across government. National Treasury provides financial support, while ICASA regulates telecommunications to ensure equitable access to digital services (DPSA, 2017; Komna & Mpungose, 2024).

5. KEY DRIVERS OF DIGITAL TRANSFORMATION

Figure 3 reflects the interconnected nature of the digital transformation ecosystem. Drivers such as technological advancements and leadership, combined with organizational and regulatory factors, propel digital transformation forward, ultimately leading to significant positive impacts such as economic growth, employment creation, and improved service delivery.

This cyclical process suggests that as the impacts manifest, they further strengthen the drivers, creating a virtuous cycle of continuous innovation and improvement in digital transformation efforts. This framework emphasizes the holistic and systemic nature of digital transformation, where multiple factors and outcomes are interdependent and continuously evolve.

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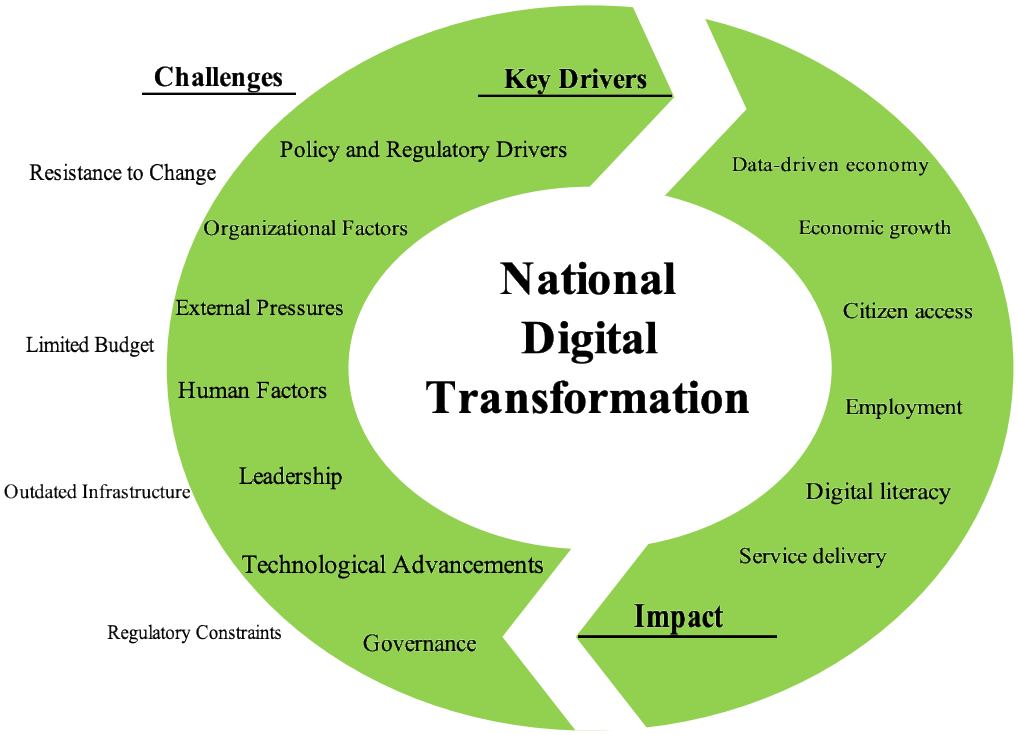

Figure 3: The conceptual framework for digital transformation in the public sector

Source: Own

While the Key Drivers push digital transformation forward and generate significant Impact, numerous challenges along the way can impede progress or shape the nature of the outcomes. Addressing these challenges through strategic policies, leadership, investments in digital skills, and governance reforms, amongst others, is critical for maximising the benefits of digital transformation. The cycle of drivers leading to impacts—and those impacts further fuelling future drivers—will only function optimally when the challenges are anticipated and effectively managed.

5.1 Technological Advancements

Technological advancements, particularly in Artificial Intelligence (AI), cloud computing, and Internet of Things (IoT), play a pivotal role in driving digital transformation. According to Thomas (2024), AI enhances decision-making capabilities by analysing vast amounts of data, while cloud computing provides scalable infrastructure that supports the deployment of digital services.

The IoT facilitates real-time data collection and connectivity, enabling smarter public services and improved operational efficiency (Hilali et al., 2020). These technologies not only optimize management processes but also empower public sector organizations to innovate and respond to the evolving needs of citizens.

The Seybold Report
ISSN 1533-9211
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On behalf of the South African government the State Information Technology Agency (SITA), South Africa has integrated emerging technologies to improve digital transformation and service delivery across government departments. Cloud computing, AI, IoT, cybersecurity, Software Defined Networking, blockchain, and data analytics have been implemented to modernize infrastructure and align with global ICT trends (SITA 2021). Cloud computing provides scalable solutions for government departments, while AI enhances decision-making, automates tasks, and provides advanced data analytics. IoT devices gather real-time data on infrastructure, environmental conditions, and public services, providing actionable insights (Komna & Mpungose, 2024). The government's cybersecurity measures have been enhanced through the Security Operations Centre, while Software Defined Networking automates network infrastructure and improves reliability (SITA, 2022). According to Komna and Mpungose (2024) blockchain technology is being explored for transparency, security, and efficiency in government processes. Data analytics and big data platforms have been established to enable SITA and government to harness vast amounts of data for data-driven decision-making and strategic planning (Komna & Mpungose, 2024).

5.2 Policy and Regulatory Drivers

Effective policy and regulatory frameworks are crucial for fostering an environment conducive to digital transformation. Governments must establish clear guidelines that support the adoption of new technologies while ensuring data privacy and security (Gómez-Trujillo & Gonzalez-Perez, 2021). For instance, the European Union's General Data Protection Regulation (GDPR) has set a precedent for data protection, influencing how public organizations implement digital solutions (Khubulova, 2022). Such frameworks can help mitigate risks associated with digital transformation and encourage public trust in new technologies. Table 1 has been adapted from Madyibi (2020) and it offers a comprehensive overview of the role of each piece of legislation and policy mentioned, how it affects the digital transformation within the broader South African public sector context.

Table 1: Policies/ Legislations

Policy/Legislation	Role
SITA Act	Defines the SITA's role in enhancing public service delivery via IT, guiding strategic digital transformation goals.
Electronic Communications Act (ECA) 2005	Provides the regulatory framework for electronic communications, crucial for the government's digital initiatives.
Protection of Personal Information Act (POPIA) 2013	Emphasizes data privacy and protection, essential for the government's data management efforts.
Cybercrimes Act 2020	Highlights the need for secure digital services, focusing on cybersecurity.
Digital Economy Master Plan	Aligns government efforts with the national digital development agenda.
Data and Cloud Policy (2021)	Focuses on data sovereignty and cloud services, crucial for the government's digital transformation strategies.
National Integrated ICT Policy White Paper 2016	Guides ICT integration into national development, setting the government's strategic direction.

The Seybold Report
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National e-Government Strategy and Roadmap	Directs the digitization of government services, aligning with the government's objectives.
South Africa Connect	National broadband policy, vital for the government's digital initiatives and infrastructure development.
PC4IR Strategic Implementation Plan (SIP)	Provides a framework for embracing the Fourth Industrial Revolution, impacting the government's adoption of advanced technologies.
Broadband Infraco Act	Establishes a state-owned entity to provide affordable broadband infrastructure, essential for supporting digital transformation across government sectors.
Sentech Act	Regulates the broadcasting signal distributor, focusing on enabling digital broadcasting and communications services, which are integral to the government's ICT goals.

5.3 Leadership and Governance

Leadership and governance are vital drivers of digital transformation. Strong leadership is necessary to champion digital initiatives and foster a culture of innovation within organisations (Oliveira & Souza, 2021). Leaders must not only advocate for the adoption of new technologies but also ensure that employees are engaged and supported throughout the transformation process. Effective governance structures can facilitate collaboration across departments and

5.4 Human Factors

Human capital is a critical factor in the success of digital transformation efforts. Organisations must invest in skills development and continuous learning to equip employees with the necessary competencies to adapt to new technologies (Dang-Pham et al., 2022). Employee engagement is also essential; when staff members feel valued and involved in the transformation process, they are more likely to embrace change and contribute positively to the organisation's digital initiatives (Nguyen et al., 2023). As such, fostering a culture of continuous learning and upskilling is imperative for organisations aiming to keep pace with technological advancements.

Skills Development: Continuous skills development is crucial for equipping employees with the competencies needed for digital transformation. Linh (2023) highlights that the perceived ease of use of digital tools significantly influences employee engagement, emphasising the need for targeted training programs. Xin et al. (2022) also note that well-educated employees are essential for successful digitalization, as they help reshape organizational values during the transformation.

Employee Engagement: Employee engagement is vital for digital transformation success. Thileepan & Raveendran (2022) found that engaged employees are more motivated and contribute to a culture of innovation, which is crucial for adapting to digital environments.

Adaptability to New Technologies: The ability to adapt to new technologies is key in digital transformation. Zafar & Mehmood (2019) and Iddagoda & Opatha (2020) emphasize the role of transformational leadership in motivating employees to embrace innovation, which can help curb resistance and enhances adaptability.

The Seybold Report
ISSN 1533-9211
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Continuous Learning and Upskilling: Continuous learning is essential due to the fast pace of technological advancements. Çetindamar and Abedin (2020) argue for building a culture of ongoing competence development to navigate digitalization challenges effectively.

Resistance to Change: According to Jones et al. (2020), resistance to change, driven by cultural norms and concerns about job security, is a common barrier, necessitating clear communication about the benefits of digital transformation and support for employees during transitions.

5.5 External Pressures

External pressures, including global trends and public demand, significantly influence digital transformation in the public sector. The rapid pace of technological change and the increasing expectations of citizens for efficient and transparent services compel governments to adopt digital solutions (Li et al., 2017). Additionally, the COVID-19 pandemic has accelerated the shift towards digital services, highlighting the need for governments to be agile and responsive to public needs (Deng et al., 2022).

5.6 Organisational Factors

Leadership and Vision: Leadership in digital transformation is crucial for creating an agile environment conducive to change (Ly, 2023). The "E-Governance in Africa 2024: Opportunities and Challenges" by Maslov et al. (2023) serves as a handbook on digitalisation of public administration in African countries and presents an overview of up-to-date information on e-Governance development in the region, trends, common challenges and solutions being implemented with a goal of shedding light on the diversity of e-governance initiatives in African countries.

Maslov et al. (2023) highlight that strong leadership is necessary to overcome the various challenges associated with DX, such as the lack of infrastructure and political will, which are common obstacles in the African context. Leaders must also ensure that digital strategies are aligned with national development goals and that they are effectively communicated and implemented across all levels of government (Maslov et al., 2023)

Change Management: The experiences of European countries like Denmark, the Netherlands, and Estonia offer valuable lessons in managing digital transformation, emphasising the need for change management (Corbos et al., 2023). A study by Komna and Mpungose (2024) has demonstrated the critical need for a strategic, integrated approach to digital transformation in the South African public sector, and critical findings highlight the necessity of robust change management strategy, policy restructuring, and enhanced leadership engagement to drive digital initiatives effectively. Nurfadilah and Haliah (2024) highlight that managing resistance through effective change management strategies is crucial for the success of digital transformation efforts.

Organisational Culture: Organizational culture is a critical determinant of the success of digital transformation efforts, with several key factors influencing the ability to foster change (Komna, 2024). These include resistance to change, which can significantly hinder the adoption of new

The Seybold Report
ISSN 1533-9211
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technologies, and the degree of management support, which is essential for driving transformation initiatives forward (Bulling, 2022; Li et al., 2022). Additionally, the availability of budget and the readiness of IT infrastructure are foundational elements that determine the feasibility and scope of implementing digital solutions (Kotter, 2014; Ghosh et al., 2020). A strong organisational culture that embraces innovation and continuous learning can significantly enhance an organisation's capacity to adapt to technological changes (Schein, 2010; Cameron & Quinn, 2011). Furthermore, leadership commitment to nurturing a supportive culture and addressing barriers such as resource constraints and employee resistance is crucial for achieving sustainable digital transformation (McKinsey & Company, 2018; Deloitte, 2021). Organizational adaptation requires a shift in mindset, where employees are encouraged to embrace change and innovation. Empowerment involves providing employees with the tools, resources, and support to implement digital initiatives successfully (Komna and Mpungose, 2024).

Resource Allocation: Financial limitations often restrict the scope and scale of digital transformation initiatives, highlighting the need for adequate funding and strategic resource allocation (Chen, 2022). In a study by Komna and Mpungose (2024), 50% of the respondents identified organisational adaptation and empowerment as critical for achieving DX goals. These researchers argue that this involves reviewing and updating policies, fostering a culture of innovation, and ensuring continuous training and reskilling of employees.

Internal Communication: Effective internal communication mitigates confusion and aligns members toward common objectives (Kane et al., 2020; Bharadwaj et al., 2013). The literature emphasises the importance of clear communication in digital transformation to ensure employee awareness and engagement, which is vital for the successful adoption of new technologies.

5.7 Challenges and Barriers

Digital transformation has been proposed as a solution to enhance service delivery by improving decision-making, cutting costs, and streamlining operations, although challenges such as the digital divide and lack of technical expertise persist (Hofisi and Chigova, 2023).

Resistance to Change: Public sector organisations often face significant resistance to change, both from employees and within the broader organisational culture. This resistance stems from a fear of job loss due to automation, discomfort with new technologies, or a lack of understanding of the benefits of digital transformation. Addressing this challenge requires strong leadership, effective communication, and comprehensive change management strategies (Kotter, 2014; Bulling, 2022).

Limited Budget: Budget constraints are a major barrier to digital transformation in the public sector. Many government agencies operate under tight financial limitations, which can restrict the ability to invest in new technologies, upgrade existing infrastructure, or provide necessary training for employees (Westerman et al., 2014; Deloitte, 2021). Securing adequate funding and making strategic investments in technology are crucial for overcoming this challenge.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

Outdated Infrastructure: Many public sector organizations struggle with outdated IT infrastructure, which can hinder the implementation of modern digital solutions. Legacy systems are often incompatible with new technologies, making it difficult to integrate innovative digital tools and processes. Modernising infrastructure is essential for enabling digital transformation, but it often requires significant investment and planning (Bharadwaj et al., 2013; Accenture, 2021).

Regulatory Constraints: Public sector organisations are often bound by stringent regulatory and compliance requirements, which can slow down the adoption of new technologies. These constraints can limit the flexibility needed to implement digital initiatives effectively and can lead to delays in project execution (Gartner, 2020; Schein, 2010). Navigating regulatory challenges requires a deep understanding of the legal landscape and the ability to work within existing frameworks while advocating for necessary reforms (Komna, 2024).

5.8 Impact of Digital Transformation on the Public Sector

According to Hofisi and Chigova (2023) digital transformation is seen as a means to enhance and positively impact public service delivery by improving decision-making, reducing costs, and streamlining operations, though it faces significant challenges.

5.8.1 Impact on Society and Economy

The digital transformation journey in South Africa has the potential to significantly enhance socio-economic development. A digitally connected society can leverage the power of technology to access better education, healthcare, and economic opportunities. For example, improving digital literacy and internet access in rural areas can enable individuals to participate in the digital economy, addressing unemployment and poverty, particularly for youth and women (Msomi, 2023; Shuaibu et al., 2023).

However, the digital divide remains a significant barrier, with affordability and infrastructure challenges still hindering progress in underserved regions. By addressing these barriers, South Africa could significantly reduce the information poverty that disproportionately affects vulnerable populations, including the NEET (youth not in education, employment, or training) (Raff et al., 2022).

The National e-Government Strategy and Roadmap serves as a critical driver for this transformation, seeking to improve service delivery through digital platforms. As part of this effort, the government aims to make all services accessible online by 2030, with projects like the e-Government Portal playing a key role (DPSA, 2017; DCDT, 2024). By expanding digital identity systems and introducing online payment gateways, the government is working to improve citizen access to essential services while enhancing transparency and trust in public institutions.

The roll-out of a National Digital ID system is expected to combat fraud and strengthen security measures in digital transactions (DCDT, 2024). As more services become digitized, South Africa's public administration will evolve into a more efficient and accountable system,

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

increasing citizens' trust and reducing corruption (Komna & Mpungose, 2024).

5.8.2 Economic Growth and Industry Impact

Digital transformation also has the potential to stimulate economic growth by promoting entrepreneurship and innovation. The Draft National Data and Cloud Policy aims to support the digital economy by fostering local cloud computing services and enhancing data sovereignty, thus reducing dependency on international data infrastructure (Mhlanga & Hofisi, 2023). This would allow South Africa to retain more value within its borders, enhancing local businesses' ability to compete on a global scale. The development of local hyper-scale data centres and the expansion of the Government-Wide Centralised Data Repository are critical in supporting a data-driven economy, fostering innovation, and improving decision-making processes (DCDT, 2024).

However, economic disparities remain a significant obstacle. The high costs of digital technologies continue to restrict access, particularly for small businesses and startups in underserved areas. This affordability issue is compounded by the gender gap in mobile broadband access and technological literacy, which highlights broader social inequalities (McMenemy, 2022). Addressing these disparities is essential for creating an inclusive digital economy where innovation can thrive, especially in SMMEs and youth-led enterprises (DCDT, 2024).

6. RESEARCH METHODOLOGY

Table 2 summarises how the analysis of the literature review was conducted in different phases as per Stroumpoulis and Kopanaki (2022) recommendations.

Table 2: Analysis of the literature review steps

Phase	Description
Phase 1	Planning the review
Phase 2	Identification of key elements that align with the study's title and research objectives, focusing on digital transformation in the public sector.
STEP 1	Search for articles by keywords: "digital transformation" and "public sector".
STEP 2	Initial screening of retrieved articles was conducted in accordance with inclusion and exclusion criteria. This stage involved an initial review of titles and abstracts.
STEP 3	More key words were used to further refine the collected articles.
STEP 4	The final articles were the searched for themes that specifically talk to the key drivers
STEP 5	The articles were then group according to their similarities to create emerging themes. Though there were some overlaps for some articles, six themes emerged from the final identified literature.
STEP 6	The findings were categorized into themes, specifically addressing the themes as key drivers.

6.1 Search Strategy

6.1.1 Literature Search Approach

To develop a comprehensive literature search strategy for the South African public sector, a systematic approach was used that incorporates various academic databases and sources. The

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

first stage included the identification of key elements that underpin the title and research objectives of the study (Shibambu, 2023). In step 1 only two phrases were used to identify articles: “digital transformation” and “public sector”.

6.1.2 Academic Databases and Search Tools

Google Scholar, Scopus, Zenodo, EBSCO, Sabinet and Emerald were used to ensure comprehensive coverage of scholarly articles. These platforms provide access to a wide range of peer-reviewed journals and conference papers, which are crucial for understanding the current state of research in digital records preservation and employee empowerment in South Africa (Matlala et al., 2022; Mbangeleli and Ojugbele, 2021).

6.1.3 Government Reports and Policy Documents

Government reports and policy documents were also reviewed to gather insights into the regulatory and policy environment affecting public sector initiatives. This is particularly important for understanding what challenges and strategies related to DX in South Africa (Nhleko et al., 2023; Klaaren and Watermeye, 2022).

6.2 Keywords and Search Terms

According to Booth et al. (2016), when conducting a literature review, it is essential to establish clear inclusion and exclusion criteria to ensure that the selected studies are relevant, credible, and aligned with the research objectives.

Thus, in this study the search strategy employed was a combination of keywords such as “digital transformation,” “public sector,” “South Africa,” “drivers of digital transformation,” “e-government,” and “technology adoption.” Boolean operators like AND and OR were used to refine the search results. Keywords such as "digital governance," innovation," "cybersecurity," "artificial intelligence," "big data analytics," "policy frameworks," and "technology adoption" were further used to refine the search and identify relevant papers.

The titles were then further reviewed to eliminate duplicates and a final database of studies for further analysis was compiled. The goal was to select papers that addressed research objectives and contributed significantly to understanding the key drivers and challenges of DX in the South African public sector. After assessing the relevance of each paper, 237 papers were initially selected for further study; this list was then further refined.

6.3 Inclusion and Exclusion Criteria

Inclusion and exclusion criteria are critical in literature reviews as they help refine the focus of the study and ensure that the selected sources are both relevant and of high quality (Tranfield, Denyer, & Smart, 2003).

Inclusion criteria for the study were: (1) articles published between 2018 and 2024, (2) studies focusing on digital transformation in the public sector, (3) research relevant to the South African context, government reports and policy documents and (4) studies available in English. Exclusion criteria included: (1) studies focused solely on the private sector, (2) articles that did not explicitly discuss drivers of digital transformation.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

6.4 Selection Process

The selection process is a crucial step in systematic reviews, as it involves the meticulous screening of studies to ensure that only those most relevant to the research objectives are included (Moher et al., 2009; Higgins & Green, 2011).

The selection process began with an initial screening of titles and abstracts to identify studies that met the inclusion criteria. Full-text reviews/searches were then conducted on the remaining studies to assess their relevance to the research objectives.

6.5 Data Extraction and Analysis

6.5.1 Data Extraction Process

The data extraction process is a systematic approach used to gather and organise relevant information from selected studies, ensuring consistency and accuracy in the analysis (Petticrew & Roberts, 2006; Kitchenham & Charters, 2007).

Data extraction was conducted using a Big Data Analytics and AI platform (Microsoft Power BI) where all the selected documents were loaded to capture key information from each selected study. The extracted data included study objectives, methodology, key findings, and conclusions.

6.5.2 Data Analysis Approach

The data analysis approach in systematic reviews often involves methods like thematic analysis, which allows researchers to identify, analyse, and report patterns (themes) within the data, providing a structured way to interpret complex qualitative information (Braun & Clarke, 2006; Thomas & Harden, 2008).

The data were analysed using thematic analysis, where common themes related to the drivers of digital transformation were identified across the selected studies.

6.5.3 Categorisation of Key Drivers

Categorising key drivers into distinct themes allows for a more organised and systematic analysis, facilitating the identification of patterns and relationships within the literature (Miles, Huberman, & Saldana, 2014; Petticrew & Roberts, 2006).

The key drivers identified in the literature were categorized into six main themes: Technological advancements, policy and regulatory drivers, leadership and governance, human factors, external pressures and organizational factors

6.5.4 Evaluation Criteria

Establishing evaluation criteria helps to assess the quality and relevance of included studies as it ensures that studies with contextual relevance are prioritised, enhancing the reliability of the review's findings (Higgins & Green, 2011; Petticrew & Roberts, 2006).

Each study was evaluated based on its relevance to the topic and objectives of the study in the South African context.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

6.5.5 Synthesis of Findings

The synthesis of findings provides a comprehensive understanding of the research topic by combining insights from different sources and contexts, thereby enhancing the depth and breadth of the analysis (Noblit & Hare, 1988; Popay et al., 2006).

The findings were synthesised into a narrative review that highlighted the key drivers of digital transformation in the South African public sector.

7. FINDINGS BASED ON THE LITERATURE REVIEW

7.1 Key Drivers of Digital Transformation

- *Technology*: Technological advancements, such as AI, cloud computing, and IoT, are pivotal in driving digital transformation. They enhance decision-making and operational efficiency.
- *Policy, Governance, and Regulations*: Effective policy and governance frameworks are essential in providing a conducive environment for digital transformation by ensuring data privacy and security.
- *Leadership and Governance*: Leadership plays a critical role in fostering a culture of innovation and driving digital transformation initiatives within organizations.
- *Human Factors*: Human capital, including skills development and employee engagement, is crucial for the success of digital transformation efforts.
- *External Pressures*: Global trends and public demand significantly influence the pace and direction of digital transformation in the public sector.
- *Organisational Factors*: Organisational culture, resource allocation, and internal communication are key factors that influence the ability to successfully implement digital transformation.

7.2 Challenges and Barriers Associated with the Key Drivers

Challenges such as resistance to change, limited budget, outdated infrastructure, and regulatory constraints can hinder the effectiveness of digital transformation efforts.

7.3 Impact of These Drivers

The impact of the key drivers is seen in the overall enhancement of service delivery, efficiency, and public sector innovation. However, the identified challenges need to be addressed to maximize these benefits.

8. RECOMMENDATIONS

8.1 Practical Strategies

Based on the findings of this study, several practical strategies are proposed to enhance digital transformation in the South African public sector.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

- **Leadership Development Programs** should be implemented to equip public sector leaders with the skills and knowledge needed to drive digital initiatives effectively. The Department of Public Service and Administration school of government needs to make basic computer literacy mandatory, using the National School of Government and partnerships with tertiary institutions and industry to provide and transfer computer and technology skills to civil servants.
- **Comprehensive Change Management Plans** are essential to address resistance and ensure that employees are engaged and prepared for the transition to digital operations. The human-technology has been a struggle for government for a while with no sight in end. The resistance by employees is a critical risk for digital transformation projects.
- **Investment in Digital Skills Training** for public sector employees is crucial to build the necessary competencies to work with new technologies. A long term solution to this problem is having computer skills as one of the compulsory subject as early as primary school.
- **Digital Inclusion** should be on top of government's priority list, starting with the roll out digital infrastructure in all rural and urban areas. Moreover should revisit the fines charged to telco companies who refuse to deploy infrastructure in rural areas. Failing which government should subsidise the price of data with the intention of universal access to all..
- **Collaboration with Private Sector Partners** can help public organizations leverage cutting-edge technologies, augment scarce skills and get expertise that may not be available in-house. With the rapid change in technologies, these partnerships can also assist in deploying ICT infrastructure and bridging the skills/capacity gap.
- **Regular Monitoring and Evaluation** of digital transformation projects should be conducted to assess progress, identify challenges early, and make necessary adjustments to ensure successful implementation. One of the major gaps in government digital transformation projects is performance monitoring of the deployed. There's no monitoring and evaluation of projects on whether they are fulfilling what they were created for.

8.2 Policy Recommendations

To support digital transformation in the public sector, several policy recommendations are proposed.

- *Revised Digital Infrastructure Policies* that focus on improving connectivity in rural and underserved areas, ensuring equitable access to digital services across the country. This has been a struggle for different policies like the underserviced areas licenses (USAL) have been tried but fail. Now government needs need look into other options including legations for ICT infrastructure sharing among the private sector and government.
- *Regulatory Frameworks for Emerging Technologies* such as AI and blockchain should be developed to provide clear guidelines for their ethical and effective use in public sector operations.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13777780

- *Incentive Policies* could be introduced to encourage public sector organizations to adopt innovative digital solutions and collaborate with tech startups.
- *Policies Promoting Interdepartmental Collaboration* are essential to break down silos and ensure that digital transformation efforts are coordinated across different government agencies, leading to more integrated and effective public services. SITA's struggles as the designated government IT systems integrator. The agency struggles to get data from owner departments, hence most of their projects get delayed. This also help citizen to do any government transaction in any department.

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