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Chapter 3

Factors impacting digital government adoption in Africa

Thembekile Mayayise

Abstract

Digital government involves the use of technology, especially the internet, to provide online services such as tax filing and passport applications to citizens and other stakeholders. Similarly, digital governance entails the process of ensuring the provision of digital government services, and seeks to contribute towards enhanced efficiency, transparency, and responsiveness through these technologies. The goal is to regulate, manage and improve the delivery of government services to the citizens. Developed nations such as Denmark and Finland have taken the lead in embracing digital governance, promoting citizen engagement and transparency. Even in Africa, which was previously considered a technology desert, progress is evident in some countries, mostly those for which the state has a functional website. However, there is still work to be done to reach a level of adoption and realisation of benefits comparable to that of developed nations. This chapter aims to discuss the factors which impact digital government adoption in Africa. To achieve that, a systematic literature review was conducted, analysing peer-reviewed journal articles and conference proceedings from SCOPUS, Web of Science and EBCO Host databases, published from January 2019 to January 2024. As part of the review, 31 articles were synthesised. Inductive thematic analysis was performed, and the following sub-themes of factors were identified: Technology, Socioeconomic, Process, People, Leadership, and Legislation. These were unpacked in detail. One finding was that there is a need for more studies in Africa, as there were no studies found for 2022, 2023 and 2024. The purpose of this chapter is to assist policymakers by highlighting critical factors they should consider for the successful adoption of digital government in the African region. Future research could explore the impact of each theme in a specific African context, and compare the results for different countries.

Keywords: Africa, digital government, digital governance, e-government, adoption

Introduction

The evolution of Industry 4.0 has stimulated digital innovation in various organisations and their respective industries, driven by the benefits that these advancements brought to their business operations, especially in creating efficiencies. In the same breath, the adoption of similar technologies by various countries has seen them evolve in using technologies such as artificial intelligence bots (Cortés-Cediel et al., 2023) to promote services such as voting by citizens during elections.

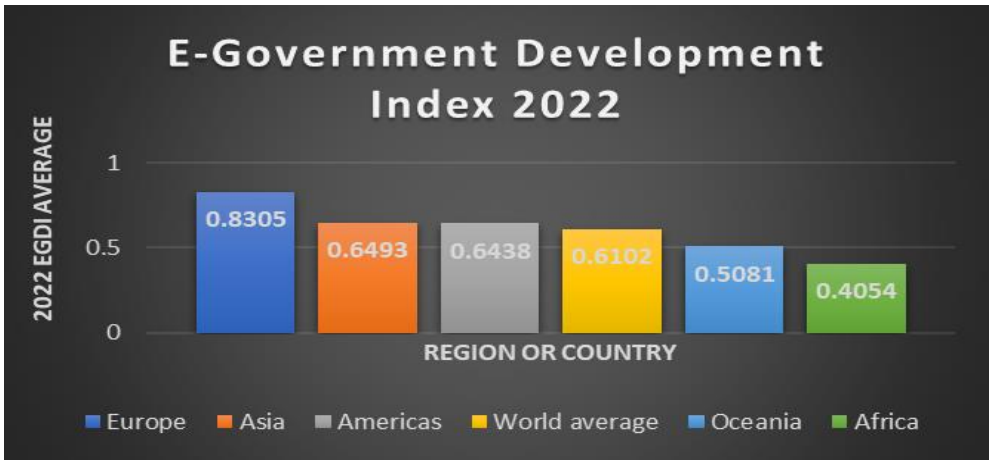
There are various definitions of e-government, used in various contexts; Ndou (2004) referred to e-government as a complex and multidimensional concept which should be looked at from a much broader perspective. According to the World Bank's definition, e-government involves the use of information technologies (such as the internet, Wide Area Networks, and mobile computing) by governmental bodies (World Bank, 2024).

Janowski (2015) suggested that electronic government has undergone development, and outlined its evolutionary phases. The initial stage involves digitisation or the integration of technology within government operations, considered the foundational phase. This is followed by the electronic government phase, where e-services are introduced, fundamentally altering how the government interacts with and serves its citizens. The next stage emphasises the engagement between government and citizens, which potentially empowers citizens by involving them in decision-making processes through online platforms, referred to as e-governance. The final stage is the contextualisation of e-governance, adapting it to suit the specific needs and circumstances of the country or region in which it operates. These stages trace the evolution of e-government from its origins as a tool for digitalisation.

Similarly, digital government has been described as the application of Information and Communication Technologies (ICTs) to enhance administrative efficiency and foster democratic principles and mechanisms (Van Toorn, 2024). Erkut (2020) contended that digital governance is comprised of e-government or digital government intertwined with certain business methodologies, engagement of stakeholders, and specific political decisions. Unlike digital government, which emphasises its structural aspects and the provision of e-services, digital governance encompasses a broader scope, emphasising the procedures, conception and utilisation of digital government.

In the scholarly literature, the terms ‘e-government’ and ‘digital government’ are often used interchangeably (Gan et al., 2023). In this chapter, more emphasis is placed on digital government, as it is considered a new trend alongside e-voting and the blockchain (Froehlich et al., 2020). Digital government is viewed as a driver for societal transformation, contributing to sustainable development and environmental governance, among other outcomes (Zhao et al., 2023). When developing a country-specific e-government index (EGDI) the United Nations examines similar elements, but also incorporates a wider range of factors. These factors encompass aspects such as the online representation of member states and the thorough execution of policies and strategies, among others. This assessment underscores the disparate levels of digital government adoption worldwide. Figure 1 illustrates this contrast, with Africa and Oceania trailing behind Europe, Asia and the Americas. Notably, Africa holds the lowest position, at 0.4054, falling below the global average.

Figure 1: E-Government Development Index (EGDI)



Source: EGDI,2024

According to the EGDI index for 2022, which at the time of writing of this chapter is the latest published index, the countries in the lead regarding digital government adoption include Denmark, Finland, the Republic of Korea, New Zealand and Iceland, while Africa and Oceania lag behind. This calls for researchers to investigate strategies that could improve the indexes of these poorly performing regions in the future.

Examining the distinctive obstacles encountered by different nations in embracing digital government, it is valuable to explore the specific issues identified as hindering digital

government adoption in the African context. Considering the context given in the preceding section, this chapter seeks to contribute to digital government adoption studies in the African context by investigating the factors influencing the adoption of digital government in Africa through a systematic literature review, drawing insights from peer-reviewed articles and conference proceedings.

Africa is acknowledged as the second-largest continent globally, following Asia, and consists of 54 recognised countries. As of 2021, the continent had a recorded population of approximately 1.4 billion. Despite its abundant natural resources, Africa faces challenges, resulting in its classification as the second-poorest continent by total wealth. Multiple factors contribute to this situation, including socio-economic policies ("Africa", 2024). As most African countries are members of the United Nations, they are expected to work towards the attainment of the United Nations Sustainable Development Goals (SDGs) by 2030. SDG 9, which focuses on industry, innovation and infrastructure, relates to innovation that could be a result of digital government initiatives.

Successful adoption of digital government in developing African countries yields various benefits, including enhanced efficiency, transparency, increased public engagement, and trust in government (Fakhoury & Aubert, 2015). These objectives align with the core principles of digital governance, emphasising integrity and sustainability, as highlighted by researchers Ngonzi and Sewchurran (2019).

Digital government enhances accountability, amplifies citizen voices and improves service delivery, while promoting transparency and reducing corruption (Zou et al., 2023). Automation and streamlining of processes lead to efficient service delivery, while data-driven decision-making fosters economic growth and innovation (Zhao et al., 2023). E-participation platforms and citizen engagement tools promote transparency, accountability and inclusivity in decision-making processes, contributing to good governance and reduced inequalities (World Bank, 2024). Moreover, digital government fosters financial inclusion, education, skills development and environmental sustainability, through initiatives promoting digital literacy, online banking and green technologies. These multifaceted benefits not only advance societal development but also align with global sustainability goals such as the SDGs, particularly those related to education, economic growth, sustainable cities, and responsible consumption and production.

The implementation of digital governments is not without challenges; and these challenges are not universal, because every country has a unique culture and socio-economic issues, among other challenges. Zeebaree and Aqel (2021) asserted that contextual factors such as location, culture, infrastructure and socio-political challenges are different from country to country, making it important to understand the specific factors prevalent in a particular region or country in order to develop strategies which will adequately address such issues in that region or country.

Rorissa and Demissie (2010) highlighted the barriers to digital government adoption in Africa, including infrastructural limitations, computer illiteracy, cultural factors and slow economic development. Several African nations prioritise addressing basic needs such as poverty and security over technological advancements, making the pursuit of digital government adoption paradoxical in some contexts. Nonetheless, there has been significant progress, with all African states establishing an online presence, reflecting positive steps towards digital government adoption (United Nations, 2024).

Research objectives

Digital government studies have predominantly been conducted in developed countries, and less often in developing countries; yet there is a need for such studies, to seek ways to address technological barriers to promoting digital government adoption (Gan et al., 2023; Al-Hujran et al., 2015). This is important for informing future policy in developing countries, and to bridge the digital divide so that African nations can participate fully in the global marketplace. Various factors have been investigated that could help to promote digital government adoption in non-African states; but the scarcity of digital government adoption studies in developing countries, especially those in Africa, calls for a more comprehensive and integrative approach that focuses on the African context (Al-Hujran et al., 2015). Unlike technology adoption in the private sector, which tends to be mandatory – e.g. the use of some banking technologies – the adoption of digital government is generally voluntary, which makes it unique; this complicates understanding the reasons for it. It must be understood that digital government adoption requires proper planning and a clear strategy; hence, it usually takes a while to implement digital government services successfully (Li & Shang, 2023). The large number of digital government studies of countries outside Africa – such as Turkey, Greece and Indonesia, among others – has been noted; this study aims to contribute to

expanding knowledge of the factors impacting digital government adoption in the African context (Kurfali et al., 2017; Voutinioti, 2013; Hapsara et al., 2017). The objectives of this chapter are:

- To investigate the types of digital government studies conducted in Africa from 2019 to 2024;
- To investigate the factors impacting digital government adoption in Africa, based on the literature.

An overview of previous similar studies

To achieve the objectives outlined in the previous section, this section discusses some earlier studies similar to that described in this chapter, in order to identify insights that can be gained from such studies.

In a systematic literature review study conducted by Sarrayrih and Sriram (2015), it was determined that the success of digital government is influenced by organisational, technological and end-user factors. The research highlighted the crucial roles played by technological advancements and the acceptance of the system by end users in the successful implementation of e-government. Technical elements identified in the study encompassed ICT infrastructure, IT security, IT standards, and technical expertise. The investigation, focusing specifically on adopting digital government in the Sultanate of Oman, revealed deficiencies in the country's legal frameworks, strategic plans, project plans, useability and information quality. Barriers to e-government adoption included inadequate planning and a lack of vision. Technological challenges were observed, particularly in web accessibility and integration with various agencies. The study in this chapter aimed to review literature from 2019 to 2024, including more recent literature from Africa, to bring forth fresher insights regarding digital government adoption in the African context.

Gan et al. (2023) conducted a quasi-experimental study focusing on the influence of a digital government policy on entrepreneurship in China. The policy aimed to enhance government services and efficiency by leveraging digital technology and the internet. A specific digital government platform was introduced in China, for local government use. The study's findings indicated that the implementation of the policy led to increased government efficiency, manifested through quicker processing speeds, a decrease in risk-seeking behaviours, enhanced transparency in local government operations, and improved access to financial resources for

entrepreneurs. These positive outcomes align with certain SDGs. The research also highlighted the importance of identifying specific areas where efficiency improvements are desired, for an effective digital government strategy. For example, entrepreneurs need to communicate their challenges, such as swift registration of new businesses, to ensure a more efficient implementation of the policy. Building on the findings by Gan et al. (2023), this chapter further explores the challenges identified from an African context perspective.

Medaglia et al. (2024) researched digital government, aiming to establish its role in the shift from a linear to a circular economy. They reported that technology plays a significant part in advancing the attainment of sustainable development goals, compelling companies to incorporate and disclose their efforts towards sustainable development. Technologies such as the blockchain contribute to the permanence of information, aligning with governmental initiatives to transition from traditional paper passports to digital-product passports. The focus of the study in this chapter is on all factors, some of which may be linked to the SDGs.

Methodology

To achieve the research objectives and address the research questions, the study in this chapter followed a systematic literature review approach, which is a qualitative method to identify the relevant literature for the study. Scholars across diverse disciplines have employed this methodological structure for literature reviews owing to its recognised reliability, facilitated by its delineated stages which enable traceability and thereby enhance transparency (AlGhamdi et al., 2020; Al-Ruithe et al., 2019; Kitchenham, 2004; Zhang et al., 2020). This section explains this methodology by unpacking the data sources used, as well as the inclusion and exclusion criteria. It further explains the key steps followed for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow which guided this review (Regona et al., 2022).

Data sources and search terms

The EBSCO HOST, Web of Science and SCOPUS data sources were consulted for the literature search. These databases were chosen for their extensive coverage and relevance, as they are known for being peer-reviewed, multidisciplinary and current. The keywords and phrases used in this systematic literature review are included in Table 1.

Table 1. Keywords/Phrases

Source	**Search string**
EBSCO HOST	(‘E-government’ OR ‘Digital government’ OR ‘Digital Governance’ OR ‘Online government’ OR ‘Mobile Government’) AND (‘Developing countries’ OR ‘Developing nations OR ‘Africa’) AND (‘Factors’ or ‘Challenges ‘OR ‘Issues’) AND (‘Impact’ OR ‘Influence’) AND (‘Adoption’)
Web of Science	(‘Digital government’ OR ‘E-government’ OR ‘Smart government’ OR ‘Digital Governance’) AND (‘Impact’ OR ‘Influence’ OR ‘Challenges’) AND (‘Factors’ OR ‘Challenges’ OR ‘Issues’) AND (‘Developing countries’ OR ‘Developing nations OR ‘Africa’) AND (‘Adoption’)
SCOPUS	(‘Digital government’ OR ‘E-government’ OR ‘Smart government’ OR ‘Digital Governance’ OR ‘Online Government’) AND (‘Impact’ OR ‘Influence’ OR ‘Challenges’) AND (‘Factors’ OR ‘Challenges’ OR ‘Issues’) AND (‘Developing countries’ OR ‘Developing nations OR ‘Africa’) AND (‘Adoption’)

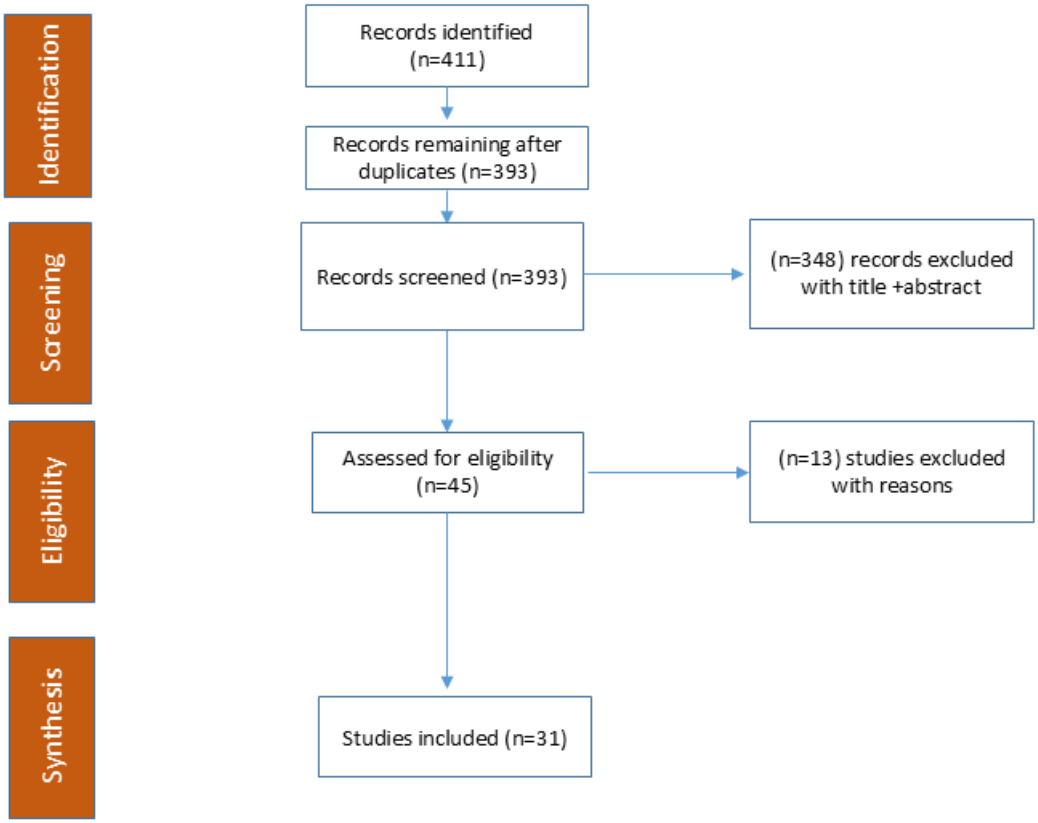
Table 2. Inclusion and exclusion criteria

Included	Excluded
Period covered: 2019-2024	Articles published before 2019
Peer-reviewed journal articles and conference proceedings	Non-peer-reviewed sources
Empirical and conceptual papers	Other studies outside the criterion
Studies focusing on African countries	Non-African studies
Open access articles	Articles not subscribed to by the affiliated institution
Articles written in English	Non-English

This comprehensive literature review investigates slightly over half a decade's worth of published works across selected databases. The review encompasses both conceptual and empirical studies, published in peer-reviewed journals and conference proceedings. While Africa comprises 54 countries, the researcher’s initial exploration of country websites as

listed by the United Nations (2024) revealed that only 24 of those have English as their official language, followed in frequency by French. Therefore, this study exclusively considered papers written in English, as the researcher lacks fluency in other African official languages. To navigate potential access restrictions in various literature sources, only open-access articles were incorporated. Crucially, the focus of this chapter is on studies conducted specifically about African countries, aligning with the primary objective of the research. The steps followed in the execution of this SLR are depicted in Figure 2, the adapted PRISMA flow diagram.

Figure 2: Adapted PRISMA flow diagram



Source: Rohan et al., 2023

The steps involved in the review of the literature include identification, screening, eligibility and synthesis of the findings, and reporting.

Identification phase

The EBSCO Host, Web of Science and SCOPUS database sources were chosen because of their comprehensive coverage of the relevant literature. The literature search involved utilising the combinations of keyword strings and phrases detailed in Table 1, following the inclusion and exclusion criteria outlined in Table 2. Synonymous terms for 'digital government' including 'smart cities', 'electronic governance', 'e-services', 'online services', 'electronic vote' and 'Government 4.0' were also considered in the analysis of the search results. The initial search returned a total of 411 results, made up of SCOPUS (356), EBSCO Host (11) and Web of Science (44).

Screening Phase

The screening process involved examining articles to ensure there were no duplicates, given that the SCOPUS database, being an indexing platform, often contains articles found in other databases as well. This step was essential for identifying and eliminating duplicates that were not filtered out during the initial search. As a result, the number of articles decreased from the initial count of 411 to 393.

Eligibility

After eliminating duplicate entries, the articles underwent additional scrutiny to determine their eligibility. This involved assessing the titles and abstracts, with studies unrelated to identified factors that influence digital government being excluded. Articles focusing on digital government outside the scope of African developing nations were also excluded. A total of 348 articles were discarded due to their lack of relevance.

Synthesis

A total of 45 articles remained for synthesis; but a detailed review identified 13 articles which had to be removed from the final synthesis as they were irrelevant. Only 31 articles remained for synthesis and reporting.

Bias

Depending on how they are executed, systematic literature reviews may be prone to bias, as they are influenced by the choices made by the researcher/s. This is how bias was handled during this study:

- *Locating bias*: Bias can be introduced when search limiters or database restrictions are applied, leading to a skewed sample that may overlook pertinent evidence (Turner et al., 2013). The inclusion of SCOPUS, which is also an indexing database, was done to minimise location bias, as SCOPUS contains articles from numerous journals. To counteract this bias, the search term 'digital government' was broadened to encompass related terms such as 'e-government', 'smart government' and 'online government'. Furthermore, other databases were considered, as outlined in the exclusion criteria (Drucker, Fleming & Chan, 2016; Page et al., 2021).
- *Evidence selection bias*: The inability to recognise all existing bodies of evidence due to an unclear definition of essential topic concepts (Page et al., 2021), often leads to evidence selection bias. To tackle this issue, a comprehensive literature search was conducted and articles from peer-reviewed journals and conference proceedings were included.
- *Exclusion bias* emerges from the manner of and rationale behind decisions concerning the inclusion or exclusion of literature deemed credible for a systematic review (Kitchenham, 2004). To mitigate this bias, Table 2 delineates the criteria for inclusion and exclusion in the review process.
- *Synthesis bias*: Selective reporting of outcomes and findings can arise when authors assess the quality of included studies to favour specific results. To mitigate this issue, the synthesis and evaluation of this systematic review were guided by the overall quality of the publications analysed, as suggested by Turner et al. (2013).

Data analysis

Thematic examination was carried out on the remaining 31 articles. An inductive approach to thematic analysis was utilised due to its capacity to reflect the actual factors identified in the literature review. Kiger and Varpio (2020) delineate six steps in conducting thematic analysis: familiarisation with the data, the initial generation of codes, searching for themes, reviewing themes, defining and naming themes, and reporting. Given the recursive and non-linear nature of thematic analysis, adjustments were made in the study to incorporate new data which was found from additional literature. In this investigation, after the researcher became acquainted with the content, codes representing both positive and negative factors influencing digital government adoption were identified. Themes were then sought and reviewed, culminating in the final naming of the themes, as illustrated in Figure 5.

3. Findings

3.1 African studies conducted on digital government adoption

One of the aims of this study was to investigate the studies conducted in African nations regarding the adoption of digital government. Table 3 provides an overview of studies on this topic retrieved from the SCOPUS, EBSCO Host and Web of Science databases. The analysis reveals a predominant focus on empirical research, as seen in works such as Mensah et al. (2020), Apleni and Smuts (2020) and Karoui et al. (2019). Notably, however, there are also conceptual studies, such as Zaoui et al. (2019) and Zeebaree and Aqel (2021), which also contribute to the understanding of the challenges faced by African countries regarding digital government adoption. But considering that few conceptual studies have been published, this chapter makes a contribution that will enable future researchers to expand on some of the themes emerging from this work.

While certain nations such as Ghana, Tanzania (Majaliwa & Simba, 2019), Rwanda (Nzaramyimana & Susanto, 2019), Mauritius (Sanmukhiya, 2019), and Nigeria (Chukwu et al., 2019) have been examined in empirical research, there is an evident necessity for more extensive investigation spanning multiple African countries. This expanded approach would provide a deeper insight into the factors impacting the adoption of digital government across Africa.

Table 3: African studies on digital government adoption (2019-2024)

Type of study	**Source/s**	**No of articles**
Conceptual	Zaoui et al. (2019); Zeebaree & Aqel (2021); Bakon et al. (2020); Frost & Lal (2019); Chukwu et al. (2019); Adjei-Bamfo et al. (2019); Iyamu (2020)	7
Case study-Qualitative	Karoui et al. (2019); Gyamfi et al. (2019);	14

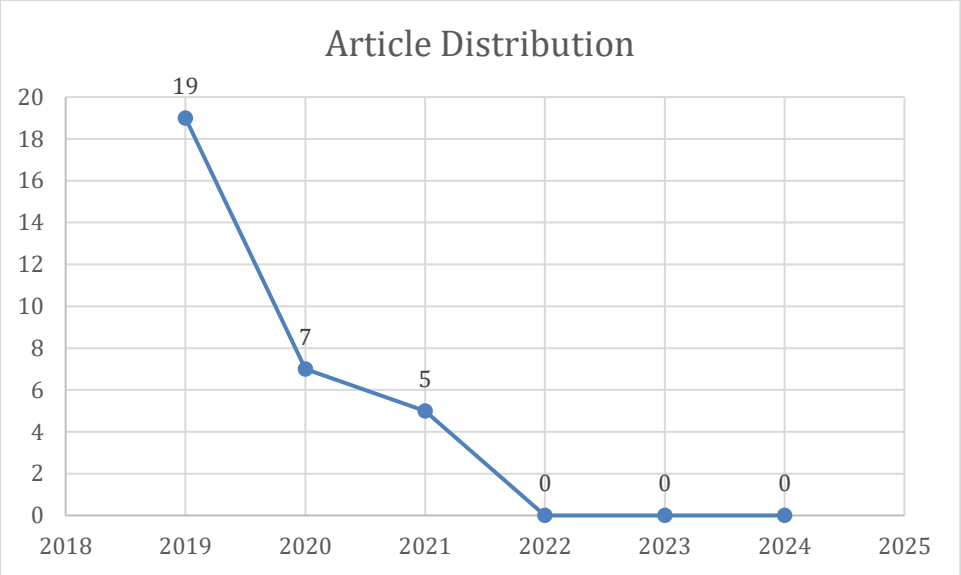
Type of study	Source/s	No of articles
	Mukamurenzi et al. (2019a); Asamoah (2019); Bakunzibake et al. (2019); Mukamurenzi et al. (2019b); Mutimukwe et al. (2019); Nakakawa & Namagembe (2019); Ngonzi & Sewchurran (2019); Apleni & Smuts (2020); Effah et al. (2020); Mensah et al. (2021); Manda (2021); Mtshengu & Mawela (2021)	
Experiment	Majaliwa & Simba (2019); Mensah et al. (2020)	2
Web analysis	Nakatumba-Nabende et al. (2019)	1
Quantitative	Sanmukhiya (2019); Nzaramyimana & Susanto (2019); Bayaga & Ophoff (2019); Okunola & Rowley (2019); Ziba & Kang (2020); Froehlich et al. (2020); Abdulkareem & Ramli (2021)	7

Table 3 indicates that a significant portion of research on digital government adoption has been conducted within the interpretivism research paradigm.

Of the studies reviewed, 14 utilised a case study methodology and seven offered conceptual frameworks for potential future investigation. There is a noticeable scarcity of quantitative research compared to qualitative studies, with only two experiments and one web analysis conducted. The distribution of articles according to methodology reveals gaps in both commonly used and less utilised research methods. Future research endeavours should strive to delve into supplementary factors and integrate diverse methodologies such as mixed

methods, experiments, and web analyses to reveal potentially novel insights. Figure 3 depicts the distribution of articles over the chosen period.

Figure 3: Distribution of articles (2019-2024)



There was a significant decline in research on digital government in the African region between January 2019 and January 2024. Notably, there was a complete absence of studies from 2022 to 2024, as illustrated by the empty segment of the graph. This research was concluded early in 2024, leaving the possibility of additional studies being published by year-end. Nonetheless, it is imperative to undertake further research to comprehend the status of digital government in Africa and its ongoing influence on the region, considering the declining publication rate.

Figure 4: Studies distribution per country



Based on the data presented in Figure 4, Rwanda and South Africa have been the focus of the most number of studies on the topic, while Malawi, Mauritius, Namibia, Morocco, and Tunisia have been the subjects of fewer studies. However, given that Africa comprises 54 countries, these studies provide an incomplete understanding of the factors influencing digital government adoption, as notable countries such as Egypt, Eswatini, Namibia and Madagascar are not included in the analysis. Some of the conceptual papers and systematic literature reviews have included various African countries in their reviews. In certain instances, a study would refer to an African country without specifying which one, which makes it difficult to classify. Both cases are reflected in the graph.

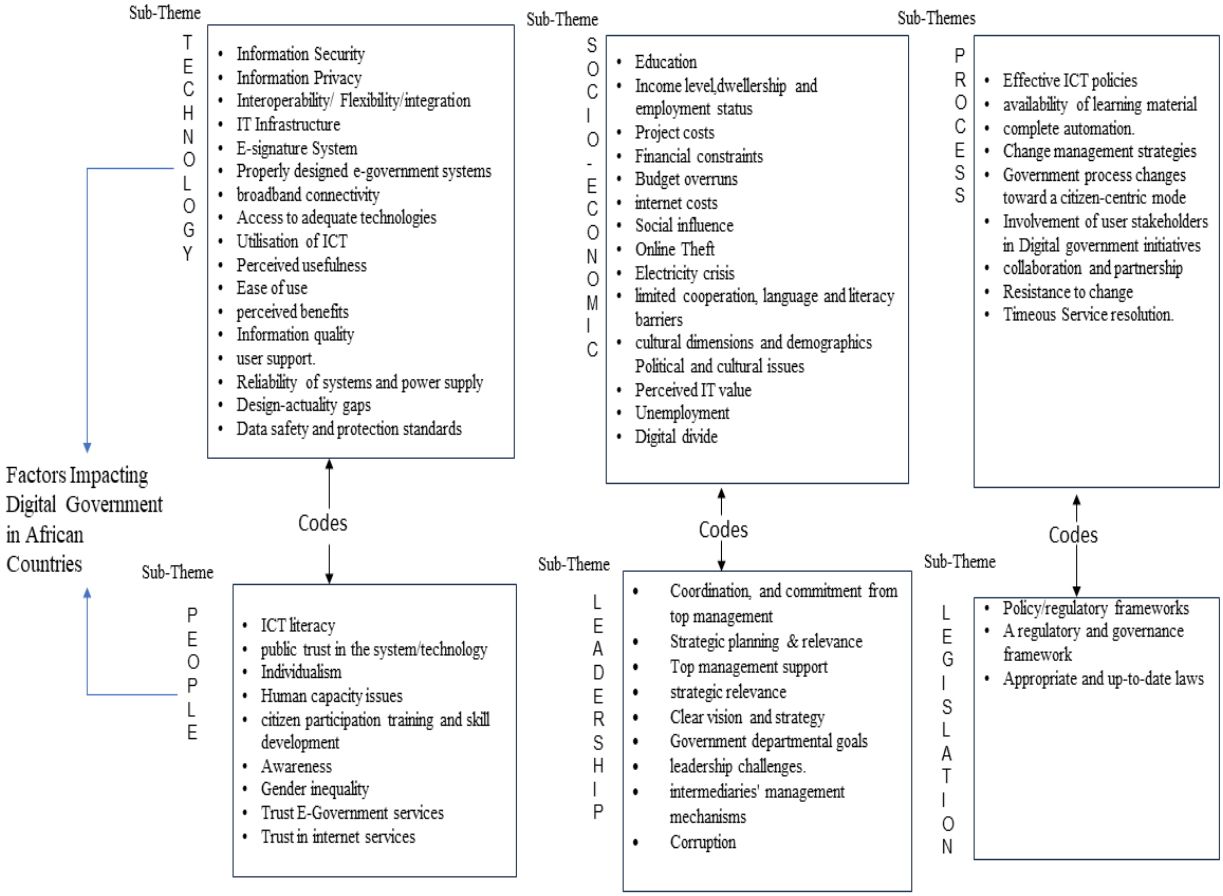
Factors impacting digital government adoption in Africa

The primary objective of the study in this chapter was to identify factors impacting digital government adoption in the African region. The examination of the literature underscores numerous issues and factors impacting the adoption of digital government across various African nations, and these are unpacked in this section. A thematic representation of the factors appears in Figure 5.

In this study, factors include ‘challenges’ and ‘issues’ identified in the literature reviewed. One main theme or general theme is factors that impact digital government adoption in African countries. The sub-themes which emerged from the reviewed literature are Technology, Socio-economic, Process, People, Leadership and Legislation. Each sub-theme

has associated codes which reflect the factors under that sub-theme identified as positively or negatively impacting digital government adoption.

Figure 5: Factors impacting digital government adoption in Africa



Technology

Technology is the foundation for digital government, enabling its functionalities; yet its effectiveness relies on other factors. The presence of technology and communication infrastructure is crucial for deploying digital platforms globally, because its absence poses a significant obstacle to e-governance initiatives (Froehlich et al., 2020). This requires essential components such as robust ICT systems encompassing databases and user-friendly interfaces, as well as the internet connectivity and digital identity platforms necessary for efficient online service delivery. While some countries, such as Mauritius (Sanmukhiya, 2019), may not be as severely impacted by infrastructural limitations, others such as South Africa, Nigeria and Malawi face significant challenges in this regard (Manda, 2021; Chukwu et al., 2019; Ziba & Kang, 2020). In these countries, insufficient infrastructure hampers the deployment of digital government solutions to meet diverse citizen needs. Even in cases where basic infrastructure exists, maintaining it often becomes problematic; leading to

inconsistent access to digital government portals, which in turn discourages citizen engagement. Compounding these infrastructure issues is the scarcity of technical expertise required for the design, implementation and upkeep of the systems (Mayedwa & Van Belle, 2021). The shortage of skilled professionals not only increases the risk of mismanagement but also leaves these systems vulnerable to cyber threats.

The adoption of digital government services in countries such as South Africa and Zimbabwe is hindered by frequent power outages and economic challenges, which are exacerbated by issues such as theft and high costs (Gyamfi et al., 2019; Sanmukhiya, 2019; Ngema, 2024). Additionally, cybersecurity risks pose significant threats to digital governance initiatives globally, with concerns over information security and privacy breaches impacting adoption rates (Mutimukwe et al., 2019; Okunola & Rowley, 2019; Adjei-Bamfo et al., 2019). Ensuring robust cybersecurity measures are implemented is crucial to prevent breaches such as the ransomware attack which occurred in the City of Johannesburg in 2019, and Cameroon's financial loss in 2021 (Atabong, 2022). Even in digitally advanced nations such as Estonia, cybersecurity remains paramount, due to the potentially severe repercussions of breaches on citizens and national interests. Kenya, despite its leading digital economy status in Africa, faces cyber-attack challenges, exemplified by incidents targeting government websites and public utilities (Sambuli, 2023). Such cyber threats, observed also in countries such as Nigeria and Sudan, not only jeopardise digital infrastructure but also impede the use of digital government services (Olomu, 2023). The review of existing literature emphasises the significant hurdles Africa faces regarding cyber/information security, privacy, and safeguarding ICT infrastructure and data. The substantial costs associated with addressing breaches, as highlighted by several sources (Bayaga & Ophoff, 2019; Nzaramyimana & Susanto, 2019; Zeebaree & Aqel, 2021) further highlight the seriousness of these challenges.

Cyber-attacks, prevalent in the online sphere, manifest in various forms. One such form is ‘denial of service’ attacks, which render websites consistently inaccessible. Malicious software can also be utilised to steal information or deceptively manipulate content. Another common cyber-attack involves website defacement, as demonstrated in 2020 when ‘hacktivists’ replaced content with political slogans on the Sudanese Ministry of Endowment and Religious Affairs website (World Bank, 2022). Consequently, digital government entities should equip themselves with the necessary skills and resources to protect their platforms

from such cyber threats. The repercussions of cyber-attacks extend to citizens, potentially deterring them from utilising websites that lack adequate preventive measures.

In countries where i-voting has been implemented, the devices used for voting have always carried a risk, with estimates suggesting that 30-40% of these devices could be infected with malware. Moreover, the network itself is highly susceptible to cyber-attacks or may possess significant vulnerabilities that could be exploited during the voting process, potentially significantly impacting its outcome (Panizo Alonso et al., 2021). These security challenges need to be addressed comprehensively, as they may be intertwined with other factors such as unreliable infrastructure due to financial constraints and a lack of necessary skills to protect systems.

Interoperability has been identified as a key factor affecting the adoption of digital government in Africa (Nakakawa & Namagembe, 2019; Apleni & Smuts, 2020; Manda, 2021; Mtshengu & Mawela, 2021; Majaliwa & Simba, 2019). Interoperability ensures smooth communication by connecting crucial system components and establishing standardised protocols. Without it, digital government systems suffer inefficiencies and fragmentation. While benefits include enhanced service delivery and innovation, challenges such as skill shortages and maintenance costs underscore the importance of proper planning and stakeholder involvement for successful implementation.

According to Mensah et al. (2021), achieving interoperability is crucial for the effective implementation of digital government services (Manoharan et al., 2021; Apleni & Smuts, 2020; Harahap et al., 2022). Among the factors influencing the uptake of digital government, perceived ease of use – which refers to how user-friendly the system is perceived to be – plays a significant role (Bayaga & Ophoff, 2019). The more intuitive digital government platforms are, the more likely they are to be utilised by citizens and other users. Perceived usefulness, indicating the system's efficacy in facilitating tasks efficiently (Mukamurenzi et al., 2019a), underscores the importance of designing systems which adhere to data safety standards and are user-friendly.

It is essential to demonstrate that utilising a digital platform or e-service portal enhances productivity. The benefits derived from these platforms should be evident, and the information provided should be of high quality (Bayaga & Ophoff, 2019). Additionally, users

encountering issues with digital government platforms should have access to adequate user support (Okunola & Rowley, 2019).

Socio-economic

Various socio-economic factors influence the adoption of digital government across African nations. Financial constraints (Gyamfi et al., 2019) hinder the procurement of necessary infrastructure and funding for initiatives supporting implementation, including awareness campaigns and change management. Escalating project costs and poor management further limit access to digital services for the working class (Mensah et al., 2021). Cultural barriers such as language differences and e-illiteracy slow adoption, while nomadic groups remain excluded (Mukamurenzi et al., 2019b; Froehlich et al., 2020). Demographics and cultural dimensions also play a role in digital government adoption (Bayaga & Ophoff, 2019; Chukwu et al., 2019).

Social influence affects adoption, with peers influencing each other's technology use. The perceived value of IT and trust in government are crucial for adoption; the more trustworthy the government and services rendered, the more likely the adoption (Mutimukwe et al., 2019; Okunola & Rowley, 2019; Adjei-Bamfo et al., 2019; Froehlich et al., 2020; Zeebaree & Aqel, 2021). Political support is essential; its absence can hinder adoption (Frost & Lal, 2019; Chukwu et al., 2019; Effah et al., 2020). There is an overlap between some of the factors, such as the people and leadership factors overlapping with the socio-economic factors.

Process

From a process standpoint, several elements influence the adoption of digital government. The absence or insufficient enforcement of ICT policies (Frost & Lal, 2019) can hinder adoption by failing to delineate the extent of implementation and utilisation of digital government. When e-services or digital government platforms are introduced, the availability of educational materials for users (Mensah et al., 2021) may also delay system uptake. Furthermore, the design of processes for the comprehensive deployment of digital government platforms should prevent partial automation of e-services, which limits their distribution and accessibility.

The absence of change management strategies is another factor affecting digital government adoption (Zeebaree & Aqel, 2021; Apleni & Smuts, 2020). Inadequate change management

may lead to resistance from citizens and other stakeholders, particularly when there is uncertainty or distrust regarding service improvement. Failure to establish a citizen-centric process (Mukamurenzi et al., 2019b) and involve key user stakeholders in digital government initiatives can also have negative repercussions for adoption, whereas ensuring the participation of key stakeholders in digital government initiatives is crucial (Ngonzi & Sewchurran, 2019). To deal with the issues of digital exclusion – for example the involvement of marginalised groups, such as visually impaired people – adequate engagement is important (especially during the design phase) as part of the process, and not as an outcome (Van Toorn, 2024). Various procedural aspects must be considered, such as swift issue resolution mechanisms (Mtshengu & Mawela, 2021) – particularly for platforms such as tax filing, where timely resolution positively impacts e-service adoption.

People

Various factors influence the adoption of digital government among people in African contexts, including challenges associated with a shortage of ICT skills (Mensah et al., 2021; Mtshengu & Mawela, 2021) stemming from the digital divide (Bakon et al., 2020; Effah et al., 2020), among other contributing factors. This disparity is particularly evident in African states, where technology usage tends to be more concentrated in urban areas compared to rural regions. Gender disparities and individualistic attitudes (Chukwu et al., 2019) also serve as barriers to digital government adoption. Additionally, low citizen engagement in digital government initiatives (possibly due to limited access to ICT resources) contributes to citizens' lack of trust in automated systems (Zeebaree & Aqel, 2021). Addressing these challenges requires interventions aimed at promoting digital inclusion, as well as awareness and training programmes targeting citizens from diverse backgrounds. The effectiveness of digital government adoption hinges on its utilisation, and limited citizen access poses a significant risk to its success.

Leadership

The effective governance and leadership of a nation play a crucial role in the successful use of a digital government system (Manda, 2021). It is the responsibility of the country's leadership (Mensah et al., 2021) to spearhead the formulation of a digital government strategy, incorporating clear and contextually relevant vision and mission statements (Apleni & Smuts, 2020). Leadership grounded in ethical principles and actively combating corruption is more likely to achieve favourable outcomes in implementation efforts. A well-defined

digital government strategy provides a roadmap for the nation, outlining both short-term and long-term objectives. Moreover, it falls upon the leadership to identify pertinent stakeholders, foster collaboration, and forge partnerships to ensure the smooth adoption of digital government (Adjei-Bamfo et al., 2019; Iyamu, 2020). Countries grappling with leadership challenges, corruption and excessive political interference may encounter significant obstacles in embracing digital government initiatives. Inadequate management of digital governance implementation can jeopardise the success of such initiatives (Mukamurenzi et al., 2019a).

Legislation

Efforts to regulate the implementation of digital government mirror the necessities of regulating any technological advancement, as they all form part of proper digital governance. Inadequate or absent regulatory measures can impede the successful integration of digital government initiatives. The absence of structured governance frameworks hampers digital governance adoption, as citizens may perceive these services to be encroaching on their rights. According to Effah et al. (2020), the presence and enforcement of fitting legal frameworks can positively influence digital government adoption. African nations should prioritise the development of regulatory structures supportive of digital government adoption, as highlighted by Nakakawa and Namagembe (2019) as well as Frost and Lal (2019). Ensuring that laws remain pertinent and adaptable to the rapid pace of technological evolution is crucial in promoting digital government adoption.

Implications for future research

The findings of this systematic literature review highlight what is a significant scarcity of research on digital governance in the African context. As only 31 articles could be synthesised, many African countries remain unexplored, revealing a contextual research gap. Table 3 categorises the studies based on their research approaches, showing that most are case studies, with few quantitative studies that could involve larger participant groups and test hypotheses to statistically confirm the impact of selected factors. Future research should consider mixed methods to enrich the results by identifying additional factors for testing. This review broadly covered factors influencing digital governance adoption across various methodologies. Future studies should focus on quantitative research and meta-analysis to assess the impact of these factors on digital governance adoption more precisely.

Given the numerous factors identified in Figure 5, future research could leverage these insights to propose digital governance adoption frameworks tailored for African countries. Such frameworks could be valuable tools for adopters and policymakers.

Conclusion

The study aimed to explore existing research on digital government adoption in Africa, as well as to examine the factors influencing this adoption. Utilising three database sources – EBSCO Host, WEB of Science and SCOPUS – 31 articles were synthesised, revealing several thematic factors: Technological, Process, People, Socio-economic, and Legislation. Socioeconomic factors encompass aspects such as the social, economic and cultural elements that influence digital government adoption. Socioeconomic conditions vary across states, with each country facing unique challenges. Given that English, French, Portuguese and Arabic are commonly spoken but in different countries, language differences may have led to the exclusion of certain sources, impacting the final number of synthesised articles. Limitations of the study in this chapter include incomplete database coverage and the exclusion of sources such as book chapters and grey literature; the focus was solely on open-access issues published between January 2019 and January 2024.

The study underscores the necessity in Africa for ongoing research on digital government adoption. It suggests that would-be adopters of digital government should consider specific technological, people-, process-, leadership- and legislation-related factors to ensure successful implementation. This categorisation could aid in developing a conceptual framework for digital government implementation, and warrants further testing.
Future research should expand the scope of the literature search to include additional sources and delve deeper into digital government in African states, to unveil factors impacting adoption within their particular contexts. The study's findings serve as a valuable resource for policymakers across African states, providing insight into the factors to consider before or while implementing digital government initiatives. Researchers are encouraged to explore the impact of factors identified in various contexts, and to conduct comparative analyses.

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