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Transformation of digital government services in the public sector in South Africa

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Background: It is well-documented that the 21st century is providing digital technologies in an alarming rate. Their emergence promotes effectiveness, efficiency, accountability and transparency of public services and internal governance. This study was conducted within the government departments and state-owned agencies of South Africa.

Aim: The aim of this study was to investigate the transformation of digital government services in the public sector in South Africa.

Methods: This case study used qualitative approach where data were collected through semi-structured interviews from the national government departments and state-owned entities. The target population comprised information technology officers, investigators or analysts and administrative officers. Data collected were thematically analysed preceding the transcription of audio-recordings.

Results: Some of the significant results of this study showed that the executives avoid playing their role to drive Information and communications technology (ICT) through Corporate ICT Strategy.

Conclusion: Some of the challenges of adopting digital transformation are associated with low digital literacy, poor digital infrastructure, unreliable power supply, among others.

Contribution: This study establishes that if the senior managers from ICT section become members of the executive committee, the government can have successful implementation of ICT projects without scepticism. This study also contributes to the awareness of considering digital literacy skills to support digital transformation.

Keywords: digital transformation; digital services; digital infrastructure; public sector; digital government; South Africa.

Introduction and background

It is well documented that the 21st century is providing digital technologies in an alarming rate. Their emergence promotes effectiveness, efficiency, accountability and transparency of public services and internal governance. Some of the notable key elements of digital transformation are cloud computing, big data, internet of things (IoT), blockchain, and artificial intelligence (AI). Even though these technologies were invented in the 20th century, Marwala (2021) contends that they became popular and effective in the 21st century. Alexandru et al. (2019) concur that digital transformation is not new; it has been in use for over two decades, reaching to an unprecedented degree of sophistication, exponentially simplifying the human existence and turning human into digital citizen. However, these technologies are still new concepts in the public sector of South Africa, because most of its services are still rendered on paper format. These services are easily rendered to those who visit government buildings because they are not automated.

Digital transformation was well received in the developing countries such as Brazil, India and Chile, which are counterparts to South Africa because they are categorised as developing countries. Kraus et al. (2021) argue that there is no established definition of digital transformation. One of the definitions provided by Martin (2008) to digital transformation as a use of information and communication technology, not when trivial automation is performed, but in the case where fundamentally new capabilities are created in business, public government and in the lives of people and society. Digital transformation refers to adopting disruptive technologies in order to increase productivity, value creation and the social welfare (Ebert & Duarte 2018). Perkin and Abraham (2021) suggest that digital transformation is used to describe changes in meanings that are not related to business in a narrow sense, but on evolutions and changes such as government and society, reorganisation of the behaviours of a workforce and motivating and recovering talent.

It is a core strategic approach that is applied to accomplish Vision 2030 goals and objectives (Saudi Gazette 2018).

Moreover, there is digital government, which is aimed at achieving high productivity in government performance, enabled by raising the performance of services for people from all societal segments (Masemola, Phahlane & Ochara 2019). Digital government service is noticeable when application for identity document, vehicle licence disc renewal, filing tax returns and others exist. It is a government's responsibility to develop digital transformation in order to use IT Governance to provide a better quality to serve citizens, business or other public companies (Tonggiroh 2017). Senior managers such as Chief Information Officers (CIO) must guide the process through the Information and communications technology (ICT) Strategy, and it is beneficial to involve other different actors affected by the adoption of digital technologies (Gong, Janssen & Weerakkody 2019). On the other hand, it is perceived that citizens are the reason why digital government is implemented for the purpose of developing solution to reduce effort and time when requesting an authenticated application or document because it promotes omnipresence. Nahrkhalaji et al. (2018) accentuate that apart from the type of technology, digital transformation involves transforming three key areas of the organisation such as customer experience, operational processes and business models. In the absence of digital transformation readiness by civil servants and citizens, the role of digital transformation may not be realised.

Many organisations and governments are struggling to adopt digital transformation. According to Weill and Woerner (2015), the organisations do not only fail to take advantages presented by digitisation but also fail to adapt business models to reflect the economic characteristics and underlying mechanisms of digitisation. Sanchez and Zuntini (2018) espouse that previously organisations adopted information technologies with an intention to reduce operational costs and increase productivity. Like many developing countries in the world, the public sector of South Africa should embrace digital transformation in order to attain digital government services. There is a perception that digital transformation process suggests a series of organisational efforts to guarantee technology readiness to face the process of eventually adopting ICT (Wolf, Semm & Erfurth 2018).

Problem statement

There is a perception that the public sector of South Africa is unpopular with poor service delivery. The long queues of the citizens coiling around the government buildings in search of services demonstrate that there is a challenge to provide service ubiquitously. As a result, these challenges led to services prominently provided to the people who present themselves in the government building. Nahrkhalaji et al. (2018) point out that some challenges are not necessarily operational or technological, but the cultural change required to derive value from digitalisation as another critical aspect. It also reflects that the government is not well resourced with digital transformation, as a form of preparing to provide digital government services. The adoption of digital transformation is unlikely to yield the expected gains if the viable resources required are unavailable in government. Furthermore, digital transformation without adequate resources will aggravate service delivery to the citizens of South African who are already faced with economic issues. Allen (2019) suggests that the major concern for South Africa is a lack of adequate resources such as IT infrastructure, skills and digital technologies required for digital transformation. The lack of digital infrastructure has an impact on the public sector to render digital government service to the public effectively.

Digital transformation readiness demonstrates how digitally literate civil servants operate technologies to provide digital government services. The problem of this study is that there is complexity of digital transformation facing the public sector of South Africa to provide digital government services.

Purpose of the study

The purpose of this study was to investigate transformation of government services in the public sector of South Africa. The specific objectives are given below:

- To identify services that have been transformed digitally in the public sector.
- To assess the infrastructure for digital services in the public sector.

Digital transformation

Digital transformation readiness is based on group interaction and collaborative information behaviours shaping information culture in digital channels of communications that might influence effective information management and information used during the rapid digital transformation changes in the organisation (Deja, Rak & Bell 2021). Readiness is defined as the ability to capitalise on future production opportunities, mitigate risk and challenges and become resilient and agile in responding to unknown future shocks (Schulz et al. 2018). Given the ever-changing technology, organisations' needs should align with the market skills of their employees. Deja et al. (2021) argue that digital transformation is not just a set of individual cognitive attitudes and settings regarding the digital environment or resources. It also comprises a group of interactions and collaborative information behaviours shaping information culture in digital channels of communications that might influence effective information management and information used during the rapid digital changes in the organisations. Prusova, Beznovskaya and Anosovoya (2019) observe that implementing digital transformation in the organisation is a project of introducing new technologies such as blockchain, cloud computing, chatbots, IoT and many more to improve efficiency of its work. Shibambu (2019) established that the government of South Africa is not ready for digital transformation such as cloud computing. This is in view that the government has not even developed policies that guide

the emerging digital technologies, for instance, *Cloud Act*. This is another example that shows that digital transformation is still a new concept in the public sector.

Shibambu and Ngoepe (2020) recommended that the government of South Africa needs to develop a *Cloud Act* as a base for digital transformation. The Act is likely to provide guidelines that bring confidence to the public sector. Shibambu (2019) points out that in the event the government intends to migrate to cloud, services of the private sector must be purchased. Furthermore, Shibambu and Marutha (2021) discovered that the public sector is sceptical to use privately owned digital platforms in fear of losing state asserts to the foreign nations. Given the present situation, which is coronavirus disease 2019 (COVID-19) virus infested, it is necessary to break the barrier of traditional (face-to-face) operation. Feher and Szabo (2018) suggest that increasing expectations of the citizens for the direct participation, transparency in public services can influence the organisations to improve their functions. That is the reason digital strategies should be drafted in preparation for digital transformation. Yucel (2018) opines that characterised by digital initiatives, the corporation takes on its technology adoption and its corporate characteristics that comprise culture, skillset, objectives, policies and risk management. Embarking on adopting digital transformation requires readiness of the organisation. Digital transformation readiness can be demonstrated by numerous aspects such as developing IT infrastructure and procuring equipment (hardware, software and licencing).

To improve readiness, the organisations should consider employing, retaining, and developing talent, which are challenges faced by digital maturing organisations. According to Gray et al. (2015), talent is one of the key influencing factors of successfully implementing digital transformation projects in the organisation.

Challenges of digital infrastructure

Despite the positive impacts provided by digital transformation, challenges also exist, which have the potential to hinder digital transformation in the public sector. Van Dyk and Van Belle (2019) suggest that one of the challenges that organisations face in adopting digital transformation is integrating and exploiting new digital technologies. Furthermore, another hindrance to digital transformation is the lack of a clear and coherent digital strategy to drive transformation with the organisation. With the formation of ICT Strategy Committee driven by the executives, common ground on ICT matters can be paved. Westerman, Bonnet and McAfee (2014) and Ismail, Khater and Zaki (2017) contend that the lack of top-down leadership to steer digital transformation is another barrier based on the fact that the executives should focus on employees, culture, talent, skillset and leadership. The successful implementation of digital transformation such as AI by the government is associated with the technological progress, digital capabilities and business model innovations (Mittal 2020). Viana (2021) points out that digital transformation is compounded by issues related to the design, limits and use of information technology, inequalities in access to the digital universe. That is the reason the developing countries such as Brazil failed to implement strategies laid out on the Digital Governance Strategy. Moreover, Kuldosheva (2021) suggests that other challenges of digital transformation comprise technical infrastructure, institutional or managerial, legal and regulatory as well as environmental context. Gong, Yang and Shi (2020) suggest that the lack of understanding of the complexity of digital transformation and the relationships between technologies, information use, organisational contexts and institutional arrangements are reported factors that explain the failures in transforming governments and organisations. Furthermore, the findings of Kohnke (2017) revealed that organisations were investing in digitalisation without trying to push the necessary changes because they underestimated the organisational implications and the human dynamics of the digitalisation process, which includes the need to align people, processes, organisational structures and culture.

Digital government services

Digital government service is a model leveraging digital technologies and ICTs as an integrated part of the government strategy to exchange information, services and interaction contents with the government for the served citizens and enhanced business models (Gil-Garcia, Dawes & Pardo 2018). The emergence of digital government services in developing countries has made many people's lives easy, rapid and more connected (Al-Salman, Mustafina & Shahoodh 2020). Alexandru et al. (2019) observe that digital public services must improve ways and channels to collect, store, analyse and process heterogeneous types of data that are generated from a large range of sources with inclusion of the citizens. Al-Salman, Mustafina and Shahoodh (2020) highlight that digital transformation has presented many governments with opportunities to migrate from traditional public administration to more effective and efficient digital services with exceptional quality and becoming more customer-centric. For instance, Al-Salman, Al-Salman, Mustafina and Shahoodh (2020) allude that in 2004, with the help of Italy, Iraq was able to develop a new network to connect Iraqi ministries with each other, which became the beginning of government-to-government (G2G) services. The value brought by digital services to government practice has a potential to promote the commitment to leaders and push-up the process of institutional transformation Al-Salman, Mustafina & Shahoodh 2020). These authors also highlight that successful transformation of public administration to services relies on having a well-planned national strategy, which is informed by a context-aware information and ICTs. As a result, keeping contact with the citizens is considered as a duty and necessity for the digital government services where all stakeholders comprehend the shift in order to guarantee the smooth flow of such services to the community. Digital services are also prone to cyber-attacks, which at times can interrupt services. transformation tends to be associated with numerous attacks.

Therefore, it is essential to preserve security and privacy in the government digital services to ensure secure exchange of information and guarantee the legal system in this digital environment. According to Abd et al. (2019), intellectual property rights must be adjusted to cover the use of ICTs and the government wherein a legal framework to apply the electronic equivalent of traditional paper-based procedures, such as personal identity, signatures and deposits. To respond to the growing demand for services, the government can cope through implementation of digital services that match some part of traditional public administration. The government can yield positive results if it is ready for digital transformation.

Research methods and design

This study opted a qualitative research method, obtaining data through semi-structured interviews. Given the COVID-19 pandemic regulations that were still in place and the different working arrangements, semi-structured interviews were conducted virtually using conference software solutions such as Microsoft Teams, Zoom and Webex meetings, to name a few. The use of various conference software was determined by what was convenient for the participants. Though there are many qualitative methods that are available, semi-structured interviews have the potential of comprehensively exploring participants' experiences and its potential to gather comprehensive data (Creswell & Creswell 2018; Ngulube 2018).

The population for the study comprised participants such as Chief Information Officers, Administrative officers, and analysts or investigators from the following eight government institutions: Department of Basic Education, Department of Transport, Department of Higher Education and Training, Department of Arts, Sports and Culture, Quality Council for Trades and Occupations, the State Information Technology Agency (SITA), Department of Home Affairs, the Office of the Military Ombud of South Africa and Sector Education Training Authority, such as Transport Education Training Authority. The sample size was not predetermined because in the semi-structured interviews, only when data saturation has been reached should a researcher stop data collection. (Sandelowski 1986; Creswell & Creswell 2018). In this case, the target sample was open-ended, and participants were interviewed until informational redundancy, a criterion measure for the number of participants, was reached (Ngulube 2018; Nelms 2015). This number was predicated by the fact that in qualitative research, a study does not necessarily use a bigger population but still realises considerable data for use in the study (Komba & Ngulube 2012). These participants were purposively chosen because they were responsible for making IT decisions and using IT to interact with internal and external clients (see Table 1). Participants were asked semi-structured questions based on the study's two objectives. All the interviews took approximately 45 min. The last interview took place around August 2022. In line with the averment of Clarke and Braun (2013), data collected were thematically analysed preceding the transcription of audio-recordings. A letter summarising the study and ethical clearance certificate was sent to the research and development sections and each participant who was contacted delightedly expressed his or her willingness to take part in the study. Moreover, they were allowed to withdraw their participation if they thought their involvement might make them uncomfortable.

TABLE 1: Coded participants and roles.

Name of participant	Role
Participant A	CIO
Participant B	CIO
Participant C	CIO
Participant D	CIO
Participant E	AO
Participant F	CIO
Participant G	CIO
Participant H	Investigators or Analysts
Participant I	CIO
Participant J	CIO
Participant K	CIO
Participant L	CIO

CIO, Chief Information Officer; AO, Administrative Officer.

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of South Africa College of Human Sciences Research Ethics Review Committee.

Discussion

The first objectives focused on the digital transformation that was intended to establish the readiness of the public sector. The participants were asked to indicate if they were aware of digital transformation. Generally, the results established that most of the participants were aware of digital transformation and that their level of awareness was high because they own smartphones. This led the researcher to ask whether the government was ready for digital transformation. The participants indicated that the government is not ready for digital transformation, and there is a need for flexibility of the government to adopt the new change; however, it does not have capacity. Participant J emphatically mentioned that the government is not ready by pointing out challenges of connectivity that result in downtime of the IT systems. South Africa is experiencing rolling blackout, which causes power outage, and this has added on the existing hindrance to digital transformation readiness. Literature concurs that other digital transformation challenges include issues regarding technical infrastructure, institutional or managerial, legal and regulatory and environmental context (Kuldosheva 2021). According to the participants, the government has the plans that are put in place, but they are not financially supported. Moreover, this was compounded by the senior officials who do not have an interest in accepting change to digital transformation. The study established poor financial planning on ICT projects by senior management, which leads to another delay in the implementation of digital transformation. While they prevaricate the implementation

in preparation for readiness, they emphasise on austerity measures; but at the end of the financial year, money is sent back to the treasury. In line with Yucel (2018), the readiness for digital transformation can be demonstrated by developing IT infrastructure and procuring resources. The study revealed that in some instances, those in charge of ICT do not participate in executive committees where ICT initiatives should be driven from. Participant K explained that there is no ICT in the annual report, and the head of IT is silenced when he or she addresses it. Literature contends that the lack of top-down leadership to steer digital transformation hinders the executives from providing a clear focus on culture, talent and employees (Westerman et al. 2014). As a result, it is not easy to discuss corporate ICT matters with the executives. The majority of the participants said that the civil servants are accustomed to the old organisational culture where paper format rules. This happens despite the few newly introduced digital transformation technologies that have been introduced such as digital signatures, but they still prefer a pen and a paper to sign. Furthermore, the results revealed that there are some sections that are reluctant to adopt digital transformation. The literature findings showed that the organisations were investing in digitalisation without attempting to make changes because they underestimated the organisational implications and human dynamics of the digitalisation process, which included the need to align people, processes, organisational structures and culture (Kohnke 2017). Participant G said that some officials are not mentally prepared for the expected level of required participation. Instead, the officials need to learn that when a system is deployed, it is a mandate of IT section to implement corporate IT systems that should be embraced by everyone.

The study probed further to establish the binding constraints preventing government from embracing digital technology. It emerged that change management is another challenge faced by the public sector, particularly when new systems are introduced. However, it is believed that if the executives can put a stop to negative mindset, change would happen. Participant C stated that some government entities went a step further to have an official appointed in an executive position in order to drive digital transformation. However, most of the time the executives are barely involved. For example, there is an ICT Strategy that should be driven by the executives. The study revealed that because of poor participation of the executives, ICT Strategy has been relegated to a lower level. In a functional organisation, corporate ICT decisions are taken at the ICT Strategy Committee meeting because every section is represented. If ICT strategy is left with ICT section, it reflects as an ICT matter and not a corporate transformation. Usually, projects that require corporate decisions are sent via the Department of Public Service and Administration (DPSA), but Participant K mentioned that such projects are shifted to IT section. When IT section assembles a team to work on an ICT task sent by DPSA, only the junior officials are delegated to the meeting, which trivialises the role of a committee. Consistent with literature, one of the challenges that organisations face in adopting digital transformation is integrating and exploiting new digital technologies (Van Dyk & Van Belle 2019). This can also be viewed as poor leadership and avoidance of ICT organisational projects by the executives. Inadequately informed executives cannot advocate for what they do not believe in. Additionally, some participants explained that technology is a constraint because they are technologically challenged.

The second objective focused on digital services provided in the public sector. The researcher asked the participants to indicate the digital services that were implemented in the public sector. The results revealed that some sectors within the government have started implementing digital transformation. For instance, the participants pointed at the Department of Home Affairs and South African Revenue Services (SARS) as quintessential organisations that are on the lead in providing digital government services to the public. Previously, Home Affairs has been prominently providing services to the citizens who visited their offices. In the recent past, people can apply for their smart card identity documents online. Public-private partnership with some banks also reduced the queues around the Home Affairs buildings because people can apply for their smart IDs with their nearest selected bank branch. In the same breath, SARS has made significant strides and become a quintessential institution that is capable to provide digital government services. The taxpayers file their tax returns online. Literature supports that digital transformation has presented many governments with opportunities to migrate from traditional public administration to more effective and efficient digital services with exceptional quality and being more customer-centric (Al-Salman, Mustafina & Shahoodh 2020). However, all these services are hindered by concerns such as energy insecurity, digital literacy and digital divide. The study revealed that even if digital services have been implemented, SITA would hamper connectivity because of its unceasing downtimes which have a negative impact to network. In addition, the emergence of load shedding has added another hindrance in digital services. Majority of the participants said that there is shortage of required skills to run the IT system. As a result, services are accessible to certain group of people, which is digitally literate. It was also confirmed during the investigation that social media was the best vehicle used to reach the public. The use of digital services is not at a desired level in the public sector. Majority of the participants said that the public sector uses digital services on reactionary basis as noticed when COVID-19 pandemic broke out. According to the study, cloud-hosted email exchange server and video conferencing tools are the digital transformation services that have been adopted. It emerged that the government is cautious to have information in the cloud while the officials are using personal cloud-based emails. In the main, faxes and file transfer protocol are services that are used for communication. The study discovered that people have a negative mindset and are not willing to learn new ways of doing things. According to

Participant K, they criticise or rather find a way of not getting involved in digital services. It is crucial to change the mindset in a way of change management to drive digital transformation in government. The consumers expect services to the level of the private sector. This can be achieved if digital services are driven centrally just like transversal system.

Contribution to this research

As the complexity of digital transformation is felt by both the public servants and the citizens of a country, the public sector plays an essential role in achieving improved services that are sustainable using technology. This study responds to the challenge that the government continues to provide slow or poor service amid the digital transformation.

Implications and recommendations

Recommendations are based on the findings of this study. As the government moves towards digital transformation, they should address the issue of developing policies and guidelines to ensure that users have legislative support. They should consider reviewing the current infrastructure to determine its suitability for the digital transformation. Given that the existing infrastructure is older and may not meet the expectations of emerging technology, upgrading it may be costly. As a result, sufficient funding should be made available for emerging technology based on implementation priorities. Furthermore, given that many employees are accustomed to old methods of performing their duties, it is prudent to initiate training and development in accordance with the emerging technology that will be implemented. It is recommended that when hiring new candidates, digital literacy skills should be considered as a requirement. To drive enterprise ICT from a higher level, the ICT manager should be included on the executive committee.

Conclusion

This study investigated transformation of government services in the public sector of South Africa. The findings show that the CIOs, administrative officers and analysts or investigators are aware of digital transformation and the fact that it promotes interaction between the government and the citizens it serves. These participants showed a positive outlook that should digital transformation find its way to the entire government, service provision can move to another level as noticed at SARS. However, the challenges of adopting digital transformation are associated with low digital literacy, poor digital infrastructure, unreliable power supply, reluctance to change of some employees, the lack of policy and guidelines, poor budgeting and the lack of co-operation between the executives and heads of IT departments as well as digital divide faced by the citizens. Readiness of digital transformation should be guided by the legislative framework in order to provide confidence to those using it.

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Data availability

The data that support the findings of this study are available from the corresponding author, A.S., upon reasonable.

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