

Role of Technological Innovation in Transforming Service Delivery in South African Local Government: A Systematic Literature Review

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Keywords

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Abstract

The focus of this study was on exploring the potential ways in which local government can leverage technological innovation to address service delivery challenges. The study adopted a literature review approach. The study uncovered an array of opportunities for transforming local government service delivery capacity and efficiency through emerging technologies such as AI, ML, big data analytics, and Blockchain. By integrating these technologies into their systems and processes, municipalities can go a long way in improving citizens engagement, decision-making, public participation, and procurement processes. However, despite the increasing realisation that digital technologies are capable of changing the face of service delivery, the adoption and implementation of such technologies is impeded by a number of barriers such as lack of financial sustainability, rising corruption, human resource challenges, the skills gap, poor leadership, bureaucratic organisational structure, and a rigid regulatory environment. The insights obtained from this paper provide municipal management and other stakeholders with innovative strategies for dealing with some of the challenges hampering effective service delivery and revenue collection. Furthermore, policy makers who are battling to come up with the best policies that can successfully lead to improved service delivery by local government will gain some insights from the findings and recommendations of this study.

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1. Introduction

1.1. Background

The world is currently experiencing rapid and disruptive technological changes that are dictating the way in which services are being delivered (Shava & Doorgapersad, 2022). These technological advancements are forcing organisations to adopt a more competitive agility in their efforts to survive and remain on the innovative edge of change. The Fourth Industrial Revolution (4IR), in particular, is more disruptive in its technological advancement, compared to the previous technological revolutions (Schwab, 2016). Technological advancements avail opportunities for enhancing organisational systems, practices, and processes (Attour & Chaupain-Guillot, 2020). Furthermore, technology is, to a large extent, dictating the ways in which growth and advancement occurs in various contexts. Thus, even service delivery practices are becoming more firmly located within the technology lens (Attour & Chaupain-Guillot, 2020). Through technological advancements, opportunities for achieving greater access to information, improved communication and networks, better capacity for accessing goods and services, wider participation on the community, and greater opportunities for innovation, are being created.

In the era of technological advancements, innovation is a topic that is gaining increased attention from researchers, policy makers, and business globally (Machiri & Pade-Khene, 2020). Innovation is widely recognised in professional areas such as sociology, science, engineering, and economics, as well as public sector institutions and private sector businesses (Debbarma & Chinnadurai, 2023). These fields regard innovation as a crucial factor in enhancing entrepreneurship, economic growth and development, organisational efficiency, and the creation of new products and services, as well as delivery of public value to the citizens of a country (Hofisi & Chigova, 2023).

In the public sector, innovation is viewed as an opportunity to develop relationships that will result in enhanced collaboration between different stakeholders from various organisations to improve service delivery. According to Shava and Doorgapersad (2022), it is important to revisit advances in technology within the framework of the changing public sector management models. The past two decades have witnessed public sector management coming under significant scrutiny in how it operates, realising that there is a need for evolution beyond traditional management towards more innovative ways of managing the delivery of services in the public sector (Shava & Doorgapersad, 2022). Faced with globalisation, critical challenges have been presented on the ways in which the public sector can become more agile, competitive, and innovative in the delivery of services and citizen engagement mandates. According to Arundel et al. (2015), it is imperative to implement

innovation in the public sector in order to move away from the traditional and bureaucratic processes that result in several complexities. Attour and Chaupain-Gallot (2020) concurred with this view as they argued that adoption of innovations in the public sector assists in realising higher levels of output with minimum inputs. To fulfil the needs of the community and increase engagement with citizens, it is important for local government to embrace new innovative ideas. It is therefore important for the public sector to allow for increased innovation in integrating technologies into its operations in order to support service delivery and engagement with citizens.

1.2. Problem Statement

Post-apartheid South African local government has been struggling to provide professional and adequate services to citizens (Shava & Doorgapersad, 2022). Access to public services in post-apartheid South Africa is no longer regarded as an advantage enjoyed by only a privileged few in the community, but as a legitimate right for all residents. Organisations, both public and private, are increasingly recognising the role of technological innovation in contributing to effective service delivery and economic growth. However, the use of service innovation in enhancing service delivery by municipalities in South Africa appears to be lagging behind (Biljohn, 2017). Despite the acknowledgement of the crucial role played by innovation in the society and economy, improvements for the adoption of innovation have been slow to materialise, with mixed results (Peterson & Kruss, 2018). Service delivery backlogs that are being experienced in South African municipalities can be linked to the absence of public sector innovation (Shava, 2022). This study therefore explores the potential ways in which technological innovation can assist in dealing with service delivery challenges faced by local government in South Africa through a review of literature.

1.3. Research objectives

The study seeks to achieve the following objectives:

- To explore the opportunities offered by technological innovation for transforming service delivery in South African local government; and
- To determine the challenges hampering the adoption and implementation of technological innovation in South African local government.

The next section of this paper provides a review of literature relating to the opportunities and challenges of adopting and implementing technological innovation in local government. This is followed by a brief discussion of the methodology that was followed in conducting the study. The methodology section is followed by the presentation of the findings of the study. Lastly, the paper

highlights the practical implications of the study as well as the recommendations for achieving success in the implementation of technological innovation in local government.

2. Literature Review

2.1 Overview of local government

Local government is the domain of government that is closest to the community in terms of service delivery and the provision of basic services to improve the lives of community members (Hofisi & Chigova, 2023). Municipalities, at least in theory, are regarded as being in a best position to obtain and understand the wishes and aspirations of the local people (Thornhill & Cloete, 2014). Thornhill (2014) regards local government as the first point of contact between individuals and government institutions. Shava and Hofisi (2017) refer to the local sphere of government as grassroots government because it has a direct association with citizens at a local level. Through this sphere, citizens have direct interaction with government and have an experience of the nature and quality of services offered (Reddy, 2016).

Municipalities should, therefore, be placed to establish and unlock potential as well as mobilise the technology innovations and or resources that are available in the community (Shava, 2022). However, these characteristics do not automatically result in higher quality and legitimacy of decisions, but they certainly possess the potential to do so. The ability of municipalities to successfully fulfil their mandate is heavily dependent on whether they are indeed configured and behave responsively (Machiri & Pade-Khene, 2020). Unfortunately, the local sphere of government, particularly in African nations has been persistently characterised by ineffective service delivery in the face of several challenges, particularly in developing countries (Shava, 2022).

2.2 Technological innovation in the public sector

Public service organisations worldwide, including local government, are operating in a highly dynamic and complex environment that is characterised by rapid technological advancements, shrinking public resources, and increasingly changing citizens' expectations (Yigitcanlar et al., 2021). It is, therefore, critical for such institutions to be creative and innovative in order to effectively deliver services to the public. According to Attour and Chaupain-Guillot (2020), there is a need for innovation to be at the heart of the efforts by the public sector to enhance performance, come up with novel capabilities, new models, and new methods in the service delivery process. For instance, governments worldwide are implementing digital technologies to creatively change the way they operate, make decisions, share information, and provide services. Amesho et al. (2021) argue that the

innovation of the public sector can potentially break through some of the difficult challenges currently facing the world. Public sector innovation offers prospects for supporting the attainment of the 2063 Agenda as well as Sustainable Development (SDG) goals as it can enhance the effectiveness and efficiency by which services are delivered (Amesho et al., 2021). Through public sector innovation, most developmental challenges can be addressed and issues of exclusion and inequality can be redressed.

However, Shava and Doorgapersad (2022) assert that there is a raging debate relating to the extent to which digital innovations are sustainable in developing countries as technocrats, social scientists, and economists hold different views regarding each facet of using digital technologies in developing economies. According to a study by Lucas and Goh (2009), there is a possibility for technological innovations to result in highly complex innovation problems due to their inadvertent outcomes. In the public sector, there are still some questions regarding the ways in which technological innovations can be managed or whether they are manageable at all. Numerous scholarly works (Evans et al., 2006; Tushman and Anderson, 2008) have investigated the connection between extreme transformation and technological innovation. An examination of literature indicated that emerging technologies have the potential to seriously disrupt established markets. Critical thinkers however counter that these difficulties can be lessened by using certain macro-level strategic models.

2.3 Technological innovation in local government

In local government, technological innovation is viewed as one of the mechanisms for dealing with the huge service delivery backlogs and enhancing the delivery of services to residents (Joseph & Williams, 2022). According to Joseph and Williams (2022), ICT plays a huge role in local government's efforts to enhance public participation. Empowering the citizen as a customer is viewed by Ntliziywana (2017) as a way of dealing with aloof and self-interested politicians and professionals in local government. Citizen empowerment is enabled through effective communication between local government and the different stakeholders in decision-making at all levels, thereby narrowing the gap in poor service delivery processes. Thus, the use of technological innovations such as ICT is capable of bridging the communication and consultation gap between local authorities and communities to achieve greater transparency and accountability (Ntliziywana, 2017). Similarly, Debbarma & Chinnadurai (2023) points out that, through technological innovations, the poor can be empowered, institutions can be made to work better for the poor, and social barriers can be broken. Through improved communication offered by ICT, the poor can have better communication, improved access to information, and better interaction with local authorities and stakeholders, which results in greater accountability.

The spread of digital technologies in the 4IR provides an opportunity for revamping global income and employment (Mamdu & Pratikto, 2021). New technologies, however, have the potential to affect people's livelihoods, businesses, markets, labour force, and economy (Schwab, 2016). Based on insights obtained from the Oslo Manual, public authorities should contemplate an innovative delivery of services online (Majchrzak & Griffith, 2020). The idea is to increase the usage of digital technologies as accelerators for faster service delivery in order to fulfil service delivery demands. According to AlAsta (2021), the rise of digital innovations encourages the development of digital governance, which pushes government establishments to adopt e-democracy, which replaces traditional governance with NPM procedures.

2.3 Technological innovation in South African local government

Local government in South Africa is regarded as the backbone of the service delivery system and provides residents with essential services. South African policy documents have addressed the significance of digital transformation in the local government sector for a long time (Hofisi & Chigova, 2023). The National Development Plan 2030 of 2020, for instance, contains a summary of it and states that its goal is to “build capabilities and enhance the capability of the state to solve complex problems.” Without a doubt, the provision of services in South Africa is becoming more and more problematic as the three levels of government in the nation struggle with enormous responsibilities (Manamela, 2021). For South Africa to be competitive in the global economy, the central government believes that digital transformation of local government is necessary. Some municipalities such as the City of Johannesburg (CoJ) are committed to embracing 4IR technologies to transform service delivery (Shibambu, 2024). For instance, CoJ highlighted its plans to implement a new SAP system in its efforts to simplify and streamline cumbersome municipal operations as part of its Smart City strategy. The system will, in essence, provide municipal services on an integrated platform, enabling the city to improve the delivery of basic services, using technology.

However, due to several reluctances to break with the existing status quo and embark on a fully digital public service, the adoption of digital innovations in the South African public sector has not yet received much attention (Boyle & Staines 2019; Shava & Hofisi 2017). Service delivery backlogs that are being experienced in South African municipalities can be linked to the absence of public sector innovation (Shava, 2022). According to Nel and Masilela (2020), 4IR technological innovations such

as 3D machines, mobile applications, computers, biometrics, cloud, and big data and analytics are crucial for improving the delivery of services and enhancing the standards of living of communities.

In South Africa, basic service delivery innovations at local government level have been generally characterised by top-down as opposed to democratic bottom-up identification as well as user participation (Booyens & Hart, 2019). In addition, the country's municipalities lack integrated management systems that can provide innovative solutions to service delivery challenges as well as the skills required for proactively taking advantage of developments in technology to enhance service delivery (Hart et al., 2019). It is, therefore, crucial to explore ways in which the South African local government can harness service innovation to improve delivery of services to the public.

3. Research Methodology

This paper adopted a systematic literature review method to explore the role of technological innovation in transforming service delivery in local government. Thus, a review of empirical and conceptual articles on technological innovation was reviewed. In management research, the conventional descriptive literature evaluation has been attracted wide criticism as lacking relevance because authors utilise personal, subjective, and often biased techniques. To mitigate this shortcoming, Moher et al. (2009) suggested the use of specific principles of the systematic review methodology typically used in medical science. A systematic review and a conventional narrative review vary primarily in that the former employs a rigorous, repeatable, transparent, scientific method, while the latter does not.

Furthermore, the review of literature for this article does not follow the meta-analysis approach, which involves analysing data synthesising conclusions through the use of econometric and statistical methods. Rather, the review takes a systematic review approach whose primary goal is to pinpoint important discoveries and contributions to a subject or issue. Systematic literature review findings are presented in a descriptive manner. The systematic review followed two steps, which are as follows: establishing the inclusion criteria and coming up with the strategy for choosing and locating possible studies.

Inclusion criteria: The review focused on peer-reviewed articles, conference proceedings, and reports published between 2015 and 2024.

Exclusion criteria: Books, periodicals, non-peer-reviewed articles, and editorials were excluded from the review. Articles published before 2015 were also excluded.

Search strategy: The search focused on the following databases: Google Scholar, ISI Web of Science, Emerald Insight. The following search terms were used: technological innovation, technological innovation/digital transformation in local government, technological innovation/digital transformation in the public sector, and barriers to local government digital transformation.

4. Results and Findings

4.1 Opportunities for enhancing service delivery through technological innovation in local government

The study found that there are several opportunities offered by digital technologies for enhancing service delivery in local government. Table 1 gives a summary of some of the ways in which local government can harness technological applications to enhance excellence in the process of service provision.

Table 1: Opportunities for enhancing service delivery through technological innovation

Opportunity	Benefits	Authors
Improve citizen engagement through smartphones, web platforms and artificial intelligence (AI)	<ul style="list-style-type: none"> • Reduced visits to offices by citizens through creation of virtual assistants and chatbots to reply queries • Improved accessibility • Easy access to information • Responsiveness to citizens' needs 	Adnan et al. (2021); Androutopoulou et al. (2018); Cuccaro-Alamin et al. (2017) Debbarma and Chinnadurai (2023); Lopez (2022); Zabala (2023)
Improve public participation through AI and smartphones	<ul style="list-style-type: none"> • Greater public participation • Improved decision making 	Attour and Chaupain-Guillot (2020); Cuccaro-Alamin et al. (2017); Distor et al. (2023); Santos & Reyes (2021);
Enhance decision-making through big data analytics and AI	<ul style="list-style-type: none"> • Data-driven decision-making • Quick access to 	Bright et al. (2019); Debbarma and Chinnadurai (2023);

	<p>information</p> <ul style="list-style-type: none"> • Improved information quality • Predictive analysis 	<p>Glaesner et al. (2018); Munné (2016); Silva et al. (2018)</p>
<p>Enhance procurement and other processes through blockchain technology</p>	<ul style="list-style-type: none"> • Increased flexibility • Enhanced transparency • Enhanced process efficiency • Minimised expenses and bureaucracy • Minimise corruption in procurement 	<p>Cagigas et al (2021); Choi and Luo (2019); Mahula et al. (2022); Ølnes and Jansen (2018); Rossi et al. (2019);</p>
<p>Enhance waste management through AI and machine learning (ML)</p>		<p>Fang et al. (2023); Na et al. (2022); Olugboja and Wang (2019); Pardini et al. (2020); Rutqvist et al. (2020),</p>

4.1.1 Improve citizen engagement through smartphones, web platforms and AI

Literature highlights a number of ways in which local government can use technological applications such as smartphones, web platforms, and AI to improve its engagement with citizens. According to Cuccaro-Alamin et al. (2017), local authorities can use AI to create virtual assistants and chatbots that can reply to people’s queries, provide information, and assist residents in completing tasks online. Androutsopoulou et al. (2018) define chatbots as independent virtual assistants that communicate mostly through text on websites in order to streamline interactions between citizens and local government officials. These innovations have the potential to increase openness, improve accessibility to public services, and provide residents more authority to actively engage in local politics. The advantages of AI in citizen engagement, such as improved accessibility, response, and participation, are highlighted in research by Pislaru et al. (2024). Chatbots driven by AI can instantly answer questions from citizens, deliver pertinent information, and assist them with a range of government services (Zabala, 2023). AI-driven data analytics can also help local government departments understand the needs, preferences, and feedback of their citizens, which can help them create policies and services that are more focused and efficient (Lopez, 2022). Zabala (2023) posits that the use of AI

has the potential to completely change how local government departments engage and communicate with their constituents.

4.1.2 Improve public participation through AI and smartphones

In realising the opportunity to utilise technology to enhance open governance, many local governments, particularly in developed countries, have introduced Web 2.0 to enable the participation of citizens, in collecting and disseminating knowledge and feedback (Attour & Chaupain-Guillot, 2020). In the light of technological advancements, citizens are growing greater interest in participating in their local government affairs (Xiao et al., 2022). This means that the traditional organisational structure of the public service, which allows for a one-way communication in which information is provided to the public by the authority, is becoming less acceptable in the digital technology era. Digital technologies therefore provide an opportunity for local government and the public to interact positively, resulting in a more conducive and open governance. Adnan et al. (2021) described open government as one of the initiatives that seek to set up a more transparent governance system and increase the participation of citizens in the process. Web 2.0 enables discussion and collaboration via forums, surveys, opinion maps, and comments as well as the gathering of ideas through voting and rating (Adnan et al., 2021). Municipalities can obtain information pertaining to the public's sentiments or opinions regarding particular policies and initiatives. Tools for analysing user behaviour, votes, and comments across the platform are also provided (Distor et al., 2023).

4.1.3 Enhance decision-making through big data analytics and AI

In addition to offering local government officials with assistance in the execution of routine tasks, digital technologies such as big data analytics and AI are also being utilised in enhancing decision-making (Agarwal, 2018). A significant part of work done by local government officials involves making complex decisions regarding who to serve, where to provide services, and when to offer interventions. AI, for instance, can be used by cities, towns, and villages to compose resolutions, produce material for social media, condense information for constituents, enhance data-driven decision-making, and more. Through AI, local authorities can automate tasks to enhance decision-making, and improve their engagement with citizens (Criado & Zarate-Alcarazo, 2022). One aspect of AI is its ability to make use of statistical processes to establish patterns within data sets. Municipal leaders can find this application valuable in their attempts to make data-driven decisions. Thus, using AI, municipalities can make more informed decisions on matters such as public safety, waste management, and traffic management.

There is also great potential for local government to utilise AI for predictive analysis (Yigitcanlar et al., 2022). This entails making use of historical data to predict future events. For instance, using AI algorithms to analyse traffic data and predict where and when traffic congestion is likely to occur. Local governments can thus make more informed decisions regarding the management of traffic and planning for infrastructure development (Santos & Reyes, 2021). However, just like man-made decisions, there is a potential of bias and discrimination in AI systems, depending on how they were programmed, the data used, and their ultimate application (Zabala, 2023). It is, therefore, critical to exercise extra care when using AI to inform important decisions.

4.1.4 Enhance procurement and other processes through blockchain technology

One example of a collection of cutting-edge technologies that can be used in technological innovation in a variety of ways is blockchain technology. Mahula et al. (2022) describe blockchain technology as “distributed ledger technology in the form of a distributed transactional database, secured by cryptography, and governed by a consensus mechanism.” Previous studies have highlighted a number of benefits that the public sector, including local government, can derive from using blockchain technology; increasing flexibility, transparency, and process efficiency, as well as minimising expenses and bureaucracy (Ølnes & Jansen, 2018; Rossi et al., 2019; Sobolewski & Allessie, 2021). Furthermore, blockchain technology assists in breaking siloes between agencies and getting rid of corruption in the supply chain (Mahula et al., 2022).

An examination of literature relating to blockchain in public administration reveals that the discussions of scholars are mainly focused on three aspects, which are organisational structure, governance, and data management (Ølnes et al., 2017; Rodriguez & Santos, 2020; Reddick et al., 2019). Essentially, blockchain technology is founded on distributed ledger technology, the essence of which is decentralisation. Thus, organisational structures and conventional governance models that are dependent on centralised hierarchical systems can be transformed through the various architectural designs of blockchain (Reddick et al., 2019). Through the authenticity, immutability, and security mechanisms of blockchain technology, the adaption of citizen-centred approaches to service delivery is made easier. These mechanisms are also capable of providing effective data management which contributes to service delivery effectiveness (Rodriguez & Santos, 2020).

4.1.5 Enhance waste management through AI and machine learning (ML)

According to Rutqvist et al. (2020), local authorities can apply big data analytics, including AI and ML, in different aspects of waste management. One of the major challenges presented by rapidly growing populations in urban areas is waste management. A study by Gupta et al. (2019) examined the role of ML models in the scheduling of waste collection from bins as well as the sorting and recycling of waste. The authors concluded that it is highly feasible and time-efficient to utilise automation techniques in the sorting of waste materials. Pardini et al. (2020) also provided a comprehensive review of waste management models based on big ML. According to the study, ML models are effective in detecting the accuracy of emptying recycling containers utilising data from sensors mounted on top. Furthermore, Al-Masri et al. (2018) described reccle.io, a waste management system enabled by the Internet of Things (IoT) that uses the Microsoft Azure IoT hub to enable municipalities to regulate waste disposal in an efficient and effective manner.

4.2 Barriers to adoption and implementation of technological innovation in local government

Although technological innovations are capable of transforming local government and enhance service delivery, the adoption and implementation of such technologies is not as widespread as would be expected (Falco & Kleinhans, 2018). When it comes to utilising these technologies for public policy and service delivery, local governments are hesitant to participate. Digital innovation presents a number of challenges to municipalities in South Africa and other developing countries. Table 2 summarises some of the barriers that impede the adoption and implementation of technological innovation in local government.

Table 2: Barriers to technological innovation adoption and implementation in local government

Challenge	Barriers related to the challenge	Authors
Lack of financial sustainability	<ul style="list-style-type: none"> • Lack of adequate financial resources • Reliance on grants and own revenue sources • No influence on budget allocation • Dependence on rates and taxes • Ballooning debt 	Shava and Doorgapersad (2022)
Rising corruption	<ul style="list-style-type: none"> • Corruption in government officials • Corruption in land use and building 	Day et al. (2021) Reddy and Wallis (2015); Tshishonga

	<p>control</p> <ul style="list-style-type: none"> • Corruption in human resources • Procurement and supply chain corruption 	(2015); Hofisi and Chigova (2023)
Human resource challenges	<ul style="list-style-type: none"> • Incompetent staff • High rates of employee turnover • High vacancy rates • Many appointments in acting position 	Amesho et al. (2021); Cinar (2019); Davids (2022); Debbarma and Chinnadurai (2023);
Lack of skills capacity	<ul style="list-style-type: none"> • Deficit of qualified and experienced talent • Vacant positions in local government • Shortage of digital skills 	Adnan et al. (2021); Bhorat et al. (2023); Hart et al. (2020); Joseph and Williams (2022); Maseko and Vyas-Doorgapersad (2018)
Leadership and organisational culture	<ul style="list-style-type: none"> • Absence of creative research culture • Lack of ethical leadership • Lack of accountable leadership • Conflicts between political and administrative Leadership 	Attour and Chaupain-Guillot, (2020); Bandauko (2022); Davids (2022); Hart et al. (2020); Manamela (2021)
Lack of political will	<ul style="list-style-type: none"> • Lack of interest by top government officials • Corruption and misappropriation of funds by top government officials 	Hofisi and Chigova (2023); Shibambu (2024); Hart et al. (2020)
Bureaucratic organisational structure	<ul style="list-style-type: none"> • Red tape • Bureaucratic processes • Top-down approach • Slow decision-making process 	Agarwal (2018); Debbarma and Chinnadurai (2023); De Vries et al. (2014); Osborne and Brown, (2015); Lekhi (2007); Tidd and Bessant (2009)
Rigid regulatory environment	<ul style="list-style-type: none"> • Rigid internal rules and processes • Regulatory restrictions • Red tape 	Bandauko (2022); Raipa and Giedraityte (2014)

Table 2 clearly shows that, despite the apparent benefits of adopting technological innovation in local government, the process is challenging, particularly in developing countries in which the local government sphere faces increased technology and skills gaps, political and socio-economic barriers, and deficits in infrastructure. As shown in Table 2, the main challenges uncovered in this review are: lack of financial sustainability, rising corruption, human resource challenges, the skills gap, poor leadership, bureaucratic organisational structure, and a rigid regulatory environment. For instance, a lack of political will in South Africa is shown by the corruption of public officials, a dearth of public accountability, and subpar consequence management in the public sector (Thusi et al., 2023). The lack of commitment shown by politicians in the leadership roles has raised the question of whether South Africans can rely on the government. In a South African study by Shibambu (2024), the participants complained that the problems surrounding digital transformation in local government are compounded by top government officials who lack interest in migrating to digital technologies. This intricacy emphasises the necessity for a thoughtful, deliberate approach to local government digitalisation that takes into account both its inherent difficulties and its revolutionary potential.

5. Managerial Implications

5.1 Managerial implications

This paper makes significant managerial contributions internationally. It has been noted from literature that the current state of local government in developing countries is not desirable. Local government was instituted with the specific aim of delivering services to communities in order to enhance their quality of life. This paper identified different opportunities for enhancing local government service delivery through technological applications. By effectively adopting and implementing technological applications such as AI, big data analytics, machine learning, and blockchain, managers in local government can improve citizen engagement, public participation, decision making, and the speed and efficiency with which services are delivered. The paper however noted that the adoption and implementation of technological innovation in local government is impeded by several challenges.

The results on barriers to technological innovation in local government in South Africa highlights several managerial implications that can help address these challenges effectively. Firstly, it is critical for local government to develop strong and visionary leadership that can foster an innovation-friendly culture. Managers need to demonstrate a commitment to technological innovation and develop and implement strategic plans that prioritize technological innovation. This includes aligning technology initiatives with broader organizational goals. Local government should therefore develop competent leaders who are capable of driving digital transformation. Many of the opportunities presented by

digital will be missed in the absence of political, organisational, and community developing the necessary capacity and skills among policymakers, employees, and service users, and leadership. The focus should be on coordinating the user-centric redesign of services across communities in conjunction with the entire spectrum of partner organisations and communities themselves, encouraging a group approach to creating and sharing assets. Furthermore, leadership is required to create a cohesive strategy for local government's overall digital goals, to promote the cultural shift that is necessary for innovation, and to connect, coordinate, and support various efforts. Local government will thus, be able to work more productively with the national government and other public and private sector partners to ensure the success of digital innovation initiatives.

5.2 Practical implications and recommendations

In light of the vast opportunities for transforming service delivery in local government through technological innovation and the complexities involved in digital innovation adoption, this paper recommends a strategic approach to digitisation in local authorities. Such an approach entails a careful and thorough examination of the internal and external environment which is followed by the designing of effective strategies for overcoming identified barriers. Secondly, management needs to overcome the resource barrier by allocating adequate funding to technology projects. This includes securing funds for initial investments as well as ongoing maintenance and upgrades. One way of mobilizing resources for technological innovation in local government is to collaborate with the private sector by establishing partnerships with private companies that have expertise in technology. These partnerships can provide both financial resources and technical expertise. In addition, local government can engage in joint ventures with private sector entities to co-fund and co-develop technology projects. This can reduce financial burden and share risks.

Furthermore, local government should prioritise investments in modern and scalable infrastructure that can support new technologies. This includes upgrading existing systems and adopting new ones. This can be facilitated through the formation of partnerships with technology providers and other stakeholders to gain access to the latest innovations and expertise. This can be complimented by improving the regulatory framework through initiatives such as incentives for innovation. Government can develop and implement policies that offer tax incentives and other benefits for investments in technology. In addition, procurement processes can also be simplified to make it easier and faster to acquire necessary technology.

6. Conclusions and Recommendations

This study explored the potential ways in which technological innovation can assist in dealing with service delivery challenges faced by local government through a review of literature. The findings indicate that there is an array of opportunities for transforming local government service delivery capacity and efficiency through emerging technologies such as AI, ML, big data analytics, and blockchain. The integration of these technologies into local government systems and processes can greatly enhance citizens engagement, decision-making, public participation, and procurement processes. However, despite the increasing realisation of the role played by digital technologies in transforming service delivery and clearing service delivery backlogs, the adoption and implementation of such technologies faces several barriers such as lack of financial sustainability, rising corruption, human resource challenges, the skills gap, poor leadership, bureaucratic organisational structure, and a rigid regulatory environment. Addressing the barriers to technological innovation in local government in South Africa requires a comprehensive approach that involves strategic leadership, investment in skills and infrastructure, fostering a supportive culture, and ensuring regulatory compliance. By focusing on these areas, managers can create an environment that is conducive to technological advancement and innovation.

This paper makes significant practical and theoretical contributions. The findings and recommendations will assist municipal management and other stakeholders in addressing some of the challenges that are making it difficult for municipalities to effectively deliver services and collect revenue. In addition, policy makers who are battling to come up with the best policies that can successfully lead to improved service delivery by local government will gain some insights from the findings and recommendations of this study. Future research can focus on an empirical study to develop a framework for the implementation of technological innovation in local government.

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