Unveiling the Hidden Power of Water Services Development Plans

Decoding MuSSA and WSDP's Impact in the Dynamic ICT Space

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Abstract

South African Water Services Authorities (WSAs) have been grappling with the challenge of providing sustainable water and sanitation services which is a product of the sector's inadequate planning and practices systems. Consequently, majority of end-user communities endure inadequate access to sustainable water and sanitation services. This paper aims to highlight the pivotal role of ICT in local governance planning, proposing it as an innovative solution to enhance planning efficiency and improve water and sanitation service delivery in South Africa. Through an emic perspective, systematic search of literature, and document analysis, this paper examines the 2022 MuSSA reports of Western Cape and Gauteng to identify the challenges faced by the provinces. The findings reveal deficiencies in the Western Cape's investment in asset renewal, infrastructure management, reduction of non-revenue water, and adherence to national standards. Similarly, Gauteng requires comprehensive reforms to address financial instability, asset management, and regulatory compliance. The paper also examines the progress of WSDP development in the 2022-2027. Notably, both provinces are behind schedule, having been expected to initiate WSDP development in 2022. The findings of this paper give an invaluable snippet of the water services planning mechanisms at the local government to ensure proper monitoring and adequate intervention at a local level whilst ensuring the streamlining of resource allocation and recommends that the national government reflects on its shortcomings of ensuring legislative compliance by local government.

Keywords: Water Services Authorities; Water Services Development Plan; ICT; Municipal Strategic Self-Assessment; Planning; Water Services.

Introduction

The provision of reliable water and sanitation services remains a pressing challenge, not only in South Africa but also across the globe, spanning both developed and developing nations (Goldman, 2007; Moriarty, Smits, Butterworth, and Franceys, 2013; Renick, 2014). This enduring challenge stems from a multitude of factors, including the impacts of

climate change, the deterioration of essential water and sanitation infrastructure, rampant pollution, mismanagement of water resources, declining water quality, a shortage of skilled personnel, and the daunting financial constraints faced by local government (Buthelezi, Sutherland, Hordijk, Lewis, and Meyer, 2014; Lund, 2015; Rogers, Jalal, and Boyd, 2012; Wells, Vidmar, Webb, Ferguson, Verbyla, de los, Zhang, and Mihelcic, 2022). Addressing these multifaceted issues has become a conundrum for local governments worldwide.

In the South African context, various attempts have been made to address these complex challenges through initiatives such as water conservation and demand management, water services improvement plans, and municipal master plans for water and sanitation. Regrettably, the efficacy of these responses has been stifled by a lack of comprehensive planning, insufficient resource allocation, and a shortfall in the implementation of existing policies and legislative frameworks (McKenzie and Wegelin, 2009). To confront this daunting conundrum, Water Services Authorities (WSAs) are required by DWS to voluntarily assess their performance and future expected performance in providing water and sanitation services through MuSSA. Moreover, WSAs are mandated through legislation to develop Water Service Development Plans (WSDPs).

As a legislated requirement, the Water Service Development Plan (WSDP) serves as a strategic blueprint that captures an all-encompassing overview, strategic objectives, and a robust reporting framework within a WSA. The WSDP system ensures that planning occurs through a structured approach based on information and a knowledge system that integrates all topics related to Water and Sanitation Services provision (DWS, 2022). Despite the legal obligation to develop WSDPs, numerous WSAs are grappling with this imperative task, as it will be shown later in this paper. This predicament places the planning mechanisms of WSAs in a precarious state, ultimately contributing to the inadequate delivery of essential water and sanitation services.

The MuSSA and WSDP, operating as Information and Communication Technology (ICT) tools, equip WSAs with the essential planning tools necessary to navigate these challenges successfully. In recent years ICT has emerged as a pivotal instrument in automating and facilitating various aspects of business processes, scientific research, education, and communication. Strikingly, its adoption in the realm of municipal service delivery planning remains underutilised, not just within South Africa but on a global scale (Nasi, Frosini, Cristofoli, 2010; Virtudes and Sa, 2017).

This underutilisation can be attributed to the prevailing misconception that ICT solely serves as a technical means for information processing and communication. However, the true essence of ICT extends beyond this narrow view (Bibri, 2021; Bricout, 2021; Mohapatra and Rath, 2019).

To underscore the critical role of ICT in the local governance planning sphere, Virtudes and Sa (2017) assert that ICT should take centre stage in ensuring the efficiency of planning processes. This paradigm shift signifies that the utilisation of ICT in water services planning presents an innovative and transformative approach to enhance the efficiency and competitiveness of WSAs. In this context, the adoption of ICT in the planning space emerges as a strategic imperative to overcome the challenges and elevate the standard of water and sanitation service delivery in South Africa.

Traditional planning methods have shown that they are unable to deal with the complexities of water service delivery. Therefore, the problem that this paper investigates is the uptake

and effectiveness of Information and Communication Technology (ICT)-driven mechanisms, such as the Municipal Strategic Self-Assessment Systems (MuSSA) and the Water Services Development Planning (WSDP), in improving water and sanitation service delivery within the Western Cape and Gauteng provinces. The paper unfolds in a structured manner, beginning with a discussion on the methodology used. Following this, a conceptual framework is presented to explain key terms, succeeded by an exploration of legislative requirements. The subsequent section explores the "Empowering Progress: Unveiling Municipal Potential in the Western Cape and Gauteng Provinces through Strategic Self-Assessment" (Section 5). Thereafter, the focus is directed on "Cruising Towards Water Planning: Water Services Development Plans 2022-2023 in Western Cape and Gauteng" (Section 6). Subsequently, the paper addresses "Decoding Water Services Delivery Planning: Enhancing South African Municipalities with Integrated ICT Solutions" (Section 7). The paper concludes by summarising the key findings and insights drawn throughout the sections.

Methodology

This study applies a qualitative research design to delve into the intricacies of water and sanitation services planning facilitated by an Information and Communication Technology (ICT) tool known as the Municipal Strategic Self-Assessment and Water Service Development Plan. To collect data for this study, a comprehensive process was undertaken involving the identification, selection, appraising, and synthesis of evidence relating to the utilisation and comprehension of the Western Cape and Gauteng Municipal Strategic Self-Assessment (MuSSA) and Water Service Development Plan (WSDP). This comprehensive data collection effort was guided by the objective of encompassing all available evidence relevant to the research topic. The data collection method followed four key strategies: a) A formal exploration of academic databases was conducted, employing a carefully crafted master search string to ensure thorough coverage of scholarly works; b) A search of grey literature, extending to the websites of prominent organisations operating within South Africa's water sector. In addition, Google Scholar was also utilised, with a focus on keywords closely associated with MuSSA, WSDP, ICT, Planning, and Water and Sanitation Services; c) An examination of the Department of Water and Sanitation website, as a key information site since it hosts all the MuSSA and WSDPs of the WSAs in the country; and d) A diligent citation tracing approach was adopted, employing diverse snowballing techniques including engaging DWS officials with extensive knowledge on the topic at hand (Langer et al., 2017).

Western Cape and Gauteng are the case study areas which were consciously selected due to their remarkable achievements in providing widespread water services. In both provinces, residents enjoy extensive water accessibility, whether it be within their homes, in their yards, or through communal taps. Western Cape stands out with an impressive water access rate of 99.1%, accompanied by a commendable 95.4% access to sanitation services. Similarly, Gauteng exhibits a praiseworthy 97.9% water access and a substantial 96.9% access to sanitation services. These statistics are notably higher than the national average, which hovers around 91.3% for water access and 95.35% for sanitation services as reported by Stats-SA (2022). Studying these provinces will provide invaluable insights into how the planning mechanisms are applied in these provinces to achieve the following results, thus creating a blueprint for other provinces striving to enhance their water and sanitation services.

Within this research framework, content analysis is used for data interpretation and analysis. Content analysis, as widely acknowledged by researchers (Bowen, 2009; Stake, 2000; Yin, 1989), as a qualitative research method wherein the researcher scrutinises documents to extract insights and meaning relevant to the subject under investigation. However, Corbin and Strauss (2008) provide a more comprehensive definition, emphasising that content analysis is a systematic approach to reviewing and evaluating a variety of documents, including both print and electronic materials (computer-based and internet-transmitted). Similar to other qualitative analytical methods, content analysis and descriptive analysis entail a careful examination and interpretation of data to uncover significance, foster understanding, and generate empirical knowledge. The content analysis method employed in this research follows a precise procedure, involving comprehensive reading, analysis, and categorisation of relevant literature and reports to discern key themes. This approach enables the application of rational reasoning to explore the consistent relationships among articles and reports, prioritising depth of understanding over mere quantity (Bernard, 2006; Bowen, 2009; Labuschagne, 2003; Mohajan, 2018).

Conceptual Framework

ICT as a concept has been widely used in recent decades to refer to a broad range of technologies, devices, and applications. However, despite its popularity, there is no universally accepted definition of ICT. This lack of consensus stems from the ever-evolving nature of ICT, which encompasses a dynamic landscape of emerging technologies and innovations (Wellman, 2001). For this paper, Information and Communications Technology (ICT) is defined as the use of computing and telecommunication technologies, systems and tools to facilitate the way information is created, collected, processed, transmitted and stored (Rouse, 2023). ICT development and implementation is complex, and its success and failure especially in the government sphere are dependent on three dimensions: a) Social Design – this comprises the social component of an ICT design. Aspects such as the social context of the implementation, organisational structures, stakeholders, and how information is shared are key concerns in this dimension; b) Technical Design – the system appropriateness and technical correctness for the problem at hand; c) Program design – the support structure or the scalability and sustainability of the project (Castells, 2009; Norris, 2001; Yong-Hak, 2000).

This paper conceptualises the role of ICT in municipal decision-making and governance through three theories, Resource-based view: which argues that organisations can achieve competitive advantage by leveraging their unique resources and capabilities (Barney, 1991). ICT is well known to represent a valuable resource for municipalities, enabling them to improve service delivery, enhance efficiency, and foster innovation, as seen in many countries such as Ghana and Burkina Faso. The second theory is the Contingency theory: which suggests that the most effective management approach depends on the specific context in which the organisation operates (Lawrence & Lorsch, 1967). Globally, the local government is operating in a complex environment which necessitates the ability to be flexible and adaptable to the ICT governance framework that can respond to emerging challenges and opportunities. Lastly, Stakeholder theory: gives an emphasis on the importance of considering the interests of all stakeholders when making decisions (Freeman and Medoff, 1984). In the municipal context, stakeholders including citizens, businesses, employees, and other government agencies, need to form part of the decision-making processes. In South Africa, this is a legislated requirement. An effective ICT governance

framework must consider the needs of all stakeholders to ensure that ICTs are used in a manner that benefits the entire community, as envisioned by the National Integrated ICT Policy which was gazetted by the South African Government in 2016.

The successful adoption of ICT in planning can be seen in Ghana and Burkina Faso. Examining water and sanitation planning, the case studies of Ghana and Burkina Faso illustrate successful ICT integration. The transformative shift in Ghana through the District Monitoring and Evaluation Systems (DiMES) and Burkina Faso's innovative solutions demonstrate the potential of ICTs in realistic planning, budgeting, and adaptation, emphasising the importance of universal access to information (Dickinson and Bostoen, 2013).

Legislative framework governing the water and sanitation sector

The Constitution of South Africa of 1996 mandated the decentralisation of powers and functions to local government, and as it pertains to the water sector, the local government is strategically located between the policy-making level and water consumers. This points out that the local government has a significant role to play in water management. Moreover, both the Constitution and the Water Services Act (No. 108 of 1998) establish water service delivery as a fundamental responsibility of local government, whether acting as a water service authority or as a water service provider. According to the Department of Water and Sanitation (DWS) (2021), a water service authority is defined as any municipality possessing the executive authority to provide water services[1] within its jurisdiction in accordance with the Municipal Structures Act (No. 117 of 1998) or ministerial authorisations conferred under this Act. The authority to provide water and sanitation services is exclusively conferred upon Water Services Authorities (WSAs). This encompasses any municipality, including district or rural councils as defined in the Local Government Transition Act, 1993 (Act No. 209 of 1993), responsible for ensuring access to water services. This then points to the fact that not all municipalities have the capabilities or legal authority to provide water and sanitation services.

In support of the argument, Wegelin and Jacobs (2013) contend that municipalities, functioning as water service authorities, bear ultimate accountability for water service delivery and sanitation to consumers, even if they do not directly fulfil the provider function. This underscores the exclusivity of a single water services authority within a specific area to prevent overlap. However, it is crucial to note that the legislative framework allows for the provision of water and sanitation services either internally by the water services authority or through delegation to a water services provider. A water services provider is broadly defined as any entity supplying water services to consumers or another water services institution, excluding water services intermediaries. Importantly, the authority for planning within each Water Service Authority (WSA) remains vested in the WSA itself, not the provider (Water Services Act, 1998 (Act No. 108 of 1998). This then shows that water services are an important service under the custodianship of the WSA, its importance cannot be underscored.

To emphasise the importance of water, Jalisa (2022; and 2023) postulated that the significance of water can be conceptualised through four distinct dimensions. Firstly, water holds paramount importance as a basic human right. Secondly, water is pivotal for driving

1 Water services means both water access and sanitation access, this is according to the Water Services Act.

social and economic development. Thirdly, water is integral to the functioning of the natural ecosystem. Lastly, water plays a critical role in ensuring security. The importance of water transcends any underestimation or exaggeration.

The predicament faced by WSAs in delivering water and sanitation services to communities can be linked to the existence of inadequate planning mechanisms. This deficiency results in WSAs lacking a comprehensive understanding of their operational profile and requirements, thereby hindering their ability to effectively fulfil their mandate. Since the advent of democracy, WSAs have grappled with the challenge of delivering efficient and sustainable water and sanitation services to their communities. Despite recent statistics indicating a slight increase in water access from 91,2% in 2011 to 91.3% in 2022 and the increase of sanitation access from 90.6% in 2011 to 95.1% in 2022[2] (Stats-SA, 2022), achieving universal access to clean water remains an ongoing challenge. The primary water services-related planning tool at the local authority level is the Water Services Development Planning (WSDP) and the processes driving its development. The significance of the WSDP cannot be overstated, as it is a legally sanctioned plan under Sections 12 and 13 of the Water Services Act (No. 108 of 1997). Its primary purpose is to enhance comprehension of the Water and Sanitation Business. Functioning as the principal tool for ensuring the provision and expansion of water services and the allocation of resources for these services, the Water Services Development Plan is indispensable in steering the course of water service delivery. Importantly, the Water Services Act mandates that all Water Services Authorities develop a Water Services Development Plan (WSDP) as an integral component of the municipality's overarching Integrated Development Plan (IDP).

The importance of planning at the municipal level is not only encapsulated in the Water Services Act, but the Municipal Systems Act also compels municipalities to develop the Integrated Development Plans (IDP), which encompasses all plans of the municipality including that of WSDP. Section 26 of the Municipal Systems Act delineates the components of the IDP, a strategic planning tool formulated with community involvement. This document captures the Municipal Council's long-term vision for municipal development, with a specific focus on essential development and internal transformation requirements, as per Section 26(a) of the Municipal Systems Act. Concurrently, this long-term vision and critical development must align with the objectives of local government as outlined in Section 152 of the Constitution (Law Insider, 2021). This will ultimately give WSAs more control over their areas of jurisdiction and will allow for a more efficient level of service delivery.

Both Integrated Development Planning and Water Service Development Planning (WSDP) processes are designed to facilitate meaningful discussions and debates among various stakeholders, including water service authorities, providers, intermediaries, and communities (Masia, 2022; Mukonavanhu, 2022; Ntombela, Masangane, Funke, and Nortje, 2013). These dialogues revolve around identifying water service needs and devising the most efficient and effective means to meet these requirements. It is, therefore, important that the significance of WSDP as an ICT tool should never be understated.

Before 2001, the regulation, management, and implementation of water services, encompassing both water supply and sanitation, rested primarily with the national government, specifically the Department of Water and Sanitation, formerly known as the

2 I have excluded access to sanitation through bucket system since the Department of Water and Sanitation regard this access to sanitation as undignified.

Department of Water Affairs and Forestry (DWAF, 2003; Palmer, Moodley, and Parnell, 2017). The year 2001 marked a pivotal turning point in South Africa's approach to water services provisions. In accordance with constitutional mandates, the responsibility for delivering water services transitioned to local government, while regulatory and monitoring functions remained under the purview of the national government (DWAF, 2003).

This shift in roles and responsibilities necessitated the introduction of the Strategic Framework for Water Services (SFWS). The SFWS presented a comprehensive strategy for delivering water services across the diverse spectrum of settlement types, ranging from small communities to large regional schemes (DWAF, 2003). It outlined the requisite changes in approach to fulfil the constitutional mandate of local government in delivering water services while also aligning with broader policy objectives within the sector.

The Strategic Framework for Water Services (SFWS) holds a significant position within the broader policy framework governing water services in South Africa. The SFWS is the first water services policy framework that presents a robust strategy for the management and planning of water services, and a critical component of addressing the water needs of the South African population. Its inception is rooted in the constitutional framework established by the Republic of South Africa in 1996, which delineated specific fundamental rights regarding water provision. The SFWS, thus, emerges as a response to historical injustices associated with apartheid-era water services and endeavours to redress these issues, incorporating principles of equity and gender equality (DWAF, 2003).

The primary aim of the SFWS was to articulate a vision for the South African water services sector spanning the period from 2003 to 2013. It also provided the framework necessary to translate this vision into reality (DWAF, 2003). The SFWS carried a ten-year strategic horizon, with 2014 earmarked as the year for its comprehensive review. The SFWS encompassed several critical strategic goals, including an institutional framework, a financial framework, a planning framework, national norms and standards, and a regulatory framework. These elements collectively underpinned the robust approach outlined in the SFWS to the provision of water services to the South African population. This framework symbolises a crucial milestone in South Africa's journey toward optimising water service delivery and fostering institutional growth within the evolving landscape of local government.

Empowering Progress: Unveiling Municipal Potential in the Western Cape and Gauteng Provinces through Strategic Self-Assessment

Originating from the American Water Works Association, the Municipal Strategic Self-Assessment (MuSSA) concept was carefully adapted to suit the South African municipal planning landscape (Dlamini, 2018). It is closely aligned with crucial frameworks such as the Integrated Development Plan (IDP), National Treasury (NT) guidelines, the Municipal Benchmarking Initiative, and the Blue and Green Drops Initiative. The MuSSA is an annual review process overseen by the Department of Water and Sanitation since 2006. MuSSA serves as a crucial electronic repository of strategic information, which mirrors the "business health" of the municipal water and sanitation sectors. It plays a pivotal role in pinpointing institutional vulnerabilities that demand immediate attention. This information holds significance not just for the Water Services Authorities (WSAs) and the Department of Water and Sanitation (DWS), but also serves as a guiding tool for strategic sector-driven processes such as planning and resource allocation led by other Departments such as the

Department of Cooperative Governance and Traditional Affairs (CoGTA), National Treasury (NT), and the Department of Planning, Monitoring, and Evaluation (DPME), as well as the South African Local Government Association (SALGA) (DWS, 2019).

WSAs may effectively communicate and control risks within their water and sanitation services by carefully monitoring the MuSSA data and putting into place the appropriate remedial actions. As a result, the DWS and its industry partners are better able to keep an eye on these weaknesses and offer assistance where it is most urgently needed (DWS, 2022).

MuSSA serves a dual purpose; it acts as an internal tool employed at the grassroots level by WSAs within local government. Simultaneously, it functions as a potent performance-monitoring instrument wielded by the DWS and its associated sector partners. Annually, municipal officials engage in a comprehensive assessment of the water and sanitation services' business health within their WSAs. This assessment delves into 18 essential Business Health Attributes[3] as illustrated in Figure 1 below. Post-assessment, WSAs receive a detailed report, illustrating their vulnerability percentage for each attribute and an overarching vulnerability index expressed numerically, as it will be shown in the case study of Western Cape and Gauteng. This report acts as a foundation upon which WSAs can construct a robust Municipal Priority Action Plan, addressing the findings effectively (WRC, 2020). The use of MuSSA can be aligned with the use of ICT tools for more effective information gathering about the challenges faced by the WSAs for monitoring purposes by the national government and other stakeholders.

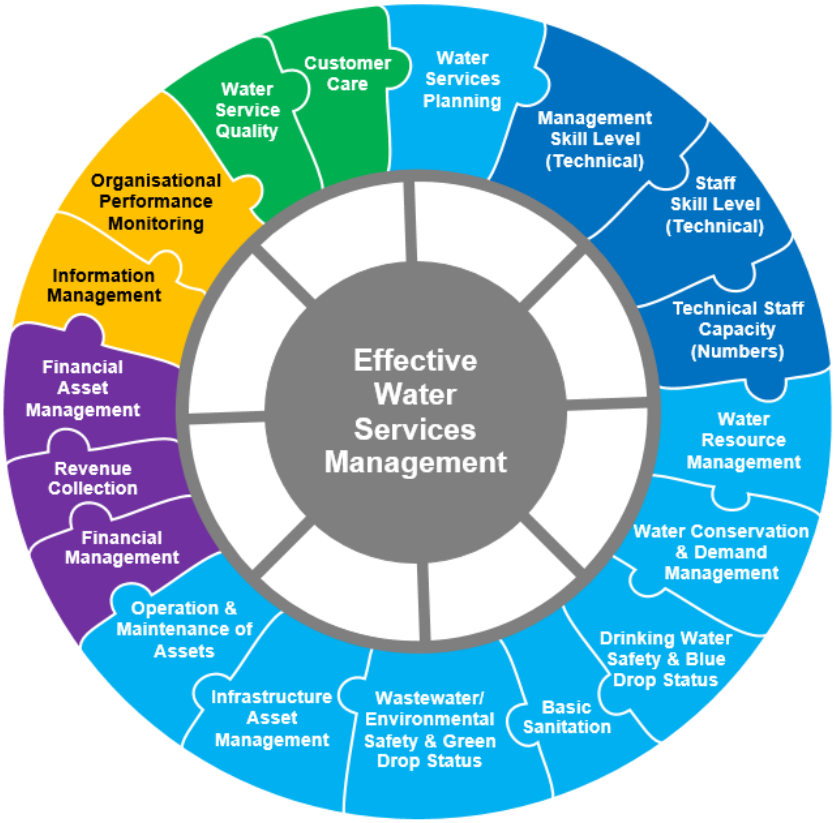

Figure 1: MuSSA Business Health Attributes (DWS, 2018)

3 It is important to note that there is a plan to expand the 18 key functionals to include Faecal Sludge, Policy and Resilience as additional attributes (WRC, 2020)

Cracking the Code: Unveiling Municipal Vulnerability in the Western Cape and Gauteng

The analysis of MuSSA data in the Western Cape province in Figure 2, gives an insight into the vulnerabilities in terms of effective water services management and operational deficiencies of Water Services Authorities (WSAs). Out of the 25 WSAs in the Western Cape only six WSAs namely Witzenberg Local Municipality, Saldanha Bay Local Municipality, Swartland Local Municipality, City of Cape Town, Overstrand Local Municipality and Bitou Local Municipality exhibited a low vulnerability, indicating a Business Health index of less than 25%. Contrary to that, nine WSAs demonstrated a moderate vulnerability, falling between 25% and 50%. Notably, five WSAs, namely Beaufort West Local Municipality, Prince Albert Local Municipality, Kannaland Local Municipality, Swellendam Local Municipality, and Stellenbosch Local Municipality, did not submit their MuSSA reports, accounting for 20% of the total WSAs. This absence of data leaves a gap in the vulnerability assessment for this subset (DWS, 2022).

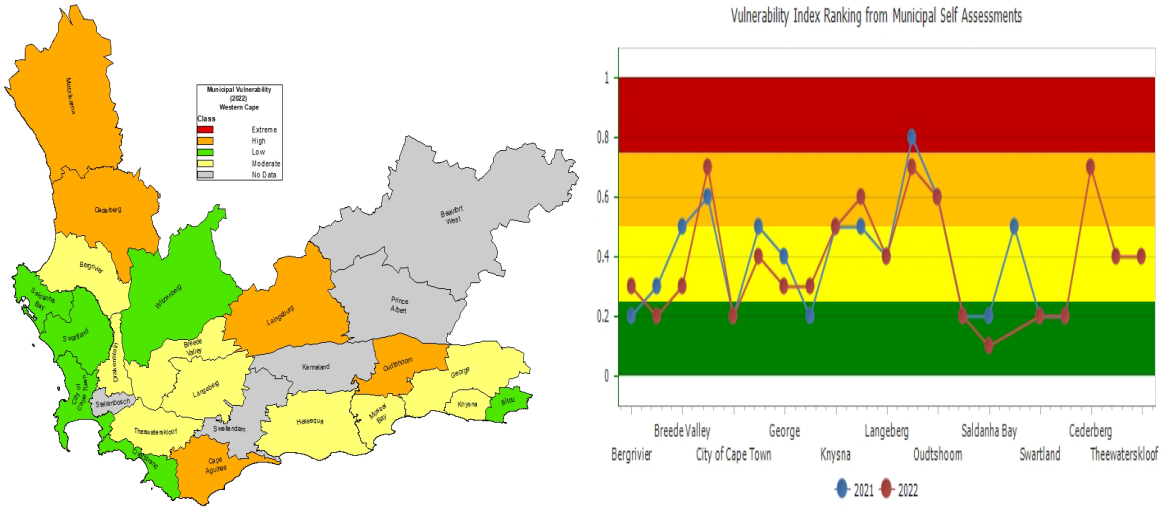

Figure 2: Western Cape MuSSA Report (DWS, 2022)

Upon analysis, of the provincial MuSSA report, 60% of the WSAs in the Western Cape that completed their MuSSA exhibited low to moderate vulnerability in terms of Business Health. However, 20% of the WSAs showed a high vulnerability, highlighting areas of concern within the region's water management systems. Notably, there is a lack of available data for the remaining 20% of WSAs, indicating a knowledge gap that needs to be addressed for a comprehensive understanding of the situation in the 2023 MuSSA (DWS, 2022).

Furthermore, the study identified several operational challenges among the WSAs in the Western Cape. A significant proportion, specifically 64.00%, did not invest adequately in asset renewal, allocating less than 75% of the required investment as a percentage of depreciation costs. Additionally, 64.00% of WSAs reported inappropriate Infrastructure Asset Management Plans, indicating inefficiencies in managing crucial water-related assets (DWS, 2022). This highlights the value of this electronic repository called MuSSA.

Non-revenue water, a key metric indicating distribution system efficiency, was a concern, with 52.00% of WSAs reporting values exceeding 30%, and all WSAs indicating non-revenue water exceeding 20%. Moreover, 44.00% of WSAs reported Water Treatment

Works (WWTW) operating either over capacity or rapidly approaching full capacity, posing potential challenges to water supply and quality (DWS, 2022).

Furthermore, 68.00% of WSAs did not dispose or reuse all their sludge in accordance with license conditions and guidelines, raising environmental concerns and indicating non-compliance with regulatory standards. Lastly, 44.00% of WSAs lacked an approved water resilience policy, which includes optimising existing water resources, diversifying supply to enhance water security, and optimising the overall water mix. This absence underscores the need for strategic planning and policy implementation to bolster the region's water infrastructure and resilience in the face of various challenges (DWS, 2022).

In Gauteng, a total of nine Water Services Authorities (WSAs) operate within the province. The 2022 MuSSA report in Figure 3 revealed that the City of Ekurhuleni is the only city that demonstrated a low vulnerability in terms of Business Health. The City of Johannesburg and Midvaal exhibited a moderate vulnerability, falling between 25% and 50%. While the City of Tshwane, Lesedi Local Municipality, and Merafong City faced high vulnerability of more than 50% but less than 75%. Mogale City and Emfuleni Local Municipality were particularly precarious, marked by an extremely high vulnerability exceeding 75%. This is no surprise since these Municipalities have been failing in their constitutional obligation of providing basic services (DWS, 2022).

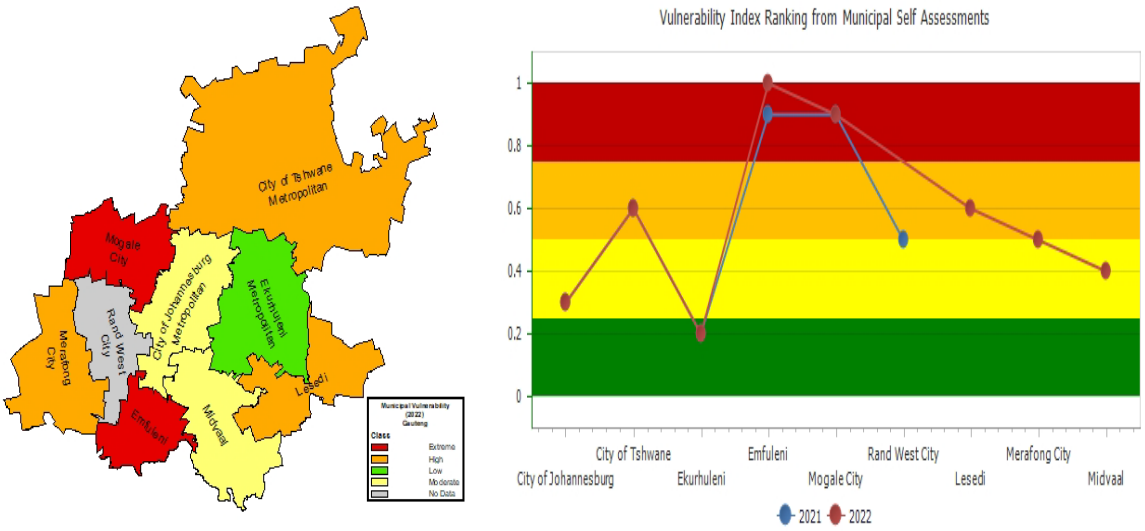

Figure 3: Gauteng MuSSA Report (DWS, 2022)

Several critical issues in the Business Health of the WSAs in the Gauteng province were identified. Firstly, 66.67% of the WSAs lacked an up-to-date and Council-adopted Water Services Development Plan (WSDP), highlighting a deficiency in strategic planning and implementation. Furthermore, 44.44% of the WSAs heavily relied on grant funding for more than 75% of their capital expenditure, indicating financial instability and a significant dependence on external funding sources (DWS, 2022).

Additionally, 77.78% of the WSAs failed to adequately invest in asset renewal, allocating less than 75% of the necessary investment compared to depreciation costs. This shortfall puts immense pressure on the province's water infrastructure, posing a risk to its long-term sustainability and service delivery capabilities. Another pressing concern was that

44.44% of the WSAs reported outstanding debts to major service providers like ESKOM and Water Boards on at least a quarterly basis, indicating a high potential for service disruptions in the province (DWS, 2022).

Moreover, 66.67% of the WSAs reported inappropriate Infrastructure Asset Management Plans, indicating inefficiencies in managing crucial water-related assets. Insufficient funding also impacted sanitation programs, with less than 75% of the required budget allocated. This not only hampers local service delivery but also compromises South Africa's international obligation to provide adequate sanitation services.

Water loss and inefficiencies in the distribution system were highlighted by 88.89% of WSAs reporting non-revenue water exceeding 30%. Furthermore, 66.67% of the WSAs indicated that their Water Treatment Works (WWTW) were either over capacity or rapidly approaching full capacity, with more than 90% of the WWTW exceeding their total design capacity. Such strain on existing infrastructure poses a significant threat to water supply and quality (DWS, 2022).

Additionally, 77.78% of WSAs reported non-compliance with regulations regarding sludge disposal and reuse, raising environmental concerns. The failure to implement required corrective actions and remedial measures identified through water safety planning and wastewater risk abatement planning was a prevalent issue, indicating a lack of responsiveness to identified risks. Lastly, 77.78% of the WSAs did not have an approved water resilience policy in place. Such a policy, including strategies such as optimising existing water resources, diversifying supply to enhance water security, and optimising the overall water mix, is essential for ensuring the region's long-term water sustainability (DWS, 2022).

Discussion

The analysis underscores a pressing need for strategic interventions and targeted programmes and policies to address the vulnerabilities and operational deficiencies within the Western Cape and Gauteng's water management and water services systems. The findings emphasise the urgency in the Western Cape of investment in asset renewal, improvement in infrastructure management, reduction of non-revenue water, and adherence to regulatory standards. Additionally, comprehensive strategic planning, including the development and implementation of water resilience policies, is essential to fortify the province's water infrastructure and enhance its resilience in the face of diverse challenges. Addressing these issues is imperative to ensure sustainable, efficient, and environmentally responsible water services for the residents of the Western Cape. For Gauteng, comprehensive reforms are needed to address the challenges faced by WSAs in Gauteng. Addressing these issues requires strategic planning, financial stability, efficient asset management, and regulatory compliance. Addressing issues related to financial management, strategic planning, infrastructure investment, regulatory compliance, and data reporting is imperative to ensure sustainable, reliable, and equitable water and sanitation services for the province's residents. The findings from Gauteng present an accurate portrayal of the on-ground reality. News reports and official statements from the Department of Water and Sanitation have highlighted the water provision challenges in many parts of Gauteng. The department's recent intervention, implementing water shifting as a temporary measure to stabilise low-storage reservoirs, reflects the urgency of the situation (DWS, 2023). These challenges are further underscored in the MuSSA report, indicating non-revenue water exceeding

30%. This discrepancy places an immense strain on water resources, revealing issues stemming from inadequate infrastructure maintenance and the need to address water losses effectively.

To address the vulnerabilities and operational deficiencies in the water management and services systems of the Western Cape and Gauteng, the strategic integration of Information and Communication Technology (ICT) is important. For the Western Cape, this involves implementing asset management systems powered by ICT for streamlined renewal processes. Utilising tools such as Geographic Information Systems (GIS), and Remote Sensing to enhance infrastructure management, implementing smart metering and sensor technologies for efficient water distribution, employing ICT for automated reporting systems to ensure real-time regulatory compliance, and leveraging data analytics for comprehensive strategic planning and the development of water resilience policies. Similarly, for Gauteng, the integration of ICT systems for financial management, implementation of asset tracking and maintenance systems, utilisation of ICT tools for real-time monitoring and reporting to ensure regulatory compliance, incorporation of data analytics in strategic planning, and establishment of online platforms for collaboration and stakeholder engagement are vital. Embracing ICT in these areas will empower both provinces to enhance water infrastructure resilience, elevate service delivery, and proactively mitigate risks associated with water provision challenges, ultimately ensuring the well-being of residents and fostering sustainable water management for the future (Bhatnagar, 2000). Collaboration between stakeholders enhanced financial management, and rigorous implementation of corrective measures are crucial steps toward resolving these challenges and building a resilient water infrastructure system for the future. Without the immediate corrective measures discussed above, Western Cape and Gauteng's water infrastructure and service delivery capabilities are at significant risk, jeopardizing the well-being of its residents.

Moving Towards Water Planning: Water Services Development Plans 2022-2023 in Western Cape and Gauteng

Currently, as of October 2023, the Water Services Authorities that have started with the development of their WSDPs for the term of 2022 to 2027 are sitting at around 56 out of 144, which is a percentage of 38.8%. Out of the 56 WSAs that have started with the development of their WSDPs, only 26 of them have submitted their WSDPs for comments. A total of 7 WSAs have submitted their WSDPs for council approval. No WSA has incorporated their current WSDP into their IDPS and only 14 WSAs have registered into the DWS online in the WSDPs system. Table 1 and 2, indicate the current status of the WSDPs in the Western Cape and Gauteng Province.

Table 1: Western Cape WSDP Statistics 2022-2023 (DWS, 2023)4

Water Services Development Plan Statistics from 2022-23 Western Cape							
Provinces	**No of Water Services Authorities**	**Name of the Water Services Authorities**	**WSDP Update Annual WSDP Performance and Audit 2022/2023**				
			WSDP 2022-2023[5]	**Submitted to DWS for comments?**	**WSDP adopted by the Council**	**Incorporated into IDP**	**Registered on DWS WSDP online**
WC	25	Beaufort West Local Municipality	No 2022/2023 (15.54%) Red	No	No	No	Yes
		Bergrivier Local Municipality	No 2022/2023 (6.88%) Red	No	No	No	Yes
		Bitou Local Municipality	Yes 2022/2023 (65.64%) Silver	No	No	No	Yes
		Breede Valley Local Municipality	Yes 2022/2023 (76.35%) Silver	No	No	No	Yes
		Cape Agulhas Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Cederberg Local Municipality	No 2022/2023 (8.75%) Red	No	No	No	Yes
		City of Cape Town Metropolitan Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Drakenstein Local Municipality	Yes 2022/2023 (67.96%) Silver	No	No	No	Yes
		George Local Municipality	Yes 2022/2023 (68.71%) Silver	No	No	No	Yes
		Hessequa Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Kannaland Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Knysna Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Laingsburg Local Municipality	No 2022/2023 (3.75%) Red	No	No	No	Yes
		Langeberg Local Municipality	Yes 2022/2023 (65.03%) Silver	No	No	No	Yes
		Matzikama Local Municipality	Yes 2022/2023 (67.40%) Silver	No	No	No	Yes
		Mossel Bay Local Municipality	No 2022/2023 (5.0%) Red	No	No	No	Yes
		Oudtshoorn Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Overstrand Local Municipality	Yes 2022/2023 (72.64%) Silver	No	No	No	Yes
		Prince Albert Local Municipality	Yes 2022/2023 (78.11%) Silver	No	No	No	Yes

4 Data generated on the 21st of October 2023

5 Red is any scored below 50%, Bronze ranges from 50.1% to 64%, Silver, 65%-79% and Gold is anything above 80%.

		Saldanha Bay Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
		Stellenbosch Local Municipality	Yes 2022/2023 (78.46%) Silver	No	No	No	Yes
		Swartland Local Municipality	No 2022/2023 (10.0%) Red	No	No	No	Yes
		Swellendam Local Municipality	No 2022/2023 (2.90%) Red	No	No	No	Yes
		Theewaterskloof Local Municipality	Yes 2022/2023 (69.92%) Silver	No	No	No	Yes
		Witzenberg Local Municipality	No 2022/2023 (0.0%) Red	No	No	No	Yes
TOTAL	**25**		**10**	**0**	**0**	**0**	**25**

Table 2: Gauteng WSDP Statistics (DWS, 2023

Water Services Development Plan Statistics from 2022-2023 Gauteng							
Provinces	**No of Water Services Authorities**	**Name of the Water Services Authorities**	**Annual WSDP Performance and Audit 2022/223**				
			WSDP 2022-2023	**Submitted to DWS for comments?**	**WSDP adopted by the Council**	**Incorporated into IDP**	**Registered on DWS WSDP online**
GP	9	City of Johannesburg Metropolitan Municipality	Yes 2022/2023 (88.49%) Gold	No	No	No	Yes
		City of Tshwane Metropolitan Municipality	No 2022/2023 (12.33%) Red	No	No	No	Yes
		Ekurhuleni Metropolitan Municipality	No 2022/2023 (18.33%) Red	No	No	No	Yes
		Emfuleni Local Municipality	No 2022/2023 (4.33%) Red	No	No	No	Yes
		Lesedi Local Municipality	No2022/2023 (3.85%) Red	No	No	No	Yes
		Merafong City Local Municipality	Yes 2022/2023 (63.04%) Silver	No	No	No	Yes
		Midvaal Local Municipality	No 2022/2023 (3.85%) Red	No	No	No	Yes
		Mogale City Local Municipality	No 2022/2023 (10.67%) Red	No	No	No	Yes
		Rand West City Local Municipality	No 2022/2023 (0%) Red	No	No	No	Yes
TOTAL	**9**		**2**	**0**	**0**	**0**	**9**

The table presents a comparative analysis of the progress in developing Water Services Development Plans (WSDPs) in the provinces of Western Cape and Gauteng. The focus is on the status of WSDP development, adoption by local councils, and registration into the Department of Water and Sanitation (DWS) online in the WSDPs system. Section 14 of the Water Services Act mandates the Water Services Authority (WSA) to develop its Water Services Development Plan (WSDP) with specific requirements. These include the obligation to (a) take reasonable measures to notify consumers, potential consumers, industrial users, and water services institutions within its jurisdiction about the draft WSDP; and (b) solicit public comments[6] within a reasonable timeframe. This process aims to enable communities to contribute their insights and participate in the planning of their municipality before the finalisation of the WSDP.

Western Cape

In the context of the Western Cape province, the data paints a revealing picture. Among the 25 assessed Water Services Authorities (WSAs), only 10 have taken the initial steps toward formulating their Water Service Development Plans (WSDPs). This cautious approach highlights a significant gap, with 15 WSAs still lagging in their planning processes. Adding to the complexity, none of the crafted WSDPs have received official endorsement from the local councils, underscoring a notable delay in formalising strategic water service plans across the province.

This situation becomes even more concerning given the backdrop of the challenges faced by the Western Cape, including water shortages due to drought and the destruction of water infrastructure caused by floods. Without concrete plans to address these issues, the province is exposed to the risk of unsustainable and ineffective water and sanitation services provision.

Gauteng

In contrast, Gauteng has made relatively more progress, with two WSAs having successfully developed their WSDPs. While this number is lower than in the Western Cape, all WSAs in Gauteng have taken the proactive step of registering their plans on the DWS, WSDP online system. However, similar to the situation in the Western Cape, none of the WSDPs in Gauteng have been officially adopted by the respective councils.

Discussion

The delayed development of Water Services Development Plans (WSDPs) in both Western Cape and Gauteng raises significant concerns about the strategic planning and the provision of sustainable water and sanitation services in these provinces. The failure of the WSAs in these provinces to adopt the developed WSDPs underscores a disconnect between strategic planning initiatives and local governance decision-making processes. This lack of adoption creates obstacles in the execution of planned water service improvements, hindering progress and service delivery.

6 Government seeks public input through diverse channels, such as public consultations (imbizo) and written submissions directed to a project manager.

The data presented, highlights a disparity in the proactive approach between Gauteng and Western Cape concerning the online registration of WSDPs. Western Cape and Gauteng's initiative in registering all its WSDPs online is commendable, as it ensures proper monitoring, evaluation, and coordination at the national level. Proper registration not only facilitates central monitoring but also promotes accountability and transparency in water management efforts, laying the foundation for efficient planning mechanisms.

To address these shortcomings, an urgent and accelerated effort is required in both provinces to develop comprehensive WSDPs. The oversight role of the council is important in ensuring accountability and compelling administrators to develop these plans, which should be subsequently incorporated into the Integrated Development Plans (IDPs). This integration ensures that strategic water service plans are not isolated but become integral components of the broader development agenda of each WSA. As depicted in table 1 and 2, both the Western Cape and Gauteng provinces are yet to finalise their WSDPs so that they can be adopted by the council and subsequently incorporated into the IDPs.

Furthermore, the Provincial Department of Cooperative Governance and Traditional Affairs (CoGTA) must strengthen its coordination with the Department of Water and Sanitation (DWS). Collaborative efforts are essential to ensure that all Water Services Authorities (WSAs) register on the DWS online WSDP system. Having a centralised monitoring and evaluation system which has been developed by DWS is commendable and fundamental in promoting transparency and accountability. By embracing online platforms, data accessibility is enhanced, fostering transparency and enabling stakeholders to actively participate in the planning mechanisms. The integration of technology, particularly online platforms, offers a viable solution, ensuring transparency and enabling informed decision-making. By adhering to these recommendations, both provinces can fortify their water service planning frameworks, ensuring sustainable and equitable access to water resources for all residents, thereby promoting the overall welfare and development of the regions.

Enhancing South African Municipalities with Integrated ICT Solutions

In the context of service delivery planning at the municipal level in South Africa, the integration of Information and Communication Technology (ICT) stands as a transformative opportunity, specifically through the development of online Water and Sanitation Development Plans (WSDPs) and the Municipal Strategic Self-Assessment (MuSSA) systems. As shown in this paper these, digital initiatives usher in an era of responsible governance and active citizen participation, fundamentally reshaping the traditional governance landscape.

The integration of ICT, particularly online MuSSA to identify the strategic vulnerability of the WSA and WSDPs, provides a transparent and accessible platform within Water Service Authorities (WSAs) planning processes. This transparency empowers stakeholders and consumers, fostering active participation and equity in municipal planning. Citizens can now review and engage with their municipality's plans, transforming them from passive recipients of services to active contributors in the decision-making process. This paper argues that the comprehensive adoption of the MuSSA system establishes self-assessment as a critical element in water services planning. Through MuSSA, local governments assess their performance, generating detailed reports on WSA business health. This approach not only fosters institutional cooperation but also ensures a high degree of transparency,

providing a basis for constructive dialogue between various stakeholders (Wehmeier and Raaz, 2012).

Scholars such as Douglas, Lennon, and Scott (2017); and Meerow, Pajouhesh, and Miller (2019) have argued that the synergy between technology and planning addresses the nuanced approach in policy and planning integration. A comprehensive policy framework deeply rooted in the embracing of ICT becomes of paramount importance. Policymakers at the local level must actively ensure that ICT becomes an integral tool across all planning processes. This approach ensures a bottom-up methodology, not just in policy development but also in the actual planning processes at the municipal level (Mawela, Ochara, and Twinomurinzi, 2017). By doing so, inclusivity and active community involvement become foundational principles.

In conclusion, it is imperative to integrate ICT into MuSSA and WSDPs in South Africa as this signifies more than just technological adoption. Through effective and inclusive ICT integration, South African municipalities can ensure efficiency, transparency, and equity. This transformative journey not only addresses immediate challenges but also lays the foundation for a sustainable, vibrant, and engaged society (Joseph and William, 2022; Kassongo, Tucker, and Pather, 2018). Furthermore, the MuSSA and WSDP framework offers national and provincial governments an unparalleled opportunity. By actively monitoring local governments and identifying areas for immediate support, these higher levels of governance can proactively contribute to the nation's progress, fostering a more inclusive and responsive governance structure that truly reflects the needs and aspirations of the people.

Conclusion

The paper has demonstrated that the challenges surrounding water and sanitation services in South Africa, as well as globally, are complex, encompassing factors from climate change impacts to institutional deficiencies. Despite legislative efforts, many Water Services Authorities (WSAs) continue to grapple with delivering efficient and sustainable water and sanitation services to their communities. This struggle is rooted in inadequate planning mechanisms, resource mismanagement, and a limited understanding of operational needs within WSAs. This study emphasises the transformative potential of Information and Communication Technology (ICT), particularly the Municipal Strategic Self-Assessment (MuSSA) and Water Service Development Plan (WSDP) in addressing these challenges.

The legislative framework, including the Water Services Act of 1997 and the Municipal Systems Act of 1998, compels WSAs to develop Water Services Development Plans (WSDPs) as integral components of their Integrated Development Plans (IDPs). The paper has shown that in selected provinces only a few WSAs complied with this legislative requirement. The paper also showed that tools like the Municipal Strategic Self-Assessment (MuSSA) offer valuable insights into the health of municipal water and sanitation sectors. Analyses in provinces such as Western Cape and Gauteng reveal vulnerabilities, especially in strategic planning, financial stability, asset management, and regulatory compliance. Addressing these vulnerabilities necessitates a synergistic approach that combines planning and ICT. By harnessing ICT tools effectively, WSAs can enhance their planning, decision-making, and performance monitoring processes (Kassongo et al. 2018; Shava and Vyas-Doorgapersad, 2021). The integration of MuSSA data, WSDP, and ICT can enable real-time monitoring, predictive analysis, and informed decision-making, leading to more efficient resource

allocation, improved asset management, and enhanced service delivery (Muralidhara, 2017; Nova, 2023; Sheng, Amankwah-Amoah, Khan, and Wang, 2021). Moreover, fostering a culture of data-driven decision-making within WSAs is paramount to achieving sustainable water and sanitation services.

Bridging the gap between policy intent and on-ground implementation requires a paradigm shift. Embracing ICT, especially when integrated with existing planning frameworks, presents a transformative opportunity. Investment in advanced technological solutions, inter-departmental collaborations, and ensuring data accuracy and accessibility empowers WSAs to navigate the complexities of water and sanitation service provision effectively (Brynskov, 2022; Morabito, 2015). This approach enhances water infrastructure resilience and moves South Africa closer to its goal of providing universal access to clean water. Access to clean water, a fundamental human right, is essential for the well-being and development of its citizens. Collaborative efforts, transparent data sharing, and ICT integration are vital steps toward establishing a responsive, inclusive, and sustainable water service planning framework (Joseph and Williams, 2022). The integration of ICT into the planning process is positioned not as an end in itself, but as a broader societal objective of WSAs. This transformative approach not only addresses immediate challenges but also shapes a future where efficient, transparent, and equitable water services become fundamental pillars of community well-being and national progress. For all this to happen, the paper therefore, recommends that the voluntary self-assessment tool called MuSSA should be made mandatory and DWS can enforce this by coming up with regulations that will indicate that any WSA that fails to complete their MuSSA will not get any funding from the Department same as the MuSSA and WSDP. Most of the blame is put on the local government for non-performance, but also the national government should take responsibility for not ensuring that they compel the local government to perform using either carrot or stick measures. In the space of policy and decision-making within provincial spheres, there exists a pressing need for the DWS to delve into methods of consolidating and generating comprehensive provincial WSDP reports. These reports serve as invaluable snippets, offering provincial departments a clear window into their strategies and objectives. By doing so, not only does this streamline the allocation of resources, but it also provides a cohesive framework, enabling seamless coordination among various departments involved in the crucial task of providing water and sanitation services.

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