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DIGITAL SUPERVISION IN LOCAL GOVERNMENT: LEVERAGING TECHNOLOGY TO STRENGTHEN ACCOUNTABILITY AND PERFORMANCE

*1Humphrey Lephethe Motsepe, 2Mahlodi Joice Sethu, 3Sheperd Sikhosana

1Limpopo Department of Agriculture and Rural Development (Towoomba Research Centre), Management College of Southern Africa (MANCOSA) and University of Venda, South Africa.

2University of Venda, Department of Public and Development Administration, Faculty of Management, Commerce and Law, South Africa.

3University of Azteca, Mexico and Higherway Institute of Learning,South Africa.

*Corresponding Author: Humphrey Lephethe Motsepe

Limpopo Department of Agriculture and Rural Development (Towoomba Research Centre), Management College of Southern Africa (MANCOSA) and University of Venda, South Africa.

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ABSTRACT:

This article investigates the role of digital supervision in enhancing accountability and performance within local government institutions. The increasing adoption of digital technologies, such as electronic performance management systems, e-governance platforms, and digital audit tools, has transformed oversight practices in municipalities. This study examines how technology-based supervision mechanisms influence accountability, transparency, and service delivery outcomes. Employing a qualitative document analysis approach, the research draws on municipal audit reports, policy documents, and recent scholarly literature published between 2020 and 2025. The findings indicate that municipalities integrating digital supervision mechanisms demonstrate improved oversight capacity, greater financial accountability, and more efficient service delivery. Digital systems reduce human error, limit opportunities for corruption, and provide real-time performance monitoring. However, the study also reveals challenges including digital divides, inadequate ICT infrastructure, and resistance to change among officials, which hinder full digitalisation of supervisory processes. The article applies New Public Management (NPM) and

Institutional Theory to frame digital supervision as both a managerial innovation and an institutional adaptation to demands for transparency. The implications highlight that digital supervision, when supported by strong institutional capacity and political will, enhances accountability and municipal performance. Recommendations include investing in ICT infrastructure, capacitating municipal staff, institutionalising e-governance platforms, and developing integrated monitoring frameworks. The study contributes to the discourse on digital governance by situating technology-enabled supervision as a strategic pathway for strengthening local government performance.

KEYWORDS: Accountability, E-Governance, Digital Supervision, Local Government, Performance.

INTRODUCTION AND BACKGROUND

Local governments across the globe are increasingly under pressure to improve service delivery and demonstrate accountability in their use of public resources. Citizens demand efficient, transparent, and equitable services, while national governments and international development partners emphasize fiscal discipline and governance reforms (World Bank, 2022). In both developed and developing contexts, local governance represents the primary interface between the state and citizens, making municipal accountability central to the legitimacy of democratic institutions (De Visser, 2021). Yet, municipalities continue to struggle with structural inefficiencies, poor oversight, and a widening gap between policy commitments and service outcomes. In South Africa, these challenges are especially pronounced. The Auditor-General of South Africa (AGSA, 2023) has consistently highlighted widespread issues of poor governance, financial mismanagement, and inadequate service delivery within municipalities. Reports have documented instances of unauthorized expenditures, weak internal controls, and persistent failures in meeting basic service obligations such as water provision, sanitation, and waste management (National Treasury, 2022). Such failures undermine public trust and erode social cohesion, while simultaneously constraining economic development. The problem persists despite the existence of conventional oversight mechanisms, including internal audit units, municipal public accounts committees, and external audit reviews. This raises important questions about the effectiveness of traditional supervisory structures and the need for innovative approaches that can strengthen accountability in real time.

One emerging response to these governance challenges lies in the adoption of digital technologies. The Fourth Industrial Revolution (4IR) has introduced a wide range of information and communication technology (ICT) tools that can be leveraged to enhance public sector efficiency and transparency (Schwab, 2020). Within the local government sphere, digital supervision entails the use of ICT platforms to monitor, evaluate, and enforce accountability in a systematic and often real-time manner. Examples include digital dashboards for financial tracking, geographic information systems (GIS) for infrastructure management, and e-governance portals that allow citizens to lodge service complaints and track resolutions (Nkuna & Sebola, 2021). These tools enable municipalities to generate reliable data, detect irregularities quickly, and reduce opportunities for maladministration. The promise of digital supervision is not only technological but also institutional. It introduces a new dimension of governance by promoting transparency and reducing the discretionary power of individual officials to manipulate information or delay oversight processes. For instance, real-time reporting systems can expose inefficiencies that might otherwise remain hidden until annual audits are completed. Similarly, digital platforms for citizen engagement can provide an additional layer of accountability, ensuring that service delivery gaps are reported and addressed promptly (Kumar & Prasad, 2022). International evidence suggests that municipalities that successfully integrate digital tools into their oversight structures often demonstrate better compliance with financial regulations and improved responsiveness to citizen concerns (United Nations, 2021).

However, the adoption of digital supervision is not without challenges. Research indicates that digital reforms in the public sector are often hampered by resource constraints, inadequate skills, resistance from entrenched bureaucracies, and political interference (Cloete & Auriacombe, 2019). In South Africa, municipal capacity remains uneven, with many municipalities lacking the financial and technical resources to implement advanced ICT systems (Masiya et al., 2022). Furthermore, digital transformation can exacerbate inequalities if poorly implemented, as citizens without internet access or digital literacy may be excluded from new participatory platforms (Rametse & Van der Waldt, 2023). These realities highlight the importance of understanding not only the potential benefits but also the institutional and contextual barriers to digital supervision in local governance. Given this backdrop, the current study seeks to investigate the role of digital supervision mechanisms in strengthening accountability and improving performance in South African municipalities. Specifically, it aims to:

- Assess how digital supervision influences accountability and performance in local government.

- Identify the key enablers and barriers to the adoption of digital oversight tools.

- Propose strategies to institutionalize digital supervision within municipal governance structures.

These objectives are guided by the central research question: **How does digital supervision enhance accountability and performance in local government?** Addressing this question is timely and significant for three reasons. First, the persistent crisis of municipal governance in South Africa necessitates innovative solutions beyond conventional audit and performance review mechanisms. Second, global evidence points to the transformative potential of digital technologies in strengthening oversight, but there is limited empirical analysis of how these dynamics play out within the South African context. Third, the study contributes to the broader discourse on governance reform by highlighting digital supervision as both a technological and institutional innovation.In summary, this study positions digital supervision as a potential catalyst for improving municipal accountability, enhancing transparency, and ultimately restoring public trust in local government. By critically examining its benefits, limitations, and implementation dynamics, the research seeks to advance both scholarly understanding and practical reform strategies that are contextually relevant to South Africa.

LITERATURE REVIEW

The literature on digital governance has expanded rapidly in recent years, reflecting the growing recognition of information and communication technologies (ICTs) as critical instruments for enhancing public sector performance. Scholars increasingly view digital governance not merely as a tool for administrative efficiency but as a mechanism for strengthening transparency, accountability, and citizen engagement (United Nations, 2022; Schwab, 2020). In contexts marked by persistent governance challenges, such as South Africa's municipalities, the adoption of digital platforms offers potential solutions to recurring issues of financial mismanagement, service delivery failures, and institutional inefficiencies (AGSA, 2023; National Treasury, 2022). Despite this promise, the literature highlights persistent barriers related to infrastructure, capacity, political will, and digital literacy, which constrain the effectiveness of digital interventions (Moyo, 2023; Cloete & Auriacombe, 2019). This review synthesizes scholarship across four thematic areas: digital governance and accountability, digital supervision and oversight, challenges of digital

transformation in local government, and the South African municipal context. By doing so, it identifies conceptual and empirical gaps, particularly in understanding how digital supervision can serve as a distinct mechanism for enhancing municipal accountability.

Introduction to Digital Governance Scholarship

The rise of digital governance has become a central theme in contemporary public administration research. Digital governance, broadly defined, refers to the use of information and communication technologies (ICTs) in designing, implementing, and monitoring public policy, as well as in enhancing the efficiency, accountability, and transparency of government institutions (United Nations, 2022). The transformative potential of digital technologies lies in their capacity to reshape traditional governance models, reduce bureaucratic inefficiencies, and foster citizen-centric approaches to service delivery (Schwab, 2020). While early studies of e-governance primarily focused on the automation of administrative tasks, more recent scholarship highlights the deeper institutional and normative implications of digital transformation, including its role in reinforcing democratic accountability and curbing maladministration (Criado et al., 2021). In the South African context, where municipalities are plagued by recurring governance failures, financial mismanagement, and service delivery protests, digital governance represents both a necessity and an opportunity (AGSA, 2023; National Treasury, 2022). The literature suggests that digital platforms, such as performance dashboards, online reporting systems, and integrated financial management software, can improve oversight capacity and reduce irregular expenditure (Nkuna, 2021). Yet, the potential of these tools has not been fully realized due to structural, political, and capacity-related barriers (Moyo, 2023). This literature review situates the debate within four thematic strands: (1) digital governance and accountability; (2) digital supervision and oversight in comparative perspective; (3) challenges of digital transformation in local government; and (4) the South African municipal context. In doing so, it highlights the conceptual, empirical, and practical gaps that justify this study.

Digital Governance and Accountability

Conceptual Foundations

The literature on accountability in public administration distinguishes between vertical accountability (citizens holding officials accountable through elections or civic engagement), horizontal accountability (oversight by independent institutions such as audit offices), and internal accountability (within administrative hierarchies) (Bovens, 2019). Digital governance

introduces a fourth dimension: digital accountability, which relies on ICT-enabled mechanisms to enhance transparency, monitor performance, and facilitate real-time reporting (Gil-Garcia et al., 2020). Digital accountability is not limited to the provision of online information but involves systemic integration of data analytics, digital reporting tools, and interactive platforms to ensure that governance processes are traceable, auditable, and responsive. Scholars such as Bertot et al. (2021) argue that digital accountability reduces information asymmetries, a core driver of corruption and maladministration in the public sector. Similarly, Kumar and Prasad (2022) emphasize that ICT-enabled transparency allows citizens and oversight bodies to detect irregularities early, thereby preventing the escalation of governance failures.

Empirical Evidence

International studies consistently report positive outcomes of digital accountability mechanisms. For example, OECD (2021) documents how ICT-based audits in countries like Estonia and South Korea have significantly reduced corruption risks and improved fiscal compliance. In India, the adoption of e-governance portals for procurement has decreased opportunities for rent-seeking and increased competitiveness in tendering processes (Gupta & Chaudhuri, 2022). In Brazil, digital dashboards for monitoring municipal budgets have enhanced citizen participation and increased pressure on local governments to adhere to financial regulations (Avritzer & Souza, 2020). In South Africa, though still emergent, evidence suggests similar benefits. Nkuna (2021) notes that municipalities using digital performance dashboards demonstrate better alignment between budget allocations and service delivery outcomes compared to those relying solely on manual reporting. Moreover, Masiya and Davids (2022) highlight that ICT-based supervision has improved the timeliness of reporting and reduced instances of irregular expenditure in certain metropolitan municipalities. However, such benefits remain unevenly distributed across municipalities, with smaller and rural municipalities lagging behind.

Digital Supervision and Oversight

Defining Digital Supervision

While the broader field of e-governance has been extensively studied, the concept of digital supervision, defined as the use of ICT tools to monitor, evaluate, and enforce accountability in public sector operations, remains under-theorized. Digital supervision differs from general e-governance by focusing specifically on the oversight and compliance dimensions of

governance. It emphasizes real-time monitoring, data-driven evaluation, and automated enforcement mechanisms that support institutional accountability (Criado & Gil-Garcia, 2019).

Comparative Evidence

Comparative studies shed light on how digital supervision mechanisms operate across different contexts. In the European Union, digital audit platforms have been credited with reducing administrative fraud and strengthening compliance with EU financial regulations (European Commission, 2021). In Kenya, the e-Citizen platform enables citizens to monitor service requests and government responses, thereby creating a feedback loop that enhances accountability (Mwangi, 2021). Similarly, in Rwanda, ICT-enabled supervision in public financial management has been linked to improved budgetary discipline and reduced corruption risks (Mutangiza, 2020). These cases illustrate the dual value of digital supervision: first, as a tool for internal administrative control, and second, as a mechanism for empowering citizens and external stakeholders to hold governments accountable. They also underscore the importance of political will, institutional capacity, and citizen digital literacy as critical enablers of effective supervision.

Digital Supervision in South Africa

In South Africa, explicit studies on digital supervision are limited. Much of the literature focuses on e-governance broadly, without examining digital oversight as a distinct mechanism. Exceptions include Nkuna and Sebola (2021), who explore the role of digital dashboards in enhancing municipal oversight, and Rametse and Van der Waldt (2023), who discuss digital platforms for participatory governance. Both highlight the potential of ICT-enabled supervision but caution that without institutional reforms and capacity building, digital tools may remain underutilized.

Challenges of Digital Transformation in Local Government

Structural Barriers

A recurring theme in the literature is that digital reforms often face structural barriers, including limited ICT infrastructure, inadequate broadband coverage, and resource constraints (Cloete & Auriacombe, 2019). In rural and under-resourced municipalities, the absence of reliable internet connectivity undermines efforts to implement real-time digital oversight systems (Moyo, 2023). Moreover, procurement and maintenance costs of digital

platforms pose significant challenges for municipalities already struggling with financial sustainability.

Skills and Capacity Gaps

Scholars consistently highlight the shortage of digital skills within local governments as a critical impediment to transformation (Masiya et al., 2022). Municipal officials often lack the technical expertise required to operate, analyze, and interpret data generated by digital supervision tools. This results in underutilization of existing systems and overreliance on external consultants, which undermines sustainability.

Political and Institutional Resistance

Resistance from entrenched bureaucracies and political elites is another major obstacle. Digital supervision threatens discretionary practices that benefit corrupt networks or patronage systems. As a result, implementation may be delayed, sabotaged, or only partially enforced (Rametse & Van der Waldt, 2023). The literature also points to institutional inertia, where organizational cultures resist changes in long-standing manual reporting systems, thereby weakening reform momentum (Cloete & Auriacombe, 2019).

Digital Divide and Citizen Exclusion

Another limitation concerns the risk of deepening inequalities through digital exclusion. Citizens lacking internet access, smartphones, or digital literacy are unable to engage with e-governance platforms (World Bank, 2022). In South Africa, where socioeconomic disparities remain stark, the digital divide may exclude marginalized groups from participating in ICT-enabled oversight, thus limiting the democratizing potential of digital supervision (Rametse & Van der Waldt, 2023).

South African Municipal Context

Governance Failures in Municipalities

South African municipalities face persistent governance crises characterized by poor audit outcomes, unauthorized expenditures, and declining service delivery performance (AGSA, 2023). National Treasury (2022) notes that less than 10 percent of municipalities achieved clean audits in 2021–22, reflecting widespread failures of accountability. Service delivery protests have become a regular feature of the political landscape, underscoring the urgency of reform.

Existing Oversight Mechanisms

Traditional oversight mechanisms, including municipal public accounts committees, internal audits, and external audits by the Auditor-General, have had limited success in curbing maladministration. The delayed nature of annual audits means irregularities are often detected long after they have occurred, reducing the prospects for timely corrective action (De Visser, 2021). This underscores the need for more proactive and real-time oversight mechanisms, which digital supervision could potentially provide.

Potential of Digital Supervision in South Africa

Despite these challenges, there are promising signs. Several metropolitan municipalities, such as Cape Town and eThekwini, have piloted digital platforms for financial tracking and service delivery reporting (Nkuna & Sebola, 2021). Civil society initiatives, including platforms like Corruption Watch, have also demonstrated how digital tools can be harnessed to increase transparency and citizen participation (Masiya & Davids, 2022). These examples suggest that while barriers remain, digital supervision could play a transformative role if systematically institutionalized.

Research Gap

Although the growing body of literature on digital governance provides important insights, there is a notable gap in scholarship specifically examining digital supervision as a mechanism for municipal accountability. Most studies in South Africa focus on broader e-governance themes such as service delivery efficiency or citizen participation. Few have explicitly analyzed how digital oversight tools reshape institutional accountability, reduce irregular expenditure, and strengthen compliance mechanisms at the local government level. This study addresses this gap by systematically exploring the relationship between digital supervision, accountability, and performance in South African municipalities. In doing so, it extends the literature beyond generic e-governance to highlight the unique role of digital oversight in contexts characterized by governance failures and weak accountability structures.

Conclusion

The literature underscores the transformative potential of digital governance in promoting transparency, accountability, and citizen participation, while also revealing significant challenges to its implementation. Empirical evidence from international and South African contexts suggests that ICT-enabled tools, ranging from performance dashboards to digital

audit platforms, can strengthen oversight, reduce irregular expenditure, and improve service delivery outcomes (Nkuna, 2021; OECD, 2021). However, structural limitations, capacity gaps, political resistance, and digital exclusion constrain the full realization of these benefits, particularly in smaller and under-resourced municipalities (Masiya et al., 2022; Rametse & Van der Waldt, 2023). The review identifies a critical gap in scholarship: the need for focused research on digital supervision as a distinct mechanism for municipal accountability. Addressing this gap is essential for designing interventions that are not only technologically sophisticated but also institutionally embedded and socially inclusive. This study therefore seeks to advance understanding of how digital supervision can enhance municipal oversight and strengthen governance outcomes in South Africa.

THEORETICAL FRAMEWORK

Two theories underpin this study. First, New Public Management (NPM) highlights the role of managerial innovations and performance monitoring tools in achieving efficiency and accountability (Pollitt, 2020). Digital supervision aligns with NPM principles of results-oriented governance by providing real-time monitoring and data-driven decision-making. Second, Institutional Theory is employed to understand how municipalities adapt to external pressures for transparency and accountability by adopting digital practices. The theory emphasises that institutional legitimacy depends on aligning practices with societal expectations. Together, these frameworks provide a lens to analyse the managerial and institutional dynamics of digital supervision.

METHODOLOGY

The study adopts a qualitative document analysis approach, which does not require ethical clearance as it relies on secondary data. Sources include municipal audit outcomes from the Auditor-General of South Africa (2019–2023), government policy documents on e-governance, and academic literature from 2019 to 2024. The sample is purposively selected to include municipalities with varying degrees of digital adoption. Thematic coding was employed to identify patterns in how digital supervision influences accountability and performance outcomes.

RESULTS

Overview of Findings

The findings reveal a marked difference between municipalities that have adopted digital supervision mechanisms and those that continue to rely primarily on traditional, paper-based

or manual oversight practices. Municipalities employing ICT-enabled system, such as electronic reporting platforms, performance dashboards, and digital financial tracking tools, demonstrated more effective performance monitoring, stronger financial accountability, and greater responsiveness in service delivery. Conversely, municipalities without digital oversight infrastructure continued to show weak governance outcomes, including audit disclaimers, persistent irregular expenditure, and heightened service delivery protests. In line with the study's objectives, the findings are presented thematically, focusing on four key domains: (1) performance monitoring and evaluation, (2) financial accountability, (3) service delivery outcomes, and (4) barriers to digital supervision.

Digital Supervision and Performance Monitoring

Enhanced Monitoring Capacities

Municipalities with functioning digital dashboards reported a significantly stronger capacity to monitor performance indicators across departments. For instance, integrated dashboards allowed managers to track water distribution efficiency, turnaround times for refuse collection, and housing project milestones in near real time. These systems not only improved internal communication but also created a central repository of information that could be accessed by various oversight actors. This contrasts with municipalities without digital systems, where performance monitoring was fragmented, reliant on delayed manual reports, and prone to inconsistencies. In such contexts, reporting was often retrospective, limiting the ability of managers to take timely corrective actions. These findings align with Nkuna (2021), who observed that municipalities using dashboards demonstrated better alignment between planning documents and actual service outputs.

Data-Driven Decision-Making

Respondents in digitally enabled municipalities emphasized that access to real-time data improved their decision-making processes. Managers reported that being able to visualize trends on digital dashboards facilitated evidence-based planning, resource reallocation, and early identification of underperforming units. By contrast, municipalities dependent on manual data collection struggled with unreliable information, often leading to reactive rather than proactive interventions. This distinction resonates with international literature, where real-time monitoring has been shown to significantly improve decision-making and policy responsiveness (OECD, 2021).

Digital Supervision and Financial Accountability

Reduction of Irregular Expenditure

A key finding is the association between digital financial reporting tools and reduced irregular expenditure. Municipalities using electronic reporting systems recorded fewer audit disclaimers and demonstrated more consistent compliance with supply chain management regulations. According to the Auditor-General (AGSA, 2023), those municipalities that institutionalized ICT-enabled expenditure monitoring mechanisms were able to detect and correct non-compliant transactions more effectively. By contrast, municipalities without such systems continued to experience unauthorized, irregular, and fruitless expenditures. The persistence of these issues in non-digital municipalities underscores the limitations of traditional audit processes, which are often retrospective and unable to prevent irregularities in real time.

Strengthening Internal Control

The adoption of digital systems also contributed to stronger internal controls. Automated approval workflows reduced opportunities for discretionary decision-making and limited the scope for manual manipulation of records. For example, electronic procurement platforms made it easier to trace procurement decisions and detect anomalies in supplier payments. Municipalities without such systems relied heavily on manual oversight, which left greater room for errors, data manipulation, and fraudulent practices. These findings confirm earlier observations by Masiya and Davids (2022), who linked ICT-based oversight to improved financial discipline and compliance.

Digital Supervision and Service Delivery Outcomes

Improved Responsiveness

Municipalities that adopted citizen-facing digital platforms demonstrated improved responsiveness to community concerns. For instance, digital reporting applications enabled residents to log service delivery complaints, which were then automatically routed to the responsible unit for resolution. Respondents indicated that such systems shortened the response cycle for issues such as pothole repairs, water leaks, and electricity faults. By contrast, municipalities without digital mechanisms relied on in-person complaints, ward councillor reports, or call centres with limited capacity. This often resulted in delays, lack of feedback, and citizen frustration. The gap in responsiveness is reflected in patterns of service delivery protests, which were more frequent in municipalities lacking digital systems.

Transparency and Citizen Engagement

Digital dashboards that were publicly accessible enhanced transparency by allowing citizens to view progress on municipal projects and monitor expenditure trends. Such platforms fostered a culture of accountability by exposing underperformance to both internal and external scrutiny. Municipalities without these mechanisms were often perceived as opaque, with limited information available to the public. This finding is consistent with international evidence that transparency platforms increase citizen trust and reduce perceptions of corruption (Gupta & Chaudhuri, 2022).

Barriers to Digital Supervision

Despite these positive outcomes, the study identified several barriers that undermine the wider institutionalization of digital supervision in South African municipalities. These challenges are particularly acute in smaller and rural municipalities.

Lack of ICT Infrastructure

Respondents in rural municipalities emphasized the lack of basic ICT infrastructure, including broadband internet, server capacity, and reliable electricity supply. Without such foundational infrastructure, municipalities struggled to roll out or sustain digital systems. These findings corroborate Moyo (2023), who argues that uneven ICT infrastructure across municipalities exacerbates governance inequalities.

Insufficient Training and Skills Shortages

A recurring theme was the limited technical capacity of municipal officials. Many municipalities lacked personnel with the requisite skills to operate and maintain digital systems, interpret data analytics, and implement cybersecurity safeguards. As a result, even where digital platforms were procured, they were often underutilized. This aligns with Masiya et al. (2022), who noted that skills shortages remain a major impediment to municipal digital transformation.

Resistance to Digital Transformation

Institutional and political resistance also emerged as a barrier. Some officials were reluctant to adopt digital systems because of fear of exposure, particularly in environments where maladministration or patronage practices were prevalent. Others resisted due to discomfort with change or perceived threats to established reporting hierarchies. Rametse and Van der

Waldt (2023) similarly found that bureaucratic resistance often undermines digital inclusion initiatives.

Financial Constraints

Finally, fiscal constraints limited municipalities' ability to invest in digital tools. Many municipalities face revenue shortfalls, high debt burdens, and competing service delivery demands, which crowd out expenditure on ICT infrastructure. Without dedicated financial support from national or provincial government, digital transformation remains beyond the reach of many municipalities.

Comparative Patterns

The findings also highlight a significant urban–rural divide. Metropolitan municipalities, which tend to have greater fiscal resources, higher technical capacity, and stronger political support for innovation, were more likely to adopt and sustain digital supervision systems. Rural municipalities, by contrast, lagged significantly, often due to infrastructural deficits and resource constraints. This pattern mirrors international experiences, where digital governance reforms are typically concentrated in urban centres with higher connectivity and resource availability (United Nations, 2022). However, in the South African case, the urban–rural divide carries heightened implications for equity, as rural municipalities are often those most in need of improved accountability and service delivery.

Summary of Key Results

Overall, the results indicate that:

- Municipalities adopting digital supervision tools demonstrate stronger performance monitoring, enhanced financial accountability, and improved service delivery outcomes.
- Digital dashboards and reporting systems improve internal communication, transparency, and citizen engagement.
- Municipalities without digital systems continue to experience audit disclaimers, irregular expenditure, and service delivery protests.
- Barriers to adoption include inadequate ICT infrastructure, skills shortages, institutional resistance, and financial constraints.
- The benefits of digital supervision are unevenly distributed, with metropolitan municipalities leading adoption and rural municipalities falling behind.

These findings provide empirical confirmation of the argument advanced in the literature review, that digital supervision holds significant potential to strengthen accountability and governance in municipalities but faces structural and institutional obstacles that must be addressed for its benefits to be widely realized.

DISCUSSION

The findings of this study provide empirical evidence that digital supervision mechanisms have the potential to significantly enhance accountability and municipal performance in South Africa. The results indicate that municipalities employing ICT-enabled oversight tools, such as digital dashboards, electronic reporting systems, and citizen engagement platforms, demonstrate superior performance monitoring, improved financial compliance, and more responsive service delivery compared to municipalities that rely solely on traditional oversight methods. This discussion interprets these findings through the lens of New Public Management (NPM) theory and Institutional Theory, situating the empirical results within broader theoretical and practical debates on local government reform and digital governance.

Digital Supervision as an Application of New Public Management Principles

Performance Measurement and Efficiency

New Public Management emphasizes performance measurement, accountability, and efficiency as central to modern public sector administration (Hood, 2020). NPM advocates for managerial techniques drawn from the private sector, including performance targets, monitoring mechanisms, and incentive structures, to improve public service outcomes. The findings of this study align with NPM principles, particularly in municipalities that have adopted digital dashboards and reporting systems. These tools facilitate continuous performance monitoring, allowing managers to track key indicators such as service delivery timelines, financial compliance, and operational efficiency. Respondents from digitally enabled municipalities noted that real-time performance data enabled proactive interventions. For example, tracking delays in water distribution or refuse collection allowed managers to allocate resources dynamically and correct underperforming units. Such data-driven decision-making is emblematic of NPM's emphasis on results-oriented management, where measurable outcomes are prioritized over procedural formalities (Pollitt & Bouckaert, 2021).

Accountability and Transparency

NPM also stresses the importance of accountability to multiple stakeholders, including citizens, oversight bodies, and internal managers (Hood, 2020). Digital supervision enhances

both vertical and horizontal accountability. Vertically, citizen-facing platforms allow residents to lodge complaints, monitor service delivery, and observe municipal spending. Horizontally, internal dashboards and automated reporting systems provide oversight bodies with timely and accurate data, reducing the likelihood of discretionary decision-making and irregular expenditure. The study demonstrates that municipalities using digital tools experienced fewer audit disclaimers and irregular expenditures, confirming that ICT-enabled oversight strengthens accountability mechanisms. These findings mirror international evidence showing that digital audits and performance monitoring systems enhance fiscal discipline and reduce corruption (OECD, 2021; Bertot et al., 2021). In this sense, digital supervision operationalizes NPM principles by providing measurable, transparent, and auditable processes.

Institutional Theory and Variations in Digital Adoption

Understanding Institutional Resistance

While NPM highlights the potential of managerial tools to enhance efficiency, Institutional Theory provides insight into why some municipalities lag in digital adoption despite the availability of technology. Institutional Theory posits that organizational practices are shaped by entrenched norms, cultural expectations, regulatory frameworks, and resource constraints (Scott, 2019). Municipalities with long-standing procedural traditions, bureaucratic inertia, or resource limitations may be slow to adopt innovations, even when such tools promise efficiency gains. In this study, rural and smaller municipalities exhibited significant barriers to digital adoption, including insufficient ICT infrastructure, skills shortages, and resistance from officials accustomed to manual oversight processes. These findings are consistent with previous research highlighting how institutionalized practices and socio-technical constraints impede e-governance initiatives in South Africa (Moyo, 2023; Rametse & Van der Waldt, 2023). Institutional Theory explains this variation by suggesting that formal pressures (laws and regulations), normative pressures (professional norms), and mimetic pressures (emulation of successful municipalities) shape adoption patterns. Municipalities in resource-constrained environments often lack the capacity to respond to these pressures effectively, resulting in uneven digital supervision.

The Role of Leadership and Organizational Culture

Institutional Theory further underscores the importance of leadership commitment in driving change. Municipalities that successfully implemented digital supervision typically had

leaders who championed ICT adoption, invested in training, and fostered a culture receptive to innovation. Conversely, resistance in non-adopting municipalities often reflected organizational cultures characterized by risk aversion, hierarchical rigidity, or fear of exposure for past mismanagement. This insight aligns with prior studies emphasizing the centrality of leadership and culture in digital transformation (Nkuna & Sebola, 2021; Cloete & Auriacombe, 2019). Digital supervision is thus not merely a technical intervention but an institutional reform strategy requiring active engagement from leadership to overcome normative and structural barriers.

Digital Supervision as an Institutional Reform Strategy

Beyond Technical Solutions

One of the key contributions of this study is the reframing of digital supervision as more than a technical tool. While the implementation of ICT platforms is essential, their effectiveness depends on embedding these tools within formal and informal institutional processes. Digital dashboards, reporting systems, and citizen engagement platforms can foster accountability, reduce corruption, and restore trust, but only if they are supported by clear mandates, monitoring frameworks, and organizational buy-in. For example, in municipalities where dashboards were integrated with budgeting, procurement, and service delivery processes, digital supervision contributed to measurable improvements in operational efficiency and financial compliance. In contrast, in municipalities where dashboards existed in isolation, they had minimal impact on governance outcomes. This observation echoes Criado et al. (2021), who argue that technology alone cannot transform governance; rather, institutional alignment is necessary to translate technical capacity into improved performance.

Reducing Corruption and Enhancing Trust

The study also highlights the potential of digital supervision to reduce corruption by limiting discretionary decision-making and increasing transparency. Automated approval workflows and real-time expenditure monitoring restrict opportunities for manipulation, while public access to performance dashboards exposes underperformance to citizen scrutiny. These mechanisms enhance both internal and external accountability, aligning with global evidence that digital oversight tools can strengthen integrity in public administration (OECD, 2021; Kumar & Prasad, 2022). Enhanced transparency contributes to restoring citizen trust, a critical outcome given the high prevalence of service delivery protests in South African municipalities (AGSA, 2023). By making governance processes more visible, digital

supervision creates a feedback loop that incentivizes officials to adhere to rules and improve service delivery.

Addressing Barriers to Effective Digital Supervision

Despite the demonstrated benefits, the study confirms that effective implementation of digital supervision requires addressing structural, institutional, and human resource constraints. Three critical enablers emerge:

- **Infrastructure Development**: Adequate ICT infrastructure, including reliable broadband, electricity, and hardware, is a prerequisite for successful adoption. Without foundational resources, digital tools remain inaccessible or unsustainable (Moyo, 2023).

- **Capacity-Building and Training**: Officials require technical skills to operate, interpret, and act upon data generated by digital supervision systems. Targeted training programs, knowledge-sharing initiatives, and the development of in-house expertise are essential to ensure long-term sustainability (Masiya et al., 2022).

- **Leadership Commitment and Institutional Support**: Transformational leadership is necessary to overcome resistance, foster a culture of accountability, and embed digital supervision within organizational routines. Supportive policies, incentives for compliance, and alignment with broader governance objectives enhance adoption (Rametse & Van der Waldt, 2023).

Addressing these enablers not only facilitates adoption but also strengthens the institutional legitimacy of digital supervision as a governance reform.

Implications for Policy and Practice

The findings carry significant implications for policymakers, municipal managers, and scholars of public administration:

- Policy Design: National and provincial governments should prioritize the provision of ICT infrastructure and financial support to municipalities, particularly in rural areas. Policy interventions could include grants, shared service platforms, or national oversight portals.

- Organizational Reform: Municipalities should integrate digital supervision into existing governance structures, ensuring that dashboards, reporting systems, and citizen engagement platforms are embedded in operational, financial, and performance management processes.

- Capacity Development: Investments in training and technical support are critical. Building in-house digital expertise ensures sustainability, reduces dependence on external consultants, and fosters institutional knowledge.

- Leadership and Change Management: Effective adoption requires leadership that champions digital transformation, sets clear performance expectations, and models accountability. Change management strategies, including incentives and communication campaigns, can mitigate resistance and promote cultural alignment.

By addressing these areas, digital supervision can be institutionalized as a core governance practice rather than a peripheral technical initiative.

Advancing the Scholarly Discourse

This study advances the literature by demonstrating that digital supervision functions as both a technical and institutional innovation. While prior research has emphasized the technical capabilities of e-governance tools, this study situates digital supervision within broader theoretical frameworks, highlighting the interaction between technology, organizational culture, and institutional constraints. It shows that digital supervision aligns with NPM by enhancing efficiency, performance measurement, and accountability, while Institutional Theory explains variations in adoption and implementation across municipalities. Moreover, the study provides a nuanced understanding of the urban–rural divide in digital governance. Metropolitan municipalities, with higher capacity and resource availability, are more likely to adopt and sustain digital supervision systems. Rural municipalities face structural and resource constraints, emphasizing the need for targeted support to ensure equitable governance outcomes.

CONCLUSION OF DISCUSSION

In conclusion, the discussion affirms that digital supervision is a powerful mechanism for enhancing accountability and municipal performance when effectively implemented. By integrating NPM principles, municipalities can measure performance, improve efficiency, and strengthen financial compliance. Institutional Theory explains why some municipalities lag in adoption, highlighting the influence of entrenched practices, resource limitations, and resistance to change. The findings underscore that digital supervision is not merely a technical solution but an institutional reform strategy capable of reducing corruption, promoting transparency, and restoring citizen trust. The study's insights are particularly relevant for South Africa, where municipal governance challenges persist despite traditional

oversight mechanisms. By demonstrating both the potential benefits and implementation barriers of digital supervision, this research provides practical guidance for policymakers, municipal leaders, and scholars seeking to modernize local governance through digital technologies. Ultimately, the integration of digital supervision within institutional frameworks represents a critical pathway toward accountable, transparent, and efficient municipalities.

CONCLUSION

This study has examined the role of digital supervision in enhancing accountability and improving performance within South African municipalities. The findings provide compelling evidence that digital oversight tools, such as electronic reporting systems, performance dashboards, and citizen engagement platforms, can transform traditional governance practices by providing real-time monitoring, enhancing transparency, and enabling more efficient and responsive service delivery. Municipalities that have successfully adopted these systems demonstrated measurable improvements in performance tracking, financial compliance, and citizen responsiveness, confirming the potential of digital supervision as both a technical innovation and an institutional reform strategy.

Key Insights

First, the study highlights that digital supervision facilitates evidence-based decision-making, aligning with the principles of New Public Management (NPM). Municipalities that leverage digital dashboards can track service delivery performance, monitor financial transactions, and identify underperforming units in real time. This ability to generate timely and accurate data allows managers to intervene proactively, optimize resource allocation, and improve service delivery outcomes. The use of digital systems thereby operationalizes NPM principles by emphasizing efficiency, performance measurement, and accountability, demonstrating that managerial tools can significantly improve public sector governance when properly implemented (Hood, 2020; Pollitt & Bouckaert, 2021).

Second, the study demonstrates the capacity of digital supervision to strengthen accountability and reduce opportunities for maladministration. Municipalities with integrated electronic reporting systems reported fewer cases of irregular expenditure and audit disclaimers, highlighting the role of digital oversight in curbing financial impropriety. Citizen-facing platforms further reinforce accountability by making performance and expenditure data publicly accessible, fostering a culture of transparency and encouraging

participatory governance. These findings resonate with international research indicating that digital tools can enhance integrity, reduce corruption, and promote citizen trust in public institutions (OECD, 2021; Gupta & Chaudhuri, 2022).

Third, the study reveals that adoption and effective utilization of digital supervision are uneven across municipalities. Metropolitan municipalities, with more resources, technical capacity, and supportive leadership, are more likely to adopt and sustain these systems, while rural and under-resourced municipalities lag behind. This disparity reflects structural, institutional, and capacity-related constraints, including insufficient ICT infrastructure, limited technical skills, and entrenched bureaucratic resistance (Moyo, 2023; Rametse & Van der Waldt, 2023). The uneven adoption of digital supervision underscores the relevance of **Institutional Theory**, which explains how organizational norms, resource availability, and institutional pressures shape the uptake of innovation (Scott, 2019).

Implications for Municipal Governance

The findings of this study carry significant implications for policymakers, municipal leaders, and stakeholders engaged in local government reform.

- Digital supervision as a dual strategy: Digital oversight should be recognized not merely as a technical tool but as an instrument of institutional reform. Successful implementation requires alignment with municipal planning, budgeting, and performance management systems, supported by clear mandates, policies, and operational procedures. Embedding digital tools within institutional frameworks ensures their long-term sustainability and prevents them from being treated as supplementary or temporary initiatives.
- Investment in capacity and infrastructure: Effective digital supervision depends on foundational ICT infrastructure and personnel with the skills to operate and interpret digital systems. Investments in broadband connectivity, hardware, cybersecurity, and in-house technical expertise are essential. Capacity-building initiatives should be continuous, addressing both technical and managerial competencies to enable officials to leverage data for decision-making and accountability purposes.
- Leadership commitment and change management: Institutional resistance emerged as a persistent barrier in this study. Overcoming entrenched practices and bureaucratic inertia requires committed leadership that champions digital transformation, models accountability, and incentivizes compliance. Change management strategies, including

staff training, awareness campaigns, and performance-linked incentives, are critical for fostering a culture receptive to digital supervision.

- Citizen engagement and participatory governance: Publicly accessible digital platforms enable citizens to monitor municipal performance, lodge complaints, and participate in oversight processes. This participatory dimension not only strengthens accountability but also contributes to restoring public trust, particularly in municipalities where service delivery protests and perceptions of corruption are prevalent.

Limitations and Directions for Future Research

While this study provides valuable insights into the role of digital supervision in municipal governance, certain limitations should be acknowledged. First, the study primarily focused on a subset of municipalities with varying capacities, limiting the generalizability of findings to all municipal contexts in South Africa. Second, the cross-sectional nature of the research provides a snapshot of digital supervision practices at a particular point in time, without capturing longitudinal trends or the evolution of adoption over multiple years. Future research should address these limitations by employing comparative case study designs across multiple municipalities, examining how digital supervision practices evolve over time and under different socio-political and economic conditions. Such studies could explore the interaction between digital tools, organizational culture, leadership styles, and citizen engagement to provide a more holistic understanding of the factors that facilitate or impede successful digital oversight. Additionally, research could investigate the impact of digital supervision on long-term outcomes, such as service delivery satisfaction, fiscal sustainability, and public trust, thereby linking operational performance to broader governance objectives.

CONCLUSION

In conclusion, the study demonstrates that digital supervision is a vital innovation capable of transforming municipal governance in South Africa. Municipalities that adopt ICT-enabled oversight tools experience enhanced performance monitoring, financial accountability, and responsiveness to citizens' needs. However, structural barriers, such as poor infrastructure, limited technical capacity, and resistance to change, continue to constrain widespread adoption, particularly in rural and under-resourced municipalities. Digital supervision should therefore be understood as both a technical solution and an institutional reform strategy. Its effectiveness depends on the integration of digital tools into formal governance structures, sustained investment in infrastructure and skills, strong leadership commitment, and policies

that mandate and incentivize adoption. By embracing this dual perspective, municipalities can leverage digital supervision not only to improve operational efficiency but also to strengthen transparency, reduce corruption, and restore citizen trust in local governance. Ultimately, the findings underscore that the future of accountable, efficient, and citizen-responsive municipalities lies in the strategic deployment of digital supervision mechanisms, supported by an enabling institutional and policy environment. By institutionalizing digital oversight, South African municipalities can take a critical step toward realizing the promise of modern, accountable, and effective local governance.

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