Contribution of the Management Information System on Improving Service Delivery at the Weights and Measures Agency in Tanzania

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Abstract

This study was conducted to evaluate the impacts of Management Information Systems (MIS) at the Weights and Measures Agency (WMA) on operational efficiency, specifically by examining their contributions to customer service delivery and consumer protection, as well as their role in countering regulatory threats. The research, guided by the Technology Acceptance Model (TAM) and Stakeholder Theory, employed a cross-sectional design and collected data from 136 WMA employees and customers. The findings indicate that the WMA-MIS significantly enhances customer trust through real-time verification of measuring instruments, improves fraud detection and the use of real-time SMS notifications. However, the study also identifies challenges, such as technological issues in the system and low user literacy, which limit the system's full potential and negatively affect perceived accountability. Despite these issues, the WMA-MIS positively contributes to regulatory enforcement, revenue collection, and transparency. The research concludes with evidence-based recommendations for system upgrades, staff training, and public awareness campaigns to enhance usability and reliability, ultimately promoting fair trade, compliance, and customer protection.

Keywords: *Management Information System, Service Delivery, Consumer Protection, Weights and Measures Agency, Data Accuracy.*

1.0 Introduction

The dawn of the twenty-first century has ushered in an era of unprecedented technological change, fundamentally reshaping the dynamics between governments and their citizens. Driven by the imperatives of globalisation and an increasingly digital-savvy populace, government agencies, particularly regulatory bodies, are under immense pressure to modernise their operations by adopting modern information systems to enhance transparency, efficiency and accountability. Globally, the implementation of Management Information Systems (MIS) has emerged as a cornerstone of public sector reforms, with a growing body of scholarly literature highlighting their transformative contribution impacts.

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These systems have been recognised as fundamental tools for improving governance, optimising resource management and revolutionising service delivery and protection to citizens (Laudon & Laudon, 2020).

Management Information Systems have been instrumental in automating internal processes to increase efficiency, decentralising services and enhancing accountability through improved information flows (Ogombe, 2023). However, implementing these systems is not without challenges, as many projects have failed due to political interference and low user participation (Sharmin & Chowdhury, 2025).

In Africa, the adoption of MIS and e-government initiatives has grown steadily, marking a significant stride toward bridging the digital divide despite persistent challenges. Countries across the continent are leveraging information and communication technologies to address complex developmental challenges, from improving financial management to enhancing public health services. In Ghana and Kenya, the establishment of centralised digital service portals and biometric identity systems has demonstrably contributed to improved public service accessibility and financial inclusion, providing a model for other nations in the region (Meng'anyi, 2022; Thiel, 2020). In Rwanda, a leader in digital governance, the implementation of electronic tax systems has been credited with enhancing revenue collection and combating financial fraud by providing robust, verifiable data sources (Roger, 2021; Wasonga & Osiemo, 2023). However, many African countries, including Zambia and Kenya, still face significant obstacles such as underdeveloped ICT infrastructures, low digital literacy, and a lack of political commitment, which hinder the full realisation of these systems' contributions (Omweri, 2024; Okello, 2024; Sikaonga & Tembo, 2020).

In Tanzania, the government has long recognised the importance of embracing information technology for public sector reforms to increase efficiency, effectiveness, and transparency, the country has implemented various systems, such as the Financial Management Information System (FMIS) and Health Management Information System (HMIS) to improve financial and health services delivery (Laizer & Suomi, 2016; Mboera *et al*., 2021). These initiatives have demonstrated how information systems can enhance resource management and inform data-driven decision-making.

The Weights and Measures Agency (WMA), established in 2002 under the Executive Agencies Act, Cap 245, was part of Tanzania's reform agenda to promote fairness, consumer protection, and market efficiency (URT, 1997). Its 2020-2026 Strategic Plan underscores commitments to accuracy in trade, health, safety, and environmental protection (WMA,2021). However, achieving these goals requires not only a strong regulatory framework but also reliable monitoring systems. Without effective mechanisms, consumer protection risks being compromised. The relevance of WMAs lies in adapting institutional capacity to technological innovations for safeguarding trade and consumers' rights.

In this regard, WMA-MIS enhances WMA's regulatory functions and efficiency by providing real-time data on inspections, certifications, and compliance, thereby increasing transparency, accountability, and consumer trust (Sadabadi *et al*., 2022). It also supports advanced data analytics, enabling the detection of measurement inaccuracies and proactive targeting of high-risk areas (Widijowati, 2023).

This study addresses a critical gap in the literature by examining the specific contribution of WMA-MIS in Tanzania. While MIS and e-government in public administration are widely studied, little attention has been given to how regulatory systems like WMA-MIS directly influence the operational efficiency of the agency in improving delivery, consumer protection, market integrity and accountability.

This study aligns with Tanzania's digitalisation and consumer protection agendas by complementing the National ICT Policy, which promotes efficiency and accountability in service delivery (Mwananziche et al., 2023), the Consumer Protection Act, ensuring fair trade and product safety (Mwenegoha, 2018), and Vision 2025, which emphasises industrialisation through technology-driven governance (Kikwete, 2014). By focusing on WMA, it demonstrates how WMA-MIS improve service quality, accountability, and transparency while advancing consumer trust and national economic development.

2.0 Literature review

2.1 Theoretical Framework

2.1.1 Technology Acceptance Model (TAM)

The study applied Davis (1989) Technology Acceptance Model (TAM), which links system adoption to Perceived Usefulness (PU), the degree to which a system enhances the performance of users, and Perceived Ease of Use (PEOU), the degree to which users believe a system is easy to use (Mohd et al., 2020; Putra, 2018). Findings showed that stakeholders and WMA staff who viewed WMA-MIS as effective in real-time verification and revenue tracking were more likely to adopt it; however, while educated users reported fewer difficulties, less educated users struggled, underscoring the need for a user-friendly design to ensure inclusive adoption and optimal usage.

2.1.2 Stakeholder Theory

The study also adopted Stakeholder Theory (Freeman, 1984), which emphasises that public service organisations must address the interests of diverse groups, including government agencies, business, and consumers, through transparent and accountable systems (Kivits et al., 2021; Adaletey et al., 2018). WMA-MIS embodies this by promoting compliance, accountability, and trust via audit trails and automated systems (Freeman et al., 2021). By providing transparent verification, revenue, and transaction records, the system reduces fraud and tampering, ensuring measurement standards are upheld. Thus, WMA-MIS reflects the Stakeholders' theory's call for openness and balanced stakeholder engagement.

2.2 Empirical Literature Review

The public sector is undergoing a profound digital transformation, with the integration of management information systems (MIS) becoming a critical factor in enhancing government efficiency, responsiveness and customer relationship management (CRM). This review highlights studies that demonstrate how MIS and digital platforms drive organisational success while addressing adoption challenges, providing valuable insights for businesses, regulators, and policymakers.

The modern business landscape, increasingly defined by technology, relies on the strategic integration of information systems to gain a competitive edge. Academically, MIS is seen as a core drive of operational efficiency and strategic agility, serving as an organisation's central nervous system rather than just a data processor. As Olorunlana (2020) found, successful MIS integration leads to optimised business processes, enhanced decision-making, and improved interdepartmental communication. This principle is equally applicable to public-sector entities like WMA, which seek to modernise and improve service delivery.

Empirical evidence confirms the critical role of MIS in enhancing Customer Relationship Management (CRM) and, in turn, profitability. Bin-Nashwan & Hassan (2017), using structural equation modelling, demonstrated that CRM success relies not only on a robust information system but also is heavily influenced by service orientation and process quality. This implies that a holistic approach is crucial for both business and government agencies. For systems like WMA-MIS, ultimate success depends on integrating the technology with high-quality service processes and a customer-centric culture to foster customer satisfaction and loyalty.

The proliferation of digital platforms has fundamentally transformed how organisations manage and leverage customer information. Stone et al. (2017) demonstrated how digitalisation, cloud computing, and emerging information-based platforms are revolutionising customer data management. Leveraging these technologies enables firms to refine their market strategies and enhance business operations. This underscores the imperative for regulatory bodies to continually adapt to technological advancements, enabling the agency not only to collect data but also to use a platform to provide transparent, real-time information that builds trust.

A critical review reveals that their effectiveness is not guaranteed. El-Ebiary et al. (2020) identified that MIS success hinges on key non-technical factors, including the quality of system design, customer-oriented features, and most importantly, staff knowledge and expertise. This underscores that mere system implementation is insufficient; organisations must invest in adequate user training and customise strategies to align with operational needs. For the WMA-MIS, this directly implies that its ability to enhance accountability is fundamentally tied to the proficiency of its users and to the platform's human-centric design.

Advanced digital technology, beyond just traditional MIS, was identified as a primary driver of innovation. Lee & Lee (2020) emphasised that adopting information and communication technology (ICT) significantly enhances an organisation's dynamic capability, fostering agility and adaptability in a rapidly changing market. Their findings were critical because they highlight how technology enables businesses not only to respond to but also to proactively shape their strategies to meet evolving customers' expectations for security and personalised experiences. For public sector organisations, this implies that the WMA-MIS's role is not just to maintain the status quo but to continuously innovate its services to remain relevant and trusted by the public.

The empirical evidence demonstrates that implementing MIS was often fraught with significant challenges, which could limit its capacity to enhance decision-making, optimise

operational efficiency, and streamline organisational communication. Quitain et al. (2024) highlighted significant obstacles, including data security risks, infrastructure limitations, and organisational resistance to technological change. For WMA, successful MIS integration required a robust cybersecurity framework, strategic change management, and proactive measures.

2.3 Conceptual Framework

The conceptual framework establishes the WMA-MIS as the independent variable, viewing it not merely as a technological tool but as a fundamental enabler of real-time verification, transaction transparency, and financial accountability. Its core functionality directly intervenes to ensure regulatory compliance and enhance fair trade by reducing fraud. Crucially, system effectiveness and user attitudes are intervening variables. The system's dependability, usability, and responsiveness directly shape user trust. This implies that mere system presence is sufficient; reliable performance and perceived trustworthiness ultimately enhance customer protection and regulatory accountability.

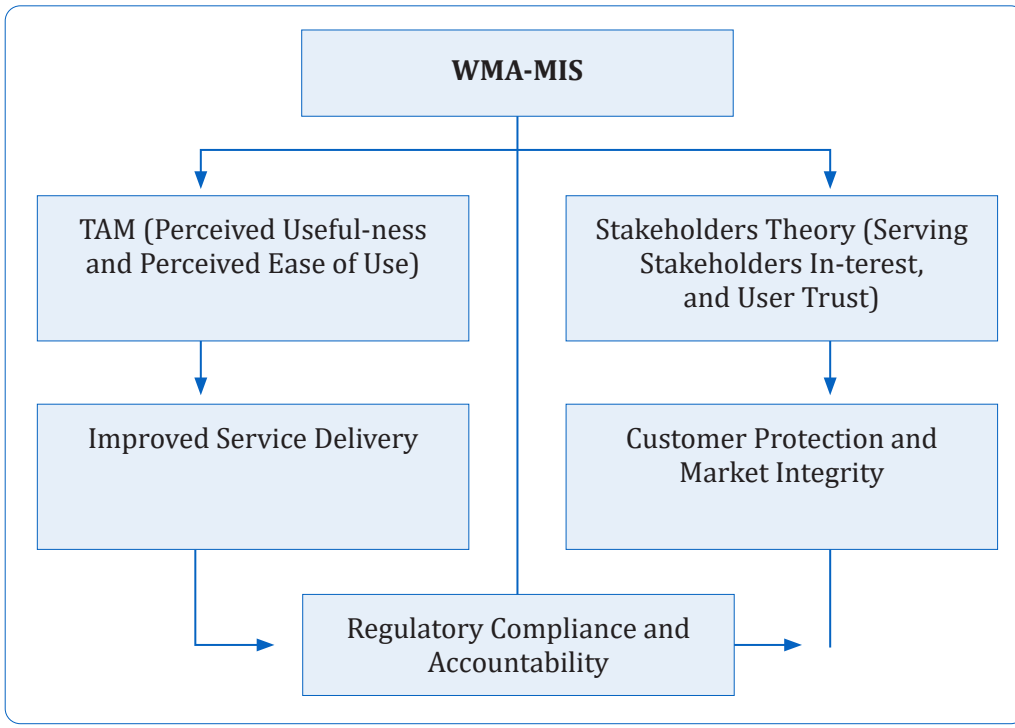

Figure 1: Illustration of how the Implementation of WMA-MIS Influences Key Outcomes.
Source: Researchers' Construct

3.0 Methodology

The study was conducted strategically across the Dar Es Salaam region at the Kinondoni, Temeke, Ilala, and Port Unit WMA Offices, and the Pwani region at Misugusugu calibration

Bay Centre. The area was chosen for its strategic economic importance as the central commercial hub, which generated a disproportionately high volume of clients and provided high-value services essential to the WMA's mandate. The concentration of crucial economic activities, such as handling large storage tanks for fuel and other liquid commodities at the port and at various industrial sites, made measurement accuracy in this area paramount for trade and revenue collection. Furthermore, as the most densely populated urban centre, the area hosted a large number of commercial and domestic utility connections (Electricity and water), for which the WMAs' meter verification was a critical service, making it a key site for investigating the comprehensive contribution of WMA-MIS to service delivery and regulatory assurance.

This study employed a cross-sectional research design to capture a comprehensive snapshot of the state of WMA-MIS and user perceptions at a specific point in time. This approach was chosen for its efficiency in simultaneously collecting data from a large and diverse population of WMA staff and customers. (Wang & Cheng, 2020). It was ideal for assessing prevalence and correlation between variables, providing valuable insights into the system's current state and its impact on service delivery, without the temporal demands or resources required for a longitudinal study. The population in this study comprised WMA employees using the WMA-MIS and the customers they serve. Given the nature of the client base, the population was treated as infinite, yielding an ideal sample size of n = 400 using Yamane's formula (α = 0.05). However, based on Nirathron (2006), which recommends a minimum of 100 respondents for such a population, a final sample of 136 was determined for data collection. Of the total, 120 respondents (staff and customers) were selected via simple random sampling for a structured questionnaire to minimise selection bias and enhance generalizability (Creswell & Creswell, 2017). The remaining 16 respondents (staff and customers) were purposively selected for a Focus Group Discussion (FGD) to ensure inclusion of individuals with specific, relevant experiences (Palinkas *et al*., 2015).

$$n = \frac{1}{e^2} = \frac{1}{(0.05)^2} = \frac{1}{0.0025} = 400.$$

A mixed-methods approach was used to collect both qualitative and quantitative data from WMA staff and customers. A structured questionnaire, containing both closed-ended demographic questions and Likert-scale items for research variables, serves as the primary tool for quantitative data collection, enabling the efficient collection of responses that are statistically analysable (Creswell & Creswell, 2017). To complement this, two Focus Group Discussions (FDGs) were conducted: one with WMA staff and one with customers, to gather rich, qualitative data and contextual insights. All 120 questionnaire copies distributed were fully returned and properly completed.

Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS) version 20, employing a Binary logistic regression model to estimate the WMA-MIS contribution to customer protection. Complementary Qualitative data were analysed using Thematic Analysis (TA), systematically exploring perceptions of the system's effect on agency operations and government revenue collection.

4.0 Findings

4.1 Demographic Characteristics of Respondents

The demographic profile indicates that the majority of respondents (31.67% in the 36-45 age bracket) were in their prime working years and active users of the WMA-MIS for regulatory and customer service functions. The gender distribution was sufficiently diverse (55.83% male, 44.17% female), ensuring that diverse perspectives were captured. Educationally, while a majority of respondents (59.16%) have at least secondary education, the substantial presence of respondents with only primary (29.17%) or informal education (11.16%) was critical, highlighting potential usability barriers. The diverse occupational mix, led by self-employed individuals (33.33%) and peasants (27.50%), confirms the system-wide reach among core stakeholders.

The chi-square analysis reveals that gender, education, and occupation significantly influence WMA-MIS adoption and efficiency ($p < 0.05$). Specifically, female users with higher education are more likely to perceive the system as efficient, thereby reinforcing TAM by showing that educational background directly impacts "Perceive Ease of Use" and Subsequent "Perceived Usefulness". Age, conversely, had a non-significant association with the adoption rate ($p = 0.122$), suggesting broad applicability across generations.

Table 4.1: Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n=120)	Percentage (%)	Chi-Square Results	Significance
Age Group	18-25	21	17.50%	5.77 (df=3)	Not Significant (p<1.122)
	26-35	27	22.50%		
	36-45	38	31.67%		
	46 and above	34	28.33%		
Gender	Male	67	55.83%	7.56 (df=1)	Significant (p<0.006)
	Female	53	44.17%		
Education Level	Informal Education	14	11.16%	39.44 (df=3)	Highly Significant (p<0.001)
	Primary Education	35	29.17%		
	Secondary Education	37	30.83%		
	College/University	34	28.33%		
Occupation	Employed	29	24.17%	18.43 (df=3)	Highly Significant (p<0.001)
	Self-employed	40	33.33%		
	Peasants	33	27.50%		
	Drivers	18	15.00%		

Source: Field Data 2024

4.2 Contribution of WMA-MIS in Enhancing Customer Service Delivery

The findings demonstrated that the WMA-MIS has significantly improved service delivery by increasing transparency and introducing user-friendly features, thereby fostering trust and a sense of empowerment among users. A significant relationship was found between gender and perceived system adoption, with female respondents more likely to have a positive perception of the system due to the control it offers over transactions ($p = 0.035$, with a coefficient of 4.209). This was corroborated by qualitative data, in which women participants described enhanced safety and a greater sense of control over transactions that had previously been confusing. The quotation from FGD emphasises this shift:

> *"Previously, I was always confused when making payments. I had to depend on others to provide me with the correct information. Now, with WMA-MIS, I can view exactly what I have paid and receive a receipt on my phone immediately. It makes me have more confidence in the system." (FDG, Customer 25th November 2024).*

The WMA-MIS significantly enhances confidence in the payment process through its unparalleled transparency. The participants emphasised this clarity, stating:

> *"By utilising WMA-MIS, I am surer that I am paying the right amount, and there is no one to take any cut. It is me and the system alone. This gives me peace of mind." (FDG, Customer, 25th November 2024).*

Furthermore, system accessibility is crucial for improving service delivery, especially for users with low levels of education. Customers with only primary education found the WMA-MIS highly accessible and straightforward to use, fostering feelings of inclusion and empowerment. One customer stated:

> *"It is a straightforward system. I do not need to be computer-literate. I can review my payments on my phone, and everything is right in front of me. As somebody like me who did not go to school much, this makes me feel like I am not getting behind." (FDG, Customer 25th November 2024).*

It is a powerful statement about the system's inclusive design, underscoring the importance of user-friendly digital platforms for broad public adoption.

The system's use of real-time SMS notifications is highly effective, providing instant, verifiable receipts that ensure successful transaction processing. This immediate feedback loop reduces anxiety associated with the bureaucratic process. The simplicity and easy-to-read format, particularly valued by participants, foster a stronger sense of security and responsibility, ultimately influencing positive user perceptions of the WMA-MIS accountability and reliability.

4.3 Contribution to Customer Protection and Market Integrity

The WMA-MIS makes a significant contribution to customer protection and market integrity. It enables real-time verification of measuring instruments and enhances fraud detection. This transparency provides immediate, verifiable transaction information, preventing unfair trade practices and building consumer confidence. Consumers gain peace of mind, as highlighted by one customer, who noted:

> *"When I buy fuel, I feel confident because the pumps have been verified and sealed by WMA. I know the measurement cannot be easily tampered with, so I believe I am paying for the exact amount of fuel I receive" (FDG, Customer 26th November 2024).*

Another emphasis on accountability:

> *"I trust the water bills I receive because my water meter has been verified and sealed by the WMA using their system. I know it is difficult for anyone to tamper with it, so I believe the bills I receive are collected and fair"*

Ultimately, WMA-MISs' real-time verification and sealing processes ensure that instruments cannot be easily tampered with, validating the system's ability to create a secure and fair-trading environment and building trust and confidence in both the market and the agency.

4.4 Contribution to Regulatory Compliance and Accountability

The WMA-MIS significantly contributes to regulatory compliance and accountability through robust, accurate, and transparent reporting mechanisms. It fundamentally improves real-time recording of verified and re-verified instruments, effectively minimising data tampering and errors. The system enhances financial accountability by providing clear audit trails of revenue collections, effectively ensuring fiscal integrity and facilitating better decision-making to improve service delivery and fair-trade practices. This internal transparency is a key strength, as one staff member emphasised:

> *"The WMA-MIS significantly improved our ability to generate accurate and timely reports on all the weighing devices that were verified. We can track and document fuel pump verifications, tanker calibrations, water meter verifications, and electricity meter verifications accurately using the system. Every verified device is recorded in real time, ensuring no transaction will be lost or altered." (FDG, MWA staff member, 26th November 2024).*

However, the research finds that this strong internal integrity is vulnerable to external perceptions: system errors significantly reduce user trust and perceived accountability ($p = 0.012$, coefficient = 6.241). Experiencing malefactions or delays in receipt leads to mistrust and questioning the WMA-MIS's dependability. This shows that system downtimes or technical glitches create a fundamental sense of mistrust among users. One customer noted this anxiety:

> "*There are times when I try to make a payment, and the system freezes, or I receive an error message. I am not sure if the payment was made, and sometimes I have to try again. This frightens me, as I do not want to pay twice or be charged mistakenly." (FDG, Customer 25th November 2024).*

A customer highlighted another loss of confidence:

> *"I once had an issue where I did not get a receipt after making a payment, and I was not certain if the payment had been taken. When these happen, I do not have much trust in the system. I need to be sure that everything is working as it should." (FDG, Customer 25th November 2024).*

The study finds that the system communication strategy can effectively mitigate the system's negative impacts. The effectiveness of the WMA-MIS reporting mechanisms was strongly linked to SMS notifications, which were identified as the most effective method for communicating transaction updates and errors. Respondents felt significantly more empowered and informed (p = 0.014; coefficient = 0.078). Participants emphasised that immediate notification provided a vital sense of security and trust regarding payment status and real-time updates. One customer stated:

> *"I prefer to get an SMS the moment I make a payment. It assures me that the transaction was completed successfully. I can check my phone and see how much I paid and when it was processed. This makes me feel assured that I will not be overcharged." (FDG, Customer 25th November 2024).*

Conversely, participants complained that email notifications were often delayed or unclear:

> *"Emails take too long to arrive, and sometimes I do not get all the information in the message. I like SMS because it is straightforward and to the point." (FDG, Customer, 25th November 2024).*

A preference for SMS alerts reflects the need for real-time, secure transaction notifications. Real-time alert minimises users' distrust, making them feel that WMA-MIS is more accountable and transparent by providing immediate confirmation of payments.

4.5 Contribution to WMA Transactions.

The regression test shows a high positive correlation between WMA-MIS transactions and perceptions of accountability (p = 0.000). The coefficient of 30.75 confirms a highly significant relationship, indicating that active users are much more likely to view the system as transparent, secure, and trustworthy for government billing and payment. Users expressed high satisfaction, crediting transparency and simplicity as key factors in building trust. One customer stated:

> *"Since the agency started using WMA-MIS, I do not worry that I will be overcharged or not given a receipt. Everything is clear on my phone, and I know exactly where my money has gone. It is like the system prevents me from making a mistake or being fraudulent." (FDG, Customer 25th November 2024).*

Another member emphasises:

> *"The greatest advantage of the WMA-MIS is that it allows us, being service providers, to accurately monitor billing, payments, and reports in real time. The system offers complete transparency into financial transactions, enabling us to be confident that all payments are accurately reflected and easily traceable. In case there are any discrepancies, we can easily view records of payments, which ensures accountability and trustworthiness of the procedure." (FDG, WMA staff member, 26th November 2024).*

The WMA-MIS was viewed as a security blanket, providing traceable, verifiable records that demonstrate security and protect customers from fraud, financial loss, and market malpractice, thereby reinforcing accountability and transparency.

Table 4.2: Binary Logistic Regression Showing the Impact of WMA-MIS

WMA-MIS **accountability in government revenue collection**	**Categorical variable**	**Coefficient**	**P-value**	**[95% Confidence Interval]**	
Age	18 - 25 26 - 35 36 - 45 46 and above	1 4.828 1.88 1.805	. 0.147 0.551 0.599	. 0.575 0.236 0.199	. 40.518 14.991 16.366
Gender	Male Female	1 4.209	. 0.035**	. 1.104	. 16.042
Education level	Informal education Primary education Secondary education Collage education	1 0.107 0.121 0.25	. 0.048** 0.157 0.371	. 0.012 0.007 0.012	. 0.983 2.254 5.212
Access to the WMA-MIS system	No Yes	1 6.241	. 0.012**	. 1.501	. 25.943
Error report and correction	Website update Social media SMS notification Emails	1 0.078 . .	. 0.014** . .	. 0.01 . .	. 0.594 . .
WMA-MIS transactions	No Yes	1 30.75	. 0.000**	. 5.899	. 160.307
Constant		2.232	0.595	0.115	43.215

Source: Field Data (2024)

3.1.6 Performance Measures for Logit Model

The model appears to fit the data well (high p-value from GOF test). The classification performance is strong, with high accuracy (87.5%) and excellent AUC (0.93). The model is better at predicting positive cases (WMA-MIS improvement) than negative cases, but its overall predictive power is outstanding.

Table 4.3: Performance Measures for the Logit Model

Accurate rate	**Sensitivity**	**Specificity**	**AUC (ROC CURVE)**	**AIC**	**BIC**	**Pseudo R^2**	**Hosmer Lemeshow test**
96.83%	93.26%	70.97%	0.9259	94.963	125.626	Adj R^2 = 0.468	chi2(52) = 28.89 Prob >chi2 = 0.9961

Source: Field Data (2024)

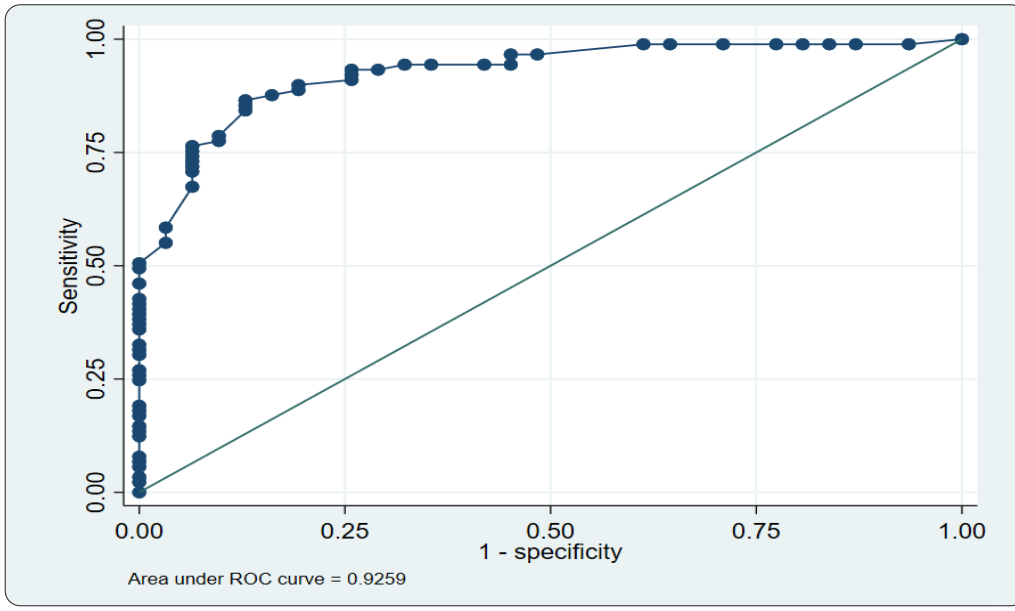

Figure 2: Area under the Curve (AUC) for the Logit Model
Source: Field Data (2024)

4.3 Study Implications

The system failures reported by users were critical insights that transcend mere technical issues and become a fundamental question of public trust and integrity. Transaction delays and failures are perceived as functional defects that erode user confidence in the reliability of WMA-MISs as tools for public service. This confirms that system reliability is a fundamental pillar of users' satisfaction and trust in the public sector. Therefore, continuous technical maintenance is a strategic imperative to fully realise the system's intended function of enhancing accountability.

Beyond reliability, the study emphasises the importance of a streamlined user experience, particularly for transaction tracking. The finding that real-time payment tracking increased the user's sense of security established a direct empirical link between system transparency and user confidence. In a regulatory context, this end-to-end visibility was crucial for preventing fraud and ensuring revenue integrity, thereby directly protecting customers.

Finally, the study's most significant finding regarding communication was the critical role of real-time SMS updates. Evidence shows that users who received live SMS notifications were more trusting and assured, demonstrating a clear, actionable path to improve accountability. Since SMS bypassed the need for internet access, it was the most reliable, accessible, and inclusive channel for reaching a diverse user base, including those with limited digital literacy.

5.0 Discussion of Findings

This study assessed the contribution of the WMA-MIS, a government digital payment system, towards customer protection and accountability in government operations and revenue collection at the WMA. The findings detail the WMA-MISs' efficiency, strengths, and areas of improvement, examining their dependability and user experience. The findings align with Dwivedi et al. (2017), who identified user satisfaction, system reliability, stakeholders' engagement, and effective communication as key factors for information systems success. Conversely, Akpe et al. (2023), Nasr et al. (2020), and Szumski (2020) found that technical errors, lack of trust, and non-compatibility discouraged users and increased frustration, resulting in revenue loss. Similarly, Chen et al. (2019) identified system reliability as a critical determinant of e-government success, while Fahm (2023) stressed technology strategies, service responsiveness, and user satisfaction as preconditions for sustained system use and the realisation of benefits.

However, this study adds a crucial new dimension by revealing that the nature of communication during a system breakdown was key to mitigating user frustrations. As Shin (2020) proposed, prompt updates reinforced perceptions of accountability and transparency. The WMA-MIS's use of instant SMS notifications created security and trust among users, even during system crashes. This demonstrates that real-time communication was a pivotal tool in maintaining users' confidence, as confirmed by Sharmin & Chowdhury (2025), who emphasised that effective communication was equally important for building transactional security and promoting system resilience.

The study found that SMS alerts were the most preferred channel for transactional updates. This aligns with Akomea-Frimpong et al. (2019) and Gatchalian et al. (2023), who found SMS-based alerts helpful in encouraging user engagement and building trust, especially in areas with low internet penetration. Yang et al. (2017) found that real-time communication to customers increased transaction transparency and trust. However, the preference for SMS contradicts studies such as Owino et al. (2017), which found email effective in more developed regions, a discrepancy attributed to the current study's demographics, in which many respondents reported limited access to smartphones or the internet. This provides further evidence for the assertion by Wasonga & Osiemo (2023) that SMS based notices remain the preferred option in developing economies. This finding strongly suggests that an effective digital payment system communication strategy must be adaptive to the local environment to maximise its reach and impact.

A key finding of this study was the direct link between lower levels of education and difficulties in using the WMA-MIS, which was highly consistent with the work of AbdulKareem & Oladimeji (2024). Qualitative data showed that participants with only a primary-level education struggled with complex interfaces, aligning with Ologunebi and Taiwo (2025), who emphasised that digital exclusion is a prominent barrier for low-education and low-income groups. These users preferred simple instructions, highlighting a critical challenge; if a significant population cannot effectively use the system, its benefits for promoting accountability cannot be universally realised.

While this study aligns with the existing literature on the need for system dependability, effective communication, and an accessible user interface, it offers new and critical insights. It uniquely contributes to the body of knowledge by demonstrating the pivotal role of real-time communication in mitigating the adverse effects of system faults. Unlike prior studies that focused on the system's technical performance (Shin, 2020), this research provides empirical evidence that a human-centred communication strategy could maintain trust in the context of technological failure. Furthermore, the findings challenged the assumptions of Mtebe & Sausi (2021) and Gohary (2019) that simplified interfaces were necessary only for less educated users. This study concludes that simplifying the interface for all users was beneficial as it promoted its broader adoption. The WMA-MIS serves as a powerful example of how a user-centric approach could overcome common barriers to digital adoption in developing economies.

This study aligns with the existing literature on the need for system dependability, a communication approach, and user interface accessibility. It uniquely emphasises that while technology infrastructure is important, user experience and local context must be considered to achieve maximum overall impact from digital government efforts.

6.0 Conclusions and Recommendations

6.1 Conclusion

This study concludes that implementing the WMA-MIS has significantly improved service delivery. The system successfully modernised the agency's operations by enhancing transparency, strengthening consumer protection, and improving institutional accountability. By providing real-time, verifiable transaction information via SMS and digital receipts, the WMA-MIS fostered a new level of trust and empowerment among customers, particularly among women and individuals with lower levels of education.

The system was also proven to be an effective mechanism for safeguarding consumers and ensuring market integrity by enabling real-time verification of measuring instruments and creating secure and digital audit trails for all transactions. Finally, the system improved regulatory compliance and accountability with the agency through automated report features. However, the study identified a critical challenge: the system's perceived accountability depends directly on its technical reliability, underscoring the need for sustained investment in system maintenance and reliability to ensure its long-term success and continued user trust.

6.2 Recommendations

It is critical to enhance the reliability of the WMA-MIS, as the system failures significantly undermine users' trust and perceptions of accountability. Therefore, the system must undergo regular technical upgrades, continuous maintenance, and the immediate resolution of errors to serve as a truly accountable tool. The WMA-MIS interface should be redesigned to be more intuitive and user-friendly, particularly for those with limited digital literacy. This strategic enhancement is vital to promoting broader adoption and ensuring that the system's benefits are accessible to all customer segments, the study's key objective. The

user experience must be intuitive for all customers, especially those with limited digital literacy. This will build on the current success and promote broader adoption.

To further enhance customer protection and compliance, the WMA-MIS should be critically integrated with other government systems related to regulatory and trade standards. This would facilitate real-time data sharing, enable the immediate detection of non-compliance issues and ensure a more synchronised and collaborative approach to consumer protection across all relevant regulatory bodies.

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