

Assessment of Technological Factors Affecting the Adoption of Electronic Payment in Local Government Authorities: A Case of Morogoro Municipal Council

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Abstract: This study examined technological factors influencing the adoption of electronic payment systems in Local Government Authorities (LGAs), using Morogoro Municipal Council as a case study. Although electronic payments improve efficiency, transparency, and revenue collection, adoption has been inconsistent due to technological barriers. A mixed-methods approach was employed, collecting data from 16 council employees and 83 local business residents through structured questionnaires and semi-structured interviews. The findings indicate that unreliable internet connectivity, complex user interfaces, insufficient security features, limited technical support, frequent system downtimes, device incompatibility, slow transaction processing, and irregular system updates significantly hinder adoption. Addressing these challenges is critical for enhancing user trust, improving system usability, and encouraging wider uptake of electronic payment systems. The study recommends strengthening ICT infrastructure, optimizing system performance, enhancing security measures, providing robust technical support, and implementing regular system updates to facilitate effective adoption and improve financial management in LGAs.

Keywords: *Electronic Payment Systems, Technological Factors, Adoption, ICT Infrastructure, User Acceptance, System Usability.*

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I. INTRODUCTION

Local Government Authorities (LGAs) in Tanzania have traditionally relied on cash-based financial systems, a practice that has presented significant challenges in efficiency, transparency, and accountability (Iacuzzi, 2022). Cash transactions are often cumbersome, resulting in delays in revenue collection and creating opportunities for mismanagement and corruption. Research by Bwalya and Mulundano (2023) emphasizes that the absence of effective electronic payment systems can lead to substantial revenue losses and hinder the overall development of local institutions.

In response to these challenges, the adoption of electronic payment systems is increasingly recognized as a critical step in modernizing financial transactions within LGAs. These systems streamline processes, reduce transaction costs, and enhance the accuracy of revenue reporting (Taherdoost, 2023). They also provide improved tracking of financial flows, significantly lowering the likelihood of fraud and misappropriation of funds (Saleh et al., 2024). Despite these benefits, the adoption of electronic payment systems across LGAs has been uneven, influenced by various technological, socio-economic, and institutional factors. Infrastructural limitations, such as inadequate internet connectivity, insufficient technology, and unreliable electricity supply, pose significant obstacles to implementation (Putrevu & Mertzanis,

2024). Moreover, limited digital literacy among staff and users can impede effective utilization of these systems.

User acceptance remains another critical determinant of successful adoption. Resistance to change, lack of awareness, and fear of technology can generate skepticism among users, undermining the potential benefits of electronic payments (Venkatesh et al., 2012). Socio-economic factors, including income levels and education, further influence individuals' willingness to adopt new technologies (Davis, 1989). At the national level, initiatives such as the Government Electronic Payment Gateway (GePG) aim to facilitate secure and accountable revenue collection. However, despite being mandatory, practical implementation of the GePG often faces resistance or partial compliance due to institutional and operational challenges, including gaps in policy enforcement and inadequate alignment of internal procedures.

Understanding the technological barriers of electronic payment adoption is therefore essential for LGAs seeking to modernize their financial operations. This study focuses specifically on the Morogoro Municipal Council to assess how technological factors affect the uptake and effective use of electronic payment systems.

II. THEORETICAL FRAMEWORK

This study was guided by the Technology Acceptance Model (TAM), first introduced by Davis (1989). TAM is a foundational framework for understanding how individuals adopt and use new technologies. The model posits that perceived ease of use (the degree to which a system is believed to be free of effort) and perceived usefulness (the degree to which a system is believed to enhance performance) are the primary determinants of technology adoption. TAM has been widely applied and extended in various contexts, including organizational settings and public sector institutions, to explain user acceptance of technological innovations (Venkatesh & Davis, 2000).

A major strength of TAM is its simplicity and predictive capability, allowing researchers and practitioners to assess key factors influencing technology adoption and design interventions to enhance acceptance (Venkatesh & Bala, 2008). However, the model also has limitations, as it tends to focus on

individual perceptions while underestimating broader contextual and organizational influences, such as infrastructure availability, digital literacy, and socio-economic factors (King & He, 2006). These limitations are particularly relevant in Local Government Authorities (LGAs), where technological, institutional, and user-related factors interact to shape adoption outcomes.

TAM is highly relevant for examining the adoption of electronic payment systems in LGAs. By emphasizing perceptions of ease of use and usefulness, the model provides a lens to understand how technological factors influence employees' and citizens' acceptance of electronic payment platforms. In the context of the Morogoro Municipal Council, TAM can help identify both facilitators.

III. METHODOLOGY

This study was guided by a pragmatic research philosophy and employed a mixed-methods approach, integrating both qualitative and quantitative approaches to gain comprehensive insights. A survey research design was applied, targeting 16 employees from the Business Department and 83 local business residents, with purposive sampling for employees and convenience sampling for residents. Data were collected using structured questionnaires for residents and semi-structured interviews for employees, with instruments validated by experts and pilot-tested to ensure reliability. Quantitative data were analyzed using statistical software, while qualitative data underwent thematic analysis. Ethical considerations, including informed consent, confidentiality, and secure data handling, were observed to ensure the credibility and integrity of the research process.

IV. FINDINGS AND DISCUSSION

The study examined various technological factors influencing the adoption of electronic payment systems, as summarized in Table 1. These factors include internet reliability, system usability, security features, technical support, system stability, device compatibility, transaction speed, and regular updates. Understanding these factors is essential for identifying barriers and opportunities to enhance user adoption and improve the effectiveness of electronic payment platforms.

Table 1: Technological Factors Affecting the Adoption of Electronic Payment Systems

Statements	SA n (%)	A n (%)	UN n (%)	D n (%)	SD n (%)	Total n (%)
Unreliable internet services hinder the adoption of electronic payment systems	41 (49.4%)	27 (32.5%)	6 (7.2%)	6 (7.2%)	3 (3.6%)	83 (100%)
Electronic payment platforms are not user-friendly and are difficult to navigate	36 (43.4%)	32 (38.6%)	9 (10.8%)	4 (4.8%)	2 (2.4%)	83 (100%)

Lack of robust security features reduces trust among electronic payment system users	39 (47.0%)	31 (37.3%)	6 (7.2%)	5 (6.0%)	2 (2.4%)	83 (100%)
Technical support is often unavailable or insufficient for users	39 (47.0%)	31 (37.3%)	6 (7.2%)	5 (6.0%)	2 (2.4%)	83 (100%)
Frequent system downtimes significantly discourage the use of electronic payments	31 (37.3%)	30 (36.1%)	8 (9.6%)	9 (10.8%)	5 (6.0%)	83 (100%)
Incompatibility with multiple devices limits the adoption of the system	42 (50.6%)	26 (31.3%)	8 (9.6%)	5 (6.0%)	2 (2.4%)	83 (100%)
Slow transaction processing deters users from utilizing the platform	33 (39.8%)	29 (34.9%)	10 (12.0%)	7 (8.4%)	4 (4.8%)	83 (100%)
Lack of regular updates diminishes the functionality and usability of payment systems	35 (42.2%)	30 (36.1%)	9 (10.8%)	6 (7.2%)	3 (3.6%)	83 (100%)

NB: SA = Strongly Agree, A = Agree, UN = Undecided, D = Disagree, SD = Strongly Disagree, n = Frequency and % = Percent

Source: Field Data (2025)

➤ *Unreliable Internet Services Hinder Adoption*

The survey shows that 81.9% of respondents (49.4% strongly agree and 32.5% agree) believe that unreliable internet services negatively impact the adoption of electronic payment systems. This strong majority highlights internet connectivity as the backbone of successful electronic payment systems implementation. Given that electronic payment systems depend on continuous online access, interruptions or slow internet speeds can frustrate users, causing delays or transaction failures. These issues discourage business owners from fully integrating digital payments, particularly in areas with poor network infrastructure, like parts of Morogoro Municipal. A small minority (10.8%) were undecided or disagreed, indicating some variance in internet experience or possible use of offline-capable solutions.

As one respondent noted:

“When the internet is down or too slow, our clients lose patience. Transactions stall, payments fail, and trust in the system drops. It’s frustrating because the technology is there, but the connection isn’t stable enough to support it.”

This insight aligns with the understanding that digital payment platforms require uninterrupted online access. Interruptions lead to transaction delays or outright failures, discouraging especially small business owners who cannot afford to lose sales due to technical glitches.

Another respondent elaborated:

“In parts of Morogoro, the network coverage is patchy. Some areas have weak signals, and that keeps people sticking to cash even when they want to try electronic payments.”

These lived experiences reinforce the scholarly literature emphasizing robust ICT infrastructure as foundational.

This finding aligns with existing literature, which emphasizes the necessity of robust ICT infrastructure for digital financial services. Kessy (2019) identified poor internet connectivity as a major hindrance to e-payment adoption, reinforcing the importance of stable network access. Similarly, Al-Rahbi et al. (2012) found that ICT infrastructure was a key technical factor influencing e-government adoption, further validating the role of internet reliability in digital transaction systems. Additionally, Vol and Singh (2024) highlighted infrastructure limitations as persistent obstacles affecting e-payment reliability, suggesting that without consistent internet services, user confidence and adoption rates may suffer. These studies collectively emphasize that improving internet accessibility and stability is crucial for fostering wider electronic payment system adoption.

➤ *User Interface Complexity Reduces Usability*

With 82% (43.4% strongly agree, 38.6% agree) perceiving electronic payment platforms as not user-friendly or difficult to navigate, usability clearly poses a barrier to adoption. Complex interfaces deter less tech-savvy business owners, especially small enterprises and older users, who may struggle with multi-step processes, unclear menus, or jargon-heavy options. Simplifying interfaces and providing intuitive navigation are essential to enhance user experience and encourage adoption. Only 7.2% disagreed, suggesting some platforms may already be easy to use, but these remain in the minority.

Respondent confirmed this observation:

“Many business owners, especially older ones or those not familiar with smartphones, find the apps confusing. There are too many steps or unclear instructions, so they give up or avoid using them.”

The significance of user-friendliness in digital payment adoption is well-documented in prior research. Shahzad et al. (2018) found that perceived ease of use significantly influenced

users' intention to adopt e-payment systems, mediated by perceived usefulness. Similarly, Kafley and Chandrasekaran (2021) revealed that perceived ease of use was a statistically significant factor in adoption intentions. Additionally, Lallmahomed et al. (2017) noted that facilitating conditions, including intuitive system design, positively impacted behavioral intention to use digital payments. These findings collectively suggest that simplifying platform navigation and enhancing usability can significantly boost adoption rates, particularly among less tech-savvy users.

➤ *Lack of Strong Security Features Undermines Trust*

Security is a cornerstone for digital financial transactions. Here, 84.3% of respondents (47% strongly agree, 37.3% agree) feel that weak security features reduce user trust in electronic payment systems. Concerns may include fears about fraud, data breaches, or unauthorized access to accounts. This lack of confidence can deter users from fully committing to electronic payments, preferring cash or other familiar methods perceived as safer. The presence of only 8.4% disagreement indicates a widespread consensus on the importance of security and the perceived gaps in current systems.

Existing literature strongly supports the link between security features and user trust in digital payments. Barkhordari et al. (2017) found that both perceived security and trust had a positive impact on e-payment usage, with technical procedures and security guidelines being particularly influential. Similarly, Igudia (2016) identified perceived security as a key facilitator of electronic payment adoption among SMEs. Furthermore, Pešterac and Tomić (2020) highlighted data security as a critical challenge in digital payment systems, emphasizing the need for robust safeguards against unauthorized access. These studies collectively affirm that enhancing security measures is essential for sustaining user trust and encouraging broader system adoption.

➤ *Insufficient Technical Support*

The data reveals 84.3% agreement (47% strongly agree, 37.3% agree) that technical support for electronic payment systems users is often unavailable or inadequate. Effective customer support is crucial for resolving issues like failed transactions, password resets, or feature guidance. Without prompt and reliable assistance, users may become frustrated and abandon the platform. Insufficient support disproportionately affects new adopters who require onboarding help, indicating a need for improved service channels such as hotlines, live chat, or in-person support within Morogoro.

The importance of technical support in digital payment adoption is echoed in prior studies. Kessy (2019) identified the lack of technical support as a major challenge hindering e-payment implementation, particularly among users with limited technological familiarity. Similarly, Al-Rahbi et al. (2012) found that technical expertise was a critical factor in e-government adoption, suggesting that accessible support

services are vital for user confidence. Additionally, Kapongo and Mutalemwa (2024) recommended training programs to enhance technology adoption, reinforcing the need for robust support systems. These findings collectively indicate that strengthening technical assistance can mitigate user frustrations and improve overall system reliability.

➤ *Frequent System Downtime Discourages Usage*

More than two-thirds (73.4%, combining 37.3% strongly agree and 36.1% agree) perceive frequent electronic payment systems downtimes as a deterrent. Unreliable availability interrupts business transactions, causing loss of sales and customer dissatisfaction. Downtime may result from server failures, maintenance, or network issues, signaling infrastructure weaknesses. While 16.8% disagreed or strongly disagreed, possibly due to using more stable platforms, the high agreement underlines system reliability as a priority for continuous adoption.

This finding is corroborated by multiple studies highlighting the detrimental effects of system instability. Vol and Singh (2024) identified system reliability as a major technological obstacle affecting e-payment adoption, with downtimes undermining transaction efficiency. Similarly, Kessy (2019) noted that unreliable electricity and internet connectivity disrupted e-payment operations, further emphasizing the need for stable infrastructure. Additionally, Putrevu and Mertzanis (2024) outlined system reliability as a key risk in digital payment growth, proposing mitigation strategies to enhance performance. These studies collectively suggest that reducing system downtimes through infrastructure improvements and backup solutions is essential for sustaining user engagement and trust in electronic payment platforms.

➤ *Device Incompatibility Limits Access*

Half the respondents (50.6% strongly agree and 31.3% agree; totaling 81.9%) identified incompatibility with multiple devices as a significant limitation. Many users access electronic payment systems through smartphones, tablets, or desktop computers running different operating systems. Systems that function only on select devices or outdated platforms exclude potential users, especially in regions where device variety and affordability vary. This finding calls for developers to prioritize cross-platform compatibility and lightweight applications to cater to a diverse user base.

One respondent observed:

“Some apps only work on certain phones or operating systems. Many small business owners have older devices that can't support the latest versions.”

Another respondent pointed out the following:

“Cross-platform support is missing. People get stuck because their device isn't compatible, so they revert to cash.”

This aligns with existing literature emphasizing the role of technical infrastructure in digital payment adoption. Al-Rahbi et al. (2012) identified ICT infrastructure as a critical factor in e-government adoption, suggesting that seamless device interoperability enhances usability. Similarly, Vol and Singh (2024) noted that system compatibility remains a persistent challenge, with limitations in cross-platform functionality hindering widespread adoption. Igudia (2016) further supports this, finding that firm IT infrastructure significantly facilitates electronic payment system adoption, reinforcing the need for multi-device support to accommodate diverse user preferences.

➤ *Slow Transaction Processing Deters Users*

Concerns about slow transaction speed were affirmed by 74.7% (39.8% strongly agree, 34.9% agree). Speedy transaction processing is crucial for business efficiency and customer satisfaction. Delays can lead to queues, frustrated customers, and lost revenue, particularly in fast-paced retail or service environments. Slow processing might be due to server limitations, poor internet, or inefficient software algorithms. Although 13.2% disagreed, indicating some users experience acceptable speeds, the majority call for system optimization to boost speed.

The significance of transaction speed resonates with prior research on performance expectancy in digital payments. Lallmahomed et al. (2017) found that performance expectancy positively influences behavioral intention, with users prioritizing systems that deliver quick and reliable transactions. Wekesa (2022) also highlighted mobile payment systems' strong impact on revenue collection, partly attributed to their efficiency. Additionally, Kessy (2019) observed that e-payment systems improved revenue monitoring through faster processing, though challenges like poor internet connectivity could undermine speed, emphasizing the need for robust technical support to sustain performance.

➤ *Lack of Regular System Updates Affects Functionality*

Finally, 78.3% of respondents (42.2% strongly agree, 36.1% agree) agreed that infrequent updates negatively impact electronic payment systems' functionality and usability. Regular updates address security vulnerabilities, improve features, and enhance user experience. Failure to maintain systems can lead to obsolete technology, increasing the risk of bugs, security threats, and incompatibility with newer devices or software standards. The relatively low disagreement (10.8%) suggests most users recognize the importance of continuous system maintenance.

The importance of system updates is corroborated by studies on technological adaptability and security. Barkhordari et al. (2017) stressed that technical procedures and security guidelines shape user trust, with regular updates being key to maintaining secure transactions. Pešterac and Tomić (2020) further emphasized that emerging technologies like IoT and blockchain require continuous updates to address security vulnerabilities and enhance functionality. Similarly, Putrevu

and Mertzanis (2024) identified system reliability as a critical success factor, advocating for iterative improvements to mitigate risks such as data breaches, thereby sustaining user confidence in digital payment ecosystems.

V. CONCLUSION

The study concludes that technological factors play a pivotal role in shaping the adoption of electronic payment systems in the Morogoro Municipal Council. Key barriers include unreliable internet connectivity, complex user interfaces, inadequate security features, insufficient technical support, frequent system downtimes, device incompatibility, slow transaction processing, and irregular system updates. These challenges collectively undermine user trust, reduce system usability, and limit the widespread adoption of electronic payment platforms.

RECOMMENDATIONS

To enhance adoption, it is recommended that the Morogoro Municipal Council should:

- Improve internet infrastructure to ensure stable and continuous connectivity for all users.
- Strengthen security measures to protect users' data and foster trust in electronic transactions.
- Enhance technical support services, including responsive hotlines, live chat, and in-person assistance.
- Optimize transaction processing speed to minimize delays and improve operational efficiency.
- Implement regular system updates to maintain functionality, security, and user confidence.

By addressing these technological factors, the council can promote greater adoption of electronic payment systems, improve financial management, and enhance service delivery to residents and business owners.

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