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STRATEGIC MANAGEMENT

STRATEGIC REVENUE COLLECTION AUTOMATION AND REVENUE GROWTH IN NAIROBI CITY COUNTY

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ABSTRACT

Purpose of the Study: This study examined how revenue collection automation influences revenue performance within Nairobi City County Government.

Problem Statement: Despite major investments in digital systems, Nairobi City County still faces revenue gaps due to fragmented platforms, low ICT capacity, limited taxpayer trust, and weak infrastructure that hinder effective automation.

Research Methodology: The study adopted a descriptive research design targeting 1,639 revenue staff from various sub-counties. Stratified random sampling was used to select a representative sample. Data was collected using structured questionnaires and analyzed using descriptive statistics, correlation analysis, and multiple regression modelling. The findings were presented using tables and figures for clarity and interpretation.

Findings: The study found a positive and statistically significant relationship between the major automation component system integration, ICT competency, taxpayer awareness, and infrastructure adequacy and revenue growth in Nairobi County. Automation was shown to enhance compliance, reduce leakages, and support more efficient revenue administration when supported by adequate human and technological capacity.

Conclusion: The study concludes that revenue automation can significantly strengthen revenue performance when supported by proper system integration, continuous staff training, strong infrastructure, and high levels of user acceptance.

Recommendations: The study recommends comprehensive policy reforms focusing on end-to-end system interoperability, staff capacity development, taxpayer digital literacy programs, and sustained investment in ICT infrastructure. Enhancing user acceptance and adoption is also essential to maximize the benefits of revenue automation.

Keywords: *Automation, revenue performance, system integration, ICT competency, taxpayer compliance, infrastructure adequacy*

INTRODUCTION

Revenue collection automation has become a central strategy for enhancing accuracy, efficiency, and transparency in public financial administration globally. Digital revenue systems reduce leakages, promote accountability, and improve real-time monitoring of financial transactions (World Bank, 2021). In developed economies, digital tax ecosystems such as Brazil's *Nota Fiscal Eletrônica* and South Korea's real-time tax reporting have significantly expanded tax bases and improved compliance (Pomeranz & Vila-Belda, 2021; OECD, 2021). Across Africa, countries such as Rwanda and Nigeria have reported substantial revenue gains following the implementation of electronic tax platforms (Nsabimana et al., 2022; FIRS, 2021).

In Kenya, county governments rely on local revenues such as land rates, business permits, parking fees, and market services to support devolved functions. Historically, these revenues were collected manually, contributing to leakages, fraud, and underreporting (CRA, 2021). Nairobi County, which serves as the nation's economic hub, implemented automated revenue systems to address these inefficiencies. Daily revenue collections reportedly increased from KSh 7 million to KSh 14 million following automation reforms (Nairobi County Government, 2021). Similarly, Mombasa County saw a 35% increase in revenue after adopting digital platforms (Nduta & Kiiru, 2021).

Despite these advances, revenue automation in Nairobi County faces persistent challenges. Fragmented systems, inadequate interoperability, low ICT competency

among staff, limited taxpayer trust, and inconsistent infrastructure readiness continue to undermine revenue performance (Achieng, 2024; Omondi, Mwalili & Mose, 2022). Furthermore, the rapidly evolving nature of digital technologies requires robust adoption strategies, consistent capacity building, and resilient ICT infrastructure (KIPPRA, 2023). Grounded in Systems Theory, Human Capital Theory, the Theory of Planned Behavior, Diffusion of Innovations, the Technology Acceptance Model (TAM), and Transaction Cost Theory, this study critically investigated how automation shapes revenue outcomes in Nairobi City County.

STATEMENT OF THE PROBLEM

Revenue growth is fundamental to sustainable fiscal management at the county level. Nairobi City County has invested heavily in digital revenue collection systems with the expectation of reducing leakages and enhancing transparency (Nairobi City County, 2024; KRA, 2024). However, despite these investments, revenue performance remains below potential. Annual reports by the Commission on Revenue Allocation indicate that counties collectively lose between KSh 30–50 billion due to inefficiencies in revenue administration, including weak automation structures (CRA, 2021).

The persistent underperformance can be attributed to several systemic issues. First, fragmented systems and lack of full interoperability limit the seamless flow of real-time data, thereby weakening revenue monitoring and enforcement (Controller of Budget, 2023; Omondi et al., 2022). Second, staff ICT capacity remains inadequate, constraining the effective operation, maintenance, and troubleshooting of automated systems (Cherop & Olweny, 2025). Third, taxpayer mistrust and limited digital literacy hinder the adoption of automated platforms, leading to late payments, underreporting, and non-compliance (Mosii, 2023).

Fourth, unreliable infrastructure, particularly internet connectivity and device availability further weakens the automation ecosystem (Achieng, 2024). Meanwhile, prior studies emphasize that the success of digital tax systems depends heavily on user acceptance and perceived system usefulness (Davis, 1989; Venkatesh & Bala, 2008). Without strong adoption, automated systems cannot deliver their intended benefits.

These gaps create a persistent mismatch between Nairobi's automation investments and actual revenue outcomes, necessitating a detailed assessment.

RESEARCH OBJECTIVES

i. To evaluate the impact of system integration and interoperability on revenue growth in Nairobi City County Government.

ii. To assess the effect of staff ICT competency and training on revenue growth in Nairobi City County Government.

iii. To examine the influence of taxpayer awareness and compliance culture on revenue growth in Nairobi City County Government.

iv. To analyze how infrastructure adequacy affects the implementation of revenue growth in Nairobi City County Government.

v. To determine the moderating role of user acceptance and adoption on the relationship between automation factors and revenue growth in Nairobi City County Government

RESEARCH HYPOTHESES

i. H_{01}: System integration and interoperability have no significant influence on revenue growth in Nairobi City County Government.

ii. H_{02}: Staff ICT competency and training have no significant effect on revenue growth in Nairobi City County Government.

iii. H_{03}: Taxpayer awareness and compliance culture have no significant influence on revenue growth in Nairobi City County Government.

iv. H_{04}: Infrastructure adequacy has no significant effect on revenue growth in Nairobi City County Government.

v. H_{05}: User acceptance and adoption do not significantly moderate the relationship between automation factors and revenue growth in Nairobi City County Government.

THEORETICAL REVIEW

This study was anchored on several theories that explain how automation, human capacity, behavioural factors, and technology adoption influence revenue collection performance. Systems Theory views organizations as interconnected subsystems whose performance depends on coordination, information flow, and integration (Midgley, 2023). In public sector revenue administration, integration of automated systems enhances data consistency and reduces redundancies, improving revenue efficiency (Jalonen, 2025). The theory supports the argument that effective system integration and interoperability improve fiscal outcomes by enhancing transparency and real-time information sharing.

Human capital theory emphasizes employee skills, knowledge, and training as key drivers of organizational productivity (Becker, 1964). In automated revenue systems, staff ICT competency is essential for operating digital platforms effectively, reducing errors, and increasing compliance (Mutio, Bunyasi, & Nyamita, 2023). Thus, human capital investment is directly linked to improved revenue collection performance in county governments. TPB posits that behaviour is shaped by attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). In revenue collection, taxpayer awareness and compliance culture influence willingness to engage with automated platforms. Research shows that taxpayers with higher awareness exhibit stronger compliance intentions and improved voluntary tax participation (Taing & Chang, 2021). This theory explains how technological innovations spread based on perceived advantages, compatibility, complexity, trialability, and observability (Rogers, 2003).

Infrastructure adequacy enhances the adoption of automated revenue systems by improving ease of use and system reliability (Okour, Chong, & Abdel Fattah, 2021). Counties with strong ICT infrastructure experience higher rates of automation uptake (Mwamkinga & Barongo, 2025). TAM states that perceived usefulness and perceived ease of use predict technology adoption (Davis, 1989). In public revenue systems, user acceptance determines how effectively automated platforms are utilized. Higher acceptance among revenue officers and taxpayers correlates with improved compliance and system performance (Marikyan & Papagiannidis, 2025; Ligeyo, 2023). Transaction Cost Theory suggests that organizations adopt systems that reduce

monitoring, searching, and enforcement costs (Williamson, 1981). Integrated automated platforms reduce transaction costs such as manual reconciliation, verification delays, and fraud detection (Cuypers et al., 2021), improving overall revenue efficiency (Zhou et al., 2022).

EMPIRICAL REVIEW

Studies in Kenya indicate that integrated digital tax systems improve data accuracy and expand the tax base (Kamau, 2024). In Nairobi, interoperable platforms accelerated transaction processing by 35% and strengthened fraud detection (Otieno, 2023). Broader African studies also show interoperability reduces administrative costs and improves fiscal capacity by up to 15% (Munyua, 2025; Ochieng & Wanjiku, 2025). Revenue automation is most effective when staff possess adequate ICT skills (Mosii, n.d.). Training improves accuracy, reduces revenue leakages, and enhances timely service delivery (Chebotibin, Matanda, & Otinga, 2021). ICT training also improves infrastructure utilization and system adoption (Omondi, Mwalili, & Mose, 2022). Awareness programmes increase voluntary compliance, as seen in Nairobi's informal sector where compliance rose by 18% after targeted education (Mwangi et al., 2023).

Compliance culture enhances the effect of awareness on tax behaviour (Wambua & Otieno, 2024). Positive interactions with tax officers also build trust and support compliance (Kariuki, 2023). Weak ICT infrastructure limits automation success (Omondi et al., 2022). Nairobi County's Revenue System demonstrated that stable internet, secure servers, and multiple digital payment channels contribute to improved compliance and transaction accuracy (Nairobi County Government, 2023). However, infrastructure requires continuous upgrades to ensure sustainability (IRJBSM, 2022). User acceptance is a strong predictor of automation success. Staff resistance or limited adoption leads to underutilized systems and persistent manual errors (Omondi et al., 2022). Technology absorption improves system effectiveness and revenue performance (Chebotibin et al., 2021). Enhanced user perceptions of usefulness and ease of use strongly predict adoption (Academia.edu, 2023).

CONCEPTUAL FRAMEWORK

Figure 1 presents the conceptual framework

Independent Variables

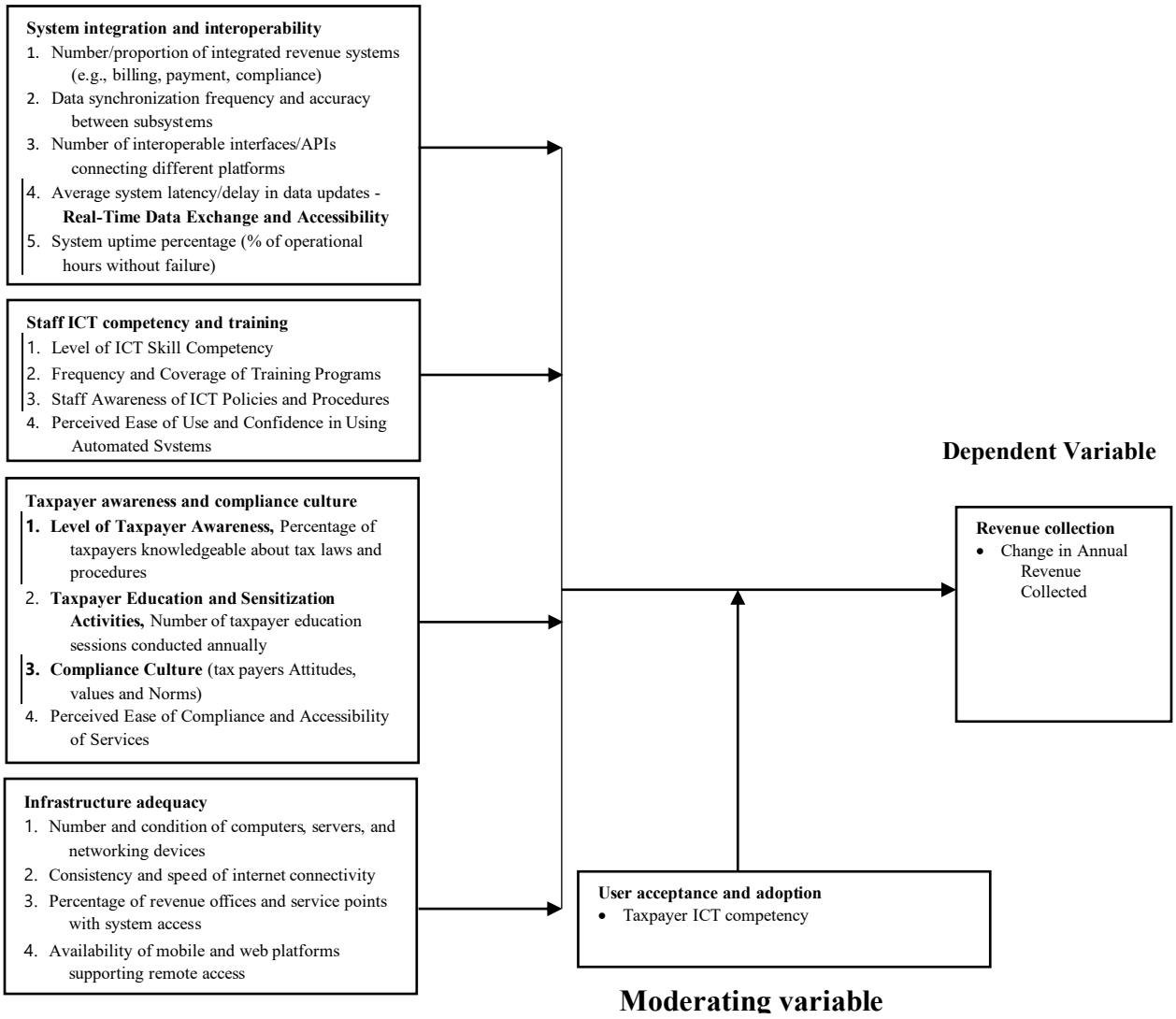

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

This study used a descriptive research design, suitable for examining relationships between automation factors and revenue performance without manipulating variables (Kothari, 2014). It enabled an objective assessment of system integration, staff competency, taxpayer awareness, infrastructure adequacy, and user acceptance. The study targeted 1,639 personnel working in revenue administration at Nairobi City County, including revenue officers, ICT staff, training personnel, and finance officers (Nairobi County Government, 2025). Stratified random sampling ensured fair representation across staffing levels (Mugenda & Mugenda, 2003). The sample size (n = 322) was calculated using Fisher's formula for large populations (Fisher et al.,

1998).

Structured questionnaires were used to gather quantitative data on each variable. Questionnaires are appropriate for large samples and yield reliable standardized responses (Bryman, 2016). Quantitative data were analyzed using descriptive statistics for summaries, correlation analysis for relationships and regression analysis to test predictive effects. Participants were assured of informed consent, confidentiality, voluntary participation, and secure data handling, following ethical research guidelines (Creswell, 2014).

RESULTS AND DISCUSSIONS

Results and Discussions

This section presents a synthesis of the study findings and links them to existing empirical and theoretical literature. The study sought to examine the strategic influence of revenue collection automation on revenue growth in Nairobi County, focusing on four core dimensions: System Integration and Interoperability, Staff ICT Competency and Training, Taxpayer Awareness and Compliance Culture, and Infrastructure Adequacy, with User Acceptance and Adoption as a moderate variable.

Response Rate and Background Characteristics

The response rate of 86.02% was considered excellent and acceptable for statistical inference, aligning with the benchmark that response rates above 70% are excellent for generalization (Lund, 2023). The respondents represented diverse roles within the revenue administration ecosystem, primarily revenue collection officers, with varying experience levels and education backgrounds. This ensured reliable and informed feedback regarding revenue automation and its outcomes.

Descriptive Findings and Discussion

Most respondents confirmed that Nairobi County has integrated key revenue systems billing, payment, and compliance though the level of integration varied, with 75–89% integration being the most common rating. The presence of functional APIs and high system uptime indicates progressively improving system architecture. These findings support literature emphasizing that interoperability enhances operational efficiency,

reduces leakages, and improves transparency in public revenue administration (Kumar, 2023). Efficient integration minimizes manual handling, accelerates data flow, and supports strategic decision-making. While staff confidence and competency were reported as generally high, neutral responses on training adequacy suggest gaps in continuous ICT upskilling.

Quarterly and monthly ICT trainings were the most common, indicating institutional commitment, though not universal. This resonates with Abu-Bader (2021), who argued that insufficient ICT capacity weakens the operational value of automated systems. High confidence levels reported (61% being high or very high) affirm that the automation agenda is supported by human capacity. The study found strong compliance culture indicators, with over 70% of taxpayers reported as knowledgeable about tax laws. Social norms encouraging voluntary compliance were also prominent. These findings align with the assertion that awareness and compliance culture are critical determinants of tax performance (Alita et al., 2021). Automation alone cannot drive revenue growth without taxpayer willingness to participate in the digital ecosystem. Infrastructure elements such as computers, servers, and connectivity were generally adequate, though variations existed. Internet speeds were largely fast (26–100 Mbps), which supports seamless revenue operations.System access in revenue offices exceeded 85% in most cases. This is consistent with Saleh and Rosli (2024), who argue that system reliability and infrastructure sufficiency directly influence the efficiency of automated public financial management processes. Taxpayer ICT competency was high, and adoption of digital services was strong. The findings confirm that end-user readiness is a crucial determinant of successful implementation of digital solutions, supporting the Technology Acceptance Model (TAM).

Inferential Findings and Discussion

All independent variables demonstrated strong and positive correlations with revenue growth ($p < 0.01$). The strongest correlation was observed with Taxpayer Awareness and Compliance Culture ($r = .777$), followed by Infrastructure Adequacy ($r = .753$) and User Acceptance and Adoption ($r = .696$). These results show that both technical and behavioral aspects significantly influence revenue growth, confirming theories of digital public finance management. The combined independent variables explained 69.7% of the variance in revenue growth. All independent variables had significant

positive effects, with Taxpayer Awareness and Compliance Culture having the greatest influence ($\beta = 0.467$, $p = 0.000$).

This highlights that automation must be complemented by informed and compliant taxpayers. The optimal model was $Y = 0.300 + 0.172X_1 + 0.151X_2 + 0.395X_3 + 0.138X_4$. These results reinforce the argument that revenue mobilization is a multi-dimensional function requiring both effective systems and informed stakeholders. User Acceptance and Adoption significantly enhanced the relationship between automation and revenue growth (R^2 change = 0.006; $p = 0.024$). Though small, the effect is statistically meaningful, demonstrating that technology yields better outcomes when embraced by users. The moderated model was: $Y = 0.281 + 0.140X_1 + 0.378X_3 + 0.127X_4 + 0.126X_5$. This confirms TAM theory, where acceptance strengthens the success of digital systems.

CONCLUSIONS

The study concludes that revenue collection automation has a significant and positive influence on revenue growth in Nairobi County. The findings reveal that system integration and interoperability, staff ICT competency and training, taxpayer awareness and compliance culture, and infrastructure adequacy all contribute meaningfully to improvements in revenue performance. Among these, taxpayer awareness and compliance culture emerged as the strongest determinant, indicating that technological solutions alone are insufficient unless taxpayers understand, appreciate, and comply with revenue requirements.

The results further show that integrated revenue systems supported by reliable infrastructure reduce errors, enhance efficiency, and expand the capacity for processing taxpayers. Staff competence in ICT also plays a critical role by ensuring that automated systems are effectively utilized, although the study notes existing gaps in continuous training that require attention. Additionally, the study establishes that user acceptance and adoption significantly moderate the relationship between automation and revenue growth, reinforcing the idea that technology yields optimal results when both staff and taxpayers willingly embrace digital platforms. Overall, the study concludes that revenue automation is a multifaceted process whose success depends on both technical and human factors working in synergy.

RECOMMENDATIONS

The study recommends that Nairobi County should strengthen system integration by completing the linkage of all revenue-related platforms to ensure seamless data flow and improved operational efficiency. Enhancing staff ICT competency should be prioritized through regular, structured, and mandatory training programs aimed at addressing emerging technological needs and ensuring that personnel remain adept at using automated systems. In addition, the county should intensify taxpayer education and awareness initiatives by increasing the frequency and reach of sensitization programs, leveraging both digital channels and community-based approaches to build a stronger compliance culture.

Infrastructure adequacy should also be improved by upgrading hardware, increasing internet reliability, and expanding system access to all revenue offices to enable a consistent and efficient working environment. Finally, user acceptance and adoption of automated revenue systems should be promoted by simplifying system interfaces, offering continuous support to taxpayers, and implementing digital literacy initiatives that build confidence in the use of online payment and compliance platforms. Through a holistic approach that combines robust technology, skilled personnel, informed taxpayers, and supportive infrastructure, Nairobi County can enhance the effectiveness of its revenue automation and sustainably improve revenue growth.

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