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Adoption of E-Procurement Procedures and its Influence on Public Construction Projects in Kenya a Survey of Parastatals in Kenya

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***Abstract*— Despite the well-documented benefits of e-procurement systems, including enhanced transparency, efficiency, accountability, and cost-effectiveness, their adoption in Kenya's public construction sector remains relatively low. This is particularly evident among parastatals tasked with implementing infrastructure projects, where procurement processes are often characterized by manual systems, bureaucratic delays and limited digital integration. The slow uptake of e-procurement in this critical sector raises concerns about inefficiencies, misallocation of resources, and the overall effectiveness of public infrastructure delivery. In light of this gap, this study sought to assess the adoption of e-procurement procedures and their influence on public construction projects in Kenya, with a specific focus on identifying key barriers, evaluating the effectiveness of user training and education, and proposing strategies to enhance system uptake.**

This study was underpinned by the Technology-Organization-Environment framework, the Technology Acceptance Model, and Diffusion of Innovations Theory. The study employed a descriptive research design to examine the state of e-procurement implementation across four selected parastatals: Kenya National Highways Authority, Kenya Rural Roads Authority, Kenya Urban Roads Authority, and the National Housing Corporation. These agencies were selected for their central role in the planning and execution of public construction projects.

The findings from the study revealed that the adoption of e-procurement systems is hindered by several interrelated barriers. Chief among these are inadequate ICT infrastructure, resistance to change, high initial setup costs, lack of supplier readiness, and cybersecurity concerns. Training emerged as a critical enabler of adoption, with the majority of respondents acknowledging that structured training improved their understanding and use of e-procurement systems. However, only half had access to regular training, indicating a significant capacity gap. Key strategies proposed in this study to improve adoption included; strengthening ICT infrastructure, institutionalizing continuous training programs, enforcing procurement regulations, onboarding suppliers, and offering incentives to encourage system use.

The study concludes that while e-procurement presents a transformative opportunity for public procurement in Kenya, its success depends on addressing both technical and human factors. It recommends that policymakers prioritize infrastructure development, establish standardized training frameworks, and enhance enforcement of procurement regulations. The findings underscore the need for a holistic, stakeholder-driven approach to digital procurement reforms. These recommendations hold significant implications for improving procurement efficiency, promoting good governance and ensuring value for money in public construction projects.

***Keywords*— e-procurement, public construction projects, barriers, training**

I. INTRODUCTION

A. Background

The global construction sector remains a pivotal contributor to economic growth and employment, with projections indicating a potential $8 trillion increase by 2030 (Global Construction Perspectives, 2015). This expansion is anticipated to generate numerous job opportunities, emphasizing the industry's significance (Mutunga, 2020). Stimulus packages and recovery strategies have further revitalized construction activities, enhancing GDP growth (Mwangi & Arani, 2021; Ndei & Mutuku, 2021). A crucial innovation within this sector has been the adoption of e-procurement, which involves steps such as system selection, stakeholder engagement, integration into existing workflows, and adequate user training. For successful implementation, organizations must consider technological capacity, organizational culture, and regulatory compliance (Vaidya et al., 2006). Structured implementation, backed by policies and guidelines, is vital for overcoming potential barriers (Kerzner, 2017).

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Developed nations have widely adopted e-procurement systems, effectively addressing traditional procurement challenges by enhancing efficiency, reducing corruption, and improving supplier relationships (Nawi et al., 2016; Mandala et al., 2024; Mwangi & Arani, 2021). These global successes offer valuable lessons for regions like Africa. E-procurement is recognized for promoting equitable competition and fostering economic growth through improved transparency and cost-effectiveness. The African Development Bank (AfDB) has championed its adoption to advance public sector reforms. However, Africa faces significant challenges, including inadequate infrastructure, limited technological expertise, and resistance to change (Chisika et al., 2024). Insufficient ICT infrastructure and organizational reluctance to transition from traditional methods hinder progress (Mwalukasa, 2024; Myovela et al., 2023). Fears over job security and a lack of understanding about the benefits of e-procurement exacerbate resistance (Okuro & Paul, 2024). Nonetheless, e-procurement's potential to reduce human involvement and corruption remains a strong motivator for adoption (Jules, 2022). Countries like South Africa and Nigeria have made strides, although challenges persist (Chepng'etich et al., 2020). Kenya, however, remains under-researched in this regard, particularly within parastatals managing public construction projects.

In Kenya, the construction industry is a key economic driver, contributing over 6.7% of GDP and providing employment (KNBS, 2021). Significant government investments, such as the Ksh 172 billion allocated in 2020 for infrastructure projects like roads and housing, underscore its importance (Institute of Public Finance Kenya, 2020). Despite this, the sector struggles with procurement inefficiencies, delays, corruption, and regulatory non-compliance, leading to cost overruns and compromised quality (Githinji & Were, 2018; Afolabi et al., 2019; Mutangili, 2019). E-procurement has been identified as a solution to enhance transparency, efficiency, and accountability in these processes (Chebet & Kihara, 2022; Kandie & Wachiuri, 2023; Vaidya et al., 2006). Effective adoption could transform Kenya's public construction sector by addressing these persistent challenges (Mambo, 2015).

B. Research Problem

Despite the well-documented benefits of e-procurement, including improved efficiency, transparency, cost-effectiveness, and accountability, its adoption within Kenya's public construction sector remains limited (Abdi & Barasa, 2023; Geoffrey & Paul, 2021). Unlike other countries where e-procurement has been successfully integrated into public sector operations, Kenya's uptake has been slow and inconsistent, particularly within public construction projects across counties. This sluggish adoption hampers procurement efficiency and curtails opportunities for innovation in project management.

Key stakeholders, including procurement officers, project managers, ICT personnel, and financial administrators, face significant challenges stemming from legacy systems, manual procurement processes, and bureaucratic inefficiencies. These issues contribute to persistent delays, cost overruns, and reduced transparency in project delivery (Waithaka & Kimani, 2021). Resistance to change, driven by low awareness, poor digital literacy, and entrenched preferences for traditional methods, further compounds the problem (Adebayo & David, 2015).

Technological limitations, particularly in rural and underfunded counties, exacerbate the situation. Many public institutions lack stable internet connectivity, modern hardware, and secure platforms necessary for effective e-procurement (Obiero & Ngugi, 2024). Additionally, the shortage of personnel with adequate ICT skills further diminishes the likelihood of successful adoption, eroding system efficiency and user confidence (Mélon & Spruk, 2020).

Kenya's legal and regulatory frameworks have also lagged behind technological advancements, resulting in unclear guidelines and weak enforcement mechanisms (Mambo, 2015). This regulatory gap has made public institutions hesitant to invest in full-scale e-procurement systems.

While previous studies have explored e-procurement in the broader public sector, there is limited research on its application within Kenya's construction industry. This study sought to fill this gap by evaluating adoption levels, identifying barriers, assessing the impact of training and management support, and proposing strategies to advance e-procurement, ultimately aiming to improve efficiency, transparency, and service delivery in public construction.

C. Research Objectives

The main objective of this study was to assess the factors influencing the adoption of e-procurement procedures in public construction projects within parastatals in Kenya. Specifically, the study sought to evaluate the primary barriers to implementing e-procurement systems within public construction projects in Kenya, determine the effectiveness of user training and education in facilitating the adoption of e-procurement, and develop strategies to enhance the acceptance and implementation of e-procurement in Kenya's public construction sector.

D. Study Significance

The construction sector is vital to Kenya's economic growth, yet it faces persistent challenges such as delays, cost overruns, corruption, and lack of transparency in procurement. E-procurement offers a practical solution by enhancing efficiency, accountability, and transparency, but its adoption within public construction projects remains low. This study was justified by the urgent need to address these inefficiencies and reduce the risks of fraud and non-compliance through digital solutions. It sought to identify barriers and enabling factors specific to Kenya's construction sector, filling a gap in existing literature that often overlooks sector-specific challenges. The findings offer valuable insights for policymakers and institutions aiming to improve procurement processes through targeted policies, training, and technology investments. Ultimately, this research contributes to strengthening public financial management and improving service delivery in Kenya's construction industry.

II. LITERATURE REVIEW

A. E-procurement Adoption

Globally, the adoption of e-procurement in the public sector has been driven by the need to improve transparency, efficiency, and accountability while reducing procurement costs. Developed countries such as the United Kingdom, United States, and

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members of the European Union have been at the forefront of implementing these systems due to their advanced technological infrastructure, supportive legislation, and leadership commitment (Mandala et al., 2024; Mwangi & Arani, 2021). In the United Kingdom, e-procurement is integrated into public procurement, especially in construction, through initiatives like the Private Finance Initiative (PFI), which focuses on large-scale infrastructure projects. The UK government mandates e-procurement across all public entities, ensuring uniformity in procedures and enhanced transparency to minimize fraud (Jules, 2022; Myovela et al., 2023). Similarly, in the United States, systems such as the General Services Administration's (GSA) e-Buy platform enable procurement officials to source information and obtain quotations efficiently, streamlining the procurement process while enhancing decision-making (Mwalukasa, 2024). The effectiveness of these systems is often tied to robust financial management solutions (Abdi & Barasa, 2023; Kandie & Wachiuri, 2023). The European Union has also championed e-procurement, urging member states to adopt digital systems to foster a unified electronic marketplace, eliminate cross-border procurement barriers, and enhance competition (Obiero & Ngugi, 2024).

In Africa, the uptake of e-procurement has been comparatively slower, mainly due to infrastructural challenges, limited internet access, insufficient human capital, and weak legal frameworks (Obiero & Ngugi, 2024; Waithaka & Kimani, 2021). Nonetheless, some African countries have embraced e-procurement to improve public procurement efficiency, cut costs, and curb corruption. In South Africa, the government has implemented platforms such as the Central Supplier Database (CSD) and the e-Tender Publication Portal to streamline procurement processes and enhance transparency. These systems consolidate supplier information and standardize tendering, promoting fairness and competition. However, South Africa's success has been inconsistent, largely due to resource constraints, lack of funding, technological challenges, and limited organizational commitment (Ngugi & Ndeto, 2024).

Nigeria has also made strides through the Nigeria Open Contracting Portal (NOCOPO), which publishes procurement plans, bids, and contract awards to enhance transparency (Obiero & Ngugi, 2024; Waithaka & Kimani, 2021). Yet, like South Africa, Nigeria faces challenges related to poor technological infrastructure, low internet penetration, resistance from stakeholders, and political interference that undermines compliance with procurement laws (Ngugi & Ndeto, 2024). In Kenya, e-procurement adoption has been influenced by regional policies like the East African Community's (EAC) e-Government Strategy, which promotes ICT integration in public service delivery (Mambo, 2015). Kenya's journey began with the Integrated Financial Management Information System (IFMIS), which includes a procurement module aimed at digitizing and improving procurement efficiency (Ngugi & Ndeto, 2024; Obiero & Ngugi, 2024).

Kenya's IFMIS system plays a critical role by integrating procurement with budgeting, accounting, and reporting, minimizing human intervention that often leads to inefficiencies and corruption (Jibril, 2023; Matano et al., 2020). The Public Procurement and Asset Disposal Act, 2015 further reinforces the adoption of e-procurement across public entities by mandating the transition from manual to electronic processes. Key institutions like the Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and Kenya Urban Roads Authority (KURA) have adopted e-procurement systems in varying capacities. These agencies oversee significant infrastructure projects and represent ideal case studies for examining digital procurement's impact on Kenya's public construction sector (Kandie & Wachiuri, 2023). Their roles in managing large-scale, capital-intensive projects through public procurement highlight the importance of e-procurement in enhancing efficiency, accountability, and transparency within Kenya's infrastructure development efforts. These experiences reflect both progress and the continued need for infrastructure, policy support, and capacity-building to fully realize the benefits of e-procurement across Africa.

B. Impact of E-Procurement on Public Construction Projects

E-procurement has significantly improved the effectiveness, efficiency, and transparency of procurement practices in public construction projects. Automation of key procurement activities, such as bidding, evaluation, and contract awarding, reduces human involvement, shortens timelines, and enhances operational efficiency (Obiero & Ngugi, 2024). In Kenya, leading public organizations like KeNHA and KURA have adopted e-procurement, resulting in more streamlined processes, better supplier management, and enhanced competitiveness (Mambo, 2015).

One of the primary benefits of e-procurement is its ability to enhance traceability and transparency, minimizing opportunities for corruption and promoting accountability across public sector entities (Obiero & Ngugi, 2024). Real-time data access further empowers procurement officials and project planners to make informed decisions regarding supplier performance, project monitoring, and necessary adjustments to meet project objectives (Vaidya et al., 2019).

However, the full benefits of e-procurement are constrained by the level of system integration, user acceptance, and adherence to legal frameworks. Challenges such as complex system integration, resistance to change, and weak technological infrastructure persist, particularly in rural regions (Waithaka & Kimani, 2021). Addressing these barriers through enhanced technological infrastructure, change management, and regulatory consistency can unlock the transformative potential of e-procurement in Kenya's construction sector.

C. Barriers to the Implementation of E-procurement Systems

The adoption of e-procurement systems faces numerous barriers, even in developed countries, and these challenges are particularly pronounced in Kenya's public construction sector. One of the most significant barriers is the high initial cost of implementation, including technology acquisition, staff training, and system maintenance (Ngugi & Ndeto, 2024; Obiero & Ngugi, 2024). These costs can be prohibitive, especially for smaller public bodies with limited budgets. Additionally, ongoing expenses for hardware, software, and human resource development remain a major concern, particularly in rural areas where resources are often constrained (Mwangi & Arani, 2021; Ndei & Mutuku, 2021).

Organizational resistance to change is another key impediment. Many public sector employees are accustomed to manual,

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paper-based processes and are hesitant to adopt digital solutions due to a lack of awareness about the benefits of e-procurement, fear of job losses, and perceived complexity of new systems (Mambo, 2015; Mwangi & Arani, 2021). This resistance is further fueled by entrenched bureaucratic cultures that prefer the status quo and view technological change as a threat to existing power dynamics (Githinji & Were, 2018; Kandie & Wachiuri, 2023).

Information security concerns also hinder adoption, as public procurement involves sensitive financial and supplier data. Fear of data breaches undermines confidence in e-procurement systems, highlighting the need for robust security measures such as encryption and adherence to international standards (Mandala et al., 2024). Additionally, frequent upgrades and maintenance are required to keep systems aligned with technological advances and procurement needs, which demand continuous investment in IT support and training (Mwangi & Arani, 2021).

The shortage of skilled human resources is a persistent challenge. Effective use of e-procurement requires competencies in ICT, procurement law, and digital systems, yet many public sector employees lack these skills (Mutangili, 2019; Githinji & Were, 2018). This gap often leads to poor system utilization or reversion to manual processes. Bridging this gap through comprehensive training and capacity-building programs is essential.

Regulatory compliance remains another barrier. Although Kenya has enacted supportive laws like the Public Procurement and Asset Disposal Act (2015), enforcement is inconsistent, and adoption varies across government departments (Githinji & Were, 2018; Nyagosia & Nyile, 2025). Additionally, inadequate ICT infrastructure, especially in rural areas, limits access to e-procurement platforms like IFMIS, further widening disparities between urban and rural entities (Obiero & Ngugi, 2024).

Fragmentation within public procurement processes also poses challenges. Many government agencies operate in silos with disparate systems, leading to inefficiencies and undermining the transparency and traceability that e-procurement aims to deliver (Chisika et al., 2024; Lagat et al., 2025). Harmonizing procedures and ensuring interoperability is vital for system effectiveness.

Cultural attitudes toward technology also impact adoption. Resistance to digital systems stems from fears of increased oversight and loss of autonomy, often resulting in subtle sabotage or disengagement (Githinji & Were, 2018; Nawi et al., 2016). Addressing these issues requires comprehensive change management strategies focused on communication, stakeholder engagement, and phased implementation (Mwangi & Arani, 2021; Omotoso, 2022).

Limited stakeholder involvement further undermines implementation efforts. Excluding suppliers, especially SMEs, from system design and training creates barriers to their participation, particularly in rural areas where technical literacy is low (Chomchaiya & Esichaikul, 2016; Yevu & Yu, 2019). Inclusive approaches are necessary to ensure broader system acceptance.

Finally, the absence of robust monitoring and evaluation mechanisms impedes progress. Without clear performance indicators, real-time dashboards, or regular audits, it is difficult to assess the effectiveness of e-procurement systems or identify areas needing improvement (Abdi & Barasa, 2023; Jibril, 2023; Institute of Public Finance Kenya, 2020). Institutionalizing M&E practices would enhance transparency, accountability, and continuous system refinement.

D. Effectiveness of User Training and Education

User training and education play a pivotal role in the successful adoption of e-procurement systems, particularly in addressing the skills gaps and resistance to change often encountered during the transition to digital procurement. In Kenya's public construction sector, a significant barrier to e-procurement adoption is the lack of technical expertise among procurement officials, many of whom have limited interaction with digital systems and fear moving from manual processes to automated platforms (Obiero & Ngugi, 2024). Training programs that focus on developing both technical and procurement-specific skills are essential to build user confidence and increase the effective utilization of e-procurement systems (Mwangi & Arani, 2021; Ndei & Mutuku, 2021). These programs should be tailored to different user groups and include practical, hands-on training, followed by refresher courses to reinforce learning and adapt to system updates.

Effective training is aligned with the specific functionalities of the e-procurement systems in use. Generic training often fails to address users' real challenges, whereas system-specific training helps users navigate interfaces, execute transactions, generate reports, and troubleshoot issues (Nandankar & Sachan, 2020; Brandon-Jones & Kauppi, 2018). Moreover, incorporating education on digital ethics, data integrity, and cybersecurity is vital, given the sensitive nature of procurement data. Proper training in these areas reduces the risk of breaches and fosters trust in digital procurement systems (Mohungoo et al., 2020).

The method of delivering training also influences its effectiveness. Research supports blended learning approaches that combine online modules with face-to-face sessions, catering to varied learning preferences and enhancing accessibility, especially in remote areas (Adjei-Bamfo et al., 2020; Brandon-Jones & Kauppi, 2018). Standardized e-learning platforms ensure consistency across government departments. Furthermore, institutional leadership plays a critical role in the success of training programs. Leadership commitment ensures adequate funding, integration into performance appraisals, and a recognition of training as a strategic investment rather than a cost (Mushi & Nsimbila, 2022).

Mentorship and peer learning also reinforce formal training. Informal learning networks facilitate experiential learning and help users adapt more confidently to new systems (Anyisile et al., 2023; Meshack, 2021). Systematic training needs assessments should precede program design to identify specific skills gaps and tailor content accordingly (Nandankar & Sachan, 2020). In Kenya, disparities in digital literacy between urban and rural areas necessitate localized training hubs and longer training durations for rural users to bridge the digital divide (Kandie & Wachiuri, 2023; Chisika et al., 2024).

Evaluating training effectiveness through feedback mechanisms, system audits, and user satisfaction surveys is

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crucial for continuous improvement. Such evaluations help refine content, address persistent challenges, and justify investments in capacity building (Brandon-Jones & Kauppi, 2018; Mohungoo et al., 2020). Additionally, securing financial resources to support these initiatives is essential to overcoming both infrastructural and human capacity barriers.

E. Strategies to Enhance the Adoption of E-procurement Systems

Successful adoption of e-procurement systems requires a multi-faceted approach, integrating leadership, infrastructure, regulation, change management, capacity building, and stakeholder engagement. Top management support is critical, as leadership influences resource allocation, shapes organizational culture, and fosters staff commitment to technological reforms (Ndei & Mutuku, 2021; Mwalukasa, 2024). In Kenya, a key barrier has been leadership's limited understanding of e-procurement benefits, sometimes resulting in resistance. Overcoming this requires informed leadership that actively communicates support, advocates for training, and aligns e-procurement goals with institutional strategies to promote buy-in and sustained adoption (Mushi & Nsimbila, 2022).

Technological infrastructure is equally essential. A robust ICT framework, reliable internet, data protection measures, and scalable systems are foundational to effective e-procurement (Ngugi & Ndeto, 2024; Obiero & Ngugi, 2024). Kenya faces challenges, especially in rural areas, with outdated equipment and poor connectivity hindering adoption (Mwangi & Arani, 2021). Investing in infrastructure upgrades, including broadband expansion and cloud-based solutions, can enhance system accessibility, interoperability, and security. Integration with other government systems like accounting and auditing platforms further strengthens efficiency and transparency (Okuro & Paul, 2024).

A conducive regulatory environment underpins successful e-procurement by providing legal clarity, setting standards, and promoting compliance (Mambo, 2015). Kenya's Public Procurement and Asset Disposal Act (2015) mandates digital procurement, yet gaps persist in implementation and enforcement (Mélon & Spruk, 2020). Continuous review of laws, enhanced audit mechanisms, and stakeholder-inclusive policy formulation are necessary to align regulations with technological advancements (Mohungoo et al., 2020; Shatta et al., 2020).

Change management is vital to mitigate resistance and ensure smooth transitions. It involves strategic communication, awareness campaigns, and engaging champions within organizations who can influence peers positively (Yevu & Yu, 2019; Mohungoo et al., 2020). Dedicated change management teams can address user concerns, monitor adaptation, and sustain momentum. In Kenya, fragmented change efforts have led to partial adoption; thus, structured strategies are needed to foster cultural shifts toward embracing digital procurement (Ibem et al., 2020).

Capacity building extends beyond initial training, focusing on continuous professional development and technical support to sustain e-procurement operations (Pitso et al., 2018). Kenya's public sector faces a shortage of ICT-proficient personnel, resulting in underutilized platforms (Nyagosia & Nyile, 2025). Tailored programs, certifications, and peer-learning models should target all organizational levels, ensuring technical competency and system ownership (Githinji & Were, 2018). Strengthening internal ICT teams reduces dependency on external consultants, enhancing sustainability (Obiero & Ngugi, 2024).

Lastly, stakeholder engagement fosters inclusivity and acceptance. Involving government officials, suppliers, ICT providers, and civil society from the outset enhances system usability and alignment with practical needs (Chomchaiya & Esichaikul, 2016; Yevu & Yu, 2019). Engagement through workshops and feedback loops enables co-creation of solutions, boosting participation and trust. Partnerships with academia, tech firms, and development partners can drive innovation, resource mobilization, and long-term success (Mavidis & Folinas, 2022). These strategies collectively enhance the adoption, sustainability, and impact of e-procurement systems in Kenya's public sector.

F. Theoretical Frameworks

This study of was grounded in three key theoretical frameworks: the Technology-Organization-Environment Framework (TOEF), the Technology Acceptance Model (TAM), and the Diffusion of Innovations Theory.

The Technology-Organization-Environment Framework (TOEF) divides the determinants of technology adoption into three critical contexts: technological, organizational, and environmental. The technological context considers the perceived benefits, complexity, and compatibility of the technology with existing processes, which significantly influence adoption decisions (Myovela et al., 2023; El-Shihy & Hassan, 2023). The organizational context focuses on internal factors such as resources, management support, and staff readiness. In Kenya, successful adoption hinges on financial resources, technical capacity, and leadership commitment within public construction organizations (Mwalukasa, 2024; Okuro & Paul, 2024). Conversely, lack of these elements fosters resistance and delays. The environmental context addresses external factors like regulatory frameworks, market pressures, and competition. While Kenya has policies like the Public Procurement and Asset Disposal Act (2015) to mandate e-procurement adoption, gaps in enforcement and outdated regulations remain challenges (Mambo, 2015; Institute of Public Finance Kenya, 2020). Although TOEF is comprehensive, it often overlooks socio-political influences such as corruption and political interference, which are critical in Kenya's public sector (Mwangi & Arani, 2021; Ndei & Mutuku, 2021).

The Technology Acceptance Model (TAM), developed by Davis (1989), focuses on two key factors, perceived usefulness and perceived ease of use, which influence an individual's intention to adopt technology. TAM is particularly relevant for assessing the attitudes of procurement officials and project managers in Kenya's public sector towards e-procurement (Brandon-Jones & Kauppi, 2018; Mutunga, 2020). Perceived ease of use is vital for overcoming resistance linked to fear and unfamiliarity, while perceived usefulness emphasizes the benefits of efficiency, cost savings, and transparency (Kademaunga & Phiri, 2019; Ngugi & Ndeto, 2024). However,

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TAM's limitation lies in its narrow focus on individual attitudes, neglecting broader organizational and environmental factors, such as infrastructure gaps, change management, and regulatory challenges (Mélon & Spruk, 2020). Therefore, integrating TAM with TOEF provides a more holistic view of e-procurement adoption.

The Diffusion of Innovations Theory, developed by Rogers (2003), explains how innovations spread within a social system through five attributes: relative advantage, compatibility, complexity, trialability, and observability. In Kenya's public construction sector, perceived advantages like efficiency gains and reduced corruption drive adoption (Mwalukasa, 2024). Compatibility with existing procurement practices also affects uptake, while complexity can hinder adoption unless mitigated through user-friendly designs and training (Mambo, 2015). Trialability allows for phased adoption through pilot projects, reducing perceived risks, and observability, through case studies and success stories, enhances confidence in the technology (Mandala et al., 2024).

G. Conceptual Framework

The conceptual framework for the investigation is displayed in Figure 1.

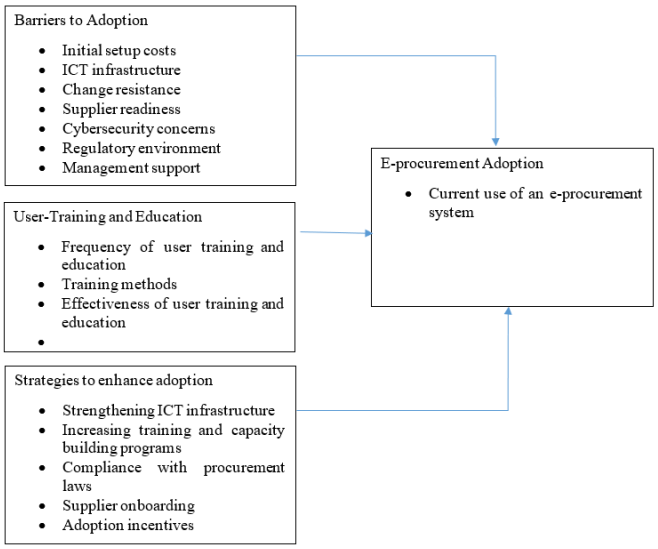

Fig.1: Conceptual Framework
Source: Author (2025)

III. METHODOLOGY

A. Research Design

This study adopted a descriptive research design to systematically capture detailed information on the current state of e-procurement adoption. The design enabled the assessment of patterns, perceptions, and influencing factors without manipulating variables, making it appropriate for examining existing conditions and relationships (Saunders et al., 2019; Bell et al., 2022).

B. Location of the Study

The study was conducted in Kenya, chosen for its ongoing efforts to digitize procurement through systems like IFMIS. Despite progress, challenges persist, particularly in public construction projects. Kenya offered a relevant context to explore barriers, opportunities, and strategies for e-procurement adoption in a developing country setting, with findings applicable to similar environments.

C. Population of the Study

The population for this study comprised all parastatals in Kenya, specifically those involved in infrastructure, transport, and land-related projects. Kenya's parastatals, approximately 290 in number (National Treasury and Economic Planning, 2023), were chosen due to their central role in public procurement policy implementation and their involvement with e-procurement systems. The study focused on key institutions in the public construction sector: Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), Kenya Urban Roads Authority (KURA), and the National Housing Corporation (NHC). These parastatals were selected for their significant involvement in road and housing construction, representing a wide scope of infrastructure. Their selection was further justified by their active adoption of e-procurement platforms like IFMIS, making them suitable for examining the implementation and challenges of digital procurement reforms.

These entities play a pivotal role in Kenya's Vision 2030 and Big Four Agenda due to their substantial budgets and mandates in delivering critical infrastructure. The study concentrated on road and housing sectors as they account for a large share of government infrastructure budgets and involve frequent, high-value procurement activities. Furthermore, these sectors have made significant efforts toward integrating e-procurement systems, ensuring relevance for this research.

Respondents included procurement officers, ICT staff, and other personnel directly involved in procurement processes. Their roles provided them with firsthand insights into e-procurement adoption, system use, and compliance, making them ideal for offering informed perspectives on the factors influencing adoption, including training effectiveness, infrastructure readiness, and institutional support.

D. Sampling Procedure and Sample Size

The target population for this study comprised employees working in procurement, project management, ICT, and finance departments within four key parastatals: KeNHA, KeRRA, KURA, and NHC. These departments were selected due to their direct involvement in procurement and construction activities. The total population across these institutions was estimated at approximately 1,000 staff actively engaged in roles relevant to the study. A stratified random sampling technique was employed to ensure balanced representation across organizations, job roles, and levels of e-procurement adoption. Each parastatal formed a distinct stratum, and within these, respondents were drawn from procurement officers, project managers, engineers, and IT staff.

Data collection involved formal communication channels and was conducted through both online surveys and in-person interviews to enhance participation and capture diverse perspectives. A total of 240 respondents were targeted, with 60 participants drawn from each parastatal. This sample size was

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deemed sufficient and manageable for detailed analysis, ensuring diversity within and across the institutions while enabling meaningful comparisons.

E. Data Collection

Data collection involved structured questionnaires with closed-ended Likert scale questions to measure the level of e-procurement implementation, perceived benefits, and challenges (Mandala et al., 2024; Ndei & Mutuku, 2021). This approach ensured uniform data suitable for statistical analysis. Additionally, semi-structured online interviews were conducted with a purposively selected sample to gather both qualitative and quantitative data, offering deeper insights into barriers and success factors. The interviews complemented the survey findings by providing richer perspectives on stakeholder attitudes and experiences related to e-procurement adoption in Kenya's public construction sector.

F. Data Validity

To ensure validity, the study's questionnaires and interview guides were developed through literature review and expert consultation in e-procurement and public sector procurement (Bell et al., 2022). A pilot test was conducted with a small group of respondents to assess the clarity, relevance, and comprehensiveness of the instruments. Feedback from the pilot informed necessary adjustments to enhance content validity and ensure the tools effectively captured all aspects of e-procurement adoption.

G. Data Analysis

Quantitative data from questionnaires was analyzed using descriptive and inferential statistics, including mean, standard deviation, and frequency distributions, to assess the level of e-procurement adoption, perceived benefits, and challenges among public entities. Qualitative data from interviews was analyzed through thematic analysis using NVivo software, which helped identify key patterns, codes, and themes. This approach provided deeper insights into stakeholder experiences, highlighting challenges, success factors, and perceptions of e-procurement adoption. The combination of quantitative and qualitative methods enabled a comprehensive understanding of the factors influencing e-procurement in Kenya's public construction sector.

IV. FINDINGS

A. Respondents Information

The study gathered data from 207 respondents across four key parastatals: KeNHA, KeRRA, KURA, and NHC. Most respondents (34.8%) were from procurement departments, with others from finance (21.7%), project management (18.4%), ICT (15%), and other functions (10.1%). Procurement officers formed the largest group (32.9%), followed by project managers, finance officers, ICT officers, and other staff. In terms of experience, 36.7% had 2–5 years, 28.5% had 6–10 years, and 23.2% had over 10 years, showing that most respondents were experienced in public construction projects. Additionally, 73.9% of respondents reported direct involvement in e-procurement processes, confirming significant uptake though some gaps remain. Organizational distribution was fairly balanced, with 28% from KeNHA, 26.1% from KeRRA, 24.2% from KURA, and 21.7% from NHC. This spread ensured diverse and representative insights across Kenya's public construction sector.

Table 1: Respondents Information

Attribute	Category	Frequency (n)	Percentage (%)
Department	Procurement	72	34.8%
	Finance	45	21.7%
	Project Management	38	18.4%
	ICT	31	15.0%
	Other (e.g., Legal, Admin)	21	10.1%
Position	Procurement Officer	68	32.9%
	Project Manager	42	20.3%
	ICT Officer	29	14.0%
	Finance Officer	35	16.9%
	Other (e.g., Engineers, Auditors)	33	15.9%
Years of Experience	Less than 2 years	24	11.6%
	2–5 years	76	36.7%
	6–10 years	59	28.5%
	More than 10 years	48	23.2%
Involvement in E-Procurement	Yes	153	73.9%
	No	54	26.1%
Distribution of Respondents by Organization	KeNHA	58	28.0%
	KeRRA	54	26.1%
	KURA	50	24.2%
	NHC	45	21.7%

Source: Author (2025

B. Primary Barriers to Implementing E-Procurement Systems

The study identified several barriers hindering the adoption and implementation of e-procurement systems within Kenya's public construction sector. The findings reflect both quantitative survey results and qualitative insights from key informant interviews, providing a comprehensive understanding of the adoption landscape.

1) Adoption Status of E-Procurement Systems

The findings indicate that e-procurement adoption remains uneven across public construction agencies. Of the 207 respondents, 38.2% reported partial adoption, while 29.5% noted full adoption. Another 18.4% indicated plans to adopt, while 14.0% confirmed no intention to implement e-procurement systems. These figures suggest that although e-procurement is gaining momentum, many institutions remain in transitional phases, with adoption decisions influenced by resource availability, institutional readiness, and organizational culture.

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Table 1: Status of Adoption of e-Procurement Systems

Adoption Status	Frequency (n)	Percentage (%)
Yes, fully	61	29.5%
Yes, partially	79	38.2%
No, but planning to adopt	38	18.4%
No, and no plans to adopt	29	14.0%
Total	**207**	**100.0%**

Source: Author (2025)

2) Key Barriers to Implementation

The study identified high initial setup costs (69.6%) as the most significant barrier. These costs include investments in ICT infrastructure, software licensing, cybersecurity, and staff training. Budget limitations, particularly in smaller or rural agencies, make such expenditures difficult to justify within existing financial constraints.

Inadequate ICT infrastructure (63.3%) emerged as a critical technical challenge. Poor internet connectivity, outdated hardware, and lack of interoperability between systems were cited as common problems, particularly in regional and rural offices. These limitations directly affect system performance and user experience.

Resistance to change among staff (56.5%) was also a significant barrier. Employees accustomed to manual processes expressed fears about job security and skepticism towards digital systems, which is compounded by insufficient training and weak incentives to embrace new technologies.

Supplier unreadiness (48.8%) further complicates implementation. Many suppliers, especially small and medium-sized enterprises (SMEs), lack the digital infrastructure or skills needed to engage with e-procurement platforms. This digital divide slows down broader adoption efforts and limits the inclusivity of procurement reforms.

Cybersecurity concerns (45.9%) were also notable, with organizations expressing apprehension about data breaches, hacking risks, and potential legal liabilities. These fears are compounded by a perceived lack of robust cybersecurity protocols within public institutions.

Finally, lack of clear policies and regulatory guidelines (42.0%) remains a systemic issue. Although Kenya's Public Procurement and Asset Disposal Act (2015) mandates e-procurement, respondents highlighted gaps in enforcement, clarity, and harmonization of procurement standards. Bureaucratic delays, inconsistent interpretations of regulations, and outdated legal frameworks hinder uniform adoption.

Table 2: Challenges in the Implementation of e-Procurement Systems

Challenge	Frequency (n)	Percentage (%)
High initial setup costs	144	69.6%
Lack of adequate ICT infrastructure	131	63.3%
Resistance to change from staff	117	56.5%
Lack of supplier readiness	101	48.8%
Cybersecurity concerns	95	45.9%
Lack of clear policies and regulations	87	42.0%
Other (e.g., bureaucratic delays)	26	12.6%

Source: Author (2025)

3) Qualitative Insights

Interviews with procurement officers, ICT staff, and finance personnel reinforced these findings. Many cited unreliable internet access, outdated systems, and fragmented platforms as significant operational hurdles. Financial constraints were repeatedly mentioned as a key obstacle, with budget allocations for digital procurement often deprioritized.

Resistance to change was deeply rooted in organizational culture, particularly among older staff. Interviewees noted that fear of increased oversight and potential redundancy contributed to reluctance. Additionally, suppliers' limited digital literacy and lack of infrastructure were flagged as barriers, especially in regions where basic internet services are lacking.

Policy gaps also surfaced as a recurring theme. Participants lamented outdated regulations and inconsistent application of procurement laws, which created confusion and hampered progress. Several highlighted that current laws were not designed with digital systems in mind, leading to misalignment between practice and policy.

4) Severity of Challenges

Respondents rated the severity of these barriers on a scale of 1 to 5. High implementation costs scored the highest (4.31), followed by poor ICT infrastructure (4.09) and resistance to change (3.87). Supplier reluctance (3.64) and regulatory gaps (3.52) were considered moderately severe but still influential.

5) Role of Top Management Support

Top management support emerged as a pivotal factor in driving e-procurement adoption. Approximately 61.3% of respondents reported high or very high influence from top leadership, underscoring the role of executive buy-in in shaping procurement practices. However, 14.0% indicated low or very low influence, reflecting inconsistency across institutions.

In terms of support provided, 71.0% of respondents noted financial allocations from management, 58.5% cited policy development efforts, and 55.1% mentioned staff training programs. However, only 42.5% reported active monitoring and evaluation of e-procurement processes. A small proportion (7.7%) indicated no support at all, highlighting gaps in leadership engagement.

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Qualitative data reinforced these findings, revealing that leadership commitment varied widely across organizations. Where senior leaders prioritized e-procurement, implementation was smoother, resources were allocated, and accountability mechanisms were established. In contrast, passive or resistant leaders contributed to stalled initiatives, poor system utilization, and minimal compliance.

Interviewees emphasized that leadership support goes beyond financial resources; it shapes organizational culture, sets priorities, and ensures accountability. Some shared success stories where proactive CEOs or directors championed e-procurement, driving faster adoption and stronger compliance. Others recounted instances where leadership indifference led to fragmented implementation, lack of follow-up, and minimal staff engagement.

6) Thematic Analysis Summary

The thematic analysis identified five key barriers to e-procurement adoption in Kenya's public construction sector. Inadequate ICT infrastructure remains a major challenge, with unreliable internet, outdated systems, and lack of integration hampering effective use. High implementation costs related to system setup, maintenance, and training continue to strain public sector budgets. Additionally, organizational resistance rooted in cultural reluctance and fear of redundancy limits user engagement and adoption. Supplier unreadiness, particularly among SMEs lacking digital literacy and infrastructure, further complicates adoption efforts. Finally, policy and regulatory gaps, stemming from outdated or unclear regulations, create confusion and inconsistencies, undermining the implementation of e-procurement systems.

On management support, four themes emerged. Strategic commitment from top leadership accelerates adoption by ensuring resources are allocated and priorities are clear. Financial and policy support, through dedicated budgets and internal guidelines, facilitates system implementation. However, a lack of monitoring structures weakens the ability to track progress and enforce accountability, resulting in ineffective adoption. Additionally, leadership resistance or indifference, where some leaders are either skeptical or passive towards e-procurement, slows progress by limiting communication, follow-through, and enforcement, ultimately hindering the success of digital procurement reforms.

C. Extent of Stakeholder Engagement in Project Identification

Descriptive statistics indicate a moderate level of stakeholder involvement in project planning for road projects in Homa Bay County. The highest-rated items included staff training (M = 3.49) and stakeholder participation in risk mitigation planning (M = 3.49), suggesting emphasis on capacity-building and proactive risk management. Other items, such as community involvement in planning, skill assessment, consultant hiring, and budget structuring, also received moderately positive scores (M = 3.40–3.45). The overall composite mean was 3.45 (SD = 0.781), reflecting consistent but average engagement across planning dimensions. Open-ended responses highlighted key priorities for enhancing planning effectiveness: early and realistic budgeting, early engagement of technical experts, and stronger community participation. Risk assessment and contingency planning were seen as essential, alongside improved staff training and clear project timelines. These insights suggest that while stakeholders are involved, planning processes would benefit from more formal, inclusive, and technically sound mechanisms to improve project execution and outcomes in the county.

D. Effectiveness of User Training and Education

The analysis of user training and education on e-procurement adoption revealed mixed progress among Kenya's public construction-related parastatals. The findings show that 79.7% of respondents reported receiving some form of training, though consistency remains a concern. Only 36.7% had been trained regularly, while 43.0% received training infrequently. Alarmingly, 20.3% had received no training at all. These inconsistencies undermine the objective of building robust user competencies, ultimately impacting the sustainability and effectiveness of e-procurement systems. The limited training provision reflects gaps in organizational change management and highlights the need for more structured capacity-building strategies.

In terms of training methods, workshops and seminars were the most commonly used approach, cited by 58.5% of respondents, reflecting a preference for interactive, face-to-face learning formats. On-the-job training was also prevalent (44.9%), emphasizing the importance of experiential learning in bridging knowledge gaps. However, only 37.7% had access to online training modules, suggesting either infrastructural limitations or a slow shift toward digital learning in these public institutions. The 20.3% of respondents reporting no training further emphasizes the lack of comprehensive strategies to prepare staff for digital procurement processes.

Regarding the effectiveness of the training provided, the majority of respondents expressed positive perceptions. About 68.6% indicated that training had been effective or very effective in enhancing their understanding of e-procurement processes, while 63.3% noted improvements in staff confidence. However, the perceived impact on improving regulatory compliance (56.1%) and reducing transactional errors (49.8%) was lower. These findings suggest that while training helps build basic operational knowledge and confidence, it may not be sufficiently targeted or rigorous to address technical compliance or accuracy comprehensively. There is a need for more tailored training focusing not just on system usage but also on procurement regulations, audit standards, and data integrity.

Interview data provided deeper insights into these challenges. Many participants highlighted inconsistencies in training delivery, noting that training is often sporadic, outdated, or insufficiently role-specific. Several respondents shared experiences of attending one-off seminars with no subsequent refresher courses or structured follow-ups, leaving new staff to learn through trial and error. Others criticized the overly theoretical nature of existing training programs, which fail to provide adequate hands-on practice or real-world simulations. This gap between training content and job realities was cited as a key reason for user errors and underutilization of e-procurement platforms.

Additionally, participants emphasized the absence of post-training support mechanisms such as helpdesks or follow-up evaluations. Without ongoing guidance, staff competence tends to plateau, and knowledge transfer to new employees becomes informal and inconsistent. Respondents advocated for more

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structured, continuous, and role-specific training programs that are regularly updated to reflect evolving systems and policies. The need for diverse learning approaches—combining e-learning, peer mentorship, and modular sessions—was also emphasized as a way to cater to different learning styles and improve retention.

Table 4: Effectiveness of Training in Enhancing E-Procurement Adoption (n = 207)

Indicator	1 (Not Effective)	2	3	4	5 (Very Effective)
Understanding e-procurement processes	6 (2.9%)	18 (8.7%)	41 (19.8%)	74 (35.7%)	68 (32.9%)
Increasing staff confidence	9 (4.3%)	20 (9.7%)	47 (22.7%)	69 (33.3%)	62 (30.0%)
Improving compliance with regulations	11 (5.3%)	24 (11.6%)	56 (27.1%)	67 (32.4%)	49 (23.7%)
Reducing errors in procurement transactions	14 (6.8%)	27 (13.0%)	63 (30.4%)	59 (28.5%)	44 (21.3%)

Source: Author (2025)

A Pearson correlation analysis was conducted to examine the relationships between training effectiveness, management support, perceived barriers, and e-procurement adoption.. The results show a strong positive correlation between training effectiveness and e-procurement adoption ($r = 0.684$, $p < 0.01$), and a moderate positive correlation between management support and adoption ($r = 0.598$, $p < 0.01$). A significant negative correlation was observed between perceived barriers and adoption ($r = -0.541$, $p < 0.01$), indicating that as barriers increase, adoption levels tend to decline.

Table 5: Correlation Matrix

Variable	Adoption	Training Effectiveness	Management Support	Barriers
E-Procurement Adoption	1.000			
Training Effectiveness	0.684**	1.000		
Management Support	0.598**	0.431**	1.000	
Perceived Barriers	-0.541**	-0.423**	-0.371**	1.000

Source: Author (2025)

E. Strategies to Enhance the Adoption of E-Procurement Systems

The findings on strategies to enhance the acceptance and implementation of e-procurement systems in Kenya's public construction sector highlight a multi-faceted approach necessary for success. The most prominent recommendation was the strengthening of ICT infrastructure, cited by 83.6% of respondents. This reflects a widespread acknowledgment that without reliable internet, modern hardware, and secure networks, the full potential of e-procurement cannot be realized. Many organizations, particularly those in rural or underserved areas, face ongoing challenges with connectivity and system reliability, which undermines the efficiency and effectiveness of digital procurement processes.

The second most endorsed strategy was increasing training and capacity-building programs, supported by 76.3% of respondents. This reinforces earlier findings that training remains a cornerstone of successful adoption. Stakeholders recognize that technology alone cannot drive change without parallel investments in people. Continuous, structured training not only boosts user confidence but also ensures that staff stay updated on evolving systems and regulations. Similarly, 61.4% recommended encouraging supplier onboarding. Respondents noted that many suppliers, particularly SMEs, lack the tools or knowledge to participate in e-procurement effectively, creating gaps in the procurement process. Bridging this gap through targeted training and support is viewed as essential for full system integration and achieving the benefits of digital procurement.

Enforcing strict compliance with procurement laws was suggested by 54.6% of respondents. Participants stressed that regulations, while in place, are not consistently enforced, leading to bypassing of e-procurement systems in favor of manual processes. Effective enforcement, coupled with audit trails and accountability measures, was seen as a necessary step toward eliminating loopholes and driving widespread adoption. Providing incentives for adoption was identified by 45.9% of respondents, though it ranked lowest among the suggested strategies. Nevertheless, incentives such as recognition programs, performance bonuses, or streamlined processes for compliant departments and suppliers were viewed as valuable tools for encouraging adoption and reinforcing positive behaviors.

Open-ended responses echoed these themes, with additional suggestions emphasizing the need for uniform, nationwide e-procurement platforms to minimize fragmentation and promote shared learning. Public-private partnerships were also recommended to enhance ICT infrastructure and training, especially in remote counties. Customizing platforms to suit the complex needs of construction projects, such as staged payments and technical specifications, was another recurring theme. Furthermore, respondents advocated for policies mandating periodic audits and user evaluations to ensure continuous improvement and accountability.

Qualitative interviews reinforced these findings, highlighting poor connectivity and outdated systems as major barriers. Participants called for upgrades to servers and networks to prevent system crashes during critical periods. Continuous learning frameworks were widely supported, with suggestions for national e-learning portals and regular training budgets. Stricter enforcement of existing policies was emphasized to close loopholes that allow manual procurement practices to persist. Supplier readiness emerged as a significant concern, with recommendations for training boot camps to equip vendors with the skills needed to participate in digital procurement.

Finally, the idea of incentives was discussed as a means to accelerate adoption, both for internal departments and suppliers. Suggestions included additional development funds, public recognition, tax waivers, and expedited processing for those

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embracing e-procurement early. These strategies reflect a consensus that successful adoption depends not on a single intervention but on a coordinated approach that combines infrastructure development, human capacity building, regulatory enforcement, supplier engagement, and incentivization. Table 4.15 summarizes these themes, emphasizing the interconnected nature of the barriers and solutions identified. Moving forward, the successful implementation of e-procurement in Kenya's public construction sector will require strategic alignment between policy, infrastructure, and human capital to build a robust, inclusive, and efficient digital procurement ecosystem.

The multiple linear regression analysis showed that training effectiveness, management support, and perceived barriers significantly predict e-procurement adoption, explaining 63.9% of the variance. Training effectiveness was the strongest positive predictor ($\beta = 0.442$, $p < .001$), followed by management support ($\beta = 0.316$, $p < .001$), while perceived barriers negatively influenced adoption ($\beta = -0.285$, $p < .001$). These findings highlight the importance of enhancing training, leadership involvement, and addressing infrastructure and supplier challenges to drive successful e-procurement adoption in Kenya's public construction sector. A holistic strategy targeting these factors is essential for sustained implementation

Table 6: Regression Coefficients

Predictor	Unstandardized B	Std. Error	Beta (β)	t	Sig.
Constant	1.102	0.279	—	3.950	.000
Training Effectiveness	0.512	0.071	0.442	7.211	.000
Management Support	0.398	0.089	0.316	4.472	.000
Perceived Barriers	-0.327	0.075	-0.285	-4.345	.000

Source: Author (2025)

V. CONCLUSION

The study identified multiple barriers hindering the successful implementation of e-procurement systems within Kenya's public construction projects. Key among these were inadequate ICT infrastructure, resistance to change, high initial setup costs, supplier unreadiness, and cybersecurity concerns. These findings mirror prior local studies (Ngugi & Ndeto, 2024; Obiero & Ngugi, 2024) and align with global literature, highlighting that public institutions in Kenya share common challenges faced worldwide during digital procurement transformations. Poor ICT infrastructure remains a critical issue, particularly in rural counties where unreliable internet connectivity, outdated systems, and lack of IT support limit the functionality and adoption of platforms such as IFMIS. This corresponds with the technological dimension of the Technology-Organization-Environment (TOE) framework, which posits that weak infrastructure diminishes the perceived benefits of technological adoption.

Resistance to change emerged as another significant obstacle, reflecting entrenched manual procurement cultures and staff fears over redundancy or unfamiliarity with digital tools. These attitudes align with the Technology Acceptance Model (TAM), which highlights perceived ease of use and usefulness as pivotal in driving user adoption. In organizations lacking robust change management, resistance persists, often exacerbated by limited training and lack of user engagement. High implementation costs were also a key barrier, particularly for county-level agencies constrained by limited budgets. These costs cover software, hardware, licenses, and staff development, restricting opportunities for piloting innovations and thus slowing diffusion, as suggested by Rogers' Diffusion of Innovations Theory.

The study further revealed that many suppliers, particularly SMEs, lack the digital literacy or infrastructure required to participate effectively in e-procurement, undermining the platforms' effectiveness. Cybersecurity concerns also persist, reflecting fears of data breaches and fraud in a context where regulatory frameworks are underdeveloped. Interview findings underscored inconsistencies in regulatory enforcement despite the Public Procurement and Asset Disposal Act (2015), with unclear policies and enforcement gaps stalling uniform adoption.

Training and education were found to be critical enablers of e-procurement adoption. While most respondents acknowledged training's positive role in enhancing system understanding, compliance, and reducing errors, gaps remain. Training provision is inconsistent, with some institutions offering it regularly, others sporadically, and some not at all. This fragmentation reflects weaknesses in institutional strategies for capacity building. Training was shown to improve perceptions of system usefulness and ease of use, supporting TAM's core constructs. Moreover, training needs to be role-specific, recognizing the varied competencies required by procurement officers, ICT staff, and engineers. Continuous learning, rather than one-off sessions, was advocated to keep pace with system upgrades and policy changes.

Strategically, the study recommends a multi-faceted approach to enhance e-procurement adoption, emphasizing ICT infrastructure improvement, sustained training, enforcement of procurement laws, supplier onboarding, and incentives. Robust ICT infrastructure is foundational, ensuring system reliability and accessibility. Investment in broadband, cloud-based systems, and cybersecurity measures is vital to overcome existing deficits, particularly in rural counties. Enhanced infrastructure aligns with TOE's technological context, where readiness directly influences adoption outcomes.

Increased investment in tailored, continuous training was also highlighted. Structured programs addressing both system usage and regulatory compliance build user confidence and competence, reducing resistance and errors. Follow-up support, such as refresher courses and troubleshooting workshops, was recommended to reinforce learning. These strategies are aligned with the literature advocating user-centric approaches for digital transformation success.

Legal enforcement and policy harmonization were deemed essential. Despite existing mandates, inconsistent enforcement and outdated regulations undermine adoption. Regular reviews and updates, coupled with clear guidelines and audit mechanisms, are necessary to foster compliance and trust. Within TOE's environmental domain, supportive legal structures are crucial for sustaining innovation.

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Encouraging supplier participation was another key recommendation. Supplier capacity-building programs, onboarding initiatives, and simplified digital processes were proposed to ensure inclusivity and maximize platform benefits. Lastly, incentives for adoption, such as recognition, bonuses, or additional resources for compliant departments, were suggested to motivate both staff and suppliers. These strategies collectively reflect the TOE framework's emphasis on the interplay between technology, organizational capacity, and environmental factors, as well as the Diffusion of Innovations Theory's principles of trialability, observability, and early adopter modeling.

This study highlighted key areas for further research on e-procurement in Kenya's public construction sector. Future studies should examine adoption at the county government level to capture decentralized challenges. Longitudinal research is needed to track changes over time in infrastructure, policy, and training impacts. Additionally, studies should explore the influence of political dynamics, corruption, and governance on e-procurement implementation. Comparative research across sectors like health or education could reveal unique adoption barriers. Finally, supplier readiness and digital inclusion, particularly among rural SMEs, warrant further investigation to ensure e-procurement reforms are equitable and accessible to all vendors.

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