International Journal of Management and Leadership Studies
2025; 6(1): 938-957
ISSN 2311-7575

# ELECTRONIC PROCUREMENT PRACTICES AND PERFORMANCE OF THE INLAND TRANSPORT INDUSTRY: A CASE STUDY OF KENYA PORTS AUTHORITY, MOMBASA

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## ABSTRACT

The study looked at how the Kenya Ports Authority's (KPA) procurement performance was affected by electronic procurement methods. The increased demand for accountability, efficiency, and openness in public procurement within Kenya's inland transport sector served as the impetus for the study. The study's primary goal was to find out how electronic procurement procedures affect KPA's procurement performance. Its specific goals were to ascertain how e-tendering, e-auctioning, e-cataloguing, and e-invoicing affect procurement outcomes. The Resource-Based View, Transaction Cost Economics, and the Technology Acceptance Model served as the study's guiding principles. The study used both quantitative and qualitative methods in a descriptive mixed-method design. Through organized surveys, document inspections, and interviews, information was gathered from 240 Kenya Ports Authority workers. The Statistical Package for the Social Sciences (SPSS) version 28 was used to analyze the data, utilizing multiple regression analysis, correlation, and descriptive statistics. The study established that procurement inefficiencies, limited transparency, and high transaction costs affected organizational performance. The theoretical framework emphasized the influence of internal capabilities, transaction efficiency, and technology acceptance on procurement performance. The literature review revealed that electronic procurement enhances operational efficiency, accountability, and cost reduction within public institutions. The conceptual framework demonstrated the interrelationship link e-procurement procedures and procurement success, demonstrating how digital solutions can enhance institutional results. The population characteristics, sampling techniques, and data collection tools were all described in depth in the research design. Cronbach's alpha, expert evaluation, and pilot testing were used to verify validity and reliability. The ethical precepts of secrecy, anonymity, and informed consent were upheld. The findings revealed that the four e-procurement practices jointly explained 69.2% of the variation in procurement performance at KPA ($R^2$ = 0.692). Individually, e-tendering contributed 22.8%, e-auctioning 18.6%, e-cataloguing 15.4%, and e-invoicing 12.4% to procurement performance. The results further showed that procurement planning moderated these effects and emerged as the strongest predictor of performance outcomes. The adoption

of e-procurement improved efficiency, enhanced transparency, and reduced transaction costs. Findings showed increased effectiveness, more openness, and decreased procurement costs resulting from the adoption of electronic procurement systems. The study concluded that improving staff competency, strengthening contract management, ensuring adequate resource allocation, and institutionalizing procurement planning enhance procurement performance. Recommendations included continuous capacity building, integration of risk management practices, and increased investment in ICT infrastructure to sustain e-procurement effectiveness. The research provided empirical evidence on the significance of electronic procurement practices in improving efficiency, cost control, and accountability within the Kenya Ports Authority. The study contributed to policy formulation, institutional development, and academic discourse on digital transformation in public procurement systems.
**Keywords:** *E-auctioning, E-invoicing, E-procurement, E-tendering, Performance*

## INTRODUCTION

The global transport and logistics industry has undergone significant transformation driven by technological advancements, increasing competition, and evolving customer expectations (UNCTAD, 2021; WBG, 2022). In developed economies, the adoption of electronic procurement (e-procurement) has become a key element of supply chain digitalization, facilitating automation, transparency, and real-time monitoring of procurement processes (Agarwal et al., 2022; Kähkönen et al., 2023). Studies indicate that e-procurement systems enhance process efficiency, reduce operational costs, and improve collaboration with suppliers, thus contributing to improved organizational performance (Andersen & Christensen, 2020). This global trend highlights the planned reputation of digital gaining tools in strengthening institutional competitiveness and operational resilience.

In Africa, governments and public institutions have increasingly embraced e-procurement to enhance transparency, reduce transaction costs, and mitigate corruption in procurement processes (UNECA, 2021; AfDB, 2023). Several African states have reported measurable improvements in efficiency, supplier participation, and regulatory compliance following the implementation of electronic procurement systems. Nonetheless, challenges such as inadequate technological infrastructure, limited digital literacy, and resistance to change remain prevalent (Mangi et al., 2022; Otieno & Awuor, 2020). The African Union's Agenda 2063 further emphasizes leveraging digital technologies, including e-procurement, to drive economic growth, institutional reforms, and sustainable development (AU, 2015). Regionally, the East African Community (EAC) has prioritized e-procurement to strengthen integration, facilitate cross-border trade, and harmonize public procurement frameworks (EAC, 2020). Evidence from member states shows that digital procurement platforms improve compliance, reduce administrative inefficiencies, and enhance supplier engagement (NEMA, 2022; KNBS, 2023), provided that robust policy, infrastructure, and capacity-building initiatives are in place.

In Kenya, e-procurement has become a central component of public sector modernization, aligned with the government's Digital Economy Blueprint and broader economic transformation agenda (GoK, 2022; KIPPRA, 2021). The Kenya Ports Authority (KPA), a key player in the country's transport and logistics sector, has adopted e-procurement to improve efficiency, transparency, and accountability (KPA, 2023). While this adoption has led to shorter procurement cycles, cost savings, and enhanced transparency, challenges such as employee resistance, limited digital infrastructure, and data security concerns persist (Mwaniki, 2020; KEPSA, 2021). E-procurement at KPA encompasses practices such as e-tendering, e-auctioning, e-cataloguing, and e-invoicing, which collectively aim to streamline procurement processes, reduce costs, improve supplier satisfaction, and enhance overall organizational performance (Tai et al., 2021; Kimani & Ndung'u, 2022; Kähkönen et al., 2023).

Despite the growing importance of e-procurement, the inland transport sector in Kenya continues to face performance challenges, including high operational costs, inefficiencies in procurement processes, delays in service delivery, and limited transparency (KIPPRA, 2021; World Bank, 2021). KPA, as a critical actor in the sector, has not been immune to these challenges. While prior studies have explored e-procurement adoption in Kenya's public sector broadly (Mwaniki, 2020; Otieno & Awuor, 2020) or in different international contexts (Tai et al., 2021), there is limited empirical evidence examining the impact of e-procurement practices on organizational performance within Kenya's inland transport industry. There is, therefore, a need to assess how KPA's e-procurement initiatives affect efficiency, cost reduction, and supplier relationship management, in order to generate insights for policymakers, practitioners, and academics.

This study's main goal is to use KPA as a case study to examine how e-procurement procedures affect Kenya's inland transport sector's performance. The study specifically aims to investigate how organizational performance is affected by e-tendering, e-auctioning, e-cataloguing, and e-invoicing. The following research questions serve as the study's compass: What impact does e-tendering have on KPA's performance? How much does e-auctioning impact performance? What is the impact of e-cataloguing on performance? What effect does e-invoicing have on KPA's performance?

This study is justified on several grounds. Policymakers will benefit from evidence-based insights for crafting regulations and policies that enhance efficiency, transparency, and competitiveness in the inland transport sector. Industry practitioners will gain practical knowledge on how to implement e-procurement strategies to improve procurement outcomes. For KPA, the study will provide actionable recommendations to optimize e-procurement adoption and strengthen its digital transformation agenda. Moreover, by addressing the empirical gap in the literature on e-procurement within Kenya's inland transport industry, the study contributes to academic discourse on digital procurement in developing country contexts, offering guidance for future research and policy development

# LITERATURE REVIEW

## Theoretical Literature Review

This study is anchored on the Technology Acceptance Model (TAM), which posits that technology adoption is influenced by perceived usefulness and ease of use (Davis, 1989). It also draws on Transaction Cost Economics (TCE) theory, highlighting how e-procurement reduces transaction costs (Williamson, 1979), and the Resource-Based View (RBV), which explains how unique and valuable organizational resources contribute to competitive advantage (Barney, 1991). Together, these models offer a framework for analyzing the effects of online purchasing procedures on productivity at the Kenya Ports Authority.

## Technology Acceptance Model

The Technology Acceptance Model (TAM), a well-liked theoretical framework in information systems research that is used to forecast and explain consumer acceptance of new technologies, was first presented by Davis in 1989. Perceived usefulness (PU) and perceived ease of use (PEOU) are the two main criteria that impact a user's decision to embrace and employ a technology, according to TAM. Perceived utility is the degree to which an individual feels that utilizing a specific system will improve their performance at work, while perceived ease of use is the degree to which an individual feels that using the system would be straightforward. Perceived utility, according to TAM significantly influences a user's attitude towards a technology. If a user perceives a technology as beneficial, they are more likely to have a positive attitude towards it and, consequently, a stronger intention to use it (Davis, 1989; Venkatesh & Davis, 2000). Furthermore, perceived ease of use influences perceived usefulness, as technologies that are easy to use are typically seen as more beneficial (Davis, 1989).

## Transaction Cost Economics (TCE) Theory

Transaction Cost Economics (TCE), developed by Williamson (1979), explains how organizations structure transactions to minimize costs beyond the price of goods or services. These transaction costs include searching for information, bargaining, monitoring, and enforcing agreements. TCE posits that the choice between market-based or in-house transactions depends on transaction frequency, uncertainty, and asset specificity, with firms seeking governance structures that reduce overall transaction costs (Williamson, 1985; 1991; 1996).

## Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory, introduced by Barney (1991), asserts that a firm's sustained competitive advantage derives from its unique internal resources and capabilities, in contrast to the external focus of industrial organization theory (Wernerfelt, 1984). VRIN (valuable, rare, unique, and non-substitutable) resources allow businesses to

exploit opportunities and mitigate risks. In the context of e-procurement, RBV suggests that the adoption of digital procurement practices can serve as a strategic resource, enhancing efficiency, reducing costs, and providing a competitive edge (Croom & Brandon-Jones, 2007).

## Empirical Literature Review

E-tendering, also known as electronic or online tendering, involves the solicitation, receipt, and evaluation of bids for goods, works, or services through digital platforms (Croom & Brandon-Jones, 2007). The use of online systems to advertise tenders, distribute documents, and facilitate bid submission enhances transparency, accountability, and competitiveness in procurement processes (Otieno & Awuor, 2020). Empirical studies indicate that e-tendering significantly reduces procurement lead times, increases supplier participation, and improves process efficiency, thereby supporting organizational performance (Mwaniki, 2020; Kimani & Ndung'u, 2022). A descriptive survey by Mbugua et al. (2023) among procurement professionals in Kenya's public sector revealed that e-tendering strengthened accountability and enhanced transparency, while emphasizing the critical need for continuous training and capacity building.

E-auctioning, or electronic reverse auctions, is a digital procurement method in which suppliers compete in real time to offer the lowest price for goods or services, thereby enhancing cost-effectiveness and operational efficiency (Elmaghraby, 2007; Jap, 2003). Research within the Kenyan public sector and multinational corporations has demonstrated that e-auctioning reduces procurement cycle times, decreases costs, and encourages competition among suppliers, while promoting transparency in organizational procurement (Majanga, 2022; Njoroge & Ngugi, 2021). International studies, such as those conducted in China, further confirm that e-auctioning improves project efficiency and reduces procurement expenditures, although its effectiveness depends on factors such as auction design, the number of bidders, and the nature of the project (Zheng et al., 2020).

E-cataloguing, or electronic cataloguing, involves the creation and maintenance of online catalogs that list goods and services available for procurement, providing standardized information on specifications, pricing, and terms of supply (O'Brien, 2002; Boer et al., 2001). The adoption of e-cataloguing systems has been shown to streamline procurement processes, reduce administrative costs, and enhance the accuracy and transparency of purchase orders (Muathe, 2017). In the Kenyan public sector, e-cataloguing has been linked to reduced procurement lead times, improved supplier selection, and greater compliance with procurement regulations, demonstrating its impact on operational efficiency and organizational performance (Mwangi, 2019).

E-invoicing involves the electronic exchange of invoices between buyers and suppliers, allowing for automated processing, improved accuracy, and faster financial transactions (O'Brien, 2002). Studies in the Kenyan public and private sectors indicate that e-invoicing reduces the time required to process invoices, enhances transparency in financial transactions, and strengthens supplier relationships through timely and accurate payments (Kimani et al., 2023; Ngugi & Kamau, 2022). Research further highlights that the successful adoption of e-invoicing systems is dependent on the availability of robust technology infrastructure, as well as the capacity and willingness of staff to adopt new processes.

## Summary and Research Gaps

Research that has been viewed are summarized in Table 1 below.

***Table 73:*** *Summary of Research Gaps*

| Study | Area of Study | Methodology | Findings | Research Gaps | Focus of the current study |
|---|---|---|---|---|---|
| Mbugua et al. (2023) | Influence of e-tendering on procurement performance | Survey methodology targeting procurement professionals across various government agencies | E-tendering significantly reduced procurement lead times, improved transparency, and fostered accountability | To guarantee the efficient use of e-tendering technologies, thorough training and capacity building are required. | Investigating how e-tendering practices influence performance at Kenya Ports Authority (KPA) |
| Eshitoli (2016) | Adoption of e-tendering in the oil marketing sector | Research conducted in the oil marketing sector in Kenya | Positive correlation between adoption of e-tendering and procurement performance in terms of cost savings and process efficiency | Emphasis on top management support and employee training for effective implementation | Analyzing how e-tendering practices influence performance metrics such as procurement cycle time and cost savings at KPA |

| Study | Area of Study | Methodology | Findings | Research Gaps | Focus of the current study |
|---|---|---|---|---|---|
| Zheng et al. (2020) | Impact of e-tendering on construction project performance | Regression analysis of project data | E-tendering reduced project delays and cost overruns, improving project efficiency | Need for addressing various challenges including technological infrastructure and change management in developing countries | Using KPA as a case study, examine how e-tendering affects procurement performance in Kenya's inland transport sector. |
| Al-Marri and Zairi (2017) | Effect of e-tendering on public procurement | Research in the United Arab Emirates | Transparency increased as a result of e-tendering, reduced administrative costs, and improved relationships with suppliers | Limited focus on the specific performance outcomes and challenges associated with e-tendering implementation in the transport sector | Evaluating the influence of e-tendering on procurement cycle time and supplier relationship management at KPA |

## CONCEPTUAL FRAMEWORK

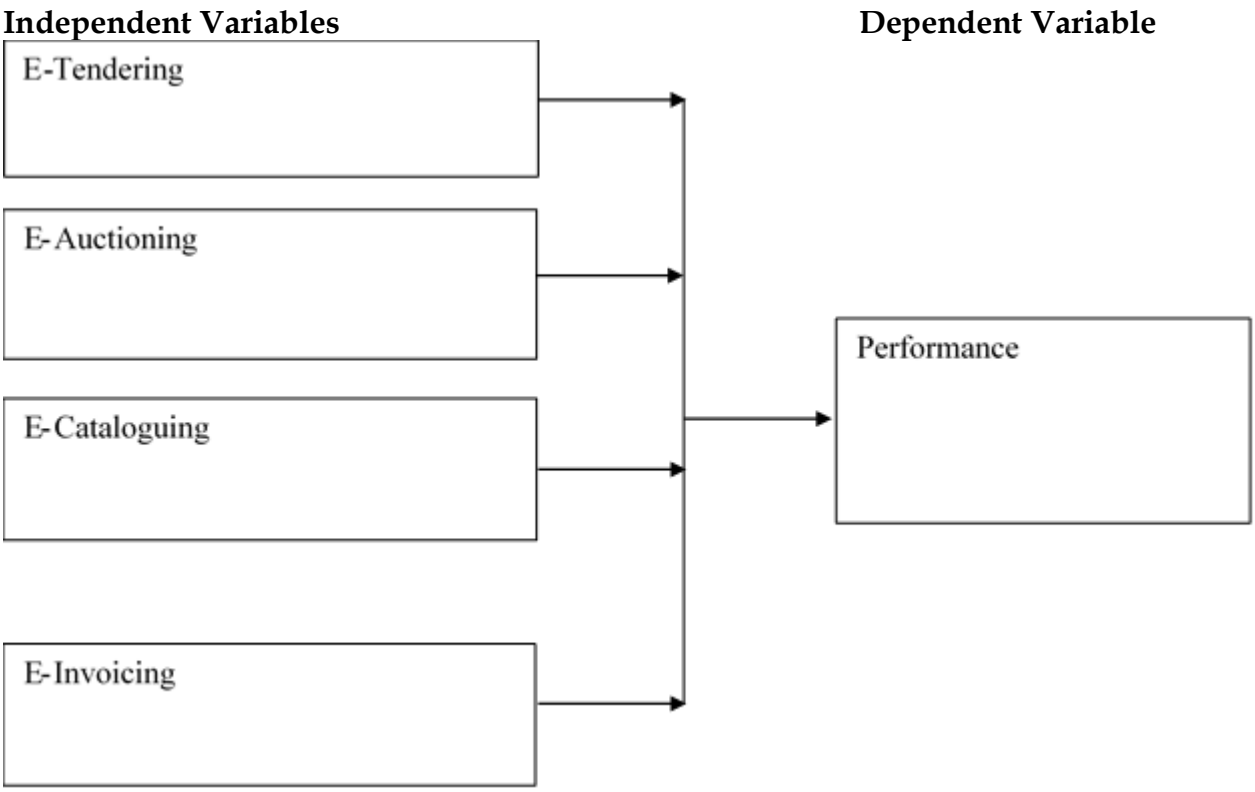


**Figure 28:** Conceptual Framework

## OPERATIONALIZATION OF VARIABLES

| Variable | Indicators | Measurement Scale | Tools of Analysis |
|---|---|---|---|
| E-tendering | • Fairness, transparency,<br>• Ease of participation,<br>• Timeliness of feedback | Likert Scale (1-5) | descriptive statistics and inferential statistics |
| E-auctioning | • Competitiveness, transparency,<br>• Effectiveness in cost savings,<br>• Ease of participation | Likert Scale (1-5) | descriptive statistics and inferential statistics |
| E-cataloguing | • Ease of use,<br>• Comprehensiveness and accuracy,<br>• Usefulness | Likert Scale (1-5) | descriptive statistics and inferential statistics |

| Variable | Indicators | Measurement Scale | Tools of Analysis |
|---|---|---|---|
| E-invoicing | • Accuracy and timeliness,<br>• Reduction in paperwork and effort,<br>• Improved communication | Likert Scale (1-5) | descriptive statistics and inferential statistics |
| Performance | • Timeliness, accuracy, ease of use | Likert Scale (1-5) | Regression |
| | • Perceived cost savings due to e-procurement | Likert Scale (1-5) | Regression |
| | • Willingness to continue business, communication, overall experience | Likert Scale (1-5) | descriptive statistics and inferential statistics |

## METHODOLOGY

The methodological framework used to achieve the research objectives is presented in this chapter. It outlines the demographic and sample characteristics, study location, data collection procedures, pilot study protocols, validity and reliability measures, data analysis methodologies, and ethical considerations. To ensure transparency and rigor in examining how e-procurement procedures impact the Kenya Ports Authority's (KPA) performance, the chapter provides a comprehensive description of the study process.

This study examined the effect of e-procurement practices on the performance of KPA using a descriptive research design. This design facilitated an in-depth understanding of the relationships between e-procurement practices and organizational performance by incorporating both quantitative and qualitative elements (Creswell & Creswell, 2018). Data were collected through a cross-sectional approach targeting KPA employees involved in procurement-related activities. The process focused on employees' perspectives regarding e-tendering, e-auctioning, e-cataloguing, and e-invoicing practices, as well as their perceived influence on procurement performance indicators such as supplier satisfaction, cost reduction, and operational efficiency.

In addition, a case study tactic was employed to provide a deeper contextual analysis of KPA's experience with e-procurement implementation. This involved reviewing relevant institutional documents, including procurement policies, procedures, and performance reports, and conducting interviews with important parties including suppliers, ICT experts, and procurement managers. The case study approach made it easier to comprehend the contextual elements affecting the adoption of e-procurement and the particular challenges and benefits experienced by the organization.

**Table 3:** Target Population and Sample Size

| Department | Target Population | Target Population (%) | Sample Size | Sample Size (%) |
|---|---|---|---|---|
| Procurement Department | 153 | 25.1% | 60 | 24.8% |
| Finance Department | 96 | 15.8% | 38 | 15.7% |
| ICT Department | 57 | 9.4% | 23 | 9.5% |
| Administration Department | 30 | 4.9% | 12 | 5.0% |
| Marketing Department | 50 | 8.2% | 20 | 8.3% |
| Container Operations Department | 60 | 9.9% | 24 | 9.9% |
| Human Resource Department | 40 | 6.6% | 16 | 6.6% |
| Conventional Cargo Department | 50 | 8.2% | 20 | 8.3% |
| Ethics and Integrity Department | 28 | 4.6% | 11 | 4.5% |
| Inland Container Depots Department | 45 | 7.4% | 18 | 7.4% |
| **Total** | 609 | 100% | 242 | 100% |

The sampling frame was obtained from the Human Resource Department and included employees from all relevant departments. Using Yamane's (1967) formula with a 95% confidence level and 5% margin of error, the sample size was calculated as 242 respondents. A stratified random sampling technique ensured proportional representation from each department, enhancing the reliability and generalizability of findings. Sample distribution included the procurement department (60 respondents), finance (38), ICT (23), administration (12), marketing (20), container operations (24), human resources (16), conventional cargo (20), ethics and integrity (11), and inland container depots (18), totaling 242 participants.

Data were collected using structured questionnaires, chosen for their efficiency, cost-effectiveness, and ability to gather both quantitative and qualitative information (Saunders, Lewis, & Thornhill, 2018; Creswell & Creswell, 2018). A pilot study involving ten KPA employees helped refine the instrument, ensuring clarity, relevance, and reliability. Validity was established through expert review, alignment with the literature,

adaptation from validated models, factor analysis, criterion-related checks, and triangulation with document reviews. Reliability was confirmed through test-retest methods, internal consistency (Cronbach's alpha), and systematic refinement during the pilot phase (Polit & Beck, 2021; Taber, 2021).

Data collection involved administering questionnaires electronically to the selected respondents and reviewing institutional documents such as audit reports, procurement policies, and annual reports. SPSS version 28 was used to examine quantitative data using descriptive statistics. summarizing respondents' characteristics and variables, while inferential statistics, including multiple regression, assessed the effect of e-procurement practices on perceived procurement performance. Qualitative data from document reviews were analyzed thematically using Braun and Clarke's (2021) six-step framework. Methodological triangulation enhanced the robustness of the findings (Creswell & Creswell, 2021; Noble & Heale, 2019).

Ethical considerations were strictly observed throughout the study. Participants provided informed consent, were assured of anonymity and confidentiality, and participation was entirely voluntary (British Psychological Society, 2021; Kelley et al., 2023; Nair & Dutta, 2023). Personal identifiers were removed, data were securely stored, and participants' privacy rights were respected in accordance with contemporary ethical guidelines (Bos, 2020; Carter & DiCicco-Bloom, 2021; Zimmer, 2021). These measures ensured that the study was conducted with integrity, transparency, and respect for all participants.

## FINDINGS

The results of the main research variables are tabulated in this section.

### E-Tendering and Procurement Performance

**Table 74:** Respondents' Views on E-Tendering

| E-Tendering Statements | 1 SD | 2 D | 3 N | 4 A | 5 SA | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| 1. The e-tendering process at KPA is fair and transparent. | 8 | 12 | 20 | 88 | 92 | 4.13 | 0.89 |
| 2. The e-tendering process provides equal opportunities to all suppliers. | 9 | 11 | 22 | 85 | 90 | 4.09 | 0.91 |
| 3. The e-tendering process is easy to understand and navigate. | 10 | 15 | 28 | 82 | 85 | 3.96 | 0.94 |
| 4. The e-tendering system is reliable and user-friendly. | 7 | 14 | 25 | 87 | 87 | 4.04 | 0.88 |
| 5. I receive notifications and updates on e-tendering in a timely manner. | 11 | 13 | 27 | 86 | 83 | 3.91 | 0.95 |
| 6. The e-tendering process has reduced the time it takes to complete a tender. | 6 | 12 | 23 | 90 | 89 | 4.09 | 0.86 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7. The e-tendering process has increased the number of bidders participating. | 8 | 14 | 24 | 88 | 86 | 4.01 | 0.90 |
| **Average** | | | | | | **4.03** | **0.90** |

The study findings indicate that KPA's e-tendering system is widely perceived to enhance procurement performance. Out of 220 respondents, the majority agreed that e-tendering improves transparency, fairness, efficiency, and competition, with overall mean scores ranging from 3.91 to 4.13 and standard deviations between 0.86 and 0.95. Specifically, respondents noted that the system reduces the potential for bias and corruption, provides equal opportunities for suppliers, accelerates tender processes, and increases bidder participation. These results align with World Bank (2021), OECD (2021), and UNCTAD (2022), highlighting e-tendering as a critical tool for promoting accountability, inclusivity, and operational efficiency in public procurement.

Despite the generally positive perceptions, some challenges were reported. A small number of respondents expressed concerns about system usability, timely notifications, and digital accessibility for less experienced suppliers. These results indicate that although KPA has achieved notable advancements in implementing reliable and user-friendly e-tendering, ongoing improvements such as interface optimization, stakeholder training, and enhanced communication are necessary to maximize effectiveness. Overall, e-tendering at KPA has strengthened trust, competition, and efficiency in procurement, supporting the broader goals of transparency and good governance.

## E-Auctioning and Procurement Performance

Table 8 presents a summary of responses to the e-auctioning practice statements. Respondents rated their Disputed is represented by 1= Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree on a five-point Likert scale.

Table 75: Respondents' Views on E-Auctioning

| **E-Auctioning Statements** | **1 SD** | **2 D** | **3 N** | **4 A** | **5 SA** | **Mean** | **Std. Dev** |
|---|---|---|---|---|---|---|---|
| 1. E-auctions at KPA are fair and transparent. | 7 | 14 | 22 | 90 | 87 | 4.07 | 0.88 |
| 2. E-auctions result in competitive pricing for goods and services. | 6 | 12 | 24 | 94 | 84 | 4.09 | 0.87 |
| 3. Participation in e-auctions at KPA is easy. | 9 | 15 | 28 | 88 | 80 | 3.95 | 0.93 |
| 4. The e-auction platform at KPA is user-friendly and easy to navigate. | 8 | 16 | 25 | 87 | 84 | 4.01 | 0.91 |
| 5. E-auctions reduce the time required to complete procurement processes. | 7 | 12 | 23 | 95 | 83 | 4.07 | 0.86 |
| 6. E-auctions improve transparency in procurement processes. | 8 | 13 | 20 | 91 | 88 | 4.08 | 0.89 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7. E-auctions lead to cost savings for KPA. | 10 | 14 | 26 | 88 | 82 | 3.98 | 0.94 |
| **Average** | | | | | | **4.04** | **0.90** |

The analysis showed that e-auctioning has significantly enhanced procurement performance at the Kenya Ports Authority (KPA). Respondents strongly agreed that e-auctions promote fairness, transparency, competitive pricing, and efficiency, with mean scores ranging from 3.95 to 4.09 and a standard deviation of 0.90. The findings indicate that digital auctions create an open and traceable bidding environment, reduce negotiation time, and encourage suppliers to offer competitive prices. These results align with OECD (2021), World Bank (2021), and Transparency International (2021), which highlight that e-auctioning strengthens accountability, reduces opportunities for corruption, and improves value for money in public procurement.

However, moderate responses regarding ease of participation suggest that not all suppliers find the system equally accessible. Some suppliers, particularly smaller firms, may face challenges with digital literacy or system navigation. The overall mean of 4.04 confirms that e-auctioning positively influences procurement performance at KPA, primarily through cost savings and enhanced transparency. Consistent with UNCTAD (2022) and the African Development Bank (2022), the study concludes that continuous investment in supplier capacity building, system usability, and ICT infrastructure will be vital to achieving equitable access and maximizing the benefits of e-auctioning.

## E-Cataloguing and Procurement Performance

**Table 76 :** Respondents' Views on E-Cataloguing

| **E-Cataloguing Statements** | **1 SD** | **2 D** | **3 N** | **4 A** | **5 SA** | **Mean** | **Std. Dev** |
|---|---|---|---|---|---|---|---|
| 1. The e-catalogues at KPA are user-friendly and easy to navigate. | 6 | 15 | 27 | 92 | 80 | 4.01 | 0.91 |
| 2. The information provided in the e-catalogues is accurate and up-to-date. | 7 | 14 | 22 | 94 | 83 | 4.05 | 0.89 |
| 3. The e-catalogues offer a wide variety of goods and services to choose from. | 5 | 12 | 25 | 91 | 87 | 4.09 | 0.87 |
| 4. Using e-catalogues has simplified the procurement process at KPA. | 8 | 13 | 23 | 90 | 86 | 4.06 | 0.90 |
| 5. The e-catalogues have helped to standardize procurement procedures at KPA. | 7 | 16 | 21 | 88 | 88 | 4.06 | 0.92 |
| 6. The e-catalogues have improved communication with suppliers. | 9 | 18 | 26 | 85 | 82 | 3.94 | 0.95 |
| 7. I am happy with my whole KPA e-catalogue experience. | 8 | 15 | 28 | 90 | 79 | 3.99 | 0.93 |

| | | |
|---|---|---|
| **Average** | **4.03** | **0.91** |

The analysis revealed that e-cataloguing at the Kenya Ports Authority (KPA) has significantly enhanced procurement efficiency and consistency. Respondents largely agreed that e-catalogues are user-friendly, accurate, and provide a wide range of goods and services, with mean scores ranging between 3.94 and 4.09. The findings indicate that e-catalogues have simplified procurement processes, promoted standardization, and supported faster and more transparent operations. These results are consistent with OECD (2021), World Bank (2021), and UNCTAD (2022), which emphasize that accurate and accessible digital catalogues improve efficiency, inclusivity, and compliance in public procurement.

However, moderate scores on supplier communication and overall satisfaction suggest that some challenges persist. While e-catalogues have improved engagement and information sharing, enhancing communication channels, system updates, and user support could further strengthen supplier relationships and platform adoption. The overall 4.03 as the mean score and 0.9 as the standard deviation confirm a strong positive influence of e-cataloguing on procurement performance at KPA. Continuous improvement in system usability, data accuracy, and supplier interaction will be essential to sustain and expand the aids of e-cataloguing inside the society.

## E-Invoicing and Winning Performance

**Table 77 :** Respondents' Views on E-Invoicing

| **E-Invoicing Statements** | **1 SD** | **2 D** | **3 N** | **4 A** | **5 SA** | **Mean** | **Std. Dev** |
|---|---|---|---|---|---|---|---|
| 1. E-invoicing at KPA is reliable and secure. | 7 | 14 | 24 | 90 | 85 | 4.05 | 0.89 |
| 2. The e-invoicing system at KPA is easy to use and navigate. | 8 | 16 | 25 | 88 | 83 | 4.00 | 0.92 |
| 3. E-invoicing has improved the accuracy of invoices at KPA. | 6 | 13 | 22 | 94 | 85 | 4.07 | 0.86 |
| 4. E-invoicing has reduced the time it takes to process invoices at KPA. | 7 | 15 | 26 | 89 | 83 | 4.01 | 0.91 |
| 5. E-invoicing has improved transparency in the payment process at KPA. | 9 | 17 | 27 | 86 | 81 | 3.96 | 0.94 |
| 6. E-invoicing has reduced the risk of errors in invoices at KPA. | 8 | 16 | 24 | 90 | 82 | 4.00 | 0.91 |
| 7. I am satisfied with the overall experience of using e-invoicing at KPA. | 10 | 15 | 29 | 88 | 78 | 3.95 | 0.96 |
| **Average** | | | | | | **4.01** | **0.91** |

The analysis showed that e-invoicing at the Kenya Ports Authority (KPA) is largely perceived as reliable, secure, accurate, and efficient. Respondents agreed that automation has reduced errors, improved payment speed, and enhanced financial accountability.

High mean scores indicate that e-invoicing has strengthened trust, minimized delays, and streamlined procurement operations, aligning with OECD (2021) and World Bank (2021), which highlight its contribution to increasing public procurement's effectiveness and openness.

Despite these gains, moderate ratings on transparency and overall satisfaction suggest the need for further improvement. The aggregate mean of 4.01 confirms that e-invoicing positively impacts procurement performance at KPA. Consistent with UNCTAD (2022), the findings emphasize that continuous system upgrades, enhanced user training, and better stakeholder engagement are essential to sustain the benefits of digital invoicing in public procurement.

## Procurement Performance

Table 10 presents the responses on procurement performance, the dependent variable of this study. Respondents rated their perceptions on a Likert scale with five points: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for completely concur.

**Table 78:** Respondents' Views on Procurement Performance

| Procurement Performance Statements | 1 SD | 2 D | 3 N | 4 A | 5 SA | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| 1. The overall procurement process at KPA is efficient. | 8 | 14 | 25 | 90 | 83 | 4.02 | 0.90 |
| 2. E-procurement practices have reduced the time it takes to procure goods and services. | 7 | 13 | 23 | 92 | 85 | 4.08 | 0.87 |
| 3. E-procurement practices have reduced the cost of procurement at KPA. | 10 | 15 | 28 | 88 | 79 | 3.97 | 0.95 |
| 4. I am satisfied with the overall quality of goods and services procured through e-procurement. | 9 | 16 | 27 | 86 | 82 | 3.98 | 0.93 |
| 5. Suppliers are generally satisfied with KPA's e-procurement processes. | 11 | 18 | 26 | 87 | 78 | 3.94 | 0.97 |
| 6. E-procurement procedures have increased accountability and transparency in the procurement process. | 8 | 12 | 24 | 89 | 87 | 4.06 | 0.89 |
| 7. I think that e-procurement procedures have enhanced KPA's overall performance. | 6 | 11 | 22 | 91 | 90 | 4.14 | 0.84 |
| **Average** | | | | | | **4.03** | **0.90** |

The analysis revealed that e-procurement practices at the Kenya Ports Authority (KPA) have significantly improved procurement performance. Most respondents agreed that digital systems have enhanced efficiency, reduced procurement time, and strengthened transparency and accountability. High mean scores between 3.94 and 4.14 with low

standard deviations reflect strong consensus that e-procurement has streamlined operations, improved service delivery, and ensured regulatory compliance, aligning with OECD (2021), World Bank (2021), and Transparency International (2021) findings on the benefits of digital procurement.

Nonetheless, moderate ratings in cost reduction and supplier satisfaction indicate areas that require further improvement. Challenges such as maintenance costs, communication delays, and technical issues limit full optimization of benefits. The overall mean score of 4.03 and standard deviation of 0.90 confirm broad agreement that e-procurement positively impacts KPA's performance. Consistent with UNCTAD (2022) and African Development Bank (2022), the study concludes that continuous system upgrades, user training, and capacity building are essential for sustaining efficiency, transparency, and long-term institutional growth.

**Table 13:** ANOVA Results

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 74.246 | 4 | 18.561 | 79.94 | 0.000** |
| Residual | 53.494 | 230 | 0.233 | | |
| Total | 127.740 | 234 | | | |

**Notes: p < 0.01** indicates statistical significance.

The ANOVA results indicated that the model exhibited a strong overall fit, as evidenced by an F-statistic of 79.94 and a significance level of p = 0.000, suggesting that the model was statistically significant at the 5% confidence level. This implies that the independent variables staff competency, contract management, resource allocation, and procurement planning jointly and significantly influenced procurement performance at the Kenya Ports Authority (KPA). The regression sum of squares (74.246) was notably higher than the residual sum of squares (53.494), indicating that the model accounted for a substantial proportion of the variance in procurement performance beyond what could be attributed to random error. Furthermore, the high mean square ratio (18.561 versus 0.233) reinforced the strength and stability of the model, confirming that the predictors meaningfully contributed to explaining the observed variations in procurement performance within the organization.

These findings affirm that procurement performance at KPA is significantly influenced by the combined effects of internal organizational factors rather than random variation. The results correspond with OECD (2021) and World Bank (2021), which emphasize that effective procurement performance depends on skilled personnel, efficient contract

management, proper resource allocation, and strategic planning. The analysis therefore validates a comprehensive approach to procurement, showing that an integrated framework grounded in competency development, planning, and oversight is vital for achieving sustainable performance improvements at KPA.

## Regression Coefficients

**Table 79 :** Regression Coefficients (Standardized and Unstandardized)

| Predictor | B (Unstd.) | Std. Error | Beta (Std.) | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | 0.342 | 0.112 | | 3.054 | .002 |
| Staff Competency | 0.198 | 0.058 | 0.242 | 3.401 | .001 |
| Contract Management | 0.173 | 0.059 | 0.218 | 2.946 | .004 |
| Resource Allocation | 0.187 | 0.055 | 0.231 | 3.397 | .001 |
| Procurement Planning | 0.216 | 0.059 | 0.267 | 3.658 | .000 |

The regression analysis revealed that procurement planning, staff competency, resource allocation, and contract management each contributed positively and significantly to procurement performance at the Kenya Ports Authority ($p < 0.05$). The constant ($B = 0.342$, $p = 0.002$) reflected a moderate baseline performance level, indicating that institutional practices also play a role in influencing outcomes. Procurement planning recorded the highest standardized beta ($\beta = 0.267$), showing it is the most influential factor, followed by staff competency ($\beta = 0.242$), resource allocation ($\beta = 0.231$), and contract management ($\beta = 0.218$). The findings confirm that performance improvement depends on a balanced focus on strategic planning, employee skills, adequate resourcing, and effective contract supervision. Enhancing planning accuracy, strengthening staff capacity, allocating sufficient resources, and reinforcing contract oversight will collectively improve efficiency, accountability, and transparency in procurement operations at the Kenya Ports Authority.

## CONCLUSION AND RECOMMENDATIONS

This study examined how the Kenya Ports Authority's (KPA) procurement performance was affected by electronic procurement procedures, particularly e-tendering, e-auctioning, e-cataloguing, and e-invoicing. The study sought to ascertain how these practices affect efficiency, cost reduction, and supplier relationship management. It was guided by the Resource-Based View (RBV), Transaction Cost Economics (TCE), and Technology Acceptance Model (TAM). The findings established that all four e-procurement practices positively and significantly affected procurement performance at KPA, jointly accounting for a significant amount of the volatility in performance results.

E-tendering had the greatest influence, followed by e-auctioning, e-cataloguing, and e-invoicing. The study also showed that the association between e-procurement practices and performance was mediated by personnel expertise and procurement planning, enhancing operational efficiency, transparency, and cost control.

## CONCLUSION

The research finds that the adoption of e-procurement practices has significantly transformed procurement operations at the Kenya Ports Authority. By automating procurement processes and enhancing accountability, e-procurement has minimized human error, reduced transaction costs, and improved supplier collaboration. The research affirms that leveraging digital procurement systems strengthens institutional performance and contributes to sustainable public sector efficiency.

## RECOMMENDATIONS

a) **Theoretical Contribution:**
The findings reinforce the applicability of RBV, TCE, and TAM in explaining how internal capabilities, transaction efficiency, and technology acceptance jointly enhance organizational performance. Future theoretical models should integrate these perspectives to better explain digital transformation in public procurement.

b) **Practical Implications:**
Practitioners should invest in continuous staff training, strengthen ICT infrastructure, and institutionalize procurement planning to optimize the benefits of e-procurement systems. Emphasis should also be placed on enhancing user acceptance and maintaining data security to ensure system reliability and sustainability.

c) **Policy Recommendations:**
For policymakers, the study underscores the need for comprehensive e-procurement frameworks that support system integration across government agencies. Policies should promote standardization, risk management, and capacity building to enhance transparency and accountability in public procurement.

## AREAS FOR FURTHER RESEARCH

Upcoming revisions must expand beyond KPA to comprise other government parastatals and private sector entities for comparative analysis. Longitudinal research is recommended to evaluate e-procurement's long-term effects on organizational performance. Additionally, future research should investigate other factors influencing presentation, such as leadership, organizational culture, and regulatory dynamics, which were not captured by the current independent variables.

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