



Influence of Electronic Procurement Tools on Procurement Performance; A Case Study of Kenya Bureau of Standards

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ABSTRACT

Despite various initiatives aimed at improving procurement processes, many organizations in Kenya still struggle with inefficiencies that affect cost control, prolong procurement timelines, and compromise operational effectiveness. This research primarily aimed to determine how adopting e-procurement could enhance performance at KEBS, a Kenyan parastatal. Specific objectives included analyzing the impacts of e-tendering, e-invoicing, e-payments, and e-purchasing on performance. Using a case study research design, data was collected from 37 personnel involved in e-procurement at KEBS, including procurement managers and compliance officers, through a pre-tested, self-administered questionnaire. Results showed that the implementation of these e-procurement methods significantly improved procurement efficiency and effectiveness, with a model indicating a 71.4% influence on performance. Positive correlations were found between the electronic procurement variables and overall performance, supported by descriptive statistics and linear regression analysis. E-tendering reduced procurement times and improved accountability, while e-purchasing enhanced supplier selection and bidding quality. E-invoicing strengthened supplier relationships and accuracy, and e-payments minimized financial misconduct and simplified transactions. The influences on procurement performance were notably high: e-tendering at 74.2%, e-invoicing at 70.5%, e-payments at 66.0%, and e-purchasing at 63.9%. The study concluded that adopting e-procurement practices effectively addressed inefficiencies in Kenyan government agencies and recommended further investment in training and technology to optimize these tools, benefiting overall public sector performance. These findings also offer valuable insights for other Kenyan agencies aiming to improve their procurement processes.

Keywords: Procurement, e-tendering, e-invoicing, e-payments, e-purchasing, performance.

1. INTRODUCTION

E-procurement encompasses several stages, including e-tendering, e-purchasing, e-invoicing, and e-payment, aimed at streamlining procurement processes within organizations. As noted by Neef (2023), this advancement integrates e-business into supply chain management, enhancing purchasing efficiency and reducing costs (Neef, 2023; Croom, 2021; Essig & Arnold, 2022; de Boer et al., 2020). Despite its potential, challenges remain, particularly due to a limited focus on specialized applications (Cuthbert et al., 2021). Ginzberg (2020) defines implementation as a continuous process, emphasizing the complexity of deploying e-procurement tools. Over the past decade, these technologies have gained traction in both commercial and public sectors, although their origins and advantages over traditional methods remain debated (Dai & Kauffman, 2022; Koorn et al., 2023). EDI has facilitated automated interactions between buyers and vendors since the 1960s, laying the groundwork for modern e-procurement tools.

The influence of e-procurement on procurement performance, particularly its potential to reduce costs, increase transparency, and improve supplier relationships, is a vital area of research. Gunasekaran and Ngai (2022) assert that its adoption can significantly enhance performance, while Croom and Brandon-Jones (2020) highlight its role in fostering competitive sourcing and collaboration. However, the impact of e-procurement in the public sector, especially in developing countries, is less understood, with previous studies focusing mainly on private sectors (Walker & Brammer, 2023; Ronchi et al., 2021). In Kenya, the adoption of e-procurement tools in public enterprises is still developing, facing challenges such as technological barriers and limited resources. For instance, the Kenya Bureau of Standards (KEBS) has struggled with inefficiencies and a lack of transparency in its procurement processes, indicating a need for a more integrated e-procurement system.

Procurement has significantly evolved in recent years, particularly with the advent of e-procurement technologies that facilitate online management of tendering and auction processes, resulting in benefits such as reduced transaction costs, enhanced inter-organizational coordination, and greater competitive sourcing opportunities. However, many organizations in Kenya still encounter challenges in effectively implementing these e-procurement tools due to technological barriers, resistance to change, and a lack of skilled personnel, leading to persistent inefficiencies, delays, and transparency issues. Recent reports from the Auditor General and the Systems Audit and State Laws Office reveal alarming statistics, including unconfirmed trade payables and potential annual losses exceeding Kshs. 30 billion, which highlight the urgent need for reform. Despite studies showing that successful integration of e-invoicing and electronic payments can yield efficiency gains, the overall impact of e-procurement on public agency performance, particularly at the Kenya Bureau of Standards (KEBS), remains under-explored. This study aims to investigate how e-tendering, e-invoicing, e-payments,

and e-purchasing can enhance procurement efficiency and streamline operations, addressing existing challenges and improving service delivery and accountability within the public sector. The findings will provide valuable insights for policymakers and organizations, guiding the development of best practices for e-procurement implementation and ultimately contributing to enhanced procurement performance in the Kenyan public sector.

2. LITERATURE REVIEW.

Numerous studies have highlighted the advantages of e-procurement, demonstrating its ability to enhance supply chain transparency and enable organizations to focus on strategic procurement while decentralizing operational tasks. For instance, a survey by Eyholzer and Hunziker in 2000 revealed that only 18% of Swiss enterprises utilized computerized procurement tools, although many planned to adopt such systems. Similar trends have been noted in other countries, indicating a widespread intention to integrate e-procurement. Research by Croom and De Boer et al. emphasizes that improving process efficiency primarily stems from internal automation and efficiencies, while Tan et al. found that better supply chain integration significantly improves product quality and customer service. This integration is linked to enhanced performance for both buyers and suppliers. Additionally, Chapman et al. noted the importance of in-house technical skills and ICT expertise in the adoption of these technologies. Despite the benefits, challenges remain, such as a lack of internet resources and system integration issues, as discussed by Rebecca and Gordon, who also highlighted the complexities of e-procurement practices in the public sector. Studies like those by Ghasemi et al. show that e-tendering can enhance procurement performance by improving accountability and stakeholder engagement, while Wanyonyi and Chirchir found that information technology positively influences procurement in public institutions and Kenyan tea firms, respectively. E-invoicing, with its associated cost savings and process efficiencies, also faces challenges in adoption, particularly regarding top management involvement, as highlighted by Chipiro. Meanwhile, e-payments are recognized for their potential to reduce costs and enhance transaction efficiency, yet research on their specific challenges in Kenyan contexts is limited. Lastly, e-purchasing has been identified as a strategic tool that improves procurement efficiency and fosters better supplier relationships, thereby enhancing organizational performance. Overall, procurement performance is defined by the achievement of objectives while minimizing costs, with critical dimensions including effectiveness, efficiency, and timely delivery, all of which are increasingly significant in influencing supply chain dynamics during economic downturns.

3. RESEARCH METHODS

The study employed a case study research approach. The research was conducted in the Nairobi County, Kenya, focusing on e-procurement using a sample size of 37 respondents. A census sampling technique was used to select the respondents. Data collection involved the use of closed ended questionnaires allowing for a comprehensive understanding of the research problem. Data analysis was conducted using quantitative methods. The quantitative data from the interviews were analyzed using descriptive and inferential statistics. A regression model was applied to test the relationship between the independent variables, such as e-tendering and e-purchasing, and the dependent variable, which was procurement performance at the Kenya Bureau of Standards.

4. RESULTS AND DISCUSSIONS

Response Rate

The study achieved a response rate of 94.6%, with 35 out of 37 distributed questionnaires being duly filled and returned for analysis. According to Dillman et al (2014), a response rate between 60% and 80% is sufficient to represent the sampled respondents. Therefore, the study's response rate of 94.6% exceeds these benchmarks and is regarded as adequate and representative for the analysis.

Regression Analysis Results

Regression analysis was conducted to determine the statistical relationship between various independent variables— e-tendering, e-purchasing, e-invoicing, and e-payment —and the procurement performance at the Kenya Bureau of Standards. The model summary indicated a strong overall correlation coefficient (r) of 0.845, suggesting that the combined influence of these four aspects of entrepreneurial training significantly correlates with coffee farming performance. The R-squared value (r^2) of 0.714 indicates that 71.4% of the variation in procurement performance of KEBS can be attributed to these e-procurement tools. To assess the fitness of the regression model, an Analysis of Variance (ANOVA) test was performed, yielding an F-statistic of 50.528, significant at a p-value of 0.000 ($p < 0.05$). This significance confirms that the model reliably predicts the relationship between the e-procurement tools and procurement performance. The regression coefficients revealed that e-tendering had a Beta coefficient (β) of 0.742, suggesting that a unit change in e-tendering training while holding other factors constant, would enhance procurement performance by 74.2%. e-purchasing showed a Beta coefficient of 0.639, indicating a 63.9% improvement in performance for each unit change. E-invoicing had the highest Beta coefficient (β) of 0.705, meaning that a unit change in e-invoicing would increase procurement performance by 70.5%. Finally, e-payment exhibited a Beta coefficient (β) of 0.660, indicating that a unit change in this area would improve procurement performance by 66.0%. From these results, it can be concluded that e-tendering has the most substantial impact on procurement performance, followed by e-invoicing, e-payment, and finally, e-purchasing.

Regression Analysis Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845 ^a	0.714	0.700	.7378

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.088	4	28.522	50.528	.0000 ^a
	Residual	45.723	31	0.5645		
	Total	159.811	35			

Regression Coefficients

	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	4.793	.612		7.832	0.0000
E-tendering X ₁	0.742	.161	0.577	4.609	0.0000
E-Purchasing X ₂	0.639	.279	0.452	2.290	0.0246
E – Invoicing X ₃	0.705	.198	0.516	3.561	0.0006
E- Payment X ₄	0.660	.251	0.481	2.629	0.0102

*Discussion**E-tendering*

The first objective of the study was to examine the influence of e-tendering on the procurement performance of Kenya Bureau of Standards. The results indicated that e-tendering had substantially improved procurement performance at the Kenya Bureau of Standards, with the highest agreement on its impact in shortening the procurement period and maintaining a reliable audit trail, underscoring its effectiveness in streamlining processes and enhancing overall efficiency. The analysis purports that e-tendering enhanced procurement performance at KEBS significantly. It was discussed by Amit and Zott (2001) that an organization would generate numerous wealth through conducting electronic procurement through minimization of waste and time spent to conduct the transactions through the tracking and tracing of orders that in turn make the ease of correcting any errors that may arise as well enabling the employees to carry out other duties. Ghasemi *et.al.* (2019) also studied the influence of e-tendering on procurement performance and found out that positive growth within organizations were highly affected by e-tendering's accountability and transparency in the procurement process. The study further emphasized on how e-tendering could enhance procurement creativity and flexibility in its response to the ever changing market conditions. This showed that this study is in agreement with other researcher's studies and findings that e-tendering played a role in the success of procurement performance in KEBS.

E-invoicing

The second objective of the study was to examine the influence of e-invoicing on the procurement performance of Kenya Bureau of Standards. The results indicated that e-invoicing substantially improved procurement performance at the Kenya Bureau of Standards, with the order of agreement on its improved supplier/customer relationships and facilitating faster payments, reducing associated costs, improved the accuracy and timeliness of payments and better tracking and management of financial transactions. Studies done by other researchers including Geldunhuy *et al.* showed how the use of e-invoicing systems led to enhanced performance and cost efficiency, Wanjera, whose study found that organizations form a network of partners and suppliers through e-invoicing who in turn improve the attractiveness of the e-invoicing in the financial supply chain. This further agrees with the Technology Acceptance Model theory that through the adoption of e-invoicing, financial operations could be streamlined through automating repetitive tasks, reducing manual data entry which in turn reduces the occurrence of human errors, reduction of invoice processing times, faster payments cycles and improved cash flows.

In accordance to the previously done research, it is visible that this study's research aligns well and is in agreement with them thus showing that the implementation and usage of e-invoicing positively affects the procurement performance in KEBS.

E-payment

The third objective of the study was to examine the influence of e-payment on the procurement performance of Kenya Bureau of Standards. The findings suggest that e-payment, as an e-procurement practice, significantly contributed to the enhanced procurement performance of KEBS. This can be further supported by the research previously carried out by other researchers including Salonske (1997) who examined how e-payments benefits companies and found out that it and advantages like reduction on costs and returns on investments when implemented. He also found out in another study that e-payment had decreased expenses and increased convenience as these transactions could be done at any time and any place of the users' convenience. The study therefore is in agreement with the Resource –Based View theory which states that through e-payments, a company benefits from reduced lead times and the costs associated as well as improved its efficiency. In the procurement process by a large extent as everything is automated and payments are directly done between the supplier and the buyer. This brings the finding that e-procurement had a significant and positive relationship with the procurement performance in KEBS.

E-purchasing

The last objective of the study was to examine the influence of e-purchasing on the procurement performance of Kenya Bureau of Standards. The findings highlighted the effectiveness of e-purchasing practices in enhancing procurement performance within KEBS, emphasizing areas such as competitive pricing and transparency while also pointing to potential areas for further improvement in supplier selection efficiency. E-purchasing makes supplier management easier as it allows businesses to use performance indicators and supplier data to make smarter purchases and improve supply chain effectiveness (Narasimhan et al., 2009). Additionally, Barasa and Namusonge (2017) did a study that showed the efficiency in e-procurement were largely contributed to by websites that allowed for e-purchasing transactions to take place within companies and organizations through the placement of orders and reduction of overall costs the process. E-purchasing also make the procurement process more transparent and enhances accountability which fosters credibility and confidence as discovered by Wang et al. (2017). These studies therefore concur with the Transaction Cost Economics theory that states how desired procurement performance could be achieved by e-purchasing through minimization of errors, boost efficiency and expediting decision-making as well as benefitting from economies of scale and scope through streamlining of purchasing processes, standardization of procurement activities and using their purchasing influence to negotiate better and more favourable terms with vendors. These finding therefore highlight the adoption of e-purchasing in KEBS and other organization so as to achieve better procurement performance results.

5. CONCLUSION

The study concluded that e-tendering significantly enhanced the procurement performance of the Kenya Bureau of Standards (KEBS). It demonstrated a substantial positive influence by reducing procurement timelines, improving accountability, and streamlining processes, highlighting its effectiveness in fostering a more efficient and transparent procurement environment. E-purchasing was also found to be integral in improving procurement performance, enhancing supply quality, reducing bias in supplier selection, and encouraging competitive bidding (. Similarly, e-invoicing played a critical role by strengthening supplier relationships, improving dispute resolution, and enhancing invoicing accuracy, which contributed to reduced costs and increased procurement visibility. Additionally, e-payment systems were identified as vital for improving procurement performance by minimizing financial misconduct, simplifying supplier payments, and enhancing accountability. The significant relationship between e-payment usage and improved outcomes further underscored its role in streamlining financial processes. Overall, the findings suggest that various e-procurement practices, including e-tendering, e-purchasing, e-invoicing, and e-payment, are crucial in enhancing KEBS's procurement performance, making processes more efficient, transparent, and cost-effective.

Recommendation

This research highlights the significant impact of digital procurement tools—namely e-tendering, e-purchasing, e-invoicing, and e-payment—on the procurement performance of the Kenya Bureau of Standards (KEBS). It demonstrates how these technologies streamline processes, enhance transparency, and improve supplier relationships, offering actionable insights for more efficient public procurement practices that can also benefit the broader industry. The study emphasizes the need for comprehensive reforms in tendering processes, including automation and regular training for staff and suppliers to ensure effective use of e-tendering platforms, while also recommending the expansion of e-invoicing and e-payment systems to improve accuracy and reduce reliance on cash transactions. Furthermore, it advocates for the standardization of digital procurement practices across the industry, encouraging collaboration among public agencies to share best practices and enhance overall standards. By providing empirical evidence and a framework for evaluating digital tools' impacts, the study paves the way for future research and offers data-driven insights that can inform policymakers in developing regulations to promote digital procurement practices. Ultimately, implementing these recommendations can help KEBS improve its procurement processes and set a precedent for the wider procurement industry.

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