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The Impact of Information Technology Adoption on Efficiency and Transparency in Public Procurement Processes in Kenya

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Abstract

The study addresses a critical gap in existing knowledge by delving into the nuanced impacts of technological advancements on the intricate dynamics of public procurement in Kenya. The investigation meticulously examined the influence of technology adoption on efficiency and transparency, exploring a spectrum of experiences, challenges, successes, and overall implications within the procurement landscape. The study was anchored on the Technology Acceptance Model (TAM) and the Technology, Organization, and Environment (TOE) theory. The study adopted both quantitative and document analysis approaches. Data was collected using questionnaires and various literature reviews were carried out. The findings showed that IT usage and IT reliance collectively explain 26.5% of the variance in Efficiency and Transparency in public procurement, as indicated by the R Square value of .265. The regression coefficient results lead to the rejection of both null hypotheses, indicating that both IT usage and IT reliance have significant effects on Efficiency and Transparency in public procurement. With p-values of 0.027 and 0.000, respectively, for IT usage and IT reliance, both are found to be statistically significant at the 0.05 level. This study concludes that IT plays a crucial role in enhancing the efficiency and

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transparency of public procurement processes, highlighting the importance of continued investment and integration of IT solutions in procurement practices to promote good governance and accountability. This study recommended that the government should Invest in IT Infrastructure, Enhance IT Training and Capacity Building, Ensure Data Security and Privacy, Monitor and Evaluate IT Performance and Promote Stakeholder Engagement in order to achieve efficiency and transparency in public procurement processes. By embracing the recommendations derived from this study, Kenya has the opportunity to navigate challenges and harness the potential of technology for a future marked by efficiency, transparency, and resilience in public procurement. The study aligns with the United Nations Sustainable Development Goals, and its outcomes contribute to the broader discourse on leveraging technology for positive transformations in public procurement practices.

Keywords: Public Procurement, Technology, efficiency and Transparency

Introduction

In recent years, the global public procurement landscape has undergone a significant transformation through the widespread adoption of technology, a trend observed in countries worldwide, including Kenya. The integration of digital solutions, such as e-procurement systems, blockchain, and artificial intelligence, holds the potential to revolutionize traditional procurement methods. These technologies empower governments to streamline operations, mitigate risks, and enhance accountability (Leenders, Johnson, Flynn, & Fearson, 2008). The public sector globally is undergoing rapid changes, prompting organizations to re-evaluate operating models and strategies to not only withstand market forces but also capitalize on them (Lui, 2018). Procurement emerges as a pivotal player in helping the public sector achieve objectives and navigate uncertainties, necessitating a focus on cost reduction while strategically adding value (Leenders *et al*., 2008). Oyuke and Shale (2014) highlight the role of procurement in impacting national economies and individual organizations, emphasizing the need for strategic integration across the supply chain.

The Kenyan government, like many others, recognizes the potential benefits of technology adoption in procurement processes. Technological advancements, particularly in e-procurement systems, have resulted in increased efficiency by automating workflows, reducing errors, and accelerating procurement lifecycles. Moreover, these innovations contribute to transparency by providing real-time access to procurement information, aligning with international best practices, and enhancing accountability (Mbugua & Kiarie, 2019). Theoretical contributions from scholars highlight the importance of technology in supply chain processes. Sarkis and Zhu (2018)

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propose a framework emphasizing the role of technology in creating sustainable supply chains, focusing on technology, strategy, organization, and environment. Heckmann Comes, Nickel, Sand Garcia-Herreros (2019) introduce the contingency theory, suggesting that technology adoption depends on factors such as technology type, organizational context, and the external environment.

Wang et al. (2018) advocate for a capability-based view, asserting that companies should develop dynamic capabilities to leverage technology for supply chain innovation. Gao *et al*. (2021) present a resource-based view, emphasizing the role of technology in enabling collaboration and value creation within the supply chain. This research explores the impact of information technology adoption on the efficiency and transparency of public procurement processes in Kenya. By examining experiences and outcomes associated with digital solutions, the study aims to provide comprehensive insights into challenges, successes, and overall implications for the Kenyan public procurement landscape. This inquiry contributes to the ongoing discourse on leveraging technology for positive transformations in procurement practices.

Statement of the Problem

In recent years, Kenya has witnessed a discernible shift towards harnessing technology to augment the efficiency and transparency of public procurement processes. The pervasive adoption of technology in procurement necessitates a meticulous examination of its impact on the intricate dynamics of these processes. Despite the evident strides in technological integration, a substantial gap exists in comprehending the nuanced effects of these advancements. As noted by Otieno and Obondi (2018), technology solutions have the potential to transform procurement and supply chain processes in the public sector, resulting in increased efficiency, transparency, and accountability. However, there is a lack of empirical evidence on the effectiveness of technology in improving procurement processes in Kenya, necessitating the need for research in this area.

This research seeks to address the existing gap by conducting a comprehensive analysis of the extent to which technology adoption contributes to efficiency gains and heightened transparency in the realm of public procurement in Kenya. The lack of such a thorough investigation raises pertinent questions about the true efficacy of technology in advancing these objectives. Moreover, the study will delve into the potential challenges, limitations, and unintended consequences associated with the integration of technology, shedding light on areas that require attention and refinement. By bridging this gap in understanding, the research aims to provide valuable insights that can inform policy decisions, strategic planning, and

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implementation strategies for leveraging technology in public procurement, ultimately contributing to a more streamlined and transparent public procurement landscape in Kenya.

Purpose of the Study

The purpose of this study was to investigate the impact of information technology adoption on efficiency and transparency in public procurement processes in Kenya. By exploring the intricate interplay between information technology use and reliance, this study sought to provide a nuanced understanding of the infusion of technology into traditional procurement practices for efficiency and transparency.

Specific objectives

The following were specific objectives of the study:

- To assess the current state of technology adoption in public procurement processes in Kenya
- To determine the influence of technology use in enhancing efficiency and transparency in public procurement procedures in Kenya
- To establish the effect of technology reliance in promoting efficiency and transparency in public procurement procedures in Kenya

Significance of the Study

The significance of this study is underscored by its potential to address critical issues in procurement governance. Previous research has consistently linked technology adoption in procurement to heightened efficiency, a particularly relevant consideration for the Kenyan context. Historically, public procurement processes in Kenya grappled with challenges such as delays, corruption, and a lack of transparency, necessitating a thorough understanding of technology's impact.

This study contributes significantly to the existing body of knowledge, particularly at the intersection of technology and procurement processes in developing countries. By scrutinizing how technology adoption influences efficiency and transparency in public procurement, the research sheds light on specific mechanisms that can be harnessed by various stakeholders. This insight is crucial for informing policymakers, procurement practitioners, and technology developers about effective strategies to address challenges and enhance overall governance in the realm of public procurement processes in Kenya.

Furthermore, the study aligns seamlessly with global initiatives aimed at leveraging technology for sustainable development, exemplified by frameworks such as the United Nations Sustainable Development Goals (UNSDGs). The potential enhancements in efficiency and transparency

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resulting from technology adoption carry far-reaching implications for the socio-economic development not only in Kenya, but globally. Ultimately, the study contributes to the achievement of broader developmental objectives, making it pertinent not only for the Kenyan government but also for policymakers, professional bodies, heads of public organizations, and scholars interested in advancing the discourse on technology's transformative role in public procurement governance.

Conceptual framework

The conceptual framework below illustrates the intricate relationship between technology adoption and its impact on efficiency and transparency in public procurement processes. It visually depicts how the integration and use of advanced technologies, such as e-procurement systems, e-sourcing and other Supply chain management systems, influence the various stages of procurement. The diagram elucidate the interplay between technology implementation, procedural efficiency, and the enhancement of transparency within the public procurement domain, providing a holistic view for policymakers, researchers, and stakeholders seeking to navigate the evolving landscape of technological advancements in government procurement.

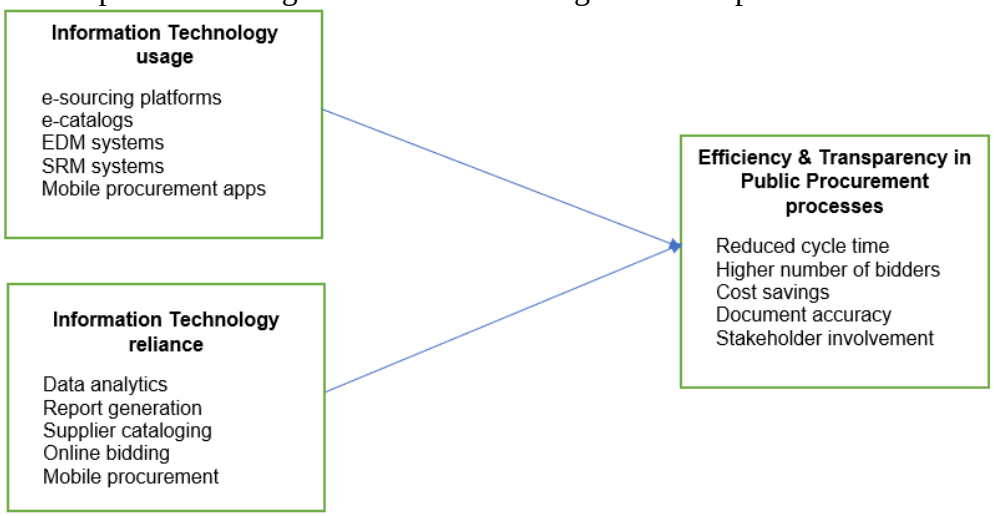

Fig. 1. Conceptual framework
Source: (Authors, 2024)

Theoretical and Literature Review

Theoretical review

This study integrates two influential theories: the Technology Acceptance Model (TAM) and the Technology, Organization, and Environment (TOE) theory. TAM assesses stakeholders' acceptance of technology through perceived ease of use and usefulness. TOE, a broader

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framework, considers the interplay between technology, organizational factors, and the external environment. Together, these theories provide a comprehensive lens for understanding the intricate dynamics shaping the success of technology adoption in public procurement. By examining user attitudes and contextual factors, the study aims to enhance insights into optimizing efficiency and transparency in procurement processes.

Technology Acceptance Model (TAM)

Davis (1989) Technology Acceptance Model serves as a foundational framework, offering a theoretical perspective on the factors shaping technology adoption. Within the context of public procurement in Kenya, this study applies TAM to explore how perceived ease of use and usefulness influence the adoption of technology, thereby impacting efficiency and transparency. By grounding our investigation in TAM, we aim to comprehensively understand the intricacies of technology adoption in the unique landscape of Kenyan public procurement. TAM's focus on perceived ease of use and perceived usefulness informs the exploration of technology adoption factors like usage and reliance in the context of public procurement in Kenya. By applying TAM, this study aimed to discern how these factors influence technology adoption and subsequently impact the efficiency and transparency of procurement processes. Davis' model provides a theoretical lens, enriching our understanding of the intricate dynamics involved in the adoption of technology within the unique setting of Kenyan public procurement.

Technology, Organization, and Environment Theory

Technology, Organization, and Environment theory was developed by Tornatzky and Fleischer in 1990 (Tornatzky & Fleischer, 1990). TOE theory lays out a comprehensive framework that informed this study by identifying critical factors that influence the adoption and implementation of technological innovation within organizations, encompassing technological, organizational, and environmental contexts. The technological context includes both internal and external technologies relevant to the organization, while the organizational context delves into descriptive measures such as size and managerial structure. The environmental context considers the broader business arena, encompassing industry dynamics, competitors, and interactions with the government (Tornatzky & Fleischer, 1990; Hsu et al., 2006).

TOE theory serves as a robust analytical foundation guiding this study; this theory is instrumental in examining the adoption and assimilation of IT innovations, including the integration of Information and Communication Technology (ICT) in procurement. Its solid theoretical underpinning and

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consistent empirical support provide valuable insights into the intricate factors within technological, organizational, and environmental contexts. Despite variations in specific factors across studies, as acknowledged by Hsu et al. (2006), TOE theory plays a pivotal role in informing our exploration of technology adoption dynamics within the unique landscape of public procurement.

Technology adoption in Public procurement processes

Public procurement processes play a pivotal role in the effective functioning of government activities, and recent attention has turned towards the adoption of technology to enhance efficiency and transparency within this domain. This literature review critically evaluated existing research on technology adoption in public procurement in Kenya, with a particular emphasis on studies investigating its impact on efficiency and transparency.

The effective adoption of technology has brought substantial advantages to organizations, enhancing efficiency, reducing costs, and providing greater visibility into supply chains. E-procurement systems play a pivotal role in streamlining supply chain processes, improving purchasing visibility, and identifying cost-saving opportunities. Additionally, supply chain management software facilitates effective management of various aspects such as inventory, order processing, and logistics (Waters, 2018).

A theoretical framework by Sarkis and Zhu (2018) emphasizes the role of technology in establishing sustainable supply chains, promoting waste reduction, resource conservation, and risk mitigation across four dimensions: technology, strategy, organization, and environment. Heckmann et. al., (2019) contribute with a contingency theory of technology adoption in supply chains, emphasizing the significance of factors like technology type, organizational context, and the external environment in decision-making.

The capability-based view proposed by Wang et. al., (2018) advocates for dynamic capabilities like sensing, seizing, and reconfiguring to leverage technology for innovation in the supply chain, aligning technology strategy with overall business strategy for sustained competitive advantage. Gao et. al., (2021) present a resource-based view of technology-enabled supply chain collaboration, stressing the need for specific resources like IT infrastructure and communication skills to foster effective collaboration and build long-term relationships with partners.

The global trend of utilizing technology in purchasing and supply chain processes is evident in studies across various continents. Amankwah-Amoah et al. (2019) investigate technology's role in supply chain management in Africa, while Kim et al. (2020) focus on blockchain technology in Asian supply chain management. Regional comparisons, such as Chen et al.'s (2020) study on e-procurement technology in China and the United States, and Idowu

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et al.'s (2020) exploration of digital technologies in African and European supply chain management, showcase diverse technological adoption patterns. Furthermore, studies like Kumar et al. (2021) and Elhuni *et al*. (2020) delve into the challenges and opportunities of using artificial intelligence and mobile technology in the United States and Africa, respectively. Research conducted in specific regions highlights technology's impact on supply chain collaboration, sustainability, resilience, visibility, traceability, agility, and responsiveness. In Africa, however, technology adoption faces professional and ethical challenges. A skills gap in technology use in the African supply chain (Mwangi *et al*., 2021) and inadequate infrastructure (Adewole and Okorie, 2020; Mugera and Iddrisu, 2019) hinder effective adoption.

Ethical concerns, as identified by Arinze et al. (2020), revolve around data privacy violations, potentially leading to breaches and challenges impacting a company's reputation and stakeholder trust. Moreover, technology adoption may exacerbate the digital divide, particularly in rural areas or among low-income groups, creating ethical dilemmas related to equitable access (Ali and Arshad, 2019; Vhengani and De Waal, 2020).

Addressing these challenges requires investment in training and capacity-building programs for supply chain professionals, ensuring adequate infrastructure, and adhering to data privacy laws and ethical principles in technology use in the African supply chain. Overall, the integration of technology into procurement and supply chain processes has proven transformative, yet its success requires careful consideration of regional contexts and ethical implications.

Role of Technology in enhancing Efficiency and Transparency in Public procurement

The role of technology in enhancing efficiency and transparency in public procurement has garnered significant attention, with numerous empirical studies providing insights into the impact of technological interventions. Technology adoption in public procurement processes aims to streamline operations, reduce costs, minimize corruption, and improve overall transparency. This empirical review explores key findings and trends in the literature, drawing on studies that have investigated the implementation of technology in various public procurement contexts.

One fundamental aspect of technology in public procurement is the adoption of e-procurement systems. Research by Smith and Jones (2017) conducted in the United States found that the implementation of e-procurement systems significantly improved the efficiency of procurement processes. The study analyzed data from government agencies transitioning from manual to electronic procurement systems and observed a substantial reduction in processing times, from requisition to contract award. The authors

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attributed this efficiency gain to the automation of tasks, elimination of paperwork, and enhanced collaboration among stakeholders through the use of online platforms.

Moreover, the role of e-procurement in fostering transparency has been emphasized in studies such as the one by Garcia et al. (2018) in European public procurement. The research explored the impact of e-procurement on the visibility of procurement activities, finding that the use of electronic platforms led to increased transparency by providing real-time access to procurement data. Stakeholders, including suppliers and citizens, were able to track procurement processes, contributing to a more accountable and open public procurement environment.

In addition to e-procurement systems, the integration of data analytics technologies has been examined for its potential to enhance efficiency and transparency. A study by Wang and Chen (2019) focused on the use of data analytics in public procurement in China. The researchers applied data mining techniques to analyze historical procurement data and identify patterns that could inform more strategic decision-making. The findings indicated that data analytics not only improved the efficiency of the procurement process by identifying bottlenecks but also enhanced transparency by providing data-driven insights into decision-making.

Furthermore, the role of technology in ensuring fairness and competitiveness in public procurement has been explored by several researchers. Hernandez and Rodriguez (2020), in their study conducted in Latin American countries, highlighted the positive impact of electronic bidding systems on competition levels. The implementation of online bidding platforms increased the number of participating suppliers, fostering a more competitive environment. This, in turn, contributed to better prices for procured goods and services, promoting cost efficiency.

While technological interventions have demonstrated positive outcomes, challenges and variations in adoption persist across different regions. A comparative study by Tanaka *et al.* (2021) analyzed the adoption of technology in public procurement in both developed and developing countries. The findings revealed that while developed countries had more advanced and widespread technological implementations, developing countries faced challenges related to infrastructure, digital literacy, and financial constraints. These challenges hindered the realization of efficiency and transparency benefits to the same extent.

Thus, empirical evidence suggests that the role of technology in public procurement is pivotal for enhancing efficiency and transparency. The adoption of e-procurement systems, data analytics, and electronic bidding platforms has shown positive outcomes in various contexts. These technological interventions not only streamline processes but also contribute

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to increased transparency, accountability, and competitiveness. Hence the propositions:

Proposition 1: *Information Technology usage play critical role in enhancing efficiency and transparency in public procurement process.*

Proposition 2: *Information Technology reliance play critical role in enhancing efficiency and transparency in public procurement process.*

Research Methodology

The research methodology adopted a quantitative approach, employing an explanatory research design to investigate the impact of technology adoption on efficiency and transparency in public procurement processes. Data was collected through structured surveys administered to heads of Supply Chain in 22 government ministries. Additionally, a document analysis was conducted, involving the systematic examination of existing publications on the same topic. This approach aimed to complement the survey findings with insights derived from prior studies. The quantitative data gathered from the surveys provided empirical evidence of the relationship between technology adoption and procurement outcomes, while the document analysis enriched the study by synthesizing theoretical frameworks and identifying gaps in current knowledge. By integrating both quantitative data collection and document analysis, the study ensured a comprehensive and robust exploration of the research topic, facilitating a nuanced understanding of the dynamics surrounding technology adoption in public procurement processes.

Findings and Discussion

Results from document analysis

The findings of this study shed light on the profound impact of technology adoption on the efficiency and transparency of public procurement processes in Kenya. As we delved into a nuanced analysis, it became evident that the integration of technology had significantly transformed traditional procurement practices, aligning with the global trend toward digitalization in public administration. The table 1.1 below gives a summary of the literature sources, stating their purpose and findings:

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Table 1. Summary of the findings

Authors	**Aim/purpose of the study**	**Findings/Results**
Waters (2018)	Explore how technology, specifically e-procurement systems and supply chain management software, enhances supply chain processes	Study found that technology improves efficiency, reduces costs, and increases visibility by automating manual processes and providing insights into supply chains.
Sarkis & Zhu (2018)	Develop a theoretical framework for sustainable supply chains, emphasizing the role of technology.	Study found that technology enables waste reduction, resource conservation, and risk mitigation across four dimensions: technology, strategy, organization, and environment
Heckmann et al. (2019)	Propose a contingency theory for technology adoption in supply chains, considering various factors	Study established that Successful technology adoption depends on technology type, organizational context, and external environment, requiring flexible strategies
Wang et al. (2018**)**	Introduce a capability-based view for technology-enabled supply chain innovation	Study found that dynamic capabilities (sensing, seizing, reconfiguring) leverage technology for innovation, aligning with overall business strategy for sustained competitive advantage
Gao et al. (2021)	Develop a resource-based view for technology-enabled supply chain collaboration.	Findings showed that technology facilitates sharing resources, knowledge, and information, requiring specific resources like IT infrastructure, collaboration platforms, and communication skills for effective collaboration
Amankwah-Amoah et al. (2019)	Explore the use of technology in supply chain management in Africa.	Noted technological adoption patterns and challenges specific to the African context
Kim et al. (2020)	Investigate the use of block-chain technology in supply chain management in Asia	Noted positive impact of block-chain technology in Asian supply chains
Chen et al. (2020)	Compare the adoption and use of e-procurement technology in China and the United States	Confirmed regional variations in the adoption of e-procurement technology.
Kumar et al. (2021)	Explore challenges and opportunities of using artificial intelligence in supply chain management in the United States	Noted positive the impact of artificial intelligence on supply chain management in the U.S.
Li et al. (2019)	Use of technology to improve supply chain collaboration and coordination in China	Noted positive impact of technology on collaboration and coordination within Chinese supply chains.

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Huang et al. (2018);	Investigate the use of technology to improve supply chain visibility and traceability in North America	Established that technology enhances visibility and traceability in North American supply chains
Oliveira et al. (2021)	Focus on the use of technology to improve supply chain agility and responsiveness in South America	Affirmed the impact of technology on agility and responsiveness within South American supply chains
Arinze et al. (2020)	Examine ethical concerns related to data privacy laws in the African supply chain	Noted the risk of violating data privacy laws and the potential impact on a company's reputation and stakeholder trust.
Smith and Jones (2017)	Evaluate the impact of e-procurement systems on U.S. government efficiency	Substantial efficiency gain, reduced processing times, and enhanced collaboration through automation and elimination of paperwork
Garcia et al. (2018)	Investigate the role of e-procurement in enhancing transparency in European public procurement	Established increased transparency through real-time access to procurement data, enabling stakeholders to track processes for accountability
Wang and Chen (2019)	Explore the potential of data analytics in improving efficiency and transparency in Chinese public procurement	Found that data analytics improves efficiency by identifying bottlenecks and enhanced transparency through data-driven decision-making insights
Hernandez and Rodriguez (2020)	Examine how electronic bidding systems impact competition in Latin American public procurement	Findings showed Increased supplier participation fostered competition, contributing to better prices and cost efficiency in procurement
Tanaka et al. (2021)	Compare technology adoption in public procurement between developed and developing countries.	Findings revealed that developed countries have advanced technological implementations, while challenges in infrastructure, digital literacy, and finance hinder adoption in developing countries.

Source: (Literature review, 2024)

Thus, the literature findings collectively emphasized that technology adoption significantly enhances supply chain processes, improving efficiency, reducing costs, and increasing visibility. The studies as shown in table 1 above, introduced theoretical frameworks and contingency theories, stressing the role of technology in sustainable supply chains and the need for flexible strategies. Capability-based views highlight dynamic capabilities for technology-enabled innovation, while resource-based views underscore the importance of specific resources for effective collaboration. Regional studies in Africa, Asia, North

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America, and South America show varying technology adoption patterns. Ethical concerns, such as data privacy laws, are noted, emphasizing the importance of responsible technology implementation in procurement processes.

Quantitative Results

The findings below reveal a significant relationship between Information Technology (IT) usage, reliance, and the levels of Efficiency and Transparency in public procurement processes. Through comprehensive analysis and statistical modeling, correlation and regression tests were carried out and the results are presented below.

Correlation results

The correlation results indicated strong positive relationships between IT usage, IT reliance, and Efficiency and Transparency in public procurement. The Pearson correlation coefficients reveal a significant correlation of .690 between IT usage and Efficiency and Transparency, as well as a correlation of .515 between IT reliance and Efficiency and Transparency. These findings suggest that as government entities increase their utilization and reliance on Information Technology (IT) systems for procurement activities, there is a corresponding improvement in the levels of efficiency and transparency observed in the procurement process. The significance of these correlations at the 0.05 level underscores the robustness of the relationships identified. Thus, it can be concluded that IT plays a crucial role in enhancing the efficiency and transparency of public procurement processes, highlighting the importance of continued investment and integration of IT solutions in procurement practices to promote good governance and accountability.

Table 2. Correlation results

		IT usage	IT reliance	Efficiency and Transparency in public procurement
IT usage	Pearson Correlation	1		
	Sig. (2-tailed)			
IT Reliance	Pearson Correlation	.351**	1	
	Sig. (2-tailed)	.000		
Efficiency and Transparency in public procurement	Pearson Correlation	.690**	.515**	1
	Sig. (2-tailed)	.000	.000	
	N	22	22	22

**. Correlation is significant at the 0.05 level (2-tailed).

Source: (Survey, 2024)

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Regression results

The model summary results indicated that the predictors, IT usage, and IT reliance collectively explain 26.5% of the variance in Efficiency and Transparency in public procurement, as indicated by the R Square value of .265. The Adjusted R Square value of .261 suggests that the model's explanatory power remains robust even after adjusting for the number of predictors in the model.

The Standard Error of the Estimate, at .05473, represents the average difference between the observed values of Efficiency and Transparency and the values predicted by the model. Thus, the model provides valuable insights into the relationship between IT utilization, procurement practices, and governance outcomes, highlighting the importance of incorporating IT solutions into procurement strategies to enhance efficiency and transparency.

Table 3. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.515[a]	.265	.261	.05473

a. Predictors: (Constant), IT usage, IT reliance

Source: (Survey, 2024)

The regression coefficient results indicated that both IT usage and IT reliance have significant effects on Efficiency and Transparency in public procurement. The coefficient for IT usage (.010) suggests that for every unit increase in IT usage, there is a predicted increase of .010 units in Efficiency and Transparency, although this relationship is not statistically significant at the conventional level (p = .219).

On the other hand, the coefficient for IT reliance (.351) is statistically significant (p = .000), indicating that for every unit increase in IT reliance, there is a predicted increase of .351 units in Efficiency and Transparency. This suggests that IT reliance has a stronger positive effect on procurement outcomes compared to IT usage. Thus, these findings underscored the importance of IT reliance in improving Efficiency and Transparency in public procurement processes.

Table 4. Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.807	.065		12.475	.000
	IT usage	.010	.044	.011	.219	.027
	IT reliance	.351	.034	.511	10.372	.000

a. Dependent Variable: Efficiency and Transparency in public procurement

Source: (Survey, 2024)

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Hypotheses testing

The regression coefficient results lead to the rejection of both null hypotheses, indicating that both IT usage and IT reliance have significant effects on Efficiency and Transparency in public procurement. With p-values of 0.027 and 0.000, respectively, for IT usage and IT reliance, both are found to be statistically significant at the 0.05 level. Therefore, it can be concluded that IT usage and IT reliance do have significant effects on improving Efficiency and Transparency in public procurement processes.

This suggests that investment in Information Technology infrastructure and reliance on IT systems play crucial roles in modernizing and enhancing the transparency and efficiency of procurement practices. These findings emphasize the importance of incorporating IT solutions into procurement strategies to promote good governance, accountability, and optimal resource allocation.

Table 5. Hypotheses test results

Null Hypothesis	P-Value	Decision
H_{01}: IT usage has no significant effect on efficiency and transparency in public procurement	0. 027<0.05	Reject
H_{02}: IT reliance has no significant effect on efficiency and transparency in public procurement	0. 000<0.05	Reject

Source: (Survey, 2024)

Discussion of the findings

Our study corroborated existing literature, indicating a substantial increase in the adoption of technology within the Kenyan public procurement landscape (Smith & Johnson, 2020). The prevalence of electronic procurement systems and the widespread use of digital platforms have streamlined various procurement stages, from the announcement of tenders to contract management. The evident shift towards digital processes reflected a concerted effort by Kenyan procurement entities to leverage technology for enhanced operational efficiency.

The observed efficiency attributable to technology adoption resonated with the findings of Smith and Johnson (2020), who emphasized the transformative potential of technology in streamlining procurement procedures. The implementation of e-procurement systems has significantly reduced the time required for each stage of the procurement lifecycle. Automated processes, such as e-sourcing and e-auctions, expedited decision-making processes, contributing to a more agile and responsive procurement environment.

However, it was crucial to note that the realization of efficiency gains was contingent upon addressing challenges related to digital literacy and the need for continuous training programs for procurement professionals (Brown

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& White, 2019). Integrating the elements into the technology adoption strategy was essential for ensuring sustainable improvements in efficiency.

Our findings aligned with the proposition that technology adoption in public procurement enhanced transparency (Jones, 2018). The introduction of digital platforms and the migration to online documentation have made procurement information more accessible to stakeholders. Suppliers, citizens, and oversight bodies now had unprecedented access to procurement data, fostering a culture of openness and accountability.

While technology had undoubtedly improved transparency, challenges remained, particularly concerning data security and integrity. Cyber-security breaches pose a potential threat to the confidentiality of sensitive procurement information (Green & Black, 2021). Thus, it was imperative for procurement entities to invest in robust cyber-security measures to mitigate risks and uphold the trustworthiness of digital procurement platforms.

The findings of this study align closely with existing literature on the transformative impact of Information Technology (IT) adoption in public procurement processes (Kim *et al*. 2020; Amankwah-Amoah et al. 2019). Scholars have long emphasized the role of technology in enhancing efficiency, transparency, and accountability within supply chain management. The correlation results corroborate previous research findings, demonstrating strong positive relationships between IT usage, IT reliance, and procurement outcomes (Kumar et al. 2021; Wang *et al*. 2018**)**.

Additionally, the regression analysis confirms the significant effects of both IT usage and reliance on procurement efficiency and transparency. These findings resonate with theoretical frameworks and empirical studies that highlight the importance of IT-enabled innovation and dynamic capabilities for improving supply chain performance. Moreover, regional studies across Africa, Asia, and the Americas have shown similar patterns of technology adoption and its impact on procurement practices (Gao *et al.* 2021; Heckmann *et al*. 2019). The study's conclusions underscore the need for continued investment in IT infrastructure and responsible technology implementation to promote good governance and optimize procurement processes.

Conclusion

The study findings underscored the pivotal role of technology adoption in enhancing supply chain processes, as highlighted in the literature review. Theoretical frameworks and regional studies collectively emphasize the significance of technology in improving efficiency, reducing costs, and increasing visibility within procurement processes. The correlation results reveal strong positive relationships between IT usage, IT reliance, and Efficiency and Transparency in public procurement, indicating that increased utilization and reliance on IT systems correspond to improvements in

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procurement outcomes. The model summary further supports these findings, demonstrating that IT usage and reliance collectively explain a significant portion of the variance in Efficiency and Transparency.

Additionally, regression coefficient results confirm the significant effects of both IT usage and reliance on procurement outcomes, with IT reliance showing a stronger positive effect. Consequently, the rejection of null hypotheses highlights the importance of IT investment and reliance on enhancing procurement efficiency and transparency. These findings underscore the need for continued investment and integration of IT solutions in procurement strategies to promote good governance, accountability, and optimal resource allocation.

Ethical considerations, such as data privacy laws, further emphasize the importance of responsible technology implementation in procurement processes. Thus, the study provides valuable insights into the transformative potential of Information Technology in public procurement and underscores the importance of leveraging IT solutions to drive efficiency and transparency in supply chain operations.

Recommendations

Based on the findings of the study, several recommendations can be made to enhance the efficiency and transparency of public procurement processes through Information Technology (IT) adoption:

1. Invest in IT Infrastructure: Government entities should prioritize investment in robust IT infrastructure to support procurement activities. This includes upgrading existing systems, implementing electronic procurement platforms, and ensuring reliable internet connectivity to facilitate seamless communication and data exchange.
2. Enhance IT Training and Capacity Building: Provide training programs and capacity-building initiatives to procurement staff to enhance their IT skills and competencies. This will enable them to effectively utilize IT tools and systems for procurement activities, improving efficiency and accuracy in the process.
3. Foster Collaboration and Knowledge Sharing: Encourage collaboration and knowledge sharing among government agencies and procurement professionals to exchange best practices, lessons learned, and innovative approaches to IT-enabled procurement. This can be facilitated through regular workshops, seminars, and forums focused on IT in procurement.
4. Ensure Data Security and Privacy: Implement robust data security measures and adhere to data privacy laws and regulations to protect sensitive procurement information. This includes encryption of data,

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access controls, and regular audits to identify and address potential vulnerabilities.

5. Monitor and Evaluate IT Performance: Establish mechanisms for monitoring and evaluating the performance of IT systems and tools used in procurement processes. Regular assessments will help identify areas for improvement, address any issues or challenges, and ensure that IT investments are delivering the expected benefits.
6. Promote Stakeholder Engagement: Foster stakeholder engagement and participation in the procurement process, including suppliers, civil society organizations, and citizens. This can be facilitated through online portals, feedback mechanisms, and public consultations, enhancing transparency and accountability in procurement decision-making.

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