



Effect of e-procurement Adoption on Operational Efficiency in Public Institutions: A Case of Kamonyi District and Remera Rukoma Hospital

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Abstract: *The study assessed the effect of e-procurement adoption on operational efficiency in public institutions, focusing on Kamonyi District and Remera Rukoma Hospital. The study was guided by four objectives: to examine the extent of system usage, assess the influence of process automation, evaluate the effect of user training and competence, and investigate the role of system integration in improving operational efficiency. The study covered the period 2022–2025 and employed a descriptive and quantitative research design. The target population comprised 220 employees, of whom a sample of 142 respondents was selected. Data were collected using a structured questionnaire with close-ended questions measured on a five-point Likert scale. Data analysis was conducted using SPSS, employing frequencies, percentages, means, standard deviations, correlation, and regression analysis. The findings revealed that e-procurement adoption significantly improved operational efficiency. The regression model explained 97.3% of the variation in operational efficiency ($R^2 = 0.973$). System usage demonstrated the strongest positive relationship with operational efficiency ($r = 0.984$, $p < 0.001$), followed by process automation and system integration ($r = 0.969$, $p < 0.001$). User training and competence also showed a significant positive relationship ($r = 0.807$, $p < 0.001$). The study concluded that effective system utilization, automation, competent users, and integration significantly enhance operational efficiency in public institutions.*

Keywords: *e-procurement adoption; operational efficiency; system usage; process automation; user training; system integration; public institutions.*

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1. Introduction

As governments look to increase efficiency, accountability, transparency, and value for money, e-procurement has grown in importance as a part of the digital transformation of the public sector worldwide. By digitizing processes including tendering, ordering, invoicing, and payment, electronic procurement helps organizations cut down on paperwork, processing time, and administrative expenses. Digital procurement systems can increase cooperation

between public institutions and suppliers and strengthen financial management, according to evidence from several industrialized economies (Khorana, 2024). For instance, the use of electronic invoicing and e-procurement in Sweden has facilitated more effective financial administration and procurement in public agencies and municipalities (Swedish Agency Insights, 2025). Automation, information visibility, supplier accessibility, and enhanced collaboration can all lead to more effective public procurement operations, as demonstrated by

experiences from China and Denmark (Li & Zhang, 2023; Senaratne et al., 2023; Wang et al., 2024).

Adoption of e-procurement has been encouraged more and more throughout Africa as a way to solve the inefficiencies of conventional procurement procedures. The potential financial advantages of digital procurement have been demonstrated by Tanzania's National e-Procurement System, which has reduced costs and shortened procurement processing times (Aron et al., 2025). According to research conducted in various African nations, e-procurement can improve institutional performance and worker productivity provided users have the necessary digital skills and organizations offer the necessary technology assistance (Baruti et al., 2025). However, certain African institutions are still unable to fully profit from e-procurement due to a lack of ICT infrastructure, a lack of digital capabilities, and a lack of technological readiness (Apio & Asiimwe, 2024; Sserulika, 2023).

The digitization of public procurement processes in Rwanda, such as contract administration, supplier communication, and tendering, has been made easier by the Umucyo e-Procurement system. In public procurement, the system has facilitated increased efficiency, accessibility, competition, and openness (Rwanda Public Procurement Authority [RPPA], 2025). Further research shows that e-bidding, e-sourcing, and e-informing can improve contract administration, coordination, and communication (Gatore, 2023; Uwimpeta & Akims, 2025).

At the local level, Kamonyi District and Remera Rukoma Hospital rely on efficient use of electronic procurement systems to promote prompt and responsible service delivery because they operate inside Rwanda's public procurement framework. Operational results may be impacted by variations in staff proficiency, process automation, system utilization, and interaction with financial and supplier management systems. In order to comprehend how digital procurement enhances operational efficiency in the local public-sector environment, it is crucial to look at the adoption of e-procurement in these institutions.

1.1 Problem Statement

Public procurement is an essential government function that facilitates the purchase of products, services, and labour while encouraging accountability, transparency, and the effective use of public resources. With the goal of lowering paperwork, procurement delays, and administrative expenses, Rwanda's Umucyo e-Procurement system has modernised procurement through electronic tendering, sourcing, and contract administration (Kubwimana, 2025).

Some public entities still face difficulties in spite of these reforms, which could limit the full advantages of e-procurement. The effectiveness of electronic procurement processes may be impacted by inadequate ICT infrastructure, inconsistent internet access, low user competency, partial system utilisation, and inadequate training (Uwimpeta & Akims, 2025). These issues could lead to delays in procurement, mistakes in contract administration, higher administrative expenses, and trouble with supplier involvement. While prior research has demonstrated that e-procurement can enhance operational efficiency and transparency, little empirical data explains how certain adoption determinants affect efficiency in Rwandan public institutions (Gatore, 2023; Habimana, 2022).

Thus, this study looks at how e-procurement adoption affects operational effectiveness in Kamonyi District and Remera Rukoma Hospital between 2022 and 2025. It evaluates system integration, process automation, human competency and training, and system utilisation. It is anticipated that the results would demonstrate how to enhance digital procurement procedures, boost institutional performance, and facilitate efficient use of Rwanda's e-procurement system.

1.2 Research Objectives

This study was guided by the general and specific objectives presented below.

1.2.1 General Objective

The general objective of this study was to assess the effect of e-procurement adoption on operational efficiency in public institutions a case of Kamonyi District.

1.2.2 Specific objectives

- i. To examine the extent of system usage in e-procurement adoption in public institutions, including frequency, user engagement, and accessibility.
- ii. To evaluate the impact of process automation, including bidding, ordering, and payment, on operational efficiency in public institutions.
- iii. To assess the effect of user training and competence, including staff skills, formal training programs, and awareness of system processes, on operational efficiency.
- iv. To investigate the role of system integration, including integration with financial systems, inventory/stock management, and supplier management systems, on operational efficiency.

1.3 Research Hypotheses

H01: There is no significant relationship between system usage (frequency of use, user engagement, and accessibility) and operational efficiency in public institutions.

H02: Process automation (electronic bidding, ordering, and payment processes) has no significant effect on operational efficiency in public institutions.

H03: User training and competence (staff skills, formal training programs, and awareness of system processes) have no significant effect on operational efficiency in public institutions.

H04: System integration (integration with financial systems, inventory/stock management systems, and supplier management systems) has no significant effect on operational efficiency in public institutions.

2 Literature Review

This chapter covers conceptual review, theoretical frameworks and empirical studies in relation to the research variables. It also presents the conceptual framework and emphasizes the research gap that the study addresses.

2.1 Conceptual Review

2.1.1 System Usage

The frequency, scope, and consistency with which users interact with e-procurement systems to carry out procurement tasks is referred to as system utilisation. It encompasses the variety of system functionalities used, user involvement, accessibility, and frequency of use. Employees can do procurement duties more effectively and get more familiar with the system when it is used more frequently (Akintoye & Zhang, 2024). According to Mwangi and Oduor (2023), evaluating frequency, accessibility, and engagement offers a more comprehensive picture of system usage and its effects on organisations. Frequent usage of e-procurement can minimise errors, speed up procedures, and increase transparency (Khalifa & Toure, 2025). Therefore, improving operational efficiency in public institutions requires regular and purposeful system utilisation.

2.1.2 Process Automation

In e-procurement, process automation is the use of digital technologies to carry out procurement tasks, such as ordering, bidding, approval, and payment, with little to no human involvement. It increases procurement efficiency by streamlining operations, cutting down on repetitive tasks, and minimising human error (Senaratne et al., 2023). Automated ordering, bidding, and payment methods can improve operational reliability, increase transparency, and standardise procurement processes (Li & Zhang, 2024). Additionally, data suggests that automation might improve contract compliance and shorten procurement cycle timelines (Badu & Mensah, 2025). Additionally, automated systems promote auditing and accountability by enhancing traceability and record consistency (Chen & Zhao, 2023). However, proficient users and appropriate interface with other organisational systems are necessary for effective automation (Owusu & Boateng, 2025).

2.1.3 User Training & Competence

The knowledge, skills, and abilities needed to operate e-procurement systems successfully are referred to as user competency and training. Through training, users can enhance their technical abilities, comprehend system processes, and carry out procurement tasks with accuracy. In addition to lowering operational errors, well-structured training can boost user confidence (Aron et al., 2025). However, insufficient training could impede the implementation of e-procurement and have a detrimental impact on institutional performance (Sserulika, 2023). To encourage accountability and efficiency, users require knowledge of procurement processes and compliance standards in addition to technical expertise (Apio & Asiimwe, 2024). System adoption can be strengthened and transaction quality can be enhanced by ongoing training and professional development (Baruti et al., 2025). Therefore, sustaining user competency and attaining effective e-procurement operations require consistent institutional support and continuous learning.

2.1.4 System Integration

The term "system integration" describes how e-procurement systems are connected to other organizational systems, such as platforms for supplier management, inventory control, and finance administration. Integration facilitates easy data interchange, cuts down on duplication, and enhances purchase decision-making. By integrating e-procurement with financial systems, processing delays and manual reconciliation can be decreased by automating budget verification and payment authorisation (Wang et al., 2024). By coordinating procurement orders with stock levels, integration with inventory systems reduces overordering and stock shortages (Uwimpeta & Akims, 2025). In a similar vein, supplier management integration

enhances responsiveness, openness, and communication between organisations and suppliers (Gatore, 2023). Accurate reporting, monitoring, and compliance are further supported by real-time information sharing (Mwanzia & Kimani, 2025). As a result, efficient system integration can improve accountability, procurement efficiency, and operational workflows.

2.1.5 Operational efficiency

The ability of an organization to accomplish goals while using the least amount of time, money, and resources is known as operational efficiency. Cost reduction, time savings, accuracy, transparency, and expedited procurement procedures can all be used to evaluate e-procurement. By reducing paperwork and automating procurement processes, e-procurement can lower administrative costs (Aron et al., 2025). Additionally, internet transactions and automated workflows can enhance service delivery and reduce procurement cycles (Khorana, 2024). By lowering errors and increasing traceability, digital records improve accuracy, transparency, and accountability (Gatore, 2023; Habimana, 2022). Additionally, open access to procurement data can promote competitive bidding and enhance contract results (Li & Zhang, 2023). However, obtaining these advantages requires institutional support, sufficient ICT infrastructure, and user competency (Apio & Asiimwe, 2024; Sserulika, 2023). As a result, organisational procedures, personnel, and technology all contribute to operational efficiency.

2.2 Theoretical Review

2.2.1 Transaction Cost Theory

Transaction Cost Theory, developed from Coase (1937) and further advanced by Williamson, explains how organizations seek to minimize costs associated with economic exchanges, including negotiation, communication, monitoring, and enforcement. In public procurement, e-procurement reduces transaction costs by digitizing processes, automating workflows, and improving communication between institutions and suppliers. It can minimize expenses related to paperwork, transportation, delays, errors, and duplicated activities. Empirical studies indicate that e-procurement reduces transaction costs while improving procurement speed, accuracy, and transparency (Aron et al., 2025; Kubwimana et al., 2025). Therefore, the theory provides a relevant framework for explaining how e-procurement adoption enhances operational efficiency.

2.2.2 Technology Acceptance Model (TAM)

Davis (1989) created the Technology Acceptance Model (TAM), which uses perceived utility and simplicity of use to explain technology adoption. When users think e-procurement systems are simple to use and enhance work performance, they are more inclined to embrace them. These opinions may affect the desire of procurement officials at public institutions to regularly use digital procurement platforms. Adoption that is successful can improve record management and transparency while lowering errors, processing delays, and manual processes. According to research by Uwimpeta and Akims (2025) and Salekwa et al. (2025), technology adoption and operational results are influenced by system dependability, utility, and user-friendliness. As a result, TAM offers a useful framework for investigating how user acceptability of e-procurement enhances operational effectiveness.

2.2.3 Institutional Theory

Di Maggio and Powell's (1983) Institutional Theory describes how organizations change their practices and structures in reaction to external institutional influences. Coercive pressures from government rules, normative pressures from professional norms, and mimetic pressures from institutions copying successful organizations can all have an impact on the adoption of e-procurement in public procurement. In order to attain legitimacy, compliance, openness, and accountability, these demands push public institutions to implement digital procurement systems. Additionally, e-procurement improves record-keeping, audit trails, and compliance with procurement laws. Research indicates that e-procurement adoption in public institutions is influenced by professional and regulatory requirements (Harun et al., 2025; Nkurunziza et al., 2025). As a result, Institutional Theory offers a helpful framework for analyzing how organizational, professional, and regulatory forces affect the uptake of e-procurement and operational effectiveness.

2.3 Empirical review

2.3.1 System Usage and operational efficiency in public procurement

According to empirical research, efficient e-procurement system use can boost operational effectiveness by simplifying procurement processes, cutting administrative expenses, saving time, and increasing transparency. Mwalukasa (2024) discovered that by streamlining processes and encouraging competitive supplier pricing, active usage of e-procurement platforms lowers operating costs. According to Aron et al. (2025), regular system use in Tanzania decreased the need for paperwork and manual approvals, conserving resources and cutting procurement

expenses. The strong correlation between system usage and operational efficiency is further supported by data from Rwanda. Kubwimana (2025) discovered that because electronic tendering and assessment decreased duplicate procedures, frequent usage of automated procurement modules was linked to lower transaction costs. In a similar vein, Taremwa (2025) found that widespread adoption of digital procurement systems enhanced document processing, decreased errors, and decreased operating expenses in Ugandan public offices. Additionally, Kangungu et al. (2025) noted that consistent usage of e-procurement platforms improved supplier engagement and transparency, promoting competitive bidding. The body of research indicates that improving cost-effectiveness, processing speed, transparency, and institutional performance in public procurement all depend on meaningful and consistent system usage.

2.3.2 Process Automation and operational efficiency in Public procurement

Efficiency through expediting decision-making, cutting down on delays, and optimizing procurement processes. Automation reduces reliance on manual processes by enabling the computerized processing of procurement tasks such as sourcing, bidding, evaluation, approval, and payment. Mwalukasa (2024) discovered that by speeding up approvals and decision-making, automated procurement processes reduced procurement cycles. According to Uwimpeta and Akims (2025), electronic communication and e-informing enhanced information sharing among procurement parties in Rwanda, lowering delays and facilitating prompt choices. In a similar vein, Taremwa (2025) discovered that automation decreased procurement cycle times and errors in Ugandan governmental organizations. According to Aron et al. (2025), end-to-end automated workflows expedited project implementation and streamlined procurement processes in Tanzania. Additionally, Kubwimana (2025) discovered that automated evaluation and tendering streamlined bidding processes and decreased processing delays. Overall, research shows that process automation can increase operational efficiency by reducing administrative burden, increasing accuracy, speeding up processes, and making better use of organizational resources.

2.3.3 User Training & Competence and operational efficiency in public procurement

Research shows that by improving accuracy, dependability, and compliance, user competency and

training increase operational efficiency in public procurement. Employees with training are better able to use e-procurement systems, reduce errors, keep correct records, and successfully adhere to procurement procedures. Competent usage of e-evaluation tools lowers human error and promotes equitable and auditable procurement decisions, according to Mwalukasa (2024). According to Uwimpeta and Akims (2025), user competence enhances data consistency, information sharing, and stakeholder coordination in Rwanda. In a similar vein, Taremwa (2025) noted that proficient users improve documentation and supplier-data management while lowering manual entry errors. Aron et al. (2025) added that training improves auditing, monitoring, and transparency. Therefore, for dependable and effective public procurement operations, ongoing training and competency development are crucial.

2.3.4 System Integration and operational efficiency in public procurement

According to empirical data, system integration improves coordination, accountability, transparency, and regulatory compliance, all of which increase operational efficiency in public procurement. Standardised and traceable workflows are made possible by integrated e-procurement systems, which link procurement operations with supplier databases, contract management, and financial management. According to Uwimpeta and Akims (2025), integrated e-sourcing procedures increase supplier selection transparency and procurement standards compliance. According to Kubwimana (2025), integrating digital evaluation and contract management in Rwanda enhances fairness and policy compliance while reducing discretionary decisions. Bombo (2025) added that e-procurement integration supports audits by enhancing the traceability of approvals, supplier selection, and reporting. In a similar vein, Taremwa (2025) discovered that digital integration lowers procedural gaps and enhances stakeholder coordination. In general, system integration facilitates accountable, transparent, and effective procurement processes.

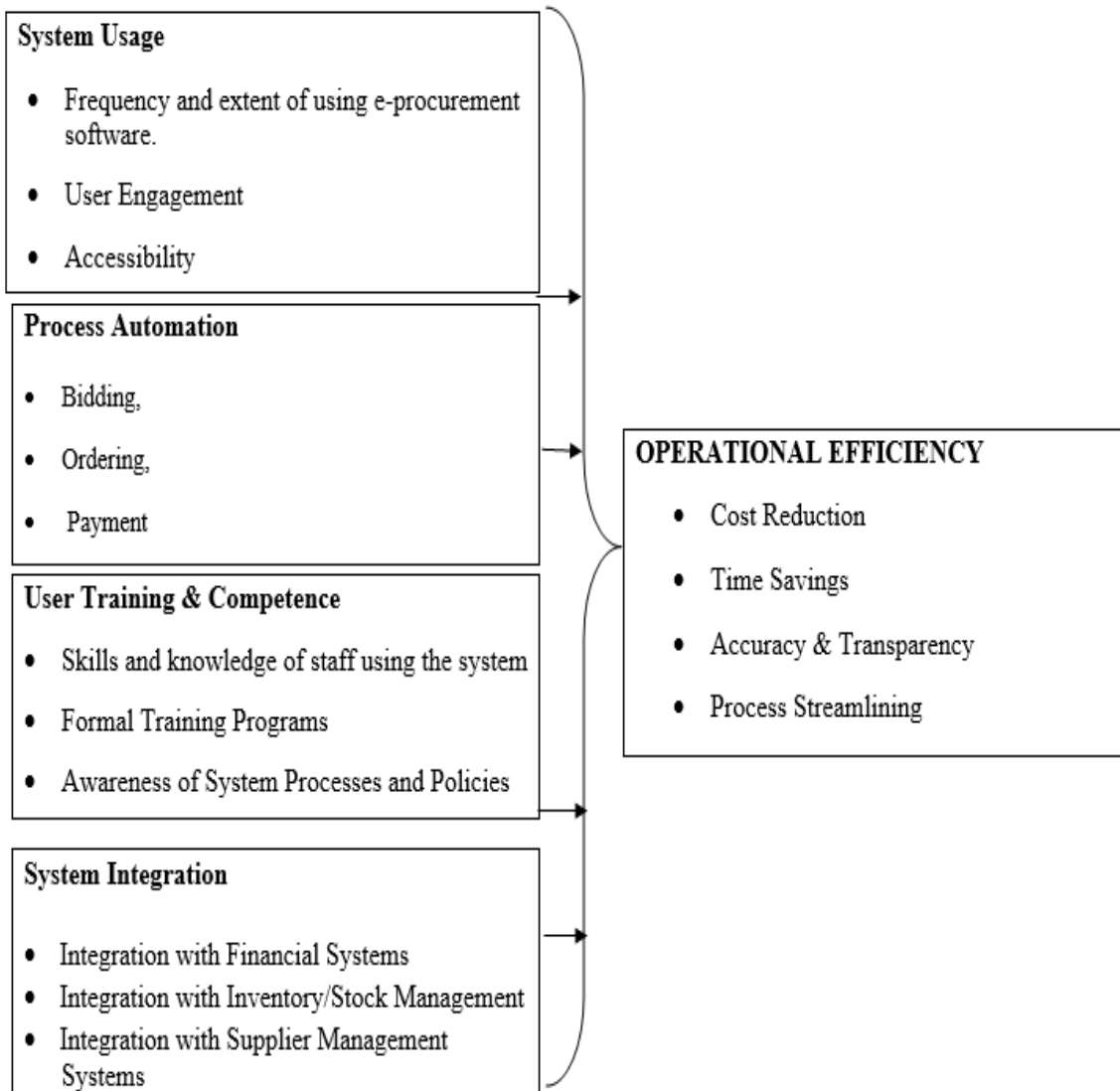
2.3.5 Conceptual Framework

A conceptual framework illustrates key study variables and their relationships, providing a structured roadmap for understanding the research problem and guiding data collection, analysis, and interpretation.

Independent Variables

Dependent Variable

E-Procurement Adoption



Source: Researcher 2026

2.5 Research Gap

There is little empirical data on e-procurement's impact on public institutions' operational efficiency, despite its increasing use. Previous research has mostly concentrated on general adoption, particular industries, or individual procurement procedures; system utilisation, process automation, user competency and training, and system integration have received less attention. Few research has quantitatively investigated how these variables relate to cost-effectiveness, time efficiency, accuracy, and transparency. However, studies conducted in Rwanda have

documented the advantages of the Umucyo e-procurement system. Additionally, evidence from other East African nations is context-specific. In order to fill these gaps, this study looks at the adoption of e-procurement and operational effectiveness in Kamonyi District and Remera Rukoma Hospital.

3 Methodology

In order to characterize e-procurement usage and investigate its impact on operational efficiency in public

institutions, the study used a descriptive and quantitative research design. 220 workers from Kamonyi District and Remera Rukoma Hospital, comprising management, finance and accounting, procurement, ICT, planning and monitoring, tender committee, health center management, and other technical and administrative personnel, made up the target population. A sample size of 142 respondents was calculated using Yamane's (1967) formula with a 5% margin of error. The respondents were chosen based on their participation in financial management, ICT, procurement, and other institutional e-procurement-related activities.

The study made use of both primary and secondary data. A standardized self-administered questionnaire was used to get primary data from chosen respondents, while institutional reports, records, books, academic journals, and other pertinent documents were used to gather secondary data. A five-point Likert scale ranging from Strongly Agree (5), Agree (4), Not Sure (3), Disagree (2), and Strongly Disagree (1) was used to measure the closed-ended questions on the questionnaire. In addition to operational efficiency, the instrument addressed four aspects of e-procurement adoption: system usage, process automation, user competency and training, and system integration.

Prior to the main survey, a pilot study was carried out to evaluate the questionnaire's logical flow, completeness, relevance, and clarity. Cronbach's Alpha was used to

examine reliability, while the Content Validity Index (CVI) was used to evaluate content validity. With 34 items, the questionnaire's overall Cronbach's Alpha coefficient was 0.827, above the suggested cutoff of 0.70. This demonstrated that the instrument was dependable for gathering data and had enough internal consistency.

Quantitative data was coded, entered, and analyzed using SPSS. Frequencies, percentages, averages, and standard deviations are examples of descriptive statistics that summarize the study variables and characteristics of respondents. The degree and direction of the connections between the adoption of e-procurement and operational efficiency were evaluated using Pearson correlation analysis. The individual and combined effects of system usage, process automation, human competency and training, and system integration were investigated using multiple regression analysis.

Last but not least, ethical standards were upheld by getting institutional approval, educating participants about the goal of the study, ensuring voluntary participation, protecting respondents' information, maintaining confidentiality and anonymity, and guaranteeing responsible data management and truthful reporting of findings.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1: System usage in e-procurement adoption

Statements	N	Mean	Std.
The e-procurement system is used regularly in procurement activities	132	4.42	.973
Most procurement processes are conducted through the e-procurement system	132	4.41	.973
The system is accessible whenever needed for procurement tasks	132	4.42	.973
Staff rely on the system for daily procurement operations	132	4.41	.973
Suppliers actively use the system to submit bids and documents	132	4.42	.973
The use of the system has reduced reliance on manual processes	132	4.41	.973
Aggregate Score	132	4.42	

Source: Field Data 2026

The results indicate that e-procurement system adoption was usually high among the chosen public institutions, with an overall mean of 4.42. Conducting procurement through the system, staff reliance on the system, and less reliance on manual processes recorded a mean rating of 4.41, while regular system use, accessibility, and supplier submission of bids and documentation received the highest mean rating (M = 4.42). Overall, procurement efficiency

was improved and the modernization of procurement operations was supported by consistent system usage, accessibility, supplier interaction, and less manual procedures. The results show that efficient use of the system can enhance the efficacy and efficiency of public procurement operations.

Table 2: The effect of process automation, including bidding, ordering, and payment

Statements	N	Mean	Std.
The system automates key procurement processes (e.g., requisition, approval)	132	4.42	.973
Approval workflows are handled automatically by the system	132	4.41	.973
The system reduces manual data entry in procurement processes	132	4.42	.973
Procurement processing time has improved due to automation	132	4.41	.973
The system minimizes errors through automated controls	132	4.42	.973
Notifications and alerts are automatically generated by the system	132	4.41	.973
Aggregate Score	132	4.42	

Source: Field Data 2026

The results indicate that process automation in e-procurement was largely successful in the chosen public institutions, with an overall mean of 4.42. The greatest mean score (M = 4.42) was obtained by automating important procurement procedures, reducing human data entry, and minimizing errors through automated controls; the mean score for automated approval workflows, faster

processing times, and system generated notifications was 4.41. All things considered, processing speed, accuracy, and operational efficacy were enhanced by automated requests, approvals, data entry, notifications, and error controls. The results show that efficient process automation improves procurement operations' efficiency, strengthens procurement controls, and minimizes manual labor

Table 3: The effect of user training and competence

Statements	N	Mean	Std.
Staff have received adequate training on the e-procurement system	132	4.42	.973
Users understand how to effectively use the system	132	4.41	.973
Training programs are regularly conducted for system users	132	4.41	.973
Users feel confident when using the e-procurement system	132	4.41	.973
Technical support is available when users encounter challenges	132	4.42	.973
The level of user competence has improved over time	132	4.41	.973
Aggregate Score	132	4.41	

Source: Field Data 2026

The results indicate that user competency and training were typically sufficient for the successful use of e-procurement at the chosen public institutions, with an overall mean of 4.41. The highest mean score (M = 4.42) was reported for adequate staff training and technical support availability, while the mean score for user comprehension, frequent training programs, confidence, and increasing competence

over time was recorded at 4.41. In general, efficient system utilization and enhanced procurement operations were made possible by staff training, technical assistance, user confidence, and ongoing competence development. The results show that improving users' knowledge and abilities is crucial for e-procurement adoption success, efficient system operation, and increased operational effectiveness.

Table 4: The role of system integration

Statements	N	Mean	Std.
The e-procurement system is well integrated with other organizational systems	132	4.41	.973
Data flows seamlessly between procurement and finance systems	132	4.42	.973
Integration reduces duplication of data entry	132	4.41	.973
The system supports real-time information sharing across departments	132	4.41	.973
Integration improves coordination between procurement and other units	132	4.42	.973
The system enhances overall organizational efficiency through integration	132	4.41	.973
Aggregate Score	132	4.41	

Source: Field Data 2026

The results indicate that system integration was generally successful in enabling e-procurement activities in the chosen public institutions, with an overall mean of 4.41. While integration with organizational systems, decreased

data duplication, real-time information sharing, and overall efficiency recorded a mean score of 4.41, data flow between procurement and finance systems and enhanced coordination between procurement and other units

recorded the highest mean score ($M = 4.42$). Information flow, departmental coordination, data accuracy, and operational efficiency were all enhanced via system integration. The results show that procurement performance can be improved and inefficiencies can be

decreased by integrating e-procurement with financial and other organizational systems.

4.2 Inferential Statistics

Table 5: Correlation Analysis

		OPERATIONAL EFFICIENCY	Cost Reduction	Time Savings	Accuracy & Transparency	Process Streamlining
System Usage	Pearson Correlation	.984**	.233**	.154	.271**	.154
	Sig. (2-tailed)	.000	.007	.079	.002	.079
	N	132	132	132	132	132
Process Automation	Pearson Correlation	.969**	.210*	.129	.267**	.129
	Sig. (2-tailed)	.000	.016	.142	.002	.142
	N	132	132	132	132	132
User Training & Competence	Pearson Correlation	.807**	-.077	.110	.297**	.110
	Sig. (2-tailed)	.000	.382	.209	.001	.209
	N	132	132	132	132	132
System Integration	Pearson Correlation	.969**	.210*	.129	.267**	.129
	Sig. (2-tailed)	.000	.016	.142	.002	.142
	N	132	132	132	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

All e-procurement adoption parameters and operational efficiency showed strong and statistically significant positive correlations, according to the correlation study. Operational efficiency was most strongly correlated with System Usage ($r = 0.984$, $p < 0.001$), followed by Process Automation and System Integration ($r = 0.969$, $p < 0.001$). Additionally, there was a significant positive correlation between User Training and Competence ($r = 0.807$, $p <$

0.001). These results show that increased operational efficiency was correlated with increased system utilization, process automation, system integration, and user competency. Overall, the findings point to a substantial correlation between enhanced operational performance and successful e-procurement adoption, especially in categories like cost reduction, accuracy, transparency, and procurement effectiveness.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986 ^a	.973	.972	3.378

With a correlation coefficient of $R = 0.986$, the regression model findings show a very significant association between e-procurement adoption parameters and operational efficiency. While the Adjusted R Square of 0.972 demonstrates that the model maintained a very high explanatory power after accounting for the number of

predictors, the R Square value of 0.973 indicates that the predictors together explained 97.3% of the variation in operational efficiency. Thus, the findings show a high correlation between operational efficiency and system usage, system integration, user training and competency, and overall e-procurement acceptance.

Table 7: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	52042.945	4	13010.736	1140.525	.000 ^b
Residual	1448.775	127	11.408		
Total	53491.720	131			

a. Dependent Variable: OPERATIONAL EFFICIENCY

b. Predictors: (Constant), System Integration , User Training & Competence , E-Procurement adoption, System Usage

The regression model was statistically significant, according to the ANOVA results in Table 7 ($F(4,127) = 1140.525$, $p < 0.001$). This demonstrates that there was a statistically significant correlation between the predictors system usage, system integration, user competency and training, and e-procurement adoption and operational efficiency. The regression model offers a statistically

meaningful explanation of changes in operational efficiency because the significance value of 0.000 is less than the 0.05 criterion. Thus, the results show that operational efficiency in the chosen public institutions was substantially correlated with e-procurement adoption variables.

Table 8: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.462	1.238		10.870	.000
	E-PROCUREMENT ADOPTION	.015	.077	.018	.196	.845
	System Usage	.687	.091	.796	7.543	.000
	User Training & Competence	.098	.028	.087	3.551	.001
	System Integration	.096	.066	.104	1.447	.150

a. Dependent Variable: OPERATIONAL EFFICIENCY

The factors exhibited different correlations with operational efficiency, according to the regression results in Table 8. improved system usage was linked to improved operational efficiency, according to the most statistically significant predictor ($B = 0.687$, $\beta = 0.796$, $t = 7.543$, $p < 0.001$). Additionally, there was a statistically significant positive correlation between User Training and Competence ($B = 0.098$, $\beta = 0.087$, $t = 3.551$, $p = 0.001$). Nonetheless, there were positive but statistically insignificant correlations between operational efficiency and E-Procurement Adoption ($B = 0.015$, $\beta = 0.018$, $t = 0.196$, $p = 0.845$) and System Integration ($B = 0.096$, $\beta = 0.104$, $t = 1.447$, $p = 0.150$). The constant ($B = 13.462$, $p < 0.001$) was statistically significant. In general, the factors that demonstrated statistically significant correlations with operational efficiency were system usage and user competency and training.

4.3 Interview Results

The results of the interviews revealed that supplier registration, requisitions, approvals, bidding, tender administration, and paperwork all regularly used e-procurement. According to respondents, using the technology sped up procurement procedures, decreased paperwork, and enhanced record accessibility. Although some processes remained manual due to system constraints and regulatory requirements, process automation decreased delays, duplication, and human error. Effective system use was supported by training and competency, although participants suggested ongoing training, refresher courses, and more robust technical support. Information exchange, collaboration, accountability, and openness were all enhanced by system integration with inventory and financial systems. Nevertheless, issues with synchronization, compatibility, and connectivity persisted. E-procurement increased procurement efficiency overall.

Table 9: Summary of the Hypotheses Testing

Hypothesis	R	Sig.	Decision
There is no significant relationship between system usage and operational efficiency in public institutions.	0.984	.001	Rejected
User training and competence have no significant effect on operational efficiency in public institutions.	0.807	.001	Rejected
System integration has no significant effect on operational efficiency in public institutions.	0.969	.001	Rejected
Process automation has no significant effect on operational efficiency in public institutions.	0.969	.001	Rejected

5 Conclusion and Recommendations

5.1 Conclusion

The study concluded that e-procurement adoption significantly contributed to improving operational efficiency in public institutions. The implementation and effective utilization of the e-procurement system enhanced procurement processes by reducing reliance on manual procedures, improving transparency, increasing accuracy, and promoting better management of procurement activities. The study established that system usage, process automation, user training and competence, and system integration were important factors that determined the effectiveness of e-procurement systems. The study further concluded that successful e-procurement adoption requires not only the availability of technological systems but also continuous improvement in user skills, technical support, and integration with other organizational platforms. When employees are adequately trained and systems are properly integrated, institutions are able to achieve faster, more transparent, and more efficient procurement operations. Therefore, e-procurement remains a valuable tool for strengthening operational performance and accountability in public institutions.

5.2 Recommendations

Based on the findings,

1. Public institutions should strengthen the use of e-procurement systems by encouraging all procurement stakeholders to fully utilize available system features.
2. Institutions should provide continuous training and refresher programs to enhance employees' skills, confidence, and awareness of procurement system processes. This will enable users to overcome operational challenges and maximize

the benefits associated with digital procurement practices.

3. Public institutions should also invest in improving system integration by ensuring effective connections between e-procurement platforms and other organizational systems such as financial management, inventory, and supplier management systems.
4. Additionally, institutions should establish strong technical support mechanisms, improve system reliability, and regularly evaluate system performance to address emerging challenges. These measures will enhance efficiency, transparency, and accountability in procurement operations.

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