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Effect of E-procurement on Performance of Construction projects of Counties in Lake Region Economic Bloc, Kenya.

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Abstract

E-procurement is the use of ICT capabilities to decrease the human contact in procurement operations. E-procurement enables users to find goods in electronic catalogs, generate orders, route them for approval, create and transmit orders to suppliers, and automate the invoicing and payment process. The study's major goal was to look at the impact of E-procurement on the performance of construction projects in Kenya's Lake Region Economic Bloc counties. The study used an explanatory research design. A stratified random sampling approach was employed to choose 342 respondents from a target group of 2,346 County officers. Primary data were gathered through interviews and questionnaires. Data was analyzed for inferential as well as descriptive statistics using SPSS version 26 and theme analysis, respectively. E-procurement was established to be a strong predictor of the success of building projects in the Lake Region Economic Bloc counties. Electronic procurement can account for up to 76.2% of the variation in construction project performance ($R2=0.762$, $P<0.05$). This suggests that electronic procurement has a substantial influence on the execution of building projects. The study concludes that, while e-procurement offers potential benefits, issues such as early setup costs, reluctance to change, cyber security threats, and the requirement for training must be addressed to attain the best outcomes.

Keywords: E-procurement; Construction projects; Lake Region Economic Bloc

1. Introduction

According to Bahrain Al-Kaabi, Alhasan, Abdeldayem, and Aldulaimi (2024), both governmental and commercial enterprises are increasingly using information technology to improve the quality of their procurement services. They also believe that the Bahrain Tender Board (BTB) aims to develop a new e-procurement system that will cover every stage of the procurement process, hence expediting the process for both bidders and purchasing corporations.

In Nigeria, Olatunji, Adeniyi, and Jegede (2021) said that E-Procurement systems are seen to have the potential to address some of the bottlenecks of traditional methods for acquiring products and services, as well as controlling the complete procurement process in the construction industry. They also established the necessity to stimulate the drive towards the integration of e-procurement into construction processes, regardless of the cost and early technological limitations in the Nigerian construction sector.

According to Williams (2020), governments should spend more in e-procurement since it improves performance in Tanzanian public institutions by being cost effective, reducing mistakes, saving time, promoting accountability, increasing efficiency, promoting transparency, and ensuring value for money. However, the research recommended that efforts be made to alleviate the obstacles of e-procurement, such as system slowness, certain suppliers' unwillingness to use online platforms, a scarcity of ICT experts, and power supply volatility.

According to Maalim and Kisimbii (2019) in their study on e-procurement and performance of infrastructural projects in devolved units; a case of roads construction projects in Mombasa County, they noted that latest changes in the procurement system have called for all the counties to allocate tenders to potential contractors by considering the e-procurement concept. They further noted that majority of the infrastructural projects firms in Mombasa have adopted e-procurement practices and are committed to equipping their staff with the necessary competencies and skills to ensure the success of their E-procurement projects thus promoting performance of the infrastructural projects.

1.1 Statement of the problem

The Purchasing Laws of 2015, which regulate purchasing procedures, have allowed Kenya's procurement structure to develop into a formal, well-organized framework (Nekesa 2014). The government's efforts to improve the efficiency of construction projects through the 2015 Laws governing Procurement have been hindered by pervasive inefficiencies related to project completion (Nekesa, 2015). As a development driver that has been emphasized by both the national and county governments, the construction sector plays a significant role in Kenya's sustainable growth (Wamalwa, 2018).

Counties in the Lake Region Economic Bloc have a number of challenges, such as a failure to follow purchasing regulations that ensure the completion of construction projects (Margoluis, Honzak, & Aibe, 2019). Furthermore, no research has been done on public procurement practices where e-procurement has been connected to the LREB region's counties' performance, indicating a need for further investigation. Additionally, there is still insufficient service provision in terms of construction projects' performance in Counties in the LREB Region, despite the fact that the public procurement process is explicitly regulated to guarantee effectiveness and efficient discharge of services. This has led to the conduct of a study to address the current issue.

1.2 Objective of the study

To access the effect of E-procurement on Performance of Construction projects of Counties in Lake Region Economic Bloc.

2. Literature Review

2.1 Theoretical review

2.1.1 Project Management Competency Theory

The theory was first proposed by McClelland and McBer in the 1980s. The theory states that project management competency is achieved by combining information gained via training and application with other abilities acquired on the job. Competence, according to their definition, is a person's fundamental quality that is closely related to effective and/or exceptional outcomes in a given field or situation. Since then, numerous project management institutes have developed a number of competency frameworks. The competency model proposed by Spencer and Spencer (1993) combines knowledge, skills, demonstrated performance, and important personality traits. Personality traits are the final category and are challenging to learn and assess through training.

According to Spencer and Spencer (1993), the PMBOK, one of the two most significant project management standards, only addresses the technical side of competency, while Australia's National Competency Standards, the third, relies on data and only focuses on demonstrated success. Nonetheless, the majority of respondents concur that professional competence includes behaviors, attitudes, knowledge, and abilities that are directly related to higher levels of productivity at work. According to Spencer and Spencer (1993), professional competence in project management is achieved by fusing skills learned in the workplace with knowledge gained through training and subsequent application. Prior managerial studies examined the relationship between output and competence.

Dainty (2004) promoted a Competency-Based Performance Framework for Construction Project Supervisors, which assesses management behavior inputs and creates nine indicators for PM competency, such as leadership and teamwork. PM proficiency measures include decision-making, reciprocity and accessibility, integrity and honesty, communication, learning, comprehension and execution, self-efficacy, and maintaining external relationships (Dainty, 2004). It is thought that if both members of the project leadership team have all the required skills, initiatives pertaining to infrastructure development management are more likely to be completed. The theory therefore matches this study in terms of addressing the requirement for obtaining qualified suppliers through supplier evaluation and the creation of multiple teams to oversee the efficient and timely completion of these projects.

2.2 Empirical Review

2.2.1 E-Procurement and performance of construction projects

Mutunga (2020) conducted study on the connection between small and medium-sized businesses' productivity and electronic purchasing. Finding out how digital sourcing, bidding, payments, and invoicing affected the productivity of medium- and small-sized businesses was the main goal of this study. A descriptive research methodology was employed in the study. 97 managers and owners of small and medium-sized businesses made up its sample. A stratified random selection method was employed to choose 97 responders. The study came to the conclusion that Nairobi, Kenya's small and medium-sized businesses' performance was not significantly impacted by electronic bidding. Moreover, e-sourcing has a big impact on the performance of small and medium-sized firms in Nairobi. Furthermore, the success of medium-sized enterprises in Nairobi, Kenya, is significantly influenced by computerized invoicing. Additionally, digital payment methods have a significant impact on the success of small and medium-sized businesses in Nairobi, Kenya. To streamline their procurement procedures and reduce associated costs, medium-sized and small businesses are advised by the study's findings to adopt and utilize electronic tendering. In Nairobi City County, Kenya, the study found a strong correlation between the success of small and medium-sized enterprises with

electronic purchasing. However, the study only looked at small and medium-sized firms; the current study will focus on county governments.

Makali (2013) conducted research to determine the relationship between the effectiveness of electronic purchasing and supermarket procurements in Nairobi. Semi-structured questions were completed by those surveyed. A census study was used in the investigation. The study found a significant and positive relationship between electronic shopping and the purchasing performance of Nairobi supermarkets. The study suggests that policymakers, particularly those working in the ICT sector, develop initiatives and regulations that will improve the use of ICTs in Kenya's retail sector in light of the findings. These initiatives may entail giving SMEs the ICT resources required to take part in electronic procurement processes through public-private collaboration. Due to the strong and positive relationship between supermarket procurement success and the efficiency of e-procurement processes, organizations should concentrate more on streamlining digital tendering, e-requisitioning, and electronic sourcing. While the last study was performed among supermarkets, the most recent study was conducted among counties. The prior research also used a census survey approach, however the current study selected the necessary sample using random stratified sampling.

Musyimi (2013) used a descriptive design in his study on the impact of electronic procurement on strategy. The study's target group consisted of 106 employees in the judiciary procurement department. The sample size consisted of only 19 officials from the Judiciary's main office. The study concluded that there is a high and favorable correlation between e-procurement and the effectiveness of Kenya's court. However, the current study looked at a sample of 342 respondents, which is thought to be a bigger number. Additionally, while the last study was carried out in the court, this one was carried out in devolved entities.

The impact of electronic procurement processes on the successful completion of construction projects in Uasin Gishu County was investigated by (Omondi, Diang‟a, Gwaya, and Onyanyo, 2017). Both descriptive and inferential statistics were used to examine the data. The performance of building projects was found to be positively correlated with the usage of electronic procurement. In contrast to the current study, which was conducted throughout the Counties in the LREB region, the previous study was conducted on a single entity.

3. Methodology

3.1 Research Design

An explanatory research design that examines cause-and-effect relationships was used in this investigation. Addressing any causality between factors related to the phenomenon being studied is the primary goal of explanatory research, which is what this study aims to do. Standardized data collection from a pre-existing population or representative sample comes after the explanatory study design (Mugenda & Mugenda, 2008).

3.2 Target Population

The study’s targeted universe entailed procurement and finance officers from every single one of the Kenyan 47 counties.

3.3 Sample size and Sampling Technique

Stratified random sampling technique was used to select a sample of 342 respondents. The Yamane formula was utilized during the research for determining the sample size. A questionnaire that entailed closed ended questions was administered to help gather primary data for the study. Closed ended questions were analysed through the statistical package for social sciences.

4. Research Findings and Discussions

4.1 Descriptive Statistics for E-Procurement

The aim of the research was in ascertaining how devolved governments in LREB region performance of construction projects were affected by E-procurement. A scale that ranges between 1(Strongly disagree) and 5 (strongly agree) was used to ask those who participated to express their feelings regarding a number of issues. The results of the analysis on EP in relation to performance of construction projects are presented in Table 1 below.

From the survey responses, a majority representing 57% strongly agreed with a rating mean of 4.57, that inviting tenders through electronic means facilitates the participation of a broad range of tenderers and promotes fair competition. Additionally, 53.5% agreed with a mean rating of 4.36, that an Electronic purchasing manual within the organization facilitates and strengthens the execution of electronic purchasing processes. Most of the respondents with a percentage rating of 50.9 percent and a mean rating of 4.36 agreed that E-requisitioning helps to cut down costs associated with manual paper based system hence cost reduction. Gunawardhana and Karunasena (2012) found that electronic purchasing enhances the firm's efficiency in sourcing and ordering processes, which is consistent with this finding. Electronic procurement technology offer several advantages to businesses, including lower transaction costs, improved supplier negotiation skills, simplified supplier identification, and enhanced procurement process monitoring and

management. Those surveyed also agreed with a mean rating of 4.43 and a percentage rating of 49.1 percent that integrated financial management system (IFMIS) has increased visibility of financial transactions by the County Government.

Table 1: Descriptive statistics for E-Procurement

Opinion statement	SD (%)	D (%)	FA (%)	A (%)	SA (%)	Mean	Std. Deviation
Invitation to tender through electronic means enables	0.0	0.0	0.0	43.0	57.0	4.57	0.496
Tender documents are uploaded to the procuring entity website	0.0	0.0	6.1	47.1	46.8	4.41	0.604
E-requisitioning helps to cut down costs	0.0	0.0	6.4	50.9	42.7	4.36	0.601
IFMIS has increased visibility of financial transactions	0.0	0.0	6.4	44.4	49.1	4.43	0.612
Electronic procurement manual within the organization	0.0	0.0	5.3	53.5	41.2	4.36	0.580

Majority of the respondents representing 47.1 percent of those surveyed with a mean rating of 4.41 also agreed that tender documents are uploaded to the procuring entity website on time to facilitate adequate tender preparation. This outcome is in agreement with Croom and Jones' (2014) findings, which showed that electronic purchasing has been able to accomplish the following advantages through the use of data transmission systems: a 70%–80% decrease in the amount of time needed to finish requests; a 73% decrease in administrative costs; a 5%–10% decrease in material prices; a 50% reduction in off-contract (or "maverick") buying; and an average reduction in inventory costs of 25% to 50%.

4.2 Results of performance of Construction projects

One of the aims of this study was in assessing the public procurement practices and its effects on performance of construction projects in county governments within the LREB region. A scale that falls between 1(Strongly disagree) and 5 (strongly agree) was used to ask those who participated to express their feelings regarding a number of issues.

Table 2: Dependent variable performance of construction projects

Opinion statement	SD (%)	D (%)	FA (%)	A (%)	SA (%)	Mean	Std. Deviation
Project completion time is an essential tool in ensuring	0.0	0.0	33.9	52.0	14.0	3.80	0.664
Construction projects are completed within the stipulated	0.0	0.0	54.7	44.4	0.9	3.46	0.517
The completed projects meet the client’s expectations	0.0	0.0	54.1	45.0	0.9	3.47	0.517
Construction projects are completed within the stipulated cost	0.0	0.0	47.1	52.0	0.9	3.54	0.517
Project costs are calculated during the planning phase	0.0	0.0	55.8	44.2	0.0	3.44	0.497

Majority of those surveyed fairly agreed with a mean rating of 3.44 and a percentage rating of 55.8 percent that project costs are calculated during the planning phase of a project which must be approved before works begin. However, a significant majority of respondents, accounting for 54.7% of those surveyed with an average rating of 3.46, expressed moderate agreement that construction projects are completed within the stipulated time frame. This finding aligns with Nekesa's (2015) research, which observed that projects often exceed their anticipated completion times due to frequent contract changes, leading to increased project costs and subsequent rises in claims and disputes. Majority of the respondents with a percentage rating of 54.1 percent and a mean rating of 3.47 fairly agreed that construction projects are completed within the stipulated cost and hence achievement of value for money. This result is consistent with that of Ogutu & Muturi (2017), who indicated that the majority of road construction projects in Kenya had been completed above the allocated funds, in subpar quality, later than expected, and outside of the project's scope. From the responses of those surveyed, 52 percent with a mean rating of 3.80 agreed that project completion time is an essential tool in ensuring coordination of resources and personnel. Those surveyed also agreed with a mean rating of 3.54 and a percentage rating of 52 percent that goods, works, and services procured are within the allocated budget.

4.3 Correlation between E-Procurement and performance of construction projects

Through the use of Pearson correlation that assesses the strength (ranging from-1 to +1) and direction (negative/positive) of the correlation between two continuous or ratio and scale variables, the correlation coefficient (r) values is presented in Table 3 below:

Table 3: Correlation between E-Procurement on performance of construction projects

		EP	PCP
SA	Pearson Correlation	1	0.873**
	Sig. (2-tailed)		0.000
	N	320	320

The correlation coefficient for Electronic Procurement was (r=0.873, p>0.05). Therefore, an increase in electronic purchasing will result in improved construction project performance.

4.3 Regression results of E-procurement on performance of construction projects

4.4.1 Influence of Electronic Procurement on Completion of Construction Projects

To ascertain how Electronic Procurement affected construction project performance, regression analysis was conducted. The outcomes are shown in Table 4 below.

Table4: Model Summary of Electronic Procurement

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.873[a]	0.762	0.762	0.127488

a. Predictors: (Constant), EP

According to Table 4, the resulting R value is 0.873, P<0.05, depicting a significant and strong association between the performance of construction projects and electronic procurement. If all other variables remain the same, an increase in electronic procurement results to an improvement in construction project performance. The coefficient of determination, or R^2, indicates that Electronic Procurement can account for as much as 76.2% of the variation in Construction Project performance (R2=0.762, P<0.05). This indicates that electronic procurement significantly impacts the performance of construction projects. This finding aligns with Omondi et al. (2017), who identified a significant association between e-procurement processes and the performance of construction projects in Uasin Gishu County. Additionally, Afolabi et al. (2018) supported this conclusion by discovering a strong and positive correlation between e-procurement systems and the performance of the Nigerian construction industry. According to Olatunji (2015), e-procurement improves procurement performance by cutting transaction costs, but it also does so by lessening fragmentation in the procurement process. Additionally, Afolabi et al. (2018) assert that since e-procurement systems rely heavily on internet services, sufficient internet connectivity is needed for the effective integration of electronic purchasing technologies.

Table 5: ANOVAa of Electronic Procurement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.589	1	16.589	1020.682	0.000[b]
	Residual	5.169	318	0.016		
	Total	21.758	319			

a. Dependent Variable: PCP

b. Predictors: (Constant), EP

The achieved score for the F-Test (F=1020.682, P<0.05), indicates that the model fits the dependent variable well in terms of explaining variation. It also implies that success of the construction projects can be well predicted by electronic procurement.

Table 6: Coefficientsa of Electronic Procurement

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.323	0.166		7.974	0.000
	EP	1.176	0.037	0.873	31.948	0.000

a. Dependent Variable: PCP

In accordance to the Table 6 above, the unstandardized beta (β) value of Electronic Procurement was 1.176 and significance level of $p< 0.05$. It displayed that a unit change in Electronic Procurement can cause a unit increase in performance of Construction Projects by 1.176. The regression equation of estimating performance of construction projects in Kenya due to electronic procurement was therefore formulated as follows:

$$Performance = 1.323 + 1.176\ Electronic\ Procurement$$

5. Conclusion and Recommendations

5.1 Conclusion

The results of this study show that e-procurement and the success of construction projects in Kenya's Lake Region Economic Bloc are strongly and positively correlated. The Counties in the Lake Region Economic Bloc that were surveyed concur that inviting bids electronically has made it possible for a sizable pool of bidders to participate, thereby fostering fair competition; the Counties' electronic procurement manual has provided guidance on e-procurement procedures, thereby enhancing its implementation; and through E-requisitioning it has helped to cut down costs associated with manual paper based system hence cost reduction, that integrated financial management system (IFMIS) has increases visibility of financial transactions by the County Government and that that tender documents are uploaded to the procuring entities website on time to facilitate adequate tender preparation. Finally, while e-procurement has potential benefits, challenges like initial setup costs, resistance to change, cyber security risks, and the need for training must be addressed to achieve optimal results.

5.2 Recommendations

Devolved units ought to consider IT as an essential asset towards implementation of E-procurement because its use in purchasing operations enhances the provision of services and assists in ensuring openness, swift actions, a simple audit trail, a decrease in human interference and lower paperwork costs. Therefore investment in IT infrastructure is required by the county governments as well as training of staff on utilization of the procured technologies is essential to ensuring full realization of the intended benefits.

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