



**INFLUENCE OF E-PROCUREMENT ON PROCUREMENT PERFORMANCE IN
MANUFACTURING FIRMS IN NAIROBI COUNTY**

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ABSTRACT

This study sought to establish the influence e-procurement on procurement performance in manufacturing firms in Nairobi County. The study was anchored on technology acceptance model. This study used of a descriptive explanatory research design. The study population was 1,142 employees in the procurement and IT departments in the manufacturing firms. The study used the Yamane formula to calculate the study sample size. The study sample size was 296 respondents. The stratified random sampling was used to select the sample size. The study's primary data was obtained using semi-structured questionnaires. The researcher carried out a pilot study to ensure the data collection tool is reliable and valid. Quantitative data was analyzed using descriptive and inferential statistics. Descriptive statistics relating to measures of central tendency and measures of dispersion was used to describe the body of data. This included percentages, frequencies, mean and standard deviation. The study conducted a correlational analysis to evaluate the strength of relationship between the study variables. Multiple regression analysis was conducted. The data was presented in form of tables, figures and pie charts. It was revealed that e-procurement had a positive influence on procurement performance in manufacturing firms. The study recommends that the manufacturing companies should use e-procurement in connecting the suppliers and employees of the organizations into the purchasing network companies that embark on e-procurement buying programmes. This would enable aggregate purchasing across multiple departments or divisions without removing individual control, reduce rogue buying, can get the best price and quality products from a wide range of suppliers.

Key Words: information technology practices, procurement performance, e-procurement

INTRODUCTION

Procurement is the nerve center of performance in every institution, whether public or private and thus needs a tight system to be followed and adopted. In procurement, information technology impact on the carrying out of activities which in turn have a major impact on the total procurement performance (Wisner, Tan & Leong, 2014). Also, the potential of information technology (IT) is realized through its integrated use in the various core and support functions of an organization as well as with external business partners (Gunasekaran, Patel & McGaughey, 2014). According to Laryea and Ibem (2016) IT in procurement significantly influences the success of a company. The priority of IT is to provide support in the creation of procurement process efficiency and cost/expenditure transparency. Additionally, Fasanghari (2018) argues that the application of information communication technology in procurement makes it possible for the organization to exploit benefits like reduced cycle time, information sharing between the organization and its suppliers thus a closer buyer-supplier interaction, improved capability in decision making thus reduction in uncertainty and decreased transaction costs.

Adoption of ICT in procurement processes allows more efficient integration of supply chains and provides better organization and tracking of transaction records for easier data acquisition. In India, Varma and Khan (2014) in their evaluation of information technology in supply chain concluded that organizations have adopted paperless transaction in procurement such as the use of system applications and products (SAP) in data processing by using enterprise resource planning (ERP) systems, automatic identification and electronic data interchange modules. These systems guarantee transparency and security of the systems to both the user and the businesses. Nair (2012) in the evaluation on radio-frequency identification (RFID) for supply chain management found that procurement based on ICT tools easily controls and manages information interchange within key business functions, products, external and internal financial resources and contributes to business profitability by enhancing quality and alleviating coordination costs and trading risks.

Nair (2013) also indicated that ICT enhances information sharing, improves the performance and eradicates supply chain risks by providing system and procedure-based execution of tasks and presents information to decision makers in formats that it's needed. Moon (2017) concluded that ICT played critical role in the integration of suppliers and customers to ensure the right quantity and quality of products are supplied. Auramo *et al.* (2015) in their exploration of Benefits of IT in supply chain management found out that ICT was being applied to data entry, real time processing, and regularization of transaction that were expected to create a balance between supply and demand among procurement chain members. Brooks and Davenport (2014) study of enterprise systems and the supply chain concluded that ICT was as a critical requirement for managing and control of procurement processes.

Organizations in Africa have realized the importance of the ICT adoption in procurement practices as a way of improving service delivery and effective supply chain performance. In Mogadishu, Dhodi (2018) reviewed the effect of information technology on inventory management for the manufacturing companies. It was noted that electronic data interchange (EDI) and electronic point- of- sale (EPOS) is the information technology that mostly the manufacturing companies in Mogadishu uses for inventory management. In Addis Ababa, Tatek (2019) looked at the effect of information communication technology (ICT) on the supply chain performance of beverage firms operating in and around Addis Ababa. It was observed that the use of information communication technology improves supply chain performance as it enhances the efficiency of procurement and risk management.

In South Africa, Ambe (2016) studied public procurement trends and developments and acknowledged that e-procurement adopted by most nations in the world economy as a means to lessen the burden of obtaining information. In Ghana, Awuah- Gyawu and Adzimah (2015) looked at the effects of ICT on the performance of inventory and warehouse operations and noted that the adoption of few ICT tools in the management of inventory and warehouse operations. Again, some of the ICT tools were underutilized as a result of major challenges. There was a significant link between the use of ICT tools and the performance of inventory and warehouse operations even with the ICT tools that were underutilized.

Muriuki (2019) evaluated effect of electronic procurement technical support staff on procurement performance in Kenya and noted that electronic procurement technical support staff contributes positively to procurement performance. Thogori (2017) focused on moderating effect of ICT on supply chain financial flow risk and performance of manufacturing firms in Kenya and indicated that ICT used moderated the relationship between financial flow risks. Miyoko, Marika and Litondo (2019) looked at e-procurement practices and performance of large manufacturing firms in Nairobi County and concluded that large manufacturing firms in Nairobi County adopt various E-procurement practices which includes e-bidding, e-tendering, e-purchasing and e-sourcing.

Bwana (2014) evaluated the effect of information communication technology on procurement in firms in Kenya. It was noted that inventory management, order processing and information processing and communication are important areas in the procurement in firms. About information processing and communication technologies, it was found out that both the traditional and the modern electronic and internet-based technologies are used in most healthcare facilities. Cheptora (2018) studied the impact of ICT on procurement performance in manufacturing firms in Kenya and found out that the e-procurement system is comprised of indent management, e-tendering, electronic auctioning, vendor management, catalogue management and contract management and further defined indent management as the software package that involves tender or bids preparations.

Statement of problem

Procurement has been identified as a core function of any manufacturing enterprise. It contributes tremendously to the organizational efficiency and effectiveness (Mukhopadhyay & Kekre, 2012). Manufacturing companies procure more than 50% of the materials needed for production. Without proper procurement systems losses can be incurred up to 30% due to loss of stocks and delays. According to KAM (2017), 30% of procurement inefficiencies among manufacturing firms are attributed to inefficiency in the procurement process. This has resulted to high operational costs, loss of customers due to delays or poor services and loosing stocks due to inaccurate inventory management and high procurement costs (Ogot, 2014).

Nowadays, there is increasing emphasis on ICT utilization in procurement for enhancing transactional activities with the aim of gaining operational efficiency. Further, intense competition is one of the key points of concern for the manufacturing industry in Kenya. Manufacturers have to develop and deliver cost-effective decisions, which are sure to stand the test of time. Countering procurement complexity is important since the traditional supply chain is now not in use. The highly complex supply chains are full of hassles, which prompt the need for use of information technology (Ogot, 2014).

Mabhodha and Choga (2020) researched on the impact of information communication technology (ICT) on procurement processes in Zimbabwean Urban Councils and found that ICT adoption in procurement improves the process and benefits other operations of the business. Roriguez-Escobar and Benito (2018) researched on the role of information technology in purchasing function and found that although IT investments exert a positive

effect on the purchasing function, the results show that this effect takes place through the implementation of purchasing practices that in turn improve the results of the purchasing function. Opondo and Makina (2020) researched on the influence of information technology and procurement process on performance of NHIF. Results revealed that information technology has positive and significant influence on performance. The reviewed studies show varied results. The current study established the influence of information technology practices on procurement performance in manufacturing firms in Nairobi County.

Specific Objectives

- i. To determine the influence of e-procurement on procurement performance in manufacturing firms in Nairobi County

LITERATURE REVIEW

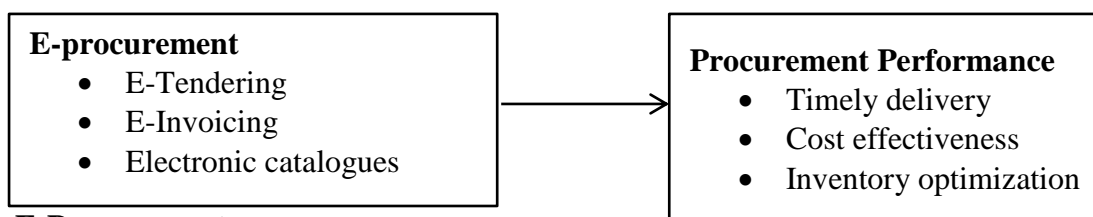
Theoretical Review

Technology Acceptance Model (TAM)

Technology Acceptance Model was developed by Davis (1989) is one of the most popular research models to predict use and acceptance of information systems and technology by individual users. In TAM model, there are two factors perceived usefulness and perceived ease of use is relevant in technology use behaviors. Davis defines perceived usefulness as the prospective user's subjective probability that using a specific application system will enhance job or life performance. Perceive ease of use (EOU) can be defined as the degree to which the prospective user expects the target system to be free of effort.

According to TAM, ease of use and perceived usefulness are the most important determinants of actual system use. These two factors are influenced by external variables. The main external factors that are usually manifested are social factors, cultural factors and political factors. Social factors include language, skills and facilitating conditions. Political factors are mainly the impact of using technology in politics and political crisis. The attitude to use is concerned with the user's evaluation of the desirability of employing a particular information system application. Behavioral intention is the measure of the likelihood of a person employing the application (Davis, 1989). TAM is tailored to e-procurement and can predict innovation acceptance and usage on the job. TAM theory is relevant in that it explains the influence of e-procurement on procurement performance in manufacturing firms.

Conceptual Framework



E-Procurement

The electronic procurement system or e-procurement involves purchase and sale of products, supplies and services through the various networking systems such as electronic data interchange and internet (Mamiro, 2016). E-procurement does not mean just online purchasing decisions. It involves connecting the suppliers and employees of the organizations into the purchasing network companies that embark on e-procurement buying programmes will be able to aggregate purchasing across multiple departments or divisions without removing individual control, reduce rogue buying, can get the best price and quality products from a wide range of suppliers. For the suppliers, E-procurement is a boom because they can be very proactive in their business proceedings (Maurice, 2014).

E-procurement actually automates the purchasing and procurement process of a company and integrates the buyers and suppliers through relevant IT systems, which together forms a value network for the company. The automation of the end-to-end procurement work flow has taken over the traditional purchase order software. It helps to improve the organizational efficiency and control over the procurement activities and the need. The advent of cloud computing concepts and using the cloud process for e-procurement has automated the procurement process further. The management of agreements and contracts, price list verification product, comparisons, article selection has not only become simplified but also speedy (Kendo & Getuno, 2016).

In today's competitive business scenario, e-procurement tools help businesses gain a competitive advantage by helping them control robust inventories, reduce purchasing overlaps, and improve manufacturing cycles. Also, e-procurement tools provide enhanced visibility into day-to-day transactions and assist firms in profiling the most suitable suppliers. Transactional procurement tools automate the purchasing process. E-procurement tools include; e-Tendering, e-Auctions, e-Catalogues, e-Invoicing, electronic catalogues, electronic purchase orders (POs) and automated workflow (Onyango, 2014).

Procurement Performance

Procurement performance involves identifying the extent to which the procurement function is able to reach the objectives and goals with minimum costs (Van Weele, 2002). Kiage (2013) noted that there several aspects of the procurement performance: effectiveness, efficiency, timely delivery of products and cost effectiveness. Procurement effectiveness is defined as the extent to which the previously stated goals and objectives are being met. It refers to the relationship between actual and planned performance of any human activity. Additionally, procurement efficiency is the relationship between planned and actual resources required to realize the established goals and objectives and their related activities, referring to the planned and actual costs. As a result, supplier performance is the most important procurement performance driver.

Measuring procurement performance is important as the purchasing department plays an ever increasingly important role in the supply chain in an economic downturn (Nyamai & Ismail, 2018). Chang, Wang and Chiu (2008) explain that a reduction in the cost of raw material and services can allow companies to competitively market the price of their finished goods in order to win business. An obvious performance measure of the success of any purchasing department is the amount of money saved by the company. Procurement department, like all other departments in a company, is an element of the overall organization, which must contribute to the achievement of the corporate goals (Kiage, 2013).

Empirical Review

Masudin, Aprilia, Nugraha and Restuputri (2021) studied the impact of e-procurement adoption on company performance: Evidence from Indonesian Manufacturing Industry. This study was conducted to determine the performance impact of e-procurement adoption in Indonesian manufacturing companies. This study consisted of four variables: top management support, information quality, implementation of e-procurement, and company performance. The final questionnaire was analyzed using Statistical Package for Social Science (SPSS) version 21 and Smart PLS v3.0 software to determine the relationship between variables. The results indicate that top management support has a significant effect on e-procurement implementation. Other results show that information quality has a significant effect on e-procurement implementation, while e-procurement implementation has a significant effect on company performance.

Rukuni and Maziriri (2020) did an assessment on electronic procurement at a state owned enterprise in South Africa. This study aimed to assess procurement employees' perceptions of factors affecting the implementation of electronic procurement and investigate the statically significant relationship between factors affecting electronic procurement and the successful implementation of electronic procurement. A quantitative descriptive approach, with the use of a structured questionnaire, was employed to collect data from a sample of 130 procurement employees at a single SOE in South Africa. The SPSS was employed to conduct descriptive and multivariate analyses, including factor analysis, correlations, and regression analyses. Results showed that procurement employees had negative perceptions on factors affecting the implementation of electronic procurement that include compatibility, resources, organizational cultural issues, infrastructural issues, and environmental issues. It was also found that factors affecting electronic procurement have a positive statistically significant relationship with the successful implementation of electronic procurement.

Mwangi and Arani (2021) studied the influence of e-procurement on the performance of state corporations in Kenya. The purpose of study was to investigate the influence of e-procurement on the performance of state corporations in Kenya. Descriptive research design was adopted with the use of questionnaire as tool for primary data collected. The population was drawn mainly from senior procurement managers of Kenya Rural Roads Authority (KeRRA). A simple regression model was conducted to test relationship between e-procurement and the performance of state corporations in Kenya. It was found out that e-procurement has transformed all routine purchasing transactions within KeRRA. However, it was established that e-procurement does not reduce the costs of acquiring materials and freeing up KeRRA resources. It was also noted that e-procurement positively increases the performance of state corporations.

Ingavo and Moronge (2019) researched on the influence of e-procurement on performance of state corporations in Kenya. The purpose of this study was to establish how E-procurement influence performance of state corporations in Kenya. The study employed descriptive research design with sample population of 127 State Corporations in Kenya. The study used primary data which was collected using a comprehensive questionnaire. Quantitative data collected was analysed by the use of descriptive statistics using SPSS (version 23). The study findings indicated a very strong positive relationship between the independent variables and dependent variable.

Waithaka (2021) studied the effect of e-procurement practices on supply chain performance. The purpose of the study is to establish the influence of electronic procurement practices on supply chain performance. The study employed a method of reviewing desktop literature. The researcher arrived at 12 papers that were relevant for review after an in-depth quest into the top key terms (e-procurement processes, supply chain management, performance). The study found that procurement performance is the backbone of an organization success since it contributes to competitive purchase and acquisition of quality goods that puts the organization products or services in the competitive edge in the market. The results also revealed that e-procurement is positively related with performance of supply chain function of County Governments in Kenya

RESEARCH METHODOLOGY

This study used a descriptive explanatory research design. This study was conducted in manufacturing firms in Nairobi County. The unit of analysis in this study was all the manufacturing firms in Nairobi County. The unit of observation of this study were employees in the procurement and IT departments in the manufacturing firms. There are a total of 571 manufacturing firms in Nairobi County (Kenya Association of Manufacturers, 2020). The study population was 1,142 respondents. The study used the Yamane formula to calculate the

study sample size. The study sample size was 296 respondents. The stratified random sampling was used to select the sample size. The study's primary data was obtained using semi-structured questionnaires.

Data collected from the field was checked for completeness and edited. The researcher was then input the data into the statistical package for social sciences (SPSS) version 23.0 for viewing and manipulation. Quantitative data was analyzed using descriptive and inferential statistics. Descriptive statistics included percentages, frequencies, mean and standard deviation. The study conducted a correlational analysis to evaluate the strength of relationship between the study variables. Multiple regression analysis was conducted to establish the influence of information technology practices on procurement performance in manufacturing firms in Nairobi County.

RESEARCH FINDINGS, ANALYSIS AND DISCUSSIONS

The 296 respondents were issued with questionnaires, from where 264 were filled and returned. This formed a response rate of 89%. According to Mugenda and Mugenda (2009) a response rate of above 70% is excellent. Hence, in this study the response rate was excellent.

Descriptive Statistics

E-Procurement

The respondents were required to indicate your level of agreement on the following statements about the influence of e-procurement on procurement performance in manufacturing firms in Nairobi County. Scale 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The results were as shown in Table 1.

Table 1: E-Procurement

Statements	1	2	3	4	5	Mean	Std. dev
Our organization has adopted e-procurement to enhance the procurement process in the organization	8	11	26	150	69	3.989	0.973
E-tendering helps our organization to select the best suppliers available	5	9	30	201	19	3.833	1.283
E-tendering helps our organization to connect with suppliers through IT systems	7	12	24	169	52	3.936	1.062
E-tendering helps our organization in profiling the most suitable suppliers	10	10	27	141	76	3.996	0.941
E-invoicing helps in enhancing tracking and reducing during procurement in our organization	4	8	29	183	40	3.936	1.149
E-invoicing enhances visibility into day-to-day transactions on procurement in our organization	8	11	19	196	30	3.867	1.245
Electronic catalogues help our organization to reach a large number of customers	4	10	28	132	90	4.114	0.952
E-procurement helps our organization to control robust inventories, reduce purchasing overlaps, and improve manufacturing cycles	3	8	30	152	71	4.061	0.992

According to the findings, the respondent's agreed that electronic catalogues help their organization to reach a large number of customers as shown by a mean of 4.114, E-procurement helps the organization to control robust inventories, reduce purchasing overlaps, and improve manufacturing cycles as shown by a mean of 4.061, e-tendering helps the organization to connect with suppliers through IT systems as shown by a mean of 3.936, e-

tendering helps the organization in profiling the most suitable suppliers as shown by a mean of 3.996, e-invoicing helps in enhancing tracking and reducing during procurement in the organization as shown by a mean of 3.936, e-invoicing enhances visibility into day-to-day transactions on procurement in the organization as shown by a mean of 3.867, the organization has adopted e-procurement to enhance the procurement process in the organization as shown by a mean of 3.989 and e-tendering helps the organization to select the best suppliers available as shown by a mean of 3.833. The findings concur with those of Masudin, Aprilia, Nugraha and Restuputri (2021) who found that top management support has a significant effect on e-procurement implementation. Rukuni and Maziriri (2020) found that factors affecting electronic procurement have a positive statistically significant relationship with the successful implementation of electronic procurement.

Procurement Performance

The respondents were required to indicate their level of agreement on the following statements about procurement performance. Scale 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The results were as shown in Table 2.

Table 2: Procurement Performance

	1	2	3	4	5	Mean	Std. Dev
Timely delivery	9	13	26	141	75	3.985	0.936
Cost effectiveness	7	11	24	162	60	3.973	1.030
Inventory optimization	5	15	20	137	87	4.083	0.969

According to the findings, the respondents agreed that there is inventory optimization as shown by a mean of 4.083, cost effectiveness as shown by a mean of 3.973 and timely delivery as shown by a mean of 3.985.

Correlational Analysis

The Pearson moment correlation was used to determine the strength of the relationship between the independent and dependent variables. The results were as shown in Table 4.8.

Table 3: Correlational Results

Variables		Procurement performance	E-procurement
Procurement performance	Correlation Coefficient	1	
	Sig. (1-tailed)	.	
	N	264	
E-procurement	Correlation Coefficient	0.814	1
	Sig. (1-tailed)	0.001	.
	N	264	264

According to the findings, e-procurement had a strong positive correlation with e-procurement performance of manufacturing firms in Nairobi County as shown by (Pearson correlation $r = 0.814$, $p = 0.001$). This implies that e-procurement had a significant influence procurement performance of manufacturing firms in Nairobi County.

Regression Analysis

Multiple regression analysis was conducted to establish the influence of information technology practices on procurement performance in manufacturing firms in Nairobi County.

Model Summary

Model summary was used to analyze the variations of procurement performance due to the changes in e-procurement, enterprise resource planning, electronic data interchange and inventory management systems. The results were as shown in Table 4.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.885 ^a	.783	.78	.17032

According to the findings, R squared was 0.783 meaning that there was 78.3% variation in procurement performance due to changes in e-procurement, enterprise resource planning, electronic data interchange and inventory management systems. The remaining 21.7% can be explained by other variables not included in the study.

Analysis of Variance

ANOVA was used to determine whether the data used in the study is significant. The results were as shown in Table 5.

Table 5: ANOVA^a

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.606	4	8.902	141.780	.001 ^b
	Residual	16.261	259	0.063		
	Total	51.867	263			

According to the findings, the processed data (population parameters) had a significance level of 0.001. This shows that the data is ideal for making conclusions on the population's parameter as the value of significance (p-value) is less than 5%. The F calculated was greater than F critical (141.780 > 2.406). This shows that e-procurement, enterprise resource planning, electronic data interchange and inventory management systems significantly influence procurement performance in manufacturing firms in Nairobi County

Beta Coefficients

The results for beta coefficients were as shown in Table 6.

Table 6: Regression Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 Constant	1.142	.149		7.664	.001
1 E-Procurement	.401	.101	.349	3.970	.001

The regression equation was fitted follows;

The regression equation was

$$Y = 1.142 + 0.401 X_1 + \epsilon$$

The equation reveals that holding e-procurement, enterprise resource planning, electronic data interchange and inventory management systems constant, the variables will significantly influence procurement performance in manufacturing firms in Nairobi County as shown by a constant value of 1.142 as shown in Table 6.

The results also revealed that e-procurement was statistically significant to procurement performance in manufacturing firms ($\beta = 0.401$, $P = 0.001$). This implies that e-procurement

had a positive influence on procurement performance in manufacturing firms. This shows that that an increase in e-procurement would result to an increase in procurement performance in manufacturing firms by 0.401 units.

Conclusions

The study found that that e-procurement was statistically significant to procurement performance in manufacturing firms. Further, e-procurement had a positive influence on procurement performance in manufacturing firms. An increase in e-procurement would result to an increase in procurement performance in manufacturing firms. The study concluded that e-procurement positively influences procurement performance in manufacturing firms in Nairobi City County.

Recommendations

It was revealed that e-procurement had a positive influence on procurement performance in manufacturing firms. The study recommends that the manufacturing companies should use e-procurement in connecting the suppliers and employees of the organizations into the purchasing network companies that embark on e-procurement buying programmes. This would enable aggregate purchasing across multiple departments or divisions without removing individual control, reduce rogue buying, can get the best price and quality products from a wide range of suppliers

Suggestions for Further Research

The objective of the study was to establish the influence of information technology practices on procurement performance in manufacturing firms in Nairobi County. The study recommends that future studies should focused on other objectives other than the ones discussed in this study. The study also recommends that futures studies should adopt secondary data collection method in determining the influence of information technology practices on procurement performance.

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