



E-PROCUREMENT PRACTICE AND PERFORMANCE OF SOURCING OF PHARMACEUTICAL DRUGS IN LEVEL FIVE PUBLIC HOSPITALS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The general objectives of this Research project was to establish effects of e-procurement practices on performance on sourcing of pharmaceutical drugs in level five public hospitals in Nairobi City County, Kenya. The study was guided by the following specific objectives: to ascertain how E-tendering affects performance of pharmaceutical drugs in level five public hospitals in Nairobi City County; to determine the effect of E-invoicing in the performance on sourcing of pharmaceutical drugs in level five public hospitals in Nairobi City County. The study used descriptive design because it enhanced systematic description that is as accurate, valid and reliable as possible regarding the responses. The research was limited to the study of public hospitals in Nairobi County. The populations for this study consisted of the employees of public hospitals in Nairobi county Kenya. The total target population was 100. Researcher used questionnaires and census as the research instrument to gather the relevant information needed. The study involved use of professionals and experts to test the validity of questionnaire by trying to assess what concept the instrument is trying to measure and the accuracy of representation of the concept under research. Quantitative data was analyzed using descriptive statistics. In addition, the study uses multiple regression analysis to analyze the data. From the findings, the study concludes that e-tendering has a positive and significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. In addition, the study concludes that e-invoicing has a positive and significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. Based on the findings, the study recommends that management of public hospitals in Kenya should implement a centralized e-tendering platform that enhances transparency and efficiency in the procurement process. In addition, the study recommends that the management of public hospitals in Kenya should implement an integrated e-invoicing system that automates and streamlines the invoicing processes.

Key Words: E-Procurement Practices, Performance, Sourcing, Pharmaceutical Drugs, Level Five Public Hospitals, E-Tendering, E-Invoicing

Background of the Study

Croom and Bradon (2004) define e-procurement as the use of internet based information and communication technology to carry out purchase and sale of supplies, equipment, works and services in all stages of procurement process. It is a process which supports the procurement and sourcing activities via internet technologies. There is centralization and automation in the interactions between an organization, customers, and other value chain partners to improve speed and efficiency of procurement practice. This enables efficient and effective negotiation between buyers and suppliers (Asumba, 2010; Giménez & Lourenco, 2004). According to Nick (2015), electronic procurement is the automation of procurement and supply chain processes so that sourcing, vendor selection, shipment status tracking and payment can be made in an online environment. The origins of e-procurement began in the 1980s. This was experienced with the growth of electronic data interchange (EDI). EDI allowed customers and suppliers to send and receive orders (and invoices as well) using call-forward networks. E-procurement has evolved to its current status and now has the capability to act as a technology that enables incorporation and perfection of processes among departments in a health facility.

According to Batenburg and Versendaal (2016), pharmaceuticals are considered to be very important part of health systems. They are counted as a bridge between patients and health care professionals. Pharmaceuticals are a significant part of health expenditures in the developing countries such as Kenya. The main concerns of practitioners and policy makers in health care systems are efficient supply and distribution of essential medicine to public hospitals. According to Munyasi (2015), World Bank and the World Health Organization (WHO), one possible way to overcome such concerns is the introduction of e-procurement in sourcing of pharmaceuticals to provide the most cost-effective medicines for most needy people through the best supplier and with the most reasonable price and payment structure. For such purpose, all structures of procurement and resource allocation would need to ensure efficient and effective access of pharmaceuticals to consumers. Since poor and vulnerable groups of people face many challenges and obstacles on the way to acquire essential medicines at the right time in the right quality, there is a need to find ways of combating the challenges of supply and distribution of pharmaceuticals.

A study carried out by Kandampully, (2017) shows that e-procurement practices in pharmaceutical sourcing are one of the key policy tools for achievement of the goals of universal health coverage. It promotes equitable access, increases financial protection, enforces competitive markets and increases the purchasing power of health services to patients. Accordingly, in many countries especially in developing ones that are characterized by resource shortage, e-procurement has been emphasized as a key to increase access to medicines. E-procurement promotes appropriate indicators in the selection of the most desirable and highest quality medicines. It encourages effective contracting with pharmaceutical suppliers to provide the most appropriate, effective, and highest quality medicines for the target population in the right time and without delay. Besides the foregoing, medicines strategic sourcing requires public hospitals to provide and reimburse pharmaceuticals with a suitable, logical, realistic, and affordable price. Furthermore, to increase the sourcing functionality, they should be able to use competitive advantages and bargaining ability to agree on the lowest acceptable price.

In the 21st Century, organizations find themselves facing rapid series of market shifts, new technological innovations, and changes in government policies (AbdiK, 2012). For successful operations to be achieved, organizations have to learn to be innovative and creative, without renouncing the level of discipline that is instrumental in effectively executing plans. For proper execution of responsibility, there have to be modification of organizational designs and taking advantage of Information and Communication Technologies (ICTs) (Kuloba, 2007)). Since procurement of pharmaceutical products are considered as the most significant cost driver of healthcare, ICT is a vital enabler of the redefinition of an organization. It promotes distribution of power, function, and control to wherever they are most effective in accordance with the mission and objectives of the organization and the culture it enjoys (Kamotho, 2014). This for all intents and purposes is to engage in e-business which has the potential to engender enormous wealth and change the way business is conducted. A number of the commonly used tools in e-business are e-Tendering,

online request for quotations (e-qaRFQ), e-Auctions, e-Catalogues, e-Invoicing and e-procurement (Mambo, 2015; Nutakor, 2016).

Statement of the Problem

In Kenya, a study by Anne and Julian (2019) revealed that low-quality data, unpaid invoices for consumed medicines which is associated with delays in medicine supplies, long processing times for orders, and a prevalence of low-quality and counterfeit drugs has weakened the procurement processes and overburdened health facility workers. This causes stock outs and put lives of patients at risk. When hospitals fail to procure enough medicines, patients forfeit treatment altogether or buy drugs at high prices. A study done by (Victor, 2013) demonstrated, for instance, that a stock out rate at Webuye Hospital falling from 21.75% in 2010/11 to 19.47% in 2012/13 resulted in high allocation of user fees and increased the actual expenditure on essential drugs. In Kenya, according to Malia (2010), Public Sector is the largest in terms of the number of public healthcare facilities. The health sector in Kenya has been able to achieve rapid growth in the recent past with the budget allocation to the health sector continuing to increase from 5.3% in 2014/15 to 7.3% in 2017/18 and 7.8% in 2019/20. Andriese, (2002) also did studies showing that there was also estimation that these public hospitals have experienced high supply cost and inventory holding costs of between thirty and forty percent (30% & 40%) due to oversupply of requirement. Which causes shortages and unaffordability sort of pharmaceutical products which leads to poor quality health care in low income Africa countries (WHO, 2011).

According Agango and Achuora (2018), healthcare sector in Nairobi City County has estimated loss of between 10% and 18% in revenue due to inventory hiccups. Despite government effort to improve the e-procurement system practices in public hospitals, it is still marred by shoddy works due to lack of commitment, untimely delivery of goods and service among others. This is due to the fact that implementation of e-procurement is low in Nairobi level five hospitals. Whereas Kenyatta National hospital and Pumwani Maternity hospital reported 42%, and 38% levels of implementation, Mbagathi and Mama Lucy reported very low at 17.7% and 14.7% respectively. Calipinar and Soysal, (2017) report that most of the procurement processes in the public sector (that includes public hospitals) are still manual with the internet only being used for e-mails and web browsing. These manual processes are costly, slow, and inefficient and data storage and retrieval is also poor.

Various studies have been done on implementation of e- procurement, challenges of implementation of e-procurement and benefits of e-procurement. Other studies have also related e-procurement with variables like operational and overall organizational performance. However, no study has been done on factors affecting e-procurement implementation in in the procurement of pharmaceutical products in the level five public hospitals in Nairobi City County. Therefore, this study sought to bridge this gap by investigating factors affecting implementation of e-procurement practices in the procurement of pharmaceutical products in the level five public hospitals in Nairobi City County.

Objectives of the study

The overall objective of the study is to establish effects of E-procurement practice on performance of pharmaceutical drugs among level five public hospitals in Nairobi City County with a view to resolve adverse effects.

Specific Objective

- (i). To ascertain how E-tendering affects performance of pharmaceutical drugs in level five public hospitals in Nairobi City County, Kenya
- (ii). To determine the effect of E-invoicing in the performance of pharmaceutical drugs in level five public hospitals in Nairobi City County.

LITERATURE REVIEW

Theoretical Framework

Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) explains how, why, and at what rate new ideas and technology spread. IDT draws primarily on the comprehensive work of Rogers (2003) in the information systems

area where identification of five characteristics of potential adopter's perceptions of accepting that innovation. The relative advantage, compatibility, complexity, observability, and trialability. Acceptance of innovations are also examined in relation to the promotion of consumer-oriented products in the marketing literature. A formation of the most important works Lee (1999), which indicates three factors that facilitates consumer acceptance of innovative applications. These are compatibility of the innovation with the existing habits of consumers, belief structure of consumers, and perceived little risks posed by the innovation to consumers. Acceptance of innovation increases as the risk perceived to be associated with the new product decreases.

OECD (1997) cited by Andreeanne and Swaminathan (2007) defined innovation as the scientific, technological, organizational, financial, and commercial activities necessary to create, implement, and market new or improved products or processes. The theory brings on board four important elements as suggested that influence the spread of a new idea as suggested by Rogers: the innovation itself, communication channels, time, and a social system. The process relies heavily on human capital. Adoption of the innovation should spread in mass for wide coverage. The last element is the social context of the new systems (Rogers, 1997). Diffusion of innovation strategies requires evolution and reinvention of products so that they are able to perform better in the market (Les Robinson, 2009).

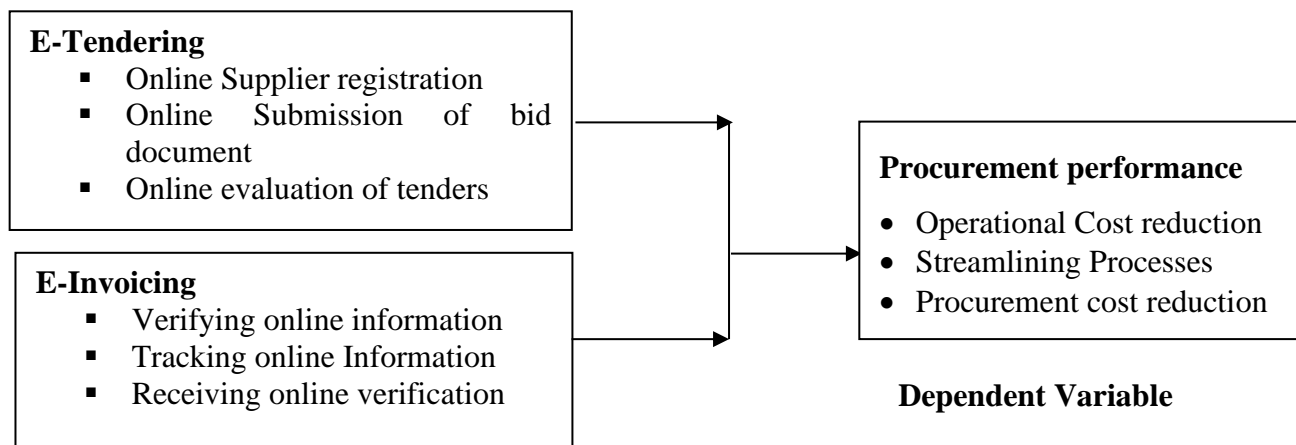
Adopters are categorized as, early adopters, early majority, late majority, and laggards Raynard, (2017). The criterion for the adopter categorization is innovativeness, which is the degree to which a person is relatively early and willing to adopt a new idea compared to other members of a social system. Innovativeness is considered "relative" in that an individual has either more or less of it than others in a social system (Rogers, 1983). Early adopters tend to be integrated into the local social system more than innovators. They seem to have the greatest degree of opinion leadership in most social systems and provide advice and information sought by other adopters about an Innovation. Agents for change seek out for early adopters to speed up the diffusion process. This is due to the fact that, they are respected by his or her peers and has a reputation for successful and discrete use of new ideas (Renko & Druzijanic, 2014).

Traditional procurement theory

This theory is an applied branch of economics which deals with how people act in auction markets and how research on properties of auction markets is applied. There are various possible designs (or sets of rules) for a procurement and typical issues studied by auction theorists. They include the efficiency of a given auction design, optimal and equilibrium bidding strategies, and revenue comparison. (Harris, 1987). Traditional theory is often said to have originated in the seminal 1961 article by William Vickrey. The insights were initially unrecognized and it took many years before his work was followed up by other researchers, it eventually led to a formidable body of research by pioneers. In the recent notable books that describe traditional theory are Krishna (2002), Milgrom (2004) and (Majdalawieh & Bateman, 2008), are especially recommended to readers. Traditional procurement is based on long standing theoretical foundation and tested empirical work. Malone et al (1989) presented classifications for various types of auction and bidding models based on the assumptions used in the models. The original idea of an e-procurement is that one can procure goods and services through the use of a bidding mechanism. Malone et al (1987) again presented an essay in management science that attempts to model the competitive bidding process. Since this work was done on the traditional auction.

Conceptual framework

A conceptual framework is a set of broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation Mugenda and Mugenda, (2003). It is a tool intended to assist a researcher to develop awareness and understanding of the situation under scrutiny. It helps the research to explain the relationship among interlinked concepts such as the dependent and independent variables (Kombo, 2006). It was conceptualized within the dependent-independent variable components and their indicators. The figure below shows a diagrammatic representation of the relationship between the dependent and independent variables.



Independent Variables

Figure 2. 1: Conceptual framework

E-Tendering

According to Eadie *et al.*, (2017), organizations which uses advertises through e-tender notices or e-requests, by sending request for information, receiving bids and offers from suppliers, and informing suppliers on the award of contracts through the use of internet based data interchange. Data exchanged through e-tendering is more concerned with product and services. The system allows the screening and selecting of suppliers. Currently organizations are practicing e-tendering as one of the mechanisms to cut costs. Empirical studies carried out Gebauer *et al.*, (1988) in the United States of America indicated that the two most important measures for the success of procurement processes are cost and time. In this method, there is no paperwork, postage fee and other costs associated with preparation and sending tender documents. It is also faster to send a document electronically as compared to the traditional method of sending tender documents through post office. It results to improved order tracking and tracing, for it is much easier to trace the orders and make necessary corrections in case an error is observed in the previous order. Secondly, there is reduction in time to source materials. In reduction in time has been proved as a relevant benefit by Knudsen (2013) who says “E-procurement is a rapid efficient method of finding and connecting new sources, being a lean channel for communication”.

Through e-tendering the organization generates wealth through electronics business (Amit and Zott, 2018). The use of technology in conducting procurement process has brought substantial benefit to organizations which practice e-tendering (Neef, 2018). Time is wasted in moving from one town or country to another to look for a potential supplier or buyer. This is greatly reduced since with a click of a button, you can readily get the information in the internet. Practicing e-procurement leads to reduction in maverick buying. Maverick buying is when staff buys from suppliers than those with whom a purchasing agreement has been negotiated. Thirdly, Lower Administration costs: in his research, Rankin (2016) argues that e-procurement results in reduction in paperwork and this leads to lower administration costs. Fourthly, Reduction in procurement staff: since most of the procurement process is done electronically, the number of staff needed to facilitate the process reduces. As Eadie *et al.*, (2017) noted, the reduction in staff is an important way of producing competitive advantage through reduced costs. This is further supported by Egbu *et al.*, (2019) in his study which revealed that through implementation of an e-procurement system, a steel supplier was able to carry out a multi-million pound project with only 20% of the staff the company would normally have used. Fifthly, e-procurement gives an organization competitive advantage over its competitors. As a centralized department can oversee all procurement activities and different offices worldwide can access the same documentation when required, this gives a distinct advantage over the much slower process of having to post documentation between offices. This extends the supply chain beyond geographical boundaries to a much wider group. Suppliers can be monitored on timely delivery, quality delivery of products and services hence performing suppliers can be contacted in future.

E-Invoicing

E-invoicing offers many benefits: significant cost reduction, process simplification, reduced payment time, greater security of data, as well as numerous environmental benefits. This is confirmed by enterprises and public authorities which already use it. Benston & Smith (1976) introduce transaction costs. They attempt to explain why individual corporations do not perform asset transformation themselves as a function of the transaction costs incurred in conducting such activities. As shown in transaction cost economics, the cost of the infrastructure is reduced per transaction when the volume of transactions increases. To create a financially viable e-invoicing solution, corporate needs to create this critical mass by a value network of alliance partners and technology solution providers to add the necessary desirability for electronic invoicing through the Financial Supply Chain. A Value Network is a web of relationships that generates economic value and other benefits through complex dynamic exchanges between two or more individuals, groups or organizations. The Value Network models mediating firms as creating value through three basic primary activities: network promotion and contract management; service provisioning; and infrastructure operations Stabell and Fjeldstad,(1998). In a network firm (Economides, 1996) the customers are offered direct access to each other, as in payment mediation, or indirect access to a common pool, as in saving and loan services (Stabell & nFjeldstad, 1998) through the set of mediation activities performed by the firm.

Both value and cost are postulated as driven mainly by network characteristics (Stabell & Fjeldstad, 1998). Value and costs depend on the number of access points, nodes or users that can be reached, and the variety of links between users. The costs for the users are in terms of charges for access to and use of the network, while the value is determined by the possibility to reach a large and relevant number of nodes through a variety of links. To provide greater value, value networks can increase their range of services offered by layering new services on top of the contract set and the infrastructure, or increasing access to a larger pool of users. Electronic financial supply chain players need to streamline the settlement process in terms of both workflow and transaction cost by creating e-marketplaces with standardized settlement mechanisms via a finite number of trusted providers with both the range of necessary solutions and the openness and reach to enable transactions throughout the e-marketplace. Buenger *et al.* (1996) provide a framework of competing value drivers, indicating that organizations face different value propositions, which may change over time due to internal and external influences and experiences.

Empirical literature

Vaidya and Callender (2016) conducted a study on Critical Factors that Influence e-procurement Implementation Success in the Public Sector. They found out that despite the efforts put by the governments through reforms towards adoption of e-procurement, adoption of e-procurement still remains a major challenge for many procurement functions. The findings further revealed that successful implementation of e-procurement established systems and feedback mechanism. They associated e-procurement with improved procurement performance. Findings of study done by Roma and McCue (2012) on e-procurement revealed that e-procurement facilitates documentation of the bidding process which in turn enhances transparency and accountancy especially in public procurement. The research further revealed that e-procurement is associated with improved efficiency and enhanced procurement operations. Other benefits of e-procurement include: increased customer satisfaction, improved professionalism in the procurement functions improving public perceptions the procurement function.

Abarden Group (2001) found out that e-procurement solutions leads to improved satisfaction of customer demands, improved contract compliance, enhanced supply chain capacity, reduced inventory costs and improved inventory management. The group identified the keys to e-procurement success. They pointed out that e-procurement should not be treated as a strategy, the organization must know what is spent on, the organization must have a plan, the implementation of e-procurement begin by benchmarking, the implementation of e-procurement must be led from the top, the implementation of e-procurement must be supported by other functional areas.

The findings of Brazel and Dang (2008) showed that implementation of ERP enhances flexibility which translates to improved earning management. A part from flexibility, ERP systems enhance management accounting and decision making that in turn enhances management's ability to manage accruals and other factors that may constrain organizational abilities. She and Thuraisingham (2007) in their study on security for Enterprise Resource Planning Systems established that e-procurement enhances security of management data which may enhance procurement performance. The above finding is in agreement with the findings of Martinez (2008) on Procurement Goals, ERP, and Supplier Coordination in the Context of Competition and Global Environment that ERP systems improve customer delivery and enable collaboration with suppliers and customers. Improved supplier and customer relations and enhance achievement of procurements strategic goals. Nah and Santiago (2006) in his study on critical Success Factors for Enterprise Resource Planning Implementation and Upgrade revealed that implementation of ERP requires critical factors such as: business plan and direction, change management, communication, appropriate technical skills, project and implementation management, top management commitment and leadership and systems management.

RESEARCH METHODOLOGY

The research design to be used in this study was descriptive research design. The target population for this study were all level five public hospitals in Nairobi County that include: Pumwani Maternity Hospital, Kenyatta University Teaching, Referral & Research Hospital, Kenyatta National Hospital and finally Mathare Mental Hospital. The total target population was therefore 158 respondents comprising of 24 senior managers, 48 Doctors and 86 Nurses. The current study comprised of 158 respondents, which is relatively small size population and hence no need of sampling. Therefore, a census was carried out for this study. The researcher used questionnaires and secondary data as the research instrument to gather the relevant information needed related to the study. The researcher collected questionnaires, code them, and enter them into the Software Package for Social Sciences (SPSS version 26) for analysis. The descriptive statistical techniques of frequency, mean, and standard deviation were used to analyze the quantitative data acquired. The results were displayed using frequency distribution tables, which kept track of how many times a score or response appears. Qualitative data collected was analysed using content analysis and presented in prose form. Inferential statistics including regression and correlation analysis was used in the study.

RESEARCH FINDINGS AND DISCUSSIONS

The researcher sampled 100 respondents who were each administered with the questionnaires. From the 100 questionnaires 80 were completely filled and returned hence a response rate of 80%. The response rate was considered as suitable for making inferences from the data collected. As indicated by Metsamuuronen (2021), a response rate that is above fifty percent is considered adequate for data analysis and reporting while a response rate that is above 70% is classified as excellent. Hence, the response rate of this study was within the acceptable limits for drawing conclusions and making recommendations.

Descriptive statistics

E-Tendering and Performance of Pharmaceutical Drugs

The first specific objective of the study was to ascertain how e-tendering affects performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. The respondents were requested to indicate their level of agreement on various statements related to e-tendering and performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. The results were as shown in Table 1.

From the results, the respondents agreed that there is increased tendency towards market structures brought forth by e-tendering ($M= 3.943$, $SD= 0.726$). The respondents agreed that e-tendering leads to the increased coordination between suppliers ($M=3.915$, $SD=0.872$). Further, the respondents agreed that low infrastructure and transaction costs of internet-based systems through e-tendering allows organizations to exploit the increased opportunities ($M=3.857$, $SD=0.555$). The respondents

agreed that e-tendering leads to the improved level of trust among all the stakeholders ($M=3.837$, $SD=0.758$). The respondents also agreed that inter-organizational systems through e-tendering enhance opportunities tend to create more effective customer-supplier relationships over time ($M=3.758$, $SD=0.641$). The results are in line with the findings of Gunasekaran et al. (2019) who highlighted that the adoption of e-tendering in European manufacturing firms resulted in significant cost reductions in procurement processes, contributing to overall organizational efficiency. The cost savings from streamlined operations allowed organizations to allocate resources more effectively, improving their financial performance.

Table 1: E-Tendering and Performance of Pharmaceutical Drugs

	Mean	Std. Deviation
There is increased tendency towards market structures brought forth by E-tendering	3.943	0.726
E-tendering leads to the increased coordination between suppliers	3.915	0.872
Low infrastructure and transaction costs of Internet-based systems through E-tendering allows organizations to exploit the increased opportunities	3.857	0.555
E-tendering leads to the improved level of trust among all the stakeholders	3.837	0.758
Inter-organizational systems through E-tendering enhance opportunities tend to create more effective customer-supplier relationships over time	3.758	0.641
Aggregate	3.862	0.710

E-Invoicing and Performance of Pharmaceutical Drugs

The second specific objective of the study was to determine the effect of e-invoicing in the performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. The respondents were requested to indicate their level of agreement on various statements related to e-invoicing and the performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. The results were as shown Table 2.

From the results, the respondents agreed that e-invoicing leads to the secure and low cost procurement transactions ($M=3.942$, $SD=0.769$). Further, the respondents agreed that e-invoicing leads to the easy retrieval and processing of data of the procurement related transactions ($M=3.875$, $SD=0.888$). In addition, the respondents agreed that e-invoicing leads to better utilization of resources thus enhancing performance in the organization ($M=3.788$, $SD=0.567$). The respondents agreed that e-invoicing leads to easy exchange and utilization of information to users ($M=3.633$, $SD=0.798$). Further, the respondents agreed that e-invoicing leads to time taken for delivery of service to be reduced ($M=3.545$, $SD=0.689$). In addition, the respondents agreed that reliability of service delivery has increased through e-invoicing ($M=3.538$, $SD=0.742$). The results are in line with the findings of Odhiambo and Kamau (2020), who found that the implementation of e-invoicing significantly reduced payment delays, which in turn improved supplier performance and ensured timely deliveries, positively impacting overall organizational operations.

Table 2: E-Invoicing and Performance of Pharmaceutical Drugs

	Mean	Std. Deviation
E-Invoicing leads to the secure and low cost procurement transactions	3.942	0.769
E-Invoicing leads to the easy retrieval and processing of data of the procurement related transactions	3.875	0.888
E-Invoicing leads to better utilization of resources thus enhancing performance in the organization	3.788	0.567
E-Invoicing leads to easy exchange and utilization of information to users	3.633	0.798
E-Invoicing leads to time taken for delivery of service to be reduced	3.545	0.689
Reliability of service delivery has increased through E-Invoicing	3.538	0.742
Aggregate	3.720	0.742

Performance of Pharmaceutical Drugs

The respondents were requested to indicate their level of agreement on various statements related to performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. The results were as shown Table 3.

From the results, the respondents agreed that e-tendering leads to improved procurement resource utilization in their organization (M=3.812, SD=0.686). The respondents also agreed that since the introduction of e-tendering, procurement time is significantly reduced (M=3.715, SD=0.665). In addition, the respondents agreed that since the introduction of e-tendering, physical handling of procurement documents is done away with (M=3.706, SD=0.782). Further, the respondents agreed that e-invoicing promotes accuracy in the procurement process in their organization (M=3.677, SD=0.892).

Table 3: Performance of Pharmaceutical Drugs

	Mean	Std. Deviation
E-tendering leads to improved procurement resource utilization in our organization	3.812	0.686
Since the introduction of e-tendering, procurement time is significantly reduced	3.715	0.665
Since the introduction of e-tendering, physical handling of procurement documents is done away with	3.706	0.782
E-invoicing promotes accuracy in the procurement process in our organization	3.677	0.892
Aggregate	3.787	0.781

Correlation Analysis

This research adopted Pearson correlation analysis determine how the dependent variable (performance of pharmaceutical drugs in level five public hospitals in Nairobi City County) relates with the independent variables (e-tendering, e-invoicing).

Table 4: Correlation Coefficients

		Performance Of E-Pharmaceutical Drugs	E-Tendering	E-Invoicing
Performance Of Pharmaceutical Drugs	Pearson Correlation	1		
	Sig. (2-tailed)			
E-Tendering	Pearson Correlation	.808**	1	
	Sig. (2-tailed)	.002		
E-Invoicing	Pearson Correlation	.818**	.437	1
	Sig. (2-tailed)	.000	.020	
N		80	80	80

From the results, there was a very strong relationship between e-tendering and performance of pharmaceutical drugs in level five public hospitals in Nairobi City County ($r = 0.808$, p value = 0.002). The relationship was significant since the p value 0.002 was less than 0.05 (significant level). The findings are in line with the findings of Vaidya and Callender (2020) who indicated that there is a very strong relationship between e-tendering and performance of pharmaceutical drugs.

Moreover, there was a very strong relationship between e-invoicing and performance of pharmaceutical drugs in level five public hospitals in Nairobi City County ($r = 0.818$, p value = 0.000). The relationship was significant since the p value 0.000 was less than 0.05 (significant level). The

findings are in line with the findings of Abarden Group (2021) who indicated that there is a very strong relationship between e-invoicing and performance of pharmaceutical drugs.

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (e-tendering, e-invoicing) and the dependent variable (performance of pharmaceutical drugs in level five public hospitals in Nairobi City County).

Table 5: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	0.334	0.086		3.884	0.002
e-tendering	0.379	0.096	0.380	3.947	0.001
e-invoicing	0.371	0.093	0.370	3.989	0.000

The regression model was as follows:

$$Y = 0.334 + 0.379X_1 + 0.371X_2$$

According to the results, e-tendering has a significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County ($\beta_1=0.379$, p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant level of 0.05. The findings are in line with the findings of Vaidya and Callender (2020) who indicated that there is a very strong relationship between e-tendering and performance of pharmaceutical drugs.

The results also revealed that e-invoicing has a significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County ($\beta_1=0.371$, p value= 0.000). The relationship was considered significant since the p value 0.000 was less than the significant level of 0.05. The findings are in line with the findings of Abarden Group (2021) who indicated that there is a very strong relationship between e-invoicing and performance of pharmaceutical drugs.

Conclusion

The study concludes that e-tendering has a positive and significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. Findings revealed that online supplier registration, online submission of bid document and online evaluation of tenders influence performance of pharmaceutical drugs in level five public hospitals in Nairobi City County.

In addition, the study concludes that e-invoicing has a positive and significant effect on performance of pharmaceutical drugs in level five public hospitals in Nairobi City County. Findings revealed that verifying online information, tracking online information and receiving online verification influence performance of pharmaceutical drugs in level five public hospitals in Nairobi City County.

Recommendations

The study recommends that the management of public hospitals in Kenya should implement a centralized e-tendering platform that enhances transparency and efficiency in the procurement process. This platform would integrate all procurement activities, including the invitation to tender, submission of bids, evaluation, and awarding of contracts, ensuring that all stakeholders—suppliers, hospital procurement officers, and regulatory bodies—have access to the same information.

In addition, the study recommends that the management of public hospitals in Kenya should implement an integrated e-invoicing system that automates and streamlines the invoicing and payment processes. This system would connect suppliers, hospital procurement departments, and finance teams, enabling seamless and efficient management of financial transactions related to pharmaceutical procurement.

Suggestions for Further Studies

This study was limited to the effects of e-procurement practice on performance of pharmaceutical drugs among level five public hospitals in Nairobi City County hence the study findings cannot be generalized to performance of pharmaceutical drugs in private hospitals. The study therefore suggests further studies on the effects of e-procurement practice on performance of pharmaceutical drugs in private hospitals in Kenya.

In addition, the study suggested further research to explore the influence of user training and capacity building on the effectiveness of e-procurement practices in the healthcare sector. Since the successful implementation of e-procurement systems often depends on the competence and skills of hospital staff, future studies could investigate how training and development programs for procurement personnel affect the performance of pharmaceutical drugs in both public and private hospitals across Kenya. This would provide insights into the human resource factors influencing e-procurement success and pharmaceutical management.

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