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DOES GOING E PAY OFF IN FIRM PERFORMANCE? AN INVESTIGATION USING PREDICTIVE REGRESSION IN A DEVELOPING ECONOMY

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ABSTRACT :

Supply chain performance is not a new phenomenon, though achieving results in purchasing firms has become a bone of contention. Supply chains face unprecedented surfeit of challenges spanning from increase in costs, poor quality of products and untimeliness. Globally, previous reports by Kanyaru & Moronge, 2017 intimate that public sector organizations are wrestling with unprecedented dynamicity of results due to ever changing technology and management structures, loosing $ 400 billion in public procurement annually. Additionally, many supply chains continue to struggle in bringing goods when and where they are needed, especially in the wake of global shocks such as Covid 19 and Russia's invasion of Ukraine. In Kenya, Public Procurement Regulatory Authority, (PPRA, 2017) report show that public entities in Kenya procure at 60% above prevailing market prices, this calling for collated efforts to provide solutions. Empirical evidence on e-procurement have concentrated on few case industries and missed focusing on procurement innovations such as e sourcing, e tendering, e auction & e ordering. The purpose of the paper was to determine effect of e procurement innovation on supply chain performance of public entities in Kenya. A primary quantitative paradigm in the lens of positivism and correlational survey design guided the study. Study is grounded in Rodgers' diffusion of innovations theory. A survey of 187 public entities with heads of procuring units as analysis units is carried out using a structured questionnaire. Data were analyzed by linear predictive regressions. Cronbach Alpha technique with values ($0.7<\alpha<0.88$) confirmed reliability of measuring instrument. Results show that e procurement innovations has significant positive effect ($R^2=.562$, $\beta=.168$, $p<.05$), implying unit improvement in adopting e procurements results to 0.168 units increase in performance. Study concludes: e procurements in public sector firms has a significant positive effect on performance and therefore pays off. It is recommended that stakeholders in public entities need to derive policies meant to enhance the use of e procurement innovations. Suggestions for future research lens is recorded.

KEY WORDS: E procurement innovations, supply chain performance, public entities, procurement, supply chain management

1.0 INTRODUCTION

Globally, public sector organizations are wrestling with unprecedented dynamicity of results due to ever changing technology and management structures. So then, the organizations have to quickly reexamine their management models as well as their business practices in order to align themselves and maintain the pace with this changes. Supply Chain Management (SCM) is a management model that plays a vital role in shouldering public organization' realization of their key objectives and conform to the changes and uncertainties ahead. In practice, this will call for procurement, an important practice in SCM, to drive costs out of operational bases as well as add value to every practice. To achieve this, the organizations must be innovative (Nyaboke & Muturi, 2017).

Innovation practices in public procurement is not new among contemporary researchers. Innovation is not a lone isolated act, but a combination of new or mixed actions with a view to improve performance. Alves, Galina & Dobelin (2018) defined innovation practices as new services, products, procedures, technologies or the new ways of improving processes where the technological properties of such processes will be significantly different from the original. Zhang, Khan, Lee, & Salik (2019) quoting Damanpour & Evan (1984), refers to innovation practices as adoption and use of an idea for a new product or a new service or the introduction of new elements in an organization's production process or service operation." Singh, Mathiassen & Mishra (2015), in their definition of innovation practices establish that materials technology are often applied to technological issues in organizational set up. The researchers further espouse that innovation practices is no longer an alternative since it has become a unique focus by top managers in many business organizations. For the purpose of this study, innovation practices is an aspect of new ideas, processes, practices, frameworks, or new ways of improving the final products and services in a formal organization.

E procurement is a type of innovativeness in public procurement. E procurement refers to practices where public sector organizations consider utilizing electronic ways such as the use of internet, websites and mails in conducting procurements and disposals. There are numerous practices that denote e procurements. To begin with, procurement through web technologies, where purchasing firms visit websites and portals surfing markets for goods and service. In the same way, service providers may also visit websites of purchasing firms in the intention of seeking supply and delivery opportunities. Furthermore, e sourcing is the practice in which supply chain firms use online means such as mails seeking for probable service providers and conducting supplier development programs. In e tendering, supply chain firms carry out procurements and make award decisions through online means. E ordering requires that firms make request and place orders for goods and services using online means. E auctioning refers to announcing trade ins and makes sales using electronic means. Even though, the challenge in conducting e procurement is often inadequate skilled labor (Nani & Ali, 2020).

The study by Yaw Obeng & Coleman (2020) looked at the effects and outcomes of innovation practices on e-learning system in Ghana by using primary data in tertiary training institutes. In analysis, logistic regression model was adopted to determine impact of innovation practices on web based e learning system. Correlation matrix ascertained relationship among conceptualized variables. The results show that innovation practices has a significant effect on eLearning system given that a single increase in innovation practices results into 55 times increase in features of the system and 3 times increase in the eLearning outcome. Further, the results also denote that features of the eLearning system has a significant effect on the eLearning outcome. The study however failed to provide recommendations for policy making (Yaw Obeng & Coleman, 2020).

Park, Bae & Hong (2019) concentrated on human resource managers of 236 private research and development centers published by the Korea Industrial Technology Association to advance a study titled: High Commitment HRM systems, HR capability and ambidextrous technological innovation. The study specifically analyzed the relationship between innovation practices, human resource capability and human resource and the mediating influence of human resource capability on the relationship between the innovation practices and human resource. Snowballing sampling technique was adopted to sample, with questionnaires adopted as the research instruments. Further, descriptive statistics and regression analysis analyzed the collected data. Findings show that human resource has a positive significant effect on innovation practices and capability. Also, human resource capability was found to have a full mediating effect on the human resource management systems and innovation practices The study discussed that research and development centers as well as other firms in Korea to prioritize adopting and implementing the study variables.
As discussed above a glut of the studies in literature on e-procurement centered on organization cases of one industry, such as the works of (Yaw Obeng & Coleman, 2020; innovation practices on e-learning system among training institutes in Ghana; Park *et* al; 2019: private research and development centers in Korea), ignoring a multi-faceted approach of firms in all industries. In addition, previous studies on e-procurement practices did not consider important e procurement practices such as e sourcing, e tendering, e ordering, e auction. In this view, information on going e by adopting fundamental e procurement practices in a multi-faceted approach is nonexistent. For this, the current study hoped to bridge this gap.

Globally, it is acknowledged that $ 400 billion is lost due to inefficiencies and undercutting practices in public procurement systems. Kenya's PEs contribute $3.64 billion spent in PP which is about 9% of the country's Gross Domestic Product (GDP). A report by Presidential task force on parastatal reforms (2021) discloses that the performance of public entities (PEs) is on a declining trend and this is seriously affecting public finances given that the entities are increasing over reliance on government financial support

1.2 Objective of the study

The main objective of the study was to establish the effect of e procurement innovations on supply chain performance of public entities in a developing economy, Kenya. Study sought to affirm the following hypothesis:
H_{01} E procurement innovations has no significant effect on supply chain performance of public entities in Kenya

1.3 Model framework

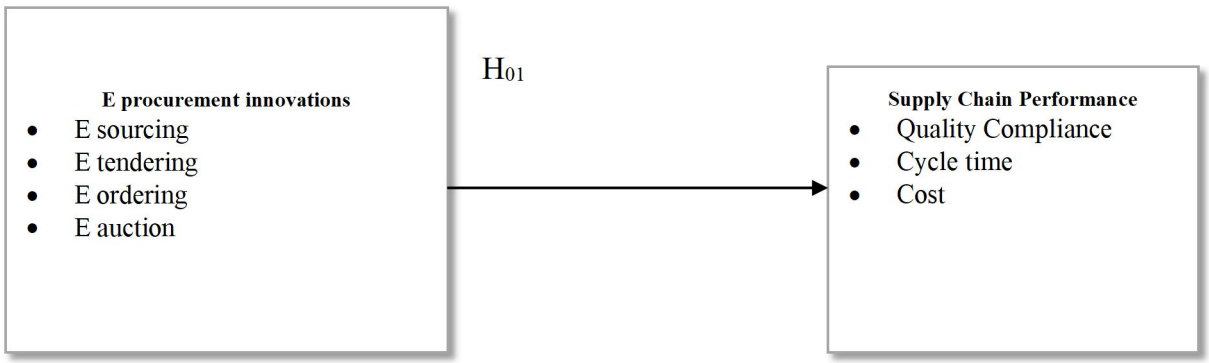

Figure 1. 1: Conceptual framework of the effect of e procurement innovations on supply chain performance of public entities in Kenya**. Source: (Adopted from Rodgers, 1962)**

The conceptual model of the study above shows an association between e procurement practices and supply chain performance which exhibits a cause and effect relationship. The independent variable is e procurement innovations. Aspects of e procurement practices in place (e sourcing, e tendering, e ordering, e auction) may affect supply chain performance of public entities. With this therefore, it is expected that the values of public procurement as

enshrined in the constitution in terms of transparency, value for money, competition and cost-effectiveness (estimated in this case as supply chain performance metrics, quality compliance, cost effectiveness, cycle time) may be achieved by public entities. Therefore, the study is composed of two main variables; independent variable (e procurement innovations) dependent variable (supply chain performance) as shown in the figure 1.1

2.0 LITERATURE REVIEW

2.1. Diffusion of Innovations Theory

Diffusion of Innovations Theory (DIT) is an established thought which explains how new ideas, technology and practices are adopted and infused in the organization. It also establishes at what rate and why the adoption of technological innovations is important, informing that organizations that continuously synchronize their operational environment for new ideas and innovations delivers more value to their clients. The idea of diffusion was first put forth by a Gabriel Tarde in 19thC with Friedrich Ratzel and Leo Frobenius being among the early promoters. However, active studies on the theory began earnestly in USA in the 1920s and 1930s.

At the time, agricultural technology was increasingly fast, scholars and researchers became interested in finding out how agricultural farmers were making use of hybrid seeds, new farming techniques and equipment. At this time Ryan & Gross (1943) conducted a research on adoption of corn seed in Lowa, USA. This study cemented original works on DIT from a unique angle that would see other scholars cite it. From its original studies in sociology and communication, continuing works have applied the theory in diverse numerous fields such as medicine, health promotions, marketing, development studies, management, conservation studies, organization studies. The theory can as a result, be applied in business filed studies.

The earliest proponent of DIT was Everett Rodgers in 1962, when he examined that the theory could be adopted among individuals and organizations after a review of 508 diffusion associated literature. This was popularized in his book the *Diffusion of Innovations*. This formed the basis from which DIT has been applied in business and management fields. According to Rodgers (1962), diffusion is the process by which innovation is communicated over a period of time among stakeholders in a social set up, say an organization.

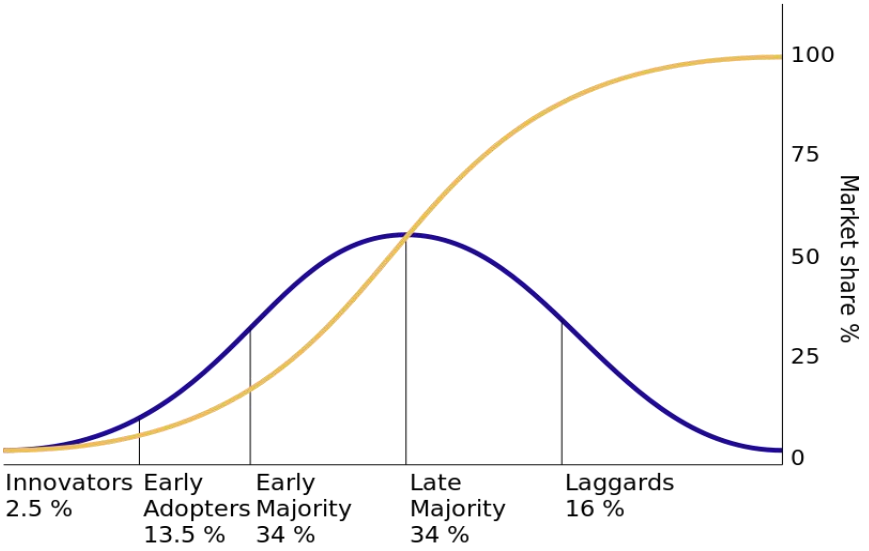

Figure 2.1: Rodgers' Diffusion of Innovation Source: (Adopted from Rodgers, 1962)

With consecutive group of consumer stakeholders adopting the new technologies and innovations as shown by the blue line, the market share (depicted in yellow) will reach saturation levels at the end. Adopters of innovations at different levels is indicated by the broken blue curve.

Rodgers (1962) proposes that there are 5 key components which influence the adoption of a new idea: innovation itself, adopters, communication channels, time, social system. The process itself to a great extent, depends on social capital. Innovation is understood as a new practice, idea or object which is seen as new by the individual or organization. Adopters refer to the individuals or organizations within a social set up considered as clients of the innovation. Communication channels is construed in the sense that for diffusion to happen among stakeholders (people or organizations), they allow the movement of information from one unit to the other. Patterns and capabilities in communication must be established between parties in the organization for diffusion to take place. Time on the other hand denotes that the passage of time is important for innovation to be adopted since the adoption process cannot happen instantaneously. The social systems refer to the mixture of external influences such as the government, surfactants, media with internal influences such as social relationships and their roles. The combination of these influences signify the total influence on the adopters.

There are a 5-step decision making process for adoption of innovation. Adoption takes place over a period of time through a series of communication channels among stakeholders in an organization. The stages are knowledge, persuasion, decision, implementation and confirmation. An individual or organization may reject an innovation during or after an innovation. At the decision stage, the organization will measure the pros and cons of using the innovation and decide whether to adopt or reject it.

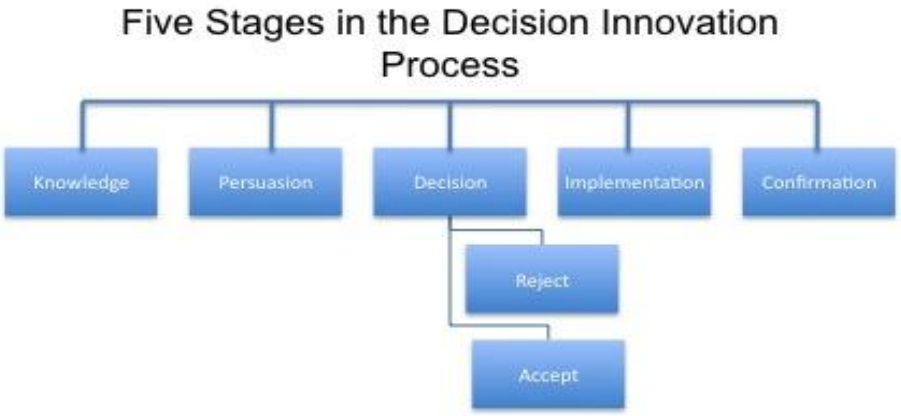

Figure 2. 1: Stages in the Innovation diffusion process Source: (Adopted from Rodgers, 1995)

The theory is adopted adoption and use of e procurement practices in the Kenyan public entities. IT cearly explains 'what is there for me' for organizations as an antecedent for them to decide in using new practices and innovations to improve their performance. In reality, the theory clearly illustrates a roadmap of understanding the importance of e procurement practices in public entities undertaking public procurement and give the reasons for, perspectives, extent to which they have or will adopt the practices. It is on record that practices such e ordering, e tendering, e sourcing & e auction are finding greater acknowledgment in emerging and developing economies by providing new streams of data for firms to improve market visibility.

E procurement innovations has been on the political agenda in many countries (Henriksen & Andersen, 2003). Various acclaims in literature concentrating on information communication technology such as those of Muriuki, 2021; Gu, Yang & Huo, 2021; Weeks & Namusonge, 2016; Zhang, Khan & Salik (2019) have shown that innovations and technology improves customer resilience and performance. The theory supports this construct since adoption of public procurement innovations such as e procurement practices require knowledge of players in practice, a persuasion that the innovation in question is important, implementation and confirmation of sustainability of the said innovation. In others words, PEs adoption of technological innovation will follow Rodgers' stages of adoption.

2.2 The concept of E procurement innovations

In the words of Mabhodha & Choga (2018), innovations in public procurement encompasses practices which must improve transparency and value in the acquisition process. This include e ordering, e tendering, e sourcing, e reverse auction. E ordering has made procurement easier through innovations. It refers to the use of electronic media to carry out all ordering for goods and services. Electronic orders are requests for goods and services that are generated and sent using an electronic format. E-ordering applications make procurement services faster and more efficient as a result of the increased speed of transactions. Also, the order data is integrated with the company's ERP, which makes processing easier for the company. Besides the automated system enables customers to receive notifications automatically when orders are ready for delivery. The notification of clients and corporations concerning the delivery of orders makes re-ordering comfortable for all end-users and may prevent delays in responding to already processed orders (Mabhodha & Choga, 2018).

E-sourcing is the process of collecting bids from different suppliers electronically, mostly over the internet. The internet as a resource makes it possible for different suppliers to access information online through company portals to allow them to find calls for bids. Therefore, e-sourcing makes information flow easy for both companies and suppliers since such information can be obtained remotely at the comfort of the suppliers' home or mobile phone (Mardia & Namusonge, 2016). Some of the advantages include improved transparency and openness because all suppliers can access the company portal and also get to view other suppliers. It, therefore, eliminates foul play and corruption, especially by middlemen.

E- tendering is the process of sourcing for suppliers electronically. This process is done via a portal on a company's website. It happens the same way as e-sourcing, however, in e-tendering, it is the entity that does the process of looking for suppliers. advantages include the ability of organizations to reach a wider base of vendors in the global business fraternity (Broughel &Thierer, 2022). It also allows for faster transactions without the need for regular travel. Additionally, the process of e-tendering enables companies to achieve transparency since all the willing vendors are allowed to access information and place their applications openly.

E-reverse auction is an online-based application that allows people to compete for supplies in real-time. this platform has the benefit of increased competition which leads to lower purchase costs (Mariam & Kisimbii, 2020). It also leads to the saving of time through reduced negotiations, which was common before the electronic auction was created. E-informing is the process of using internet resources to provide information to various stakeholders in the procurement and supply chain. the advantage includes the flow of information faster for quicker decision making. E-informing also provides stakeholders with knowledge for timely procurement choices. Additionally, the internet provides an array of information sources that the E-

informing platform can leverage to improve the efficiency of procurement and supply chain. It also improves transparency and openness in the procurement process.

2.3 E procurement innovations and supply chain performance

E procurement practices innovation have different effects on the supply chain performance. Among them include improved efficiency since it enhances human labor input at an affordable rate. The combined inputs of both humans and machines improves performance of an organization. Furthermore, there is a reduction in the cost of hiring and training staff to assume responsibilities that would otherwise be done by machines (Muriuki, 2021). In this case, the money can be invested in other areas of the company that needs growth such as improvement of employee welfare and remuneration which build employees' motivation and hence boosts their morale for performance.

Also, the cost of re-ordering improves customers' experiences during business transactions such as procurement and tendering, which leads to improved customer loyalty (Zhang, Khan, Lee & Salik, 2019). There is also continuous quality improvement because of the availability of customer feedback via technological platforms such as social media. Moreover, improved customer loyalty enhances brand value, which translates to a higher competitive advantage. Companies with a higher competitive advantage often attract a talented pool of employees, which will translate to improved performance of the entity.

Scholarly works on e-procurement innovations has been documented. Foremost, Yaw Obeng & Coleman (2020) looked at the effects and outcomes of innovation practices on e-learning system in Ghana by using primary data in tertiary training institutes. In analysis, logistic regression model was adopted to determine impact of innovation practices on web based e learning system. Correlation matrix ascertained relationship among conceptualized variables. The results show that innovation practices has a significant effect on eLearning system given that a single increase in innovation practices results into 55 times increase in features of the system and 3 times increase in the eLearning outcome. Further, the results also denote that features of the eLearning system has a significant effect on the eLearning outcome. The study however failed to provide recommendations for policy making (Yaw Obeng & Coleman, 2020).

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As discussed above a glut of the studies in literature on e-procurement centered on organization cases of one industry, such as the works of (Yaw Obeng & Coleman, 2020; innovation practices on e-learning system among training institutes in Ghana; Park *et* al; 2019: private research and development centers in Korea), ignoring a multi-faceted approach of firms in all industries. In addition, previous studies on e procurement practices did not consider important e procurement practices such as e sourcing, e tendering, e ordering, e auction. In this view, information on going e by adopting fundamental e procurement practices in a multi-faceted approach is nonexistent. For this, the current study hoped to bridge this gap.

3.0 METHODOLOGY AND DESIGN

Study based discussions in the philosophy of positivism. The choice of a research philosophy is often based on the researcher's beliefs and assumption on the orientation of knowledge. These assumptions may be related to realities encountered about the research (ontology), assumptions about the human know- how (epistemology) or assumptions about the way the researcher's values influence the research (axiology). Further, Saunders, et al. (2009) acknowledge that the choice of philosophy will inform the choice of research design and general procedures and methodologies for a research. Therefore, adopting a 'one best philosophy' will results in clashes between studies designs and methodologies in different researches, as well as knowledge beliefs and assumptions among different writers. Even though, philosophical disagreements are never absent in research studies
The philosophy of positivism first began in the works of Bacon F., Comte Auguste and Vienna Circle philosophers, the positivists pivotal attention is following the scientific method in order to obtain pure data and information without the people biasness (Tsang, 2016). Saunders *et al*. (2009) agrees with this establishment and adds that for positivists, existing theories are adopted to test derived hypothesis and give logic conclusions. Research is guided by neutrality and detachment of the researcher from the data with the view of avoiding influencing final outcomes. Moreover, the design chosen was a correlational survey due its ability to allow researchers to establish relationship among constructs.

The study surveyed 187 public entities in Kennya. The report by Chemoiywo (2014), while quoting Mars group Kenya (2013) reported that Kenya has 210 commercial public entities, with only 187 fully registered and owned by the government. This is corroborated by the Presidential task force report (2013) as quoted by Marendi (2015), which denotes that Kenya has 187 public entities. A structured questionnaire aided in collecting primary data from heads of procuring units in the public entities. Heads of Procuring Units of the public entities were chosen as respondents to answer questions on e-procurement innovations since they are the professional supply chain officers and their opinions are deemed professional. In addition, part VII, section

84, sub section 1-3 of Kenya Public Procurement & Asset Disposal Act, 2015 establishes that heads of procuring units must issue profession opinions in all procurements and disposal matters, including adoption and use of innovations in public procurement. This opinion is issued to accounting officers who formally write award decisions to service providers and contractors. The choice of heads of procurement was thus based in the public procurement law.

A pilot test on 10% of the population making 19 public entities was carried to allow pretesting of the research instrument. The choice of 10% is confirmed in Cooper& Schindler (2011) who recommends that 10% of a sample or parent study population is adequate for pilot testing. All the remaining 168 respondents took part in the final study. Results of the reliability test is presented in table 3.1

To check the reliability of the instrument in the study, Cronbach's Alpha was adopted. Mugenda & Mugenda, (2008) established that the Cronbach Alpha is a preferred test for reliability since it results into more conservative estimate for reliability and also takes less time as compared to other methods A coefficient of 0.7 is deemed acceptable for reliability test (Hair *et al.,* 1998).

Table 3. 1: Data tool scale reliability test results

Constructs	**Number of items**	**Cronbach's Alpha**	**Cronbach's Alpha based on standardized scores**
E procurement practices (EPP)	5	.863	.878

Source: (Field Survey, 2023)

From table 3.1 above, the findings show that all the measurement scale had high reliable values ranging between 0.700 and 0.881, which is above threshold of alpha value of α > 0.7 suggested by (Hair *et al*., 1998). This means that the entire instrument had a high reliability hence fit for data analysis.

In order to establish the effect of implementation of e procurement innovations on supply chain performance of Public Entities in Kenya the paper adopted, standard linear predictive regression model:

$$Y_i = \beta_0 + \beta_1 X_{1_i} + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textit{(3.1)}$$

Where;

Y_i Is the dependent variable (Supply Chain Performance), the scaled variable that is the weighted average of three SCP descriptors, quality, cost and cycle time

β_0 Identifies an adjustment constant due to scale differences in measuring e procurement innovations and Supply Chain Performance (the intercept or the place on the P - axis through which the straight-line passes. It's the value of Y when the X1 is 0.

β_1 Are constants describing the functional relationship in the population.

$X_{1,}$ Is the independent variable, e procurement innovations.

ε_i Epsilon, Represents the error component for each Entity. The portion of Y score that cannot be accounted for by its systematic relationship with values of X1, the predictor variable.

Source: (Adapted from Freund, Wilson & Sa, 2006; Field, 2005)

4.0 RESULTS AND DISCUSSIONS

4.1 Response Return rate

A total of 168 questionnaires were administered to procurement officers of the public entities. The response return rate is presented as shown in Table 4.1

Table 4. 1: Response Return rate

Organizations	Sample	Total Response	Percentage Response
Number of Organizations	168	158	94.05%

Source: (Field Survey, 2023)

From the findings in Table 4.1, it is clear that out of a total of 168 questionnaires that were administered, there was a response return of 158 fully filled questions which represents 94.05%. This is indicative of good response return according to Kothari (2003) observation that a response return rate above 90% represents a good data collection process and hence qualifies the collected data for generalization over the calculated sample size.

4.2 Descriptive statistics on E Procurement Innovations

Respondents were therefore asked to indicate the extent of implementation of the identified statements on e-procurement innovations. A five Point Likert scale was used where: Strongly Agree (SA) =1, Agree (A) = Neutral (N)=3, Disagree (D)= 4, = Strongly Disagree (SD)= 5. The findings are presented as shown in Table 4.2 below using frequency counts, percentages, means and standard deviations.

Table 4.2: E procurement Innovations

E procurement Innovations	SD	D	N	A	SA	M	STD
1. The organization uses web technologies in procurement processes	102(64.6)	27(17.1)	20(12.7)	7(4.4)	2(1.3)	1.6	0.96
2. The organization adopts and uses e procurement practices (e-sourcing, e-tendering, e ordering, e reverse auction) in procurement and disposals	103(65.2)	15(9.5)	20(12.7)	13(8.2)	7(4.4)	1.8	1.21
3. The organization has adequate skilled officers, resources and collaborations in implementing e procurement practices	113(71.5)	16(10.1)	23(14.6)	2(1.3)	4(2.5)	1.5	0.96
4. Our data from e procurement activities is always encrypted when being transmitted to outside parties such as customers & suppliers	46(29.1)	22(13.9)	48(30.4)	26(16.5)	16(10.1)	2.6	1.33
5. Our organization has integrated some of its procurement and disposal functions with e procurement applications	60(38)	30(19)	44(27.8)	17(10.8)	7(4.4)	2.2	1.2

KEY: SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree, SD- Strongly Disagree, M-Mean, STD-Standard Deviation. Source: (Field Survey, 2023)

Scanning through the results in table 4.2 show that majority of the respondents 102(64.6) strongly disagreed that their organizations use web technologies in carrying out procurements and disposal activities, with another 27(17.1). A low mean and standard deviation (M=1.6, STD=.96) further confirmed this results. Moreover. majority of the respondents, 103(65.2%) strongly disagreed that the organization adopts and uses e procurement practices (e-sourcing, e-tendering, e ordering, e reverse auction) in procurement and disposals, which was also confirmed by a low mean (M=1.8, STD=1.21) although with high standard deviation. It is further clear that public entities have no adequate skilled officers, resources and collaborations in implementing e-procurement practices as indicated by majority, 113(71.5%) of the respondents who strongly disagreed and a low mean (M=1.5, STD=.96). The findings also show that 46 of the respondents making 29.1% strongly disagreed that data from e procurement activities is always encrypted when being transmitted to outside parties such as customers & suppliers also confirmed by a low mean and standard deviation (M=2.6, STD=1.33). Moreover, 60 of the participants making 36% strongly disagreed that their organizations integrated some of its procurement functions with e procurement applications, confirmed by low mean and standard deviation (M=2.2, STD=1.23).

4.3 Effect of e procurement innovations on Supply Chain Performance of Public Entities in Kenya

The study first established whether e procurement innovations has any association with supply chain performance. This was achieved through Pearson' Product moment correlation (r) model was adopted. The correlation coefficient measures correlation between variables by the r - value, where an r - value = 0 signifies lack of correlation with a value further away from 0 (towards -1 or +1) signifies stronger correlation. LeeRodgers & Nicewander (1988) show that a coefficient correlation above 0.9 indicated presence of high correlation among variables. The adapted model is represented below;

$$\mathbf{r} = \frac{\mathbf{n}(\sum \mathbf{xy}) - (\sum \mathbf{x})(\sum \mathbf{y})}{\sqrt{[\mathbf{n}\sum \mathbf{x^2} - (\sum \mathbf{x})^2][\mathbf{n}\sum \mathbf{y^2} - (\sum \mathbf{y})^2]}}$$

Source: (Adopted from Chen *et al*., 2003; Chen & Popovich, 2002)

Where;

r = the Pearson Coefficient of correlation

n= number of pairs of the stock

$\sum xy$ = sum of products of the paired stocks

$\sum x$ = sum of the x scores

$\sum y$= sum of the y scores

$\sum x^2$ = sum of the squared x scores

$\sum y^2$ = sum of the squared y scores

The results for Pearson product moment correlation were presented as shown in Table 4.3

Table 4.3: Correlation between E Procurement Innovations & Supply Chain performance

		Mean SCP	Mean IN_EPI
Mean SCP	Pearson Correlation	1	.469**
	Sig. (2-tailed)		.000
	N	158	158
Mean IN_EPI	Pearson Correlation	.469**	1
	Sig. (2-tailed)	.000	
	N	158	158

. Correlation is significant at the 0.01 level (2-tailed). **Source: (Field Survey, 2023

The results in table 4.3 indicate the Pearson correlation coefficient showed there was a positive significant correlation between e procurement innovations and supply chain performance as shown by (r= 0.469, p<.01). This implied that e procurement innovations are positively associated with supply chain performance.

Thereafter, a standard multiple linear regression analysis was carried out to establish effect of Implementation of Executive Orders & Decrees (IEOD**)** on supply chain performance. This was modelled as follows:

$$Y_i = \beta_0 + \beta_1 X_{1_i} + \varepsilon_i \text{.....} (3.1)$$

The results are presented in the table below;

Table 4.4: Model Results on Effect of E Procurement Innovations on Supply Chain Performance of Public Entities

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.750[a]	.562	.548	.33211	.562	39.016	1	156	.000

a. Predictors: (Constant), Mean IN_EPI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.023	.110		9.291	.000		
	Mean EPI	.092	.034	.168	2.746	.007	.768	1.302

a. Dependent Variable: Mean SCP

KEY: EPI- E Procurement Innovations, SCP-Supply Chain Performance. **Source: (Field Survey, 2023)**

The results in table 4.4 point out a positive correlation (R=.707) between e procurement innovations and supply chain performance in public entities. The R square value (R^2=.562, p<.05), which is the coefficient of determination, indicates the amount of variation in supply chain performance that is explained by e procurement innovations. Therefore, e procurement innovations accounts for 56.2% variance in supply chain performance, leaving the remaining 43.8% explained other constructs not included in the model. In adjusting for overestimation through a shrinkage process, the Adjusted R Square (Adjusted R^2=.548) which indicates the true population value after controlling for overestimation is obtained. Given a small standard error value that is less than 1, it can be inferred that the model accuracy is high (Shevlyakov & Oja, 2016).

Considering the model coefficient results, the standardized coefficients prove that e procurement innovations had significant positive effect on supply chain performance (β=.168, p<.05), which was also significant at 95% confidence interval. The significant level is sufficient evidence of the effect of e procurement innovations on supply chain performance of public entities. In practice, the results show that unit improvement in adoption of e procurement innovations by practitioners in public entities would improve the supply chain performance by 0.168 units. The unstandardized model coefficients show a constant term (β=.1.023, p<.05), which was also significant. Coefficient of this constant term denotes that without including any explanatory construct in the model, performance of supply chains would be an index of 1.0232 units. Results of the study are modelled in the equation (4.1);

$$Y = 1.023 + 0.092\, X_{EPI} \text{ .....} (4.1)$$

In this, the null hypothesis; H_{01}: E procurement Innovations has no significant effect on supply chain performance of public entities in Kenya is rejected, we adopt the alternative hypothesis evidencing significant effect of EPI on supply chain performance.

The R^2 value (R^2=.562, p<.05) and model coefficient (β=.168, p<.05) is sufficient evidence (Field, 2005) that e procurement innovations has a statistically significant effect and explains considerable change in supply chain performance of public entities in the Kenyan economy. Results of the

study agrees with results of previous empirical establishments. Yaw Obeng & Coleman (2020) conducted a study on innovation practices on e-learning system in Ghana's in tertiary training institutes. As the current study, writers utilized primary data and regression models in analyzing collected data. The results show that innovations had significant positive effect on eLearning system given that a single increase in innovation practices results into 55 times increase in features of the system and 3 times increase in the eLearning outcome. Further, the results also denote that features of the eLearning system has a significant effect on the eLearning outcome. The paper advised managers and stakeholders to prioritize the adoption and use innovations.

The study Park *et al*. (2019) also show coherence with current study findings. Their paper specifically analyzed the relationship between ambidextrous technological innovation, human resource capability and human resource by targeting human resource managers of 236 private research and development centers published by the Korea Industrial Technology Association. Results revealed that ambidextrous technological innovation has significant positive effect on human resource and capability. Recommendations that research and development centers as well as other firms in Korea to prioritize adopting and implementing the study variables are made in the paper.

5.0 CONLUSSION

The paper sought to establish effect of e procurement innovations on performance of supply chains of public entities in a developing economy, Kenya. The model results show that e procurement innovations has a significant positive effect on supply chain performance, agreeing with empirical establishments. We thus conclude: e procurement innovations has a significant positive effect on supply chain performance of public entities in a developing economy, Kenya and infer that improvement in adoption of e procurement innovations pays off by heightening performance of supply chains. The paper provides evidence from a developing country that going electronic in public procurements can help supply chain firms raise their performance levels. Irrefutably, we answer the question that indeed, going e pays off. We provide exciting thoughts that public sector supply chain firms must move away from the 'pen and paper' mantra by adopting innovative practices.

6.0 RECOMMENDATION AND FUTURE RESEARCH AGENDA

The objective of the paper was to determine effect of e procurement innovations on supply chain performance of public entities. The results show that indeed, e procurement innovations has a significant positive effect and accounts for considerable variance in supply chain performance. Based on this unfolding truth, we recommend stakeholders in public sector supply chains must quickly adopt and use e procurement innovations as this has the potential to raise expected results.

In equal measures, we suggest the following for future research;

1. The current study focuses on public sector firms using tax payers' resources. Future research need to focus on public private supply chain firms that that even though have own funding means, hitherto, they use both government procurement laws and own company manuals.
2. Evidence of relationship between e procurement innovations on performance may be replicated in developed and first world economies

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