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Effect of Procurement Planning On Supply Chain Performance of Kenya Medical Supplies Authority

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Abstract: Complaints have been recorded in the Kenyan healthcare system that faces a number of challenges that makes it difficult for its supply chain to operate efficiently and effectively which has more than often led to erratic supply of important medical drugs. This study therefore sought to establish the effect of procurement planning on supply chain performance of at Kenya Medical Supplies Authority in Kenya. The study specifically sought to establish the effect of procurement needs assessment, budgeting, quality specifications and supplier selection on supply chain performance of Kenya Medical Supplies Authority in Kenya. A descriptive research design was adopted for the study. The target population for this study comprised of 330 employees from the Medical Detailers, Procurement, Warehouse, Finance & Accounts, Logistics & Distribution, Quality Control and IT departments of KEMSA. The study used quantitative primary data gathered by use of closed ended questions. A multiple linear regression model was used to test the significance of the procurement planning on supply chain performance. The findings of the study revealed that procurement needs assessment, budgeting, quality specifications and supplier selection all had a positive and significant effect on supply chain performance of Kenya Medical Supplies Authority in Kenya. The study therefore concluded that in order for KEMSA to improve its supply chain performance, there is need to focus on key procurement planning indicator for all procurement planning variables examined in this study. The study recommended that that in order for KEMSA to improve its supply chain performance, there is need to focus on key procurement needs assessment indicators.

Keywords: *Procurement planning, Supply chain performance, Procurement needs assessment, Budgeting, Quality specifications, Supplier selection*

Introduction

Throughout the world, public purchases are a very important component in the delivery of services and functioning of various departments of the government institutions. It is imperative on the government to ensure that goods and services are provided efficiently to the public (Uyarra & Flanagan, 2009). The public procurement procedures are crucial for this to be achieved. All goods and services for public use should be guided by the Public procurement requirements (Roodhooft & Abbeele, 2006). Public procurement is described as the process by which public sector organizations, ministries, and local authorities acquire goods and services. These goods and services are quality items, stationery, and standard to more complex expenditures such as the construction of roads and key services to citizens (Roodhooft & Abbeele, 2006). Public procurement performance in most countries is controlled by public procurement laws and regulatory frameworks because of the significance function of public procurement. Public procurement often constitutes the largest domestic market in developing countries. Depending on how it is managed, the public procurement system can thus contribute to the economic development of these countries (Kihara, 2009).

Public procurement is the principal means through which governments meet developmental needs such as the provision of physical infrastructure and the supply of essential medicines. Many governments use public procurement to support the development of domestic industries, overcome regional economic imbalances, and support minority or disadvantaged communities (Kihara, 2009). For the act of procurement in the public sector to be effective and efficient, the right goods and services in the appropriate proportions should be available when they are needed, and at realistic costs for the appropriate consumers in familiar ideals for quality (WHO, 2007). KIPPRA (2006) argues that among the important elements of good governance is the performance of Public sector procurement is policies. Mamiro (2010) underscores that one of the major setbacks in public procurement is poor procurement planning and management of the procurement process which include needs that are not well identified and estimated, unrealistic budgets and inadequacy of skills of procurement staff responsible for procurement. Basheka (2004) agrees that poor procurement planning has been one of the major stumbling blocks to the economic development of Africa and it has been clear that a number of African countries.

Statement of the Problem

There has been a rise in complaints by the public, professionals and other stakeholders about the SCM performance within public institutions in developing economies (WB, 2011). Similar complaints are recorded in the Kenyan healthcare system (Tarty, 2011), that faces a number of challenges that makes it difficult for its supply chain to operate efficiently and effectively which has more than often led to erratic supply of important medical drugs (Tarty, 2011). Poor procurement planning has led to high expenditures in procurement operations, increased lead time for instance in the year 2016, the average lead time from awarding of tender to time of initial delivery at KEMSA was 6 months as well as numerous complaints on delay of delivery of drugs to facilities which led to loss of lives (Ngetich, 2014). Often overlooked, however, is the need to have better procurement planning (Rao, Mellon & Sarley, 2009). Proper procurement planning plays a very important role in ensuring that quality drugs and medical equipment are sourced and delivered within reasonable time in order to serve their purpose.

Poor procurement planning at KEMSA in Kenya has not once but may times led to medical supplies stock outs, leading to needy clients inability to buy medicines expensively and prone to counterfeits that have cost many lives and mismanagement due to increase in low quality or counterfeit medicines in Kenyan market (Kazi, 2012). The study was motivated by existing contextual and conceptual knowledge gaps in the previous studies on the topic. A study by Mensah (2015) looked at the effects of logistics management practices on quality of service delivery in health centers in Ghana while Tarty (2012) focused on logistics management among medical supply agents. These studies presented contextual knowledge gaps that this study sought to fill. Studies that have focused on procurement planning have on the other hand focused on its influence on other areas other than supply chain performance for instance for instance Onyango (2012) focused on the effects of Procurement Planning on Institutional Performance while Aladejebi and Adedeji (2015) focused on the effects of procurement planning on agricultural firms' performance in Nigeria. These studies linked procurement planning to other factors other than supply chain performance. For comparison of findings across sectors and to fill the existing knowledge gaps, there was a need to conduct a study to establish the effect of procurement planning on supply chain performance of Kenya Medical Supply Authority in Kenya.

Study Objectives

i. To establish the effect of procurement needs assessment on supply chain performance of Kenya Medical Supply Authority in Kenya
ii. To determine the effect of budgeting on supply chain performance of Kenya Medical Supply Authority in Kenya
iii. To find out the effect of quality specifications on supply chain performance of Kenya Medical Supply Authority in Kenya
iv. To establish the effect of supplier selection criteria on supply chain performance of Kenya Medical Supply Authority in Kenya

Literature Review

Theoretical Review

Transaction Cost Theory

The transaction cost theory was proposed by Coase (1937). The transaction cost theory can be useful in unraveling sources of barriers to firms intending to participate in public procurement. Such costs include among other things the cost incurred in obtaining and verifying information about the quantity and quality of goods and services and the quality of property rights to be transferred including legal and contractual framework. Basheka (2009) argues that transaction costs relating to public procurement are those cost that Enterprises incur in trying to access a contracts. In most cases, communication costs are higher for small than large organizations which hinder effective, fair and open competition among suppliers.

Quality Management Theory

Quality management theory by Heizer and Render (2005), states that the management commitment and participation in quality management practices are the most important factors for the success of firm. Quality management is considered to have four main components: quality planning, quality control, quality assurance and quality improvement. Quality management is focused not only on product/service quality, but also the means to achieve it. One form of best management practices in the company is Total Quality Management (TQM). Since the early 1980's TQM has received the most attention from the managers, because it can help managers to improve the company performance. Total Quality Management (TQM) is a new paradigm in doing business. TQM attempts to maximize the competitiveness of the organization through focus on customer satisfaction, employee involvement, and continuous improvement of the quality of products, services, people, processes and organizational environment (Krajewski *et al.,* 2003). According to Sila *et al.,* (2007) total quality management (TQM) plays a very important role in enhancing the strength of enterprises competitiveness. In the global market that continuously changing both speed of delivery and product quality are the essential elements for companies to compete in marketplace. TQM is an approach that should be done many organizations to improve the quality of products, reduce production costs and increase productivity. Implementation of TQM have a positive impact on revenue and production costs (Gaspersz, 2005). Other evidence also suggests that companies that pursue best practices of TQM to achieve higher profits and shareholder value as well greater cash flows (Corbett & Rastrick, 2000).

System Theory of Logistics

Professor Rainer Stank of the Michigan State University proposed that logistics is management of an organization as an integrated whole for the total optimal performance. He believed that organization is the integration of logistical related activities that are working together to achieve lowest total costs and optimum service level as opposed to managing discrete functions individually for the lowest costs (Harrington, 2002). According to the theory, organizations will realize that effective logistics is all about managing the trade-offs (Harrington, 2002). Logistics in business must identify and determine several cost trade-offs in order to provide a positive benefit to the logistics systems as a whole (Rushton et al, 2006). The sum of all outcomes is greater than its individual parts. On the other hand, logistics scholars endorsed the relationship of logistics management to the firm logistics capabilities that is determined by the dynamics logistics capabilities. Abrahamson and Mat (2001) argued that extending the Resourced Based View (RBV) to the dynamics capabilities, the firm performance is linked to the dynamic logistics capabilities that is also defined by the operational capabilities.

According to (Barnley & Clark, 2007 and Abrahamson and Mat, 2011), capabilities must meet the essential condition of rare, valuable, inimitability and organizational in order to offer sustainable competitive advantage. Abrahamson and Mat (2011) found out that logistics must be created from the firm's unique set of operational and dynamic capabilities, and the two must be combined and be used to attain the firm superior performance. The theory is relevant to the study as it hinges on reverse logistics which is an independent variable of the study. The theory indicates that effective logistics helps to manage trade-offs in the procurement process (Harrington, 2002). This leads to better procurement performance as well as organizational performance.

Conceptual Framework

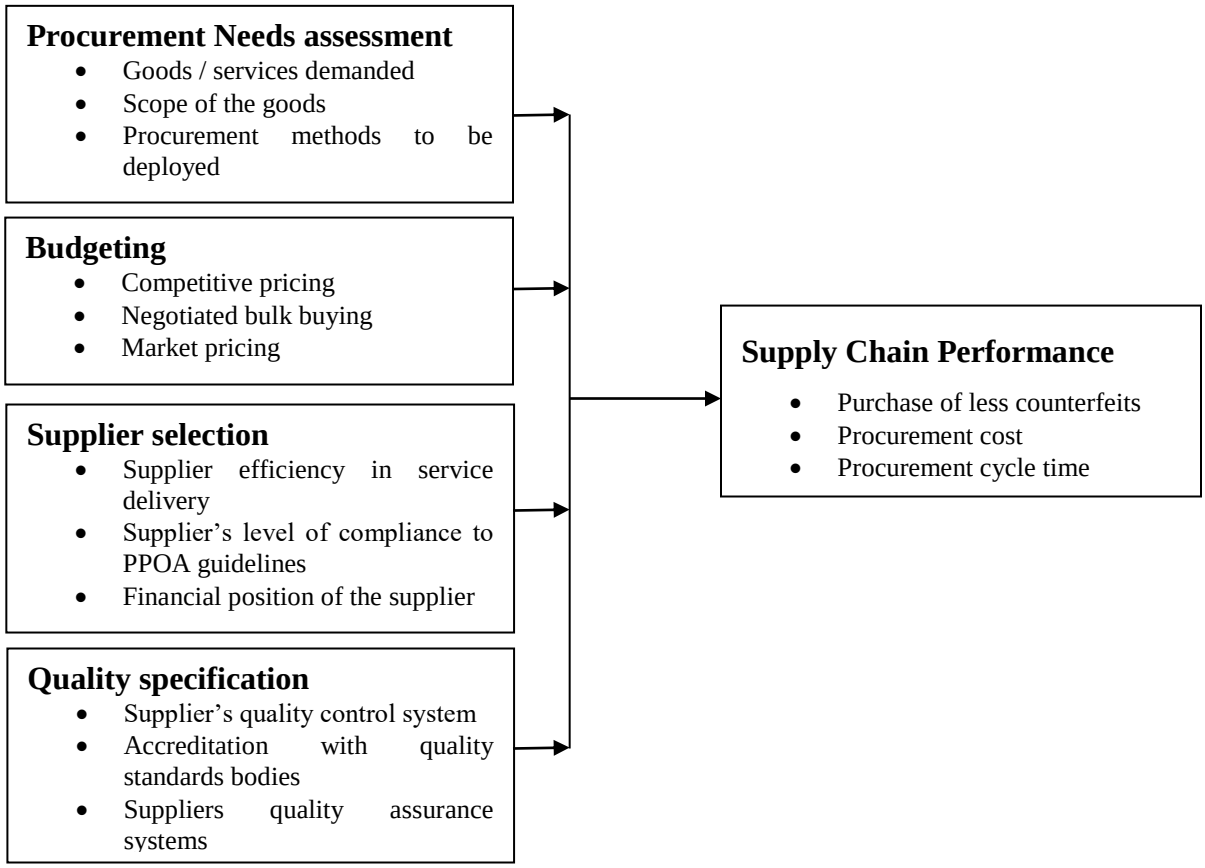

Figure 1 Conceptual Frame work

Procurement Needs Assessment

Onyango (2012) argues that procurement planning entails the identification of what needs to be procured, how the organizations needs can best be met, the scope of the goods, works or services required, what procurement strategies or methods to be deployed, setting the time frames, and the accountability for the full procurement process. Ezeh (2012) defines needs assessment as a systematic process for determining and addressing the needs, or gaps between current conditions and desired conditions or wants. The Public Procurement and Oversight Authority (2009) considers need assessment as the first step of procurement planning and is to be considered based on the inventory status, projects plan, production schedules, work plans, capital or operational requirements budgets and the procurement plan.

This stage plays a significant role in establishment of details as prices, new products or alternative or substitute products, new sources of supply, nature of competition and environmental aspects that may affect the supply market after a market survey.

Budgeting

Agaba and Shipman, (2007) argues that the second step after needs assessment in procurement planning is budgeting. The budgets for all the departments are reviewed, and in an organization that is committed to procurement planning, the accountants spend the time to find common purchasing requirements (Caldwell, Roehrich & Davies, 2009). Based on the budgets submitted, they may direct departments to work with central purchasing to combine their planned spending for specific commodities. This process works best in an organization that is committed to reducing costs. Issues surrounding delivery dates, contract compliance, and customer service issues must be resolved internally before going out to contract (Lewis & Roehrich, 2009).The PPDA Act (2007) stipulates for purchases to be economical and efficient and hence they should be based on market prices. To counter over inflating of prices, the PPOA prepares and updates a Market Price Index (MPI) to be used by the Procuring Entity (PE) on a periodic basis. Hunja (2003) noted gaps in the implementation of procurement laws in the public sectors. Various forms of unprofessional behaviors negligence and dishonesty which includes the act of inflating contract figures, alteration of documents, meddling, insider dealings and sporadic cases of suspicious approval of contract awarded to families and allies were prevalent in procurement in the public sector hence it's important to conduct a thorough cost estimation during procurement planning.

Supplier Selection criteria

Supplier selection refers to the process of evaluating and approving potential suppliers by quantitative assessment. The purpose of supplier selection is to ensure a portfolio of best in class suppliers is available for use. Supplier selection is also a process applied to current suppliers in order to measure and monitor their performance for the purposes of reducing costs, mitigating risk and driving continuous improvement (Gordon, 2008). Supplier selection is a continual process within purchasing departments and forms part of the pre-qualification step within the purchasing process; although in many organizations it includes the participation and input of other departments and stakeholders. Most experts or firms experienced in collecting supplier evaluation information prefer doing so using five-step processes for determining which to approve. Their processes often take the form of either a questionnaire or interview, sometimes even a site visit, and include appraisals of various aspects of the supplier's business including capacity, financials, quality assurance, organizational structure and processes and performance (Gordon, 2008).

Based on the information obtained via the evaluation, a supplier is scored and either approved or not approved as one from whom to procure materials or services. In many organizations, there is an approved supplier list (ASL) to which a qualified supplier is then added. If rejected the supplier is generally not made available to the assessing company's procurement team. Once approved, a supplier may be reevaluated on a periodic, often annual, basis. The ongoing process is defined as supplier performance management (Monczka, Handfield & Giunipero, 2009).

Quality Specification

Garvin (2003) defines quality using five different approaches namely; the transcendent approach; the product-based approach; the user-based approach; the manufacturing-based approach; and the value-based approach. The transcendent approach equates quality with Innate excellence: The product-based approach defines as a sum or weighted sum of the desired attributes in a product: The user-based approach identifies a high quality item as one that best satisfies consumer needs or wants. According to Handfield *et al.,* (2008) an important part of supplier evaluation processes touches on a supplier's quality management systems and philosophy. According to Lysons et al., (2008) firms appraising quality of suppliers will find themselves looking at the following issues: procedures for inspection and testing of purchased materials, accreditation with national and international quality standards bodies such company standards, Association of Trade Standards, International standards organization (ISO) and British Standards Institution (BSI) (Lysons 2008).

Supply Chain Performance at Kenya Medical Supply Authority

The healthcare industry has contributed significantly in both economic development and social welfare in modern economies. It is a highly competitive industry and it is heavily reliant on a vast and complex network of companies working to design, manufacture, deliver, and administer a wealth of health and medical related products and services (Lenin, 2014). The management of health care has stimulated a great deal of attention of several researches and practitioners over the past two decades. The main challenge in the healthcare supply chain management is to achieve improved performance and service. In general, healthcare supply chains are very complex, fragmented, diverse, and dynamic. The main reason for this increasing level of complexity is due to the participation of multiple organizations, who are involved across the entire value chain and it requires key competencies (Lenin, 2014). The healthcare supply chain generally consists of four main components: producers, purchasers, providers and patients (Medina, 2014).

The healthcare supply chain shares a number of similarities with other chains, not only in terms of processes (procurement, warehousing, distribution), but also in terms of discerning customers and management structures (Walters, 2007). Supply chain performance is a combination of processes, functions, activities, relationships and pathways along which products, services, information and financial transactions move in and between companies. The supply chain consist suppliers, manufacturing centers, warehouses, distribution centers and sales offices. Complexity of the supply chains makes the development and managing challenging (Millicent, 2015). The pharmaceutical procurement system is a major determinant of pharmaceutical availability and total pharmaceutical costs. In most developing countries pharmaceutical purchases represent the single largest health expenditure after personnel costs.

Research Methodology

The study adopted a descriptive study design in order to bring out the relationships between the variables. The choice of the design is because of its suitability in answering the research questions used in this study. The target population for this study comprised of employees from the Medical Detailers, Procurement, Warehouse, Finance & Accounts, Logistics & Distribution, Quality Control and IT departments of KEMSA.

According to the Human Resource department of KEMSA, there are 330 employees in those departments as at 2017. The study adopted Yamane (1967) formula to determine the sample size of 181 respondents. The study used quantitative primary data collected by the use of a 5-point Likert scale questionnaire. This is because questionnaires allow the respondent to present their facts on the subject matter independently enabling a greater depth of response. Analysis of the data involved the use of both descriptive and inferential statistics. Descriptive analysis was the first step; it shows percentages and means of different items in the study. The study also conducted inferential analysis which involved Pearson's correlation, regression analysis and analysis of variance (ANOVA). Karl Pearson's correlation coefficient shows the association between variables while regression analysis estimated the casual relationship between the variables. The analyzed data was then presented in frequency and percentage tables, graphs and charts to enhance easier interpretation and understanding of the research findings. A multiple linear regression model was used to establish the influence of the independent on the dependent variable. The multiple regression model was laid as below.

$Y= \beta_0+ \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X4+ \varepsilon$

Where, Y = Supply Chain Performance, $X_{1=}$ Need assessment, X_2 = Budgeting, X_3 = Supplier selection, X_4 = Quality specification, ε is error term, β_0 represents the constant And $\beta_{1,2,3,4}$ are regression coefficients.

Results

The number of questionnaires that were administered was 181. A total of 153 questionnaires were filled and returned. This represented an overall successful response rate of 85.43% as shown in Figure 2 below.

Respondents Demographic Information

Table 1 Respondent Demographic Information

Demographic Characteristic	Category	Percentage
Respondent level of education	secondary	10.5%
	college	28.8%
	university	60.8%
Respondent experience in public procurement	>5 years	19.6%
	3-5 years	47.7%
	1-2 years	22.2%
	<1 year	10.5%

Descriptive Results

Procurement Needs assessment

The findings of the study on procurement needs assessment showed that majority of the study respondents (mean 4.22) agreed to a very great extent that there is an assessment of the necessary goods to be procured. On whether there is an establishment the scope of the goods to be procured, the results of the study showed that majority of the study respondents, (mean=4.61), agreed to very high extent.

The findings of the study on procurement needs assessment also showed that majority of the study respondents agreed to a very high extent that there is an establishment of the procurement methods to be deployed before procurement, (mean=4.87). There is identification of how best the organization needs can be met, (mean=3.31). Respondents indicated that accountability for the full procurement process is established before procuring, (mean=3.06). On average, the results of the study on procurement needs assessment finally showed that majority of the study respondents as indicated by a mean value of 4.01 indicated that procurement needs assessment influenced supply chain performance of Kenya Medical Supply Authority in Kenya to a high extent.

Table 2 Procurement Needs assessment

Statement	Very small extent	Small extent	Moderate extent	High extent	Very high extent	Mean	Std Dev
There is an assessment of the necessary goods to be procured	0.00%	5.90%	10.50%	39.90%	43.80%	4.22	0.86
The scope of the goods to be procured is established before procurement	0.00%	0.00%	19.60%	0.00%	80.40%	4.61	0.80
There is an establishment of the procurement methods to be deployed before procurement	0.00%	0.00%	1.30%	10.50%	88.20%	4.87	0.38
There is identification of how best the organization needs can be met	15.70%	5.20%	36.60%	17.60%	24.80%	3.31	1.33
Accountability for the full procurement process is established before procuring	14.40%	19.00%	24.20%	31.40%	11.10%	3.06	1.24
Average						**4.01**	**0.92**

Budgeting

The findings of the study on budgeting showed that majority of the study respondents indicated to a very high extent that the procurement department establishes a competitive pricing rule before procurement, there is negotiated bulk buying to take advantage of economies of scale, (mean=4.54 and 4.78 respectively). The findings of the study on budgeting also showed that majority of the study respondents indicated that procedures for detecting inflated contract figures is set before procuring to very high extent (mean=3.6). The results further showed that majority of the respondents indicated that procedures for detecting inappropriate documents is set before procuring (mean=3.85). On average, the findings of the study on budgeting revealed that majority of the study respondents as shown by a mean value of 4.2 indicated that budgeting influenced supply chain performance of Kenya Medical Supply Authority in Kenya to a high extent.

Table 3 Budgeting

Statement	Very small extent	Small extent	Moderate extent	High extent	Very high extent	Mean	Std Dev
The procurement department establishes a competitive pricing rule before procurement	0.70%	0.00%	21.60%	0.00%	77.80%	4.54	0.87
There is negotiated bulk buying to take advantage of economies of scale	0.00%	0.00%	7.20%	7.20%	85.60%	4.78	0.56
Prices of goods is set based on the market pricing index set	3.90%	5.90%	5.90%	17.60%	66.70%	4.37	1.09
Procedures for detecting inflated contract figures is set before procuring	11.80%	8.50%	27.50%	12.40%	39.90%	3.60	1.39
Procedures for detecting inappropriate documents is set before procuring	3.90%	0.70%	15.70%	66.00%	13.70%	3.85	0.81
Average						**4.20**	**0.93**

Supplier Selection

The findings of the study on supplier selection showed that majority of the study respondents indicated that the suppliers' efficiency in service delivery is evaluated before short listing to a high extent (mean=3.52).The results of the study further revealed that majority of the respondents indicated that the suppliers' level of compliance to PPOA guidelines is evaluated before short listing to a very high extent (mean=3.81). Majority of the study respondents also indicated that the suppliers' financial position is evaluated before short listing to a very high extent (mean=3.9). On whether the suppliers' technical ability is evaluated before short listing, the findings of the study revealed that majority of the respondents concurred with the statement to a high extent (mean=3.88). The findings of the study on supplier selection further showed that majority of the study respondents indicated that the suppliers experience in offering certain services/ products is evaluated before short listing to a high extent (mean=3.46). Respondents mean value of 3.46, revealed that the suppliers profile is evaluated before short listing to a very high extent. On average therefore, the findings of the study showed that majority of the study respondents as shown by a mean value of 3.68 indicated that supplier selection influenced supply chain performance of Kenya Medical Supply Authority in Kenya to a high extent.

Table 4 Supplier Selection

Statement	Very small extent	Small extent	Moderate extent	High extent	Very high extent	Mean	Std Dev
The suppliers efficiency in service delivery is evaluated before short listing	13.70%	9.80%	15.00%	33.30%	28.10%	3.52	1.36
The suppliers level of compliance to PPOA guidelines is evaluated before short listing	10.50%	2.60%	27.50%	14.40%	45.10%	3.81	1.32
The suppliers financial position is evaluated before short listing	12.40%	1.30%	22.20%	12.40%	51.60%	3.90	1.38
The suppliers technical ability is evaluated before short listing	6.50%	1.30%	12.40%	56.90%	22.90%	3.88	0.99
The suppliers experience in offering certain services/ products is evaluated before short listing	6.50%	21.60%	12.40%	32.00%	27.50%	3.52	1.28
The suppliers profile is evaluated before short listing	20.30%	0.00%	32.70%	7.20%	39.90%	3.46	1.51
Average						**3.68**	**1.31**

Quality Specification

The findings of the study on quality specification showed that majority of the study respondents revealed that a capable inspection and acceptance committee is put in place before procurement to a high extent (mean=3.76). Majority of the study respondents also revealed that complex assignments are awarded to experts to ensure quality work to a very great extent (mean=4.01). On whether a specifications committee is put in place before procurement system begins, majority of the respondents revealed that a specifications committee is put in place before procurement system begins to a very high extent (mean=4.67). The study respondents revealed that enquiries are made from other companies about the suppliers' quality of goods during before considering them to a very high extent (mean=3.55). Respondents further indicated that accreditation with quality standards bodies is considered key in enhancing quality of the products to a very high extent (mean=4.35).

Table 5 Quality Specification

Statement	Very small extent	Small extent	Moderate extent	High extent	Very high extent	Mean	Std Dev
A capable Inspection and acceptance committee is put in place before procurement	5.90%	10.50%	7.20%	54.90%	21.60%	3.76	1.09
Complex assignments are awarded to experts to ensure quality work	0.00%	0.00%	34.00%	31.40%	34.60%	4.01	0.83
A specifications committee is put in place before procurement system begins	0.00%	0.00%	3.90%	24.80%	71.20%	4.67	0.55
Enquiries are made from other companies about the suppliers quality of goods during before considering them	19.00%	0.00%	30.10%	9.20%	41.80%	3.55	1.50
Accreditation with quality standards bodies is considered key in enhancing quality of the products	0.00%	0.00%	22.20%	20.90%	56.90%	4.35	0.82
Average						**4.07**	**0.96**

Supply Chain Performance

The findings of the study on supply chain performance showed that majority of the study respondents indicated that the organization has experienced reduced number of defects in the recent years to a very high extent (mean=4.58). Majority of the study respondents, mean value 3.98, revealed that there has been an increase in effective contract utilization to a moderate extent and high extent. The study respondents indicated that there has been a reduction in the stock out level to a very high extent (mean=4.67). The results of the study also showed that majority of the respondents, mean value of 3.45, revealed that there has been an improvement on procurement cycle time to a very high extent (mean=3.45). The respondents, mean 4.05, also indicated that there has been a reduction in the number of procurement malpractices. On average therefore, the findings of the study on the dependent variable (supply chain performance) showed that majority of the study respondents revealed that supply chain performance of KEMSA had improved to a moderate extent.

Table 6 Supply Chain Performance

Statement	Small extent	Moderate extent	High extent	Very high extent	Mean	Std Dev
The organization has experienced reduced number of defects in the recent years	0.00%	20.90%	0.00%	79.10%	4.58	0.82
There has been an increase in effective contract utilization	0.00%	34.00%	34.00%	32.00%	3.98	0.81
There has been a reduction in the stock out level	0.00%	3.90%	24.80%	71.20%	4.67	0.55
There has been an improvement on procurement cycle time	20.90%	32.00%	7.20%	39.90%	3.45	1.52
There has been a reduction in the number of procurement malpractices at the ministry	0.00%	3.90%	86.90%	9.20%	4.05	0.36
Average					**4.15**	**0.81**

Correlation Results

The study findings revealed a positive and significant relationship between procurement needs assessment and supply chain performance of Kenya Medical Supply Authority (R = 472, Sig <0.05). This therefore implies that an improvement in various indicators of procurement needs assessment such as an assessment of the necessary goods to be procured, establishment of the scope of the goods to be procured, establishment of the procurement methods to be deployed before procurement, identification of how best the organization needs can be met and establishment of accountability for the full procurement process before procuring resulted to a significant improvement in supply chain performance of Kenya Medical Supply Authority. The correlation results also revealed that budgeting and supply chain performance of Kenya Medical Supply Authority are positively and significantly related (R = 0.442, Sig <0.05). This therefore implies that an improvement in various indicators of budgeting such as the procurement department establishing a competitive pricing rule before procurement, having a negotiated bulk buying to take advantage of economies of scale, setting the prices of goods based on the market pricing index, setting procedures for detecting inflated contract figures before procuring and setting procedures for detecting inappropriate documents before procuring resulted to a significant improvement in supply chain performance of Kenya Medical Supply Authority.

Finally, the correlation results showed that quality specification is positively and significantly related with supply chain performance of Kenya Medical Supply Authority (R = 0.534, Sig<0.05) implying that improvement in various indicators of quality specification such as putting in place a capable inspection and acceptance committee before procurement, awarding complex assignments to experts to ensure quality work, putting in place a specifications committee before procurement system begins, making enquiries from other companies about the suppliers quality of goods during before considering them and considering accreditation with quality standards bodies in enhancing quality of the products resulted to a significant improvement in supply chain performance of Kenya Medical Supply Authority.

Table 8 Correlation Analysis

Correlations		Procurement Needs assessment	Budgeting	Supplier Selection	Quality specification	Supply chain Performance
Procurement Needs assessment	Pearson Correlation	1				
	Sig. (2-tailed)					
Budgeting	Pearson Correlation	.288	1			
	Sig. (2-tailed)	0.241				
Supplier Selection	Pearson Correlation	.356	.220	1		
	Sig. (2-tailed)	0.332	0.076			
Quality specification	Pearson Correlation	.257	.184	.458	1	
	Sig. (2-tailed)	0.059	0.123	0.369		
Supply chain Performance	Pearson Correlation	.472**	.442**	.644**	.534**	1
	Sig. (2-tailed)	0.000	0.000	0.005	0.000	
	N	153	153	153	153	153

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

* Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis

The model summary results as presented in Table 9 revealed that the four independent variables of procurement needs assessment, budgeting, supplier selection and quality specification jointly had a strong positive influence on supply chain performance of Kenya Medical Supply Authority as shown by a joint Pearson correlation of 0. 773. This implies that an overall improvement in all the four independent variables of procurement needs assessment, budgeting, supplier selection and quality specification resulted to a strong positive improvement in supply chain performance of Kenya Medical Supply Authority. On the same note, the coefficient of determination (R-square) was 0.597 implying that procurement needs assessment, budgeting, supplier selection and quality specification (the independent variables of the study) jointly accounted for up to 59.7% of the variation in supply chain performance of Kenya Medical Supply Authority.

Table 9 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.773	0.597	0.586	0.2909

a Predictors: (Constant), Quality specification, Budgeting, Procurement needs assessment, Supplier Selection

The F statistic indicating the overall significance of the model is significant at 5% (Sig < 0.000) showing that the model was significant. The F calculated statistic of 31.378> F (4,148) critical value of 2.198 confirming that the model was significant. The model significance results therefore imply that procurement needs assessment, budgeting, supplier selection and quality specification (the independent variables adopted by the study) are suitable factors in predicting supply chain performance of Kenya Medical Supply Authority. The results are presented in Table 10.

Table 10 ANOVA (Model Significance)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.574	4	4.643	54.856	.000
Residual	12.528	148	0.085		
Total	31.102	152			

Dependent Variable: Supply chain Performance

Predictors: (Constant), Quality specification, Budgeting, Procurement needs assessment, Supplier Selection

The regression results as shown in Table 11 revealed that procurement needs assessment positively and significantly influenced supply chain performance of Kenya Medical Supply Authority (Beta = 0.166 Sig< 0.05). This implies that a unit improvement in various indicators of procurement needs assessment resulted to 0.166 unit improvement in supply chain performance of Kenya Medical Supply Authority. The regression results further revealed that supplier selection positively and significantly influenced supply chain performance of Kenya Medical Supply Authority (Beta = 0.274, Sig< 0.05). This implies that a unit improvement in various indicators of supplier selection such as evaluating suppliers efficiency in service delivery before short listing, evaluating the suppliers level of compliance to PPOA guidelines before short listing, examining the suppliers financial position before short listing, evaluating the suppliers technical ability before short listing, evaluating the suppliers experience in offering certain services/ products before short listing and also evaluating the suppliers profile before short listing resulted to 0.274 unit improvement in supply chain performance of Kenya Medical Supply Authority. The regression results finally revealed that quality specification positively and significantly influenced supply chain performance of Kenya Medical Supply Authority (Beta = 0.365, Sig< 0.05). This implies that a unit improvement in various indicators of quality specification resulted to 0.365 unit improvement in supply chain performance of Kenya Medical Supply Authority.

Table 11 Regression Coefficients

Coefficients	B	Std. Error	Beta	t	Sig.
(Constant)	0.443	0.298		1.486	0.139
Procurement Needs assessment	0.166	0.05	0.191	3.313	0.001
Budgeting	0.245	0.054	0.252	4.566	0.000
Supplier Selection	0.274	0.039	0.404	6.588	0.000
Quality specification	0.365	0.062	0.254	4.285	0.000

The optimal regression model is as shown below

Supply Chain Performance *= 0.443 + 0.365* ***Quality Specification*** *+ 0.274* ***Supplier Selection*** *+ 0.245* ***Budgeting*** *+ 0.166* ***Procurement Needs Assessment***

Conclusions

Based on the study findings, the study concluded that an improvement in various indicators of procurement needs assessment including an assessment of the necessary goods to be procured, establishment of the scope of the goods to be procured, establishment of the procurement methods to be deployed before procurement, identification of how best the organization needs can be met and establishment of accountability for the full procurement process before procuring led to significant improvement in supply chain performance of Kenya Medical Supply Authority. The study also concluded that budgeting and adoption of supply chain performance of Kenya Medical Supply Authority were positively and significantly associated. Positive change in budgeting indicators such as the procurement department establishing a competitive pricing rule before procurement, having a negotiated bulk buying to take advantage of economies of scale, setting the prices of goods based on the market pricing index, setting procedures for detecting inflated contract figures before procuring and setting procedures for detecting inappropriate documents before procuring significantly improved supply chain performance of Kenya Medical Supply Authority.

The final conclusion made by the study is that quality specification and supply chain performance of Kenya Medical Supply Authority were positively and significantly associated. Improvement in quality specification indicators such as putting in place a capable inspection and acceptance committee before procurement, awarding complex assignments to experts to ensure quality work, putting in place a specifications committee before procurement system begins, making enquiries from other companies about the suppliers quality of goods during before considering them and considering accreditation with quality standards bodies led to positive and significant change in supply chain performance of Kenya Medical Supply Authority.

Recommendations of the study

The study recommends that in order for KEMSA to improve its supply chain performance, there is need to focus on key procurement needs assessment indicators such as an assessment of the necessary goods to be procured, establishment of the scope of the goods to be procured, establishment of the procurement methods to be deployed before procurement, identification of how best the organization needs can be met and establishment of accountability for the full procurement process before procuring. The study also recommends that for the purpose of enhancing positive and significant change in supply chain performance of Kenya Medical Supply Authority, there is need for KEMSA to focus on key procurement budgeting aspects such as the procurement department establishing a competitive pricing rule before procurement, having a negotiated bulk buying to take advantage of economies of scale, setting the prices of goods based on the market pricing index, setting procedures for detecting inflated contract figures before procuring and setting procedures for detecting inappropriate documents before procuring.

The study finally concluded that in order for Kenya Medical Supply Authority to enhance positive and significant change in supply chain performance, there is need to pay close attention to quality specification indicators such as putting in place a capable inspection and acceptance committee before procurement, awarding complex assignments to experts to ensure quality work, putting in place a specifications committee before procurement system begins, making enquiries from other companies about the suppliers quality of goods during before considering them and considering accreditation with quality standards bodies in enhancing quality of the products.

Conflict of Interest

No potential conflict of interest was reported by the authors.

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