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INFLUENCE OF SUPPLIER MANAGEMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE IN PUBLIC HEALTH INSTITUTIONS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The aim of the study was to establish the influence of supplier management practices on supply chain performance in the public health institutions in Kenya. The study was built on the Rough set theory, lean acceptance model and Grey Systems Theory. Descriptive research design was used for the study. The target population of this study was 80 procurement managers drawn from the eight health public hospitals in Nairobi City County. The study conducted a pilot study to establish the validity and reliability of the data collection instrument. Quantitative data was entered into SPSS for analysis. Quantitative data was analyzed using descriptive statistics while qualitative data was analyzed by the use of content analysis. Descriptive statistics such as percentages, means and standard deviations were used to analyze the data while inferential statistics such as multiple regression analysis was used to test on the relationship between variables at 5% level of significance. Tables were used to present the findings of the study. The study findings indicated that supplier partnerships, supplier communication, supplier development and supplier relationship Management had a significant positive influence on supply chain performance in the public health institutions in Kenya. The study recommended for proper supplier selection strategy which incorporates the specifications of suppliers based on their capacity to enhance quality managements to effectively ensure there is reduction of procurement costs. The contract period should be based on the contract review process to enhance timely delivery of goods and services. There is need to have adequate supplier development by establishment of adequate supplier rating system as a benchmark to enhance timely delivery of goods and services. The study recommended for establishment of long term supplier relationship management in the public hospitals. This can be achieved by appraising the suppliers annually; they ensure the suppliers are paid in time to motivate them.

Key Words: *Supplier Partnerships, Communication, Supplier Development, Supplier Evaluation, Supply Chain*

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INTRODUCTION

Worldwide due to increased demand for better services in the public hospitals, there is need to effectively manage suppliers. Interrelationships between the suppliers in the supply chain needs to be managed to enhance service delivery, enhances continuity and shared sense of value within the whole organization (Abu-Kaharmah, 2012).Service industries like hospitals for example, experience of patients plays a crucial role in rating and assessment and ranking of quality of services offered in these facilities. Quality in health service comes in terms of newer technology, effective medication, and qualified staff to and adequate patient ratio, effectiveness, affordability and efficiency of service delivery (Gbayden, 2010). While technical quality in health sector is defined primarily on the basis of the technical accuracy and effectiveness of the medical diagnoses and procedures or the conformance to professional specifications, functional quality is the manner in which health service is actually delivered to patients (WHO, 2010).

In Kenya, supply and availability of medical items and drugs is still an unknown system with devolution worsening the situation with County level hospitals being affected more by lack of adequate drugs and medical supplies which call for adequate supply chain management (Mselle et al., 2013). The government through its strategy of improving healthcare services delivery aims to provide basic drugs and medical supplies by strengthening public health facilities (Wanja, Muturi & Alodo, 2017). Currently, due to decentralization following the new constitutional, there is devolution of healthcare to the County governments that are responsible for health facilities within their jurisdictions. However, the Ministry of Health has consistently provided funds for the procurement of drugs and critical medical supplies via its Medical Stores Department (Mselle et al., 2013).

A 2010 review (NCAPD, KNBS&ICF, 2011) of the health situation in Kenya, performed by the Ministry of Medical Services and the Ministry of Public Health and Sanitation, reveals that improvements in health status have been marginal in the past few decades and certain indicators have worsened. Maternal Mortality Rate (MMR) and Neonatal Mortality Rate (NMR) have worsened over the past few decades, while Infant Mortality Rate (IMR) has only marginally improved. The review shows that disease burden as a result of malaria, tuberculosis and HIV/AIDS, which together account for almost 50 percent of all deaths in the country, have received the most attention GOK (2010) with the government and donors focusing on prevention, treatment and eradication efforts. While infectious diseases continue to be a burden to the Kenyan healthcare system, the incidence of non-infectious diseases such as diabetes, cancer, cardiovascular disease and high blood pressure are on the rise.

A large section of Kenyan population seeks health care services in public hospitals; The Kenya Health Sector Integrity Study Report (2011).This trend is occasioned by subsidized services in public hospitals (Ministry of Medical Services, 2010) which are cheaper than in private hospitals. Such patients have low income and lack of insurance cover for health care, The National Hospital Insurance Fund provides cover to employed patients. The cover accorded unemployed patients is subject to their subscription to NHIF by payment of Kshs500 monthly (www.kenyabusinessreview.com/892/new-nhif-rates-kenya) which many people cannot afford.

Public healthcare institutions in Kenya are influenced by environment it operates to gain competitive position in the markets. The Health institutions have many supplier of different product ranging from Clinical and technical Items. The main customers are the Doctors, Nurses, Support staff, Supplier and Patients. The customer demand high level service

level in delivery of clinical services that timely delivery of service and items, flexible procurement policy, high quality products and cost effective items.

Nairobi County being the capital city of Kenya boasts of eight (8) public hospitals namely; Kenyatta National Hospital, Armed Forces Memorial Hospital, Mathare Mental Hospital, Nairobi Hospice, Mbagathi District Hospital, National spinal Injury Hospital, Mama Lucy Kibaki District Hospital and Pumwani Maternity Hospital. Kenyatta National Hospital is at the apex of the health care system being one of the two national referral hospitals in Kenya that provides sophisticated diagnostic, therapeutic, and rehabilitative services.

Statement of the Problem

In Kenya, the new constitutional dispensation has decentralized the management of health care to County Governments. Development and implementation of supply chain performance in the public health institutions have been marred with challenges. A greater proportion of supplier management practices have not been fully implemented (Berman, Pallas, Smith, Curry, & Bradley, 2015). Lack of supplier management practices contribute to 50% of the expenses in the public hospitals (Choy, 2012). Decline in supply chain performance in the public health institutions as a result of poor supplier management (Mathuva, 2013).

However, from a report by the NCAPD, KNBS&ICF) (2011) Kenya has witnessed a sharp decline in the supply chain performance in the public health institutions over the last four years despite adequate medical supplies. The RoK (2016) notes that medical supplies are required to enhance supply chain performance in the public health institutions. A report by the WHO (2014), notes that Kenya despite supplier management, service delivery in the public hospitals is poor. A study by NACPD(2011) shows that despite quality supplier management the quality health care in the public hospitals is wanting in Kenya.

From the afore mentioned studies which shows an increase in supplier management enhance supply chain performance in the public health institutions (Gbayaden, 2010) and evidence from the local studies which indicates that there is no relationship between supplier management and supply chain performance in the public health institutions in Kenya (Obwogi, 2014; KSPAS, 2016) contradicts thus need to conduct a further study. Therefore, this study re-examined the influence of supplier management on supply chain performance in the public health institutions in Kenya.

Objectives of the Study

The general objective of the study was to establish the influence of supplier management practices on supply chain performance in the public health institutions in Kenya. The specific objectives of the study included the following;

- To determine how supplier partnerships influence supply chain performance in the public health institutions in Kenya
- To find out how supplier communication supply chain performance in the public health institutions in Kenya
- To establish how supplier development influence supply chain performance in the public health institutions in Kenya
- To examine how supplier evaluation influence supply chain performance in the public health institutions in Kenya

LITERATURE REVIEW

Rough Set Theory

Rough Set Theory was proposed by Pawlak in 1982 as a method which classifies objects into similarity classes (clusters) containing objects that are indiscernible with respect to previous occurrences and knowledge. According to Bai & Sarkis (2009) Rough set theory allows for distillation of a larger set of suppliers into a smaller set of candidate preferred suppliers, and

eventually the selection of preferred supplier. Its application to supplier selection and decision making contributes through use of historical decisions integrating previous organizational knowledge and learning into the latest decision process. The major advantage is that it can generate satisfactory outcomes using a relatively small amount of data or with great variability in factors (Li *et al*, 1997).

Transaction Cost Theory

Ronald Coase, Chester Barnard, and Herbert Simon are among the early authors who describe the contributions of transaction cost theory to the existence of firms (Scott, 2003; Williamson, 2005). Whether we look at supply chain, as a network or as an integrated process, the transaction cost theory explains the vertical connection and integration of various elements of organizational supply chain, from second tier and first tier suppliers to first tier and second tier customers.

Social Exchange Theory

This theory is based upon the underlying concept that individual groups interact with the expectation of rewards and the avoidance of penalties or punishment. The construct of reciprocity is quite popular in the social exchange theory since the action and behavior of one party will lead to reciprocal action and behavior by the other party that is involved in the transaction. Among the key themes of the theory is the importance of having trust and commitment in an effort to ensure that the relationship is a success (Field &Meile, 2008).

Commitment is here in described as the ability of the partners in the relationship to believe that the tie between supplier and the buyer is so significant that it calls for maximum effort in keeping and maintaining the relationship. While on the other hand, trust is defined as the willingness to rely on whichever partner (buyer or supplier) in whom one has confidence in. Correspondingly, power and dependence have an effect on trust and commitment with many studies (Stevens, 2011; Gudrun, 2009; Gordon, 2008) showing positive correlation. With this regard, power is defined as the ability of one firm to influence the intentions and actions of another firm. The theory is relevant to the foregoing study because of its emphasis on trust and commitments for buyer supplier relationships success.

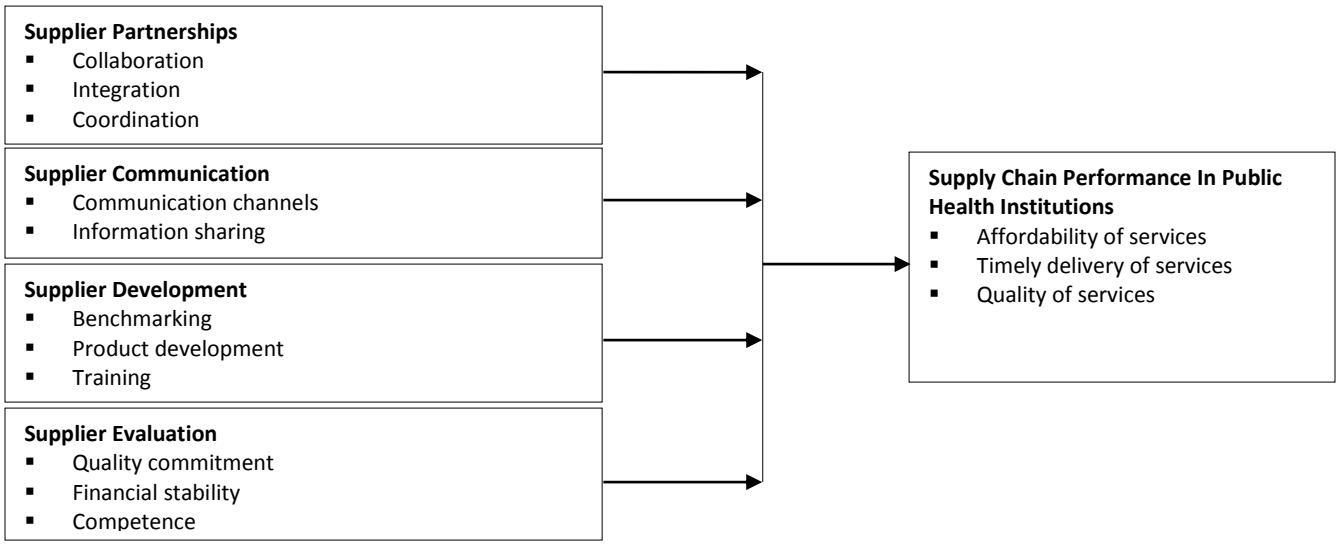

Figure 1: Conceptual Framework

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Empirical Review

According to the Livhuwani (2012) service delivery is concerned with the provision of a product or service, by a government body to a community which it was promised, or which is expected by that community. According to Tshamaano (2012) service delivery is used in preference to service provision, removing the implication that there is a provider and a beneficiary. Mwangi (2017) in the public institutions, service delivery can be measured in terms of provision and accessibility of services which is important, even more should satisfaction of consumer needs (complements & complainants) through offering quality services. Pule (2014) states that affect service delivery in public institutions is the problems of decrease in systems coverage and low levels of accessibility. They found out that most consumers prefer contacting informal service providers to receive alternative services since they are accessible.

Poor responsiveness brought about by low accessibility and quality can lead to delivering unrequited services to people who are in need of quality service (Tshamaano, 2012). Livhuwani (2012) discovered that the level to which people are satisfied differ based on different services delivered to them. Pule (2014) reiterates that for a long duration, service delivery in the public institutions is not accessible especially in the health institutions. Service delivery in health institutions and in context of this study refers to the process of offering needed assistance to the patient from admission until discharge, both in and outpatient services including the process of discharge from hospital as per the opinion of service providers and the patients (Omondi, 2016).

Martinez (2009) proposed that the dimensions of communication would function together in a specific combination based on channel conditions. They coined the phrase "collaborative communication strategy," which was more likely to occur in relational structures, supportive climates and symmetrical power. As in Giannakis (2007), collaborative communication is defined in this research as a communication effort that emphasizes indirect influence strategy, formality and feedback in unison.

Simatupang and Sridharan (2012) defined information sharing as the access to private data between business partners thus enabling them to monitor the progress of products and orders as they pass through various processes in the supply chain. They identified some of the elements that comprise information sharing, consisting of data acquisition, processing, storage, presentation, retrieval, and broadcasting of demand and forecast data, inventory status and location, order status, cost-related data, and performance status. They also add that information sharing pertaining to key performance metrics and process data improves the supply chain visibility thus enabling effective decision making. Information shared in a supply chain is of use only if it is relevant, accurate, timely, and reliable (Simatupang & Sridharan, 2005; Tathee, 2007).

Supplier development, described by Wagner (2010) as a either a reactive practice aimed at dealing with poor supplier performance or a strategic practice aimed at enhancing the long-term capability of the supply base, is an important step toward improving service delivery. Benchmarking Public Procurement is designed to support and enhance decision-making by policymakers in order to increase private sector participation in public tender and stimulate competition, which would ultimately reflect positively on both private and public sides of public procurement. The project will help identify areas for reform and achieve more transparent, competitive, and efficient public procurement systems. Benchmarking Public Procurement presents data that capture important dimensions of the quality and efficiency of public procurement systems to which business communities across the world are confronted (Chidambaranathan*et al.*, 2009).

Product development and innovation could be employed to manage problems buying firms may experience in their supply networks. Firms that include their suppliers in the early stages of innovation projects seem to substantially outperform their peers that do not. Yet a large proportion of companies, does not include suppliers in over 90% of their New Product Development projects. This is based upon our initial findings from World Café sessions and survey respondents. There is strong evidence that organizations today are increasingly implementing SD programs to improve supplier performance and remain competitive (Wagner, 2010).

According to Bozarth and Handfield (2013), in order to effectively evaluate supplier performance, the buyer should understand not only what he is evaluating but also the norms and criteria of the factors being measured or assessed and how measurement will help his company to improve competitive advantage. A survey study in the USA by Simpson, Siguaw and White (2012) reported 142 evaluation items/aspects, which can be arranged under 19 categories of criteria, the first 10 being: quality and process control; continuous improvement; facility environment; delivery; inventory and warehousing; ordering; financial conditions; certifications; and price. Interestingly, of the 10 categories, "quality and process control" had the highest percentage mentioning i.e. 24.9% while price had the lowest percentage mentioning i.e. 3.6%.

Most of supplier appraisal aspects reported by Simpson, Siguaw and White (2012) survey are neatly summarized by Lysons and Farrington (2010) as the "seven Cs of supplier evaluation". They include the following aspects: competency of the supplier to undertake the tasks required; capacity of the supplier to meet the purchaser's total needs; commitment of the supplier to the customer in terms of quality, cost driving and service; control systems in relation to inventory, costs, budgets, people and information; cash resources and financial stability; cost commensurate with quality and service; and, consistency i.e. the ability of the supplier to deliver consistently and, where possible, improve levels of quality and service.

METHODOLOGY

The researcher used a descriptive research design to determine the influence of supply chain performance in the public health institutions in Kenya. A descriptive research design is concerned with determining the frequency with which something occurs or the relationship between variables (Bryman & Bell, 2003). The unit of analysis which was the study population consisted of all the health public facilities in Nairobi City County. There were 8 health public facilities in Nairobi City County as per July, 2018(NCC, 2018). The study adopted a questionnaire as data collection instruments for this study. The questionnaire had seven sections: A, B, C, D, E, F and G. The instrument was structured in the modified Likert fashion, on a five – point scale, ranging from 'strongly agree' (SA), through 'agree' (A), neutral (N), 'disagree' (D) to 'strongly disagree' (SD). Subjects responded according to their degree of agreement with the statements contained in the instrument. This study gathered both quantitative and qualitative data which was coded and analyzed using Statistical Package for Social Sciences (SPSS) computer software Version 24. The study used Multiple Regression Model below;

$$\mathbf{Y} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_1} + \boldsymbol{\beta_2 X_2} + \boldsymbol{\beta_3 X_3} + \boldsymbol{\beta_4 X_4} + \boldsymbol{\varepsilon}$$

Where:

Y –Supply Chain Performance in health institutions (Dependent Variable)

X_1 –Supplier Partnerships

X_2 –Supplier Development

X_3 –Supplier Evaluation

X_4 –Supplier Relationship

ε -Error term

β0 -Constant (Y- Intercept)

βi - are the regression coefficients of each Xi (i=1, 2, 3, 4)

RESULTS

Supplier Partnerships

The study sought to assess the influence of supplier partnerships on supply chain performance in public health institutions in Nairobi County, Kenya. This section presented findings to statements posed, in this regard with responses given on a five-point Likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 1 presented the findings. The scores of 'Very Great Extent' and 'Great Extent' were been taken to represent a statement not agreed upon, equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' was taken to represent a statement agreed upon moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' were taken to represent a statement highly agreed upon equivalent to a mean score of 1.0 to 2.5

The study findings with a grand mean of 3.331, a majority of respondents indicated to a great extent that the specifications of suppliers were based on their capacity thus enhancing timely delivery of goods and services (3.654); the pre-qualifications of the suppliers enhances quality managements to effectively ensure there was reduction of procurement costs (3.765); the rating methods to the suppliers was based on merit thus influencing timely delivery of goods and services (3.543); the pre-qualifications of the suppliers had the capacity to meet the long term needs of the suppliers to reduce stock out reduction (3.654); The pre-qualifications of the appraisals of the suppliers was based on the recalls and complaints systems in place to enhance timely delivery of goods and services (3.987); The rating methods of the suppliers was based on the compliance and the regulatory track records to reduce procurement costs (3.459) The study findings were in agreement with literature review by Pearson and Ellram (2008) who established that supplier management plays a critical role on the procurement performance in an organization.

Table 1: Supplier Partnerships

Statement	Mean	Std
The specifications of suppliers are based on their capacity thus enhancing timely delivery of goods and services	3.654	.234
The rating methods to the suppliers is based on merit thus influencing timely delivery of goods and services	3.543	.432
The pre-qualifications of the suppliers has the capacity to meet the long term needs of the suppliers to reduce stock out reduction.	3.654	.245
The pre-qualifications of the appraisals of the suppliers is based on the recalls and complaints systems in place to enhance timely delivery of goods and services	3.987	.113
The rating methods of the suppliers is based on the compliance and the regulatory track records to reduce procurement costs	3.459	.230
Composite Mean	**3.331**	

Supplier Communication

The study sought to assess the influence of supplier partnerships on supply chain performance in public health institutions in Nairobi County, Kenya. This section presented findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 2 presented the findings. The scores of 'Very Great Extent' and 'Great Extent' were taken to

represent a statement not agreed upon, equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' was taken to represent a statement agreed upon moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' were taken to represent a statement highly agreed upon equivalent to a mean score of 1.0 to 2.5

The study findings with a grand mean of 3.009, a majority of respondents indicated to a great extent that the contract period was based on the contract review process to enhance timely delivery of goods and services (3.654); the type of contract ensured there was reduction of procurement costs (3.816); The dispute resolution influence timely delivery of goods and services (3.123); The payment terms defined the dispute rules and regulations to ensure there is timely delivery of goods and services (3.543); The involvement of the affected departments defines the contract period to ensure that there is timely delivery of goods and services (3.781); The type of contract is based on the rules and regulations so as to reduce procurement costs (3.205)

The study findings were in agreement with literature review by Pearson and Ellram(2008) who established that supplier contracting plays a critical role on the procurement performance in an organization The type of contract either Fixed Price Contracts, Variations of fixed price contracts, Cost Reimbursement Contracts, Time and Material Contracts, Letter Contracts, Indefinite Delivery Contracts, Agreements, Purchase Orders and lastly Government Commercial Purchase Card (Credit Card) have the long-term benefits: quality products with lower cost information flow improved between the two parties. The implicit or explicit promise is to continue the relationship and improve in the performance (Somogyi & Gyau, 2010).

Table 2: Supplier Communication

Statement	Mean	Std
The contract period is based on the contract review process to enhance timely delivery of goods and services	3.654	.432
The type of contract ensure there is reduction of procurement costs	3.876	.009
The dispute resolution influence timely delivery of goods and services	3.123	.156
The payment terms defines the dispute rules and regulations to ensure there is timely delivery of goods and services	3.543	.237
The involvement of the affected departments defines the contract period to ensure that there is timely delivery of goods and services	3.781	.751
The type of contract is based on the rules and regulations so as to reduce procurement costs	3.205	.189
Composite Mean	**3.009**	

Supplier Development

The study sought to assess the influence of supplier development on supply chain performance in public health institutions in Nairobi County, Kenya. This section presented findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 3 presented the findings. The scores of 'Very Great Extent' and 'Great Extent' were taken to represent a statement not agreed upon, equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' was taken to represent a statement agreed upon moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' were taken to represent a statement highly agreed upon equivalent to a mean score of 1.0 to 2.5

The study findings with a grand mean of 3.112, a majority of respondents indicated to a great extent

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that they do use of a supplier rating system as a benchmark to enhance timely delivery of goods and services (3.222); the use of a supplier audit system in the county reduces the procurement costs (3.124); Check for a training program frequently has empowered the suppliers thus reduced costs (3.765); there was tracking delivery performance of the supplier has enhanced delivery of goods and services (3.980); there is use of a corrective action system for the supplier ensure the delivery of quality goods and services (3.218); check for product quality review for the supplier to enhance timely delivery of goods and services(3.614); there is a check for continuous improvement program for the suppliers(2.987).

The study findings corroborated with literature review by Modi and Mabert (2010) who established that supplier development through training can enhance procurement performance. Training in procurement is a vital aspect of giving fighting forces the ability to perform effectively in the field. Purchasing is just as important in the civilian sector. For this reason, leadership training begins with giving people the basic skills that they require to assume responsibility, and to discharge whatever managerial authority may be entrusted to them in a way that, if not spectacular, is at least not manifestly incompetent or catastrophically bad. For purchasing departments in hospitals, training would increase the performance and/or capabilities of the buyers and meet the buying firm's short- and/or long-term goals (Modi & Mabert, 2007).

Table 3: Supplier Development

Statement	Mean	Std
We do use of a supplier rating system as a benchmark to enhance timely delivery of goods and services	3.222	.234
Use of a supplier audit system in the county reduces the procurement costs	3.124	.009
Check for a training program frequently has empowered the suppliers thus reduced costs	3.765	.812
Tracking delivery performance of the supplier has enhanced delivery of goods and services.	3.980	.064
Use of a corrective action system for the supplier ensure the delivery of quality goods and services	3.218	.045
Check for Product Quality Review for the supplier to enhance timely delivery of goods and services	3.614	.011
There is a check for continuous improvement program for the suppliers	2.987	.062
Composite Mean	**3.112**	

Supplier Relationship Management

The study sought to examine the influence of supplier relationship management on supply chain performance in public health institutions in Nairobi County, Kenya. This section presented findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 3 presented the findings. The scores of 'Very Great Extent' and 'Great Extent' were taken to represent a statement not agreed upon, equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' was taken to represent a statement agreed upon moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' were taken to represent a statement highly agreed upon equivalent to a mean score of 1.0 to 2.5.

The study findings with a grand mean of 3.221, a majority of respondents indicated to a great extent that they appraised the suppliers annually (3.765); they ensure the suppliers are paid in time (3.876); they got after sale service from your suppliers

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annually (3.116); the suppliers failed to honor the orders issued (3.541); the suppliers offered credit facilities (3.331); resolved immediate problems that would disrupt the work (3.208); recognize contributions and accomplishments of the suppliers (2.987); consult with suppliers on challenges affecting them(3.168); keep suppliers informed about management actions affecting them(3.104). The study findings were in agreement with literature review by Iloranta (2008) who established that the effective supplier management can make the procurement process more cost and time efficient. Having supply market intelligence and applying a correct competition situation are ways to implement a good supplier management strategy. Other issues that should be accounted are a reliable source for supplier performance and evaluation as well as developing the suppliers. With the help of common procurement approaches and development projects the supplier relationship is utilized to the maximum (Iloranta, 2008).

Table 4: Supplier Relationship Management

Statement	Mean	Std
We do appraise the suppliers annually.	3.765	.543
We ensure the suppliers are paid in time	3.245	.305
We do get after sale service from your suppliers annually	3.876	.492
The suppliers do fail to honor the orders issued	3.116	.257
Our suppliers offer credit facilities.	3.541	.452
Resolve immediate problems that would disrupt the work.	3.331	.231
Recognize contributions and accomplishments of the suppliers.	3.208	.211
Consult with suppliers on challenges affecting them.	3.168	.345
Keep suppliers informed about management actions affecting them	3.104	.219
Composite mean	**3.221**	

Supply Chain Performance in Public Health Institutions

On the extent to which supply chain performance in public health institutions respondents were asked to indicate the extent to which it was affected. The data was collected from the different indicators of the variable service delivery in public hospitals which was ordinal categorical. The data was therefore presented in frequency tables with the mode being used as the appropriate measure of central tendency. The results were presented in Table 5. The first indicator for the dependent variable required to know the supply chain performance in public health institutions was timely delivery of products was, 69% of the respondents had 0-20%, 3% had 20-30%, 11% had 30-40%, 17% had 40-50%, 0% had over 50%. The modal class of the respondents who had over 0%-20% timely delivery of products. The mode was found to be 1 which implied that on average the supply chain performance in public health institutions on timely delivery of products was between 0%-20%. When the respondents were asked what the level of transparency and accountability of procurement funds was, 60% of the respondents 0-20%, 3% had 20-30%, 3% had 30-40%, 34% had 40-50%, 0% had over 50%. The modal class of the respondents who had over 0%-20% transparency and accountability. The mode was found to be 1 which implied that on average the level of transparency and accountability of procurement funds in organizations was between 0%-20%. Finally, the respondents were asked what the level of quality of procured goods and services offered was, 34% of the respondents 0%-20%, 3% had 20-30%, 20% had 30-40%, 43% had 40-50%, 0% had over 50%. The modal class of the respondents who had between 0%-20%, quality level. The mode was

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found to be 1 which implied that on average the level of quality of procured goods and services offered is between 0%-20%.

Table 5: Supply Chain Performance in Public Health Institutions

Statement	0%-20%	10%-20%	20%-30%	40%-50%	Over 50%	Mode
What is the level of timely delivery of services?	69	3	11	17	0	2
What is the level of reduction of costs?	49	3	14	26	49	2
What is the level of transparency and accountability of procurement funds	60	3	3	34	60	2
What is the level of quality of procured services offered?	34	3	20	43	34	2

Multiple Regression Analysis

This sub-section examines whether the multiple regression equation can be used to explain the nature of the relationship that exists between the independent variables and the dependent variable. As can be observed in Table 6, the regression model of service delivery in the public hospitals coefficient of determination R Square was 0.682 and R was 0.826. The coefficient of determination R Square indicated that 68.20% of the variation on service delivery can be explained by the set of independent variables, namely; X_1= Supplier partnerships, X_2=Supplier Communication, X_3= Supplier Development, X_4= Supplier Relationship Management. The remaining 36.80% of variation in supply chain performance in public health institutions can be explained by other variables not included in this model.

This showed that the model had a good fit since the value is above 60%. This concurred with Graham (2012) that R-squared is always between 0 and 100%: 0% indicated that the model explains none of the variability of the response data around its mean and 100% indicates that the model explains the variability of the response data around its mean. In general, the higher the R-squared, the better the model fits the data. The adjusted R square is slightly lower than the R square which implies that the regression model may be over fitted by including too many independent variables. Dropping one independent variable will reduce the R square to the value of the adjusted R square. This indicated that supplier partnerships, supplier communication, supplier development, supplier relationship management are important factors of supplier management that need to be applied to enhance to supply chain performance in public health institutions in Kenya.

Table 6: Model Summary, Multiple Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826	.682	.667	.018

The results of Analysis of Variance (ANOVA) for regression coefficients in Table 7 revealed that the significance of the F statistics is 0.000 which is less than 0.05 and the value of F-calculated (34.861) which is greater than the F-critical value (21.345) being significant at 0.000 confidence level. The value of F is large enough to conclude that the set coefficients of the independent variables are not jointly equal to zero. This implied that at least one of the independent variables has an effect on the dependent variable and this shows that the overall model was significant.

Table 7: Analysis of Variance (ANOVA), Multiple Regression

Model		Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	24.166	4	6.0415	34.861	.000[b]
	Residual	11.268	65	.1733		
	Total	35.434	69			

NB: Critical value = 21.345

Table 8 presented the beta coefficients of all independent variables supply chain performance in public health institutions in Nairobi County, Kenya. The general form of the equation was to predict service delivery in public hospitals from supplier partnerships, supplier communication, supplier development and supplier relationship management is: ($\mathbf{Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon}$) becomes: $Y= 10.876+ 0.776X_1+ 0.680X_2+ 0.578X_3 + 0.555X_4$. As observed, Supplier Partnerships (X_1) had a coefficient of 0.776 which was greater than zero. The t statics is 4.455 which had a p-value of 0.000 which is less than 0.05 implied that the coefficient of X_1 was significant at 0.05 level of significance. This showed that supplier partnerships influence supply chain performance in public health institutions in Nairobi County, Kenya. The coefficient of supplier contracting (X_2) was 0.680 which was greater than zero. The t statistic of this coefficient is 3.266 with a p value of 0.001 which was less than 0.05. This implied that the coefficient 0.820 is significant. Since the coefficient of X_2 is significant, it showed that supplier communication had a significant effect service delivery in public hospitals in Nairobi County, Kenya. Table 8 also showed that supplier development (X_3) had a coefficient of 0.578 which was greater than zero. The t statics was 3.011 which had a p-value of 0.002 which was less than 0.05 implied that the coefficient of X_3 is significant at 0.05 level of significance. This showed that supplier development had a significant positive impact on supply chain performance in public health institutions in Nairobi County, Kenya.

Table 8 further showed that supplier relationship management (X_4) had a coefficient of 0.555 with a t static of 2.969 which has a p-value of 0.003 which is less than 0.05. This implies that the coefficient of X_4 is significant at .05 level of significance. This showed that supplier relationship management had a significant positive influence on service delivery in public hospitals in Nairobi County, Kenya. Finally, the constant term was 10.876. The constant term was the value of the dependent variable when all the independent variables are equal to zero. The constant term has a p value of 0.001 which is less than 0.05. This implied that the constant term is significant is thus an equation through the 10.876. If all the independent variables take on the values of zero, there would be 10.876 supply chain performances in public health institutions in Nairobi County, Kenya.

Table 8: Regression Model (Overall)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.876	.076		5.309	.001
	Supplier Partnerships	.776	.087	.702	4.455	.000
	Supplier Communication	.680	.156	.555	3.266	.001
	Supplier Development	.578	.200	.405	3.011	.002
	Supplier R. Management	.555	.276	.359	2.969	.003

CONCLUSIONS

Based on the study findings, the study concludes that supply chain performance in public health institutions in Nairobi County, Kenya is affected by supplier partnerships, supplier communication, supplier development and supplier relationship management are the major factors that mostly affect supply chain performance in public health institutions in Nairobi County, Kenya.

The study concluded that a supplier partnership is the first important factor that affects supply chain performance in public health institutions in Nairobi County, Kenya. The regression coefficients of the study showed that supplier partnerships have a significant influence on supply chain performance in public health institutions in Nairobi County, Kenya. This showed that supplier partnerships have a positive influence on supply chain performance in public health institutions in Nairobi County, Kenya.

The study concluded that a supplier communication is the second important factor that affects supply chain performance in public health institutions in Nairobi County, Kenya. The regression coefficients of the study show that supplier communication has a significant influence on supply chain performance in public health institutions in Nairobi County, Kenya. This shows that supplier communication have a positive influence on supply chain performance in public health institutions in Nairobi County, Kenya.

Further, the study concluded that a supplier development is the third important factor that affects supply chain performance in public health institutions in Nairobi County, Kenya. The regression coefficients of the study show that supplier development has a significant influence on supply chain performance in public health institutions in Nairobi County, Kenya. This shows that supplier development has a positive influence on supply chain performance in public health institutions in Nairobi County, Kenya.

The study concluded that a supplier relationship management is the fourth important factor that affects supply chain performance in public health institutions in Nairobi County, Kenya. The regression coefficients of the study showed that supplier relationship management has a significant influence on supply chain performance in public health institutions in Nairobi County, Kenya. This showed that supplier relationship management has a positive influence on supply chain performance in public health institutions in Nairobi County, Kenya.

RECOMMENDATIONS

The study recommended for proper supplier selection strategy which incorporates the specifications of suppliers based on their capacity to enhance quality managements to effectively ensure there is reduction of procurement costs. The rating methods on the suppliers should be based on merit to meet the long term needs of the suppliers to reduce stock out reduction.

The contract period should be based on the contract review process to enhance timely delivery of goods and services. The type of contract should ensure there is reduction of procurement costs and dispute resolution influence timely delivery of goods and services. The payment terms should define the dispute rules and regulations to ensure there is timely delivery of goods and services and reduction of procurement costs.

There is need to have adequate supplier development by establishment of adequate supplier rating system as a benchmark to enhance timely delivery of goods and services. The use of a supplier audit system in the hospitals reduces the procurement costs. The public hospitals should have a check for a training program frequently to empower the suppliers thus reduce costs. There should be a tracking delivery performance of the supplier to enhance delivery of goods and services. There is use of a corrective action

system for the supplier can enhance delivery of products in time.

The study recommended for establishment of long term supplier relationship management in the public hospitals. This can be achieved by appraising the suppliers annually; they ensure the suppliers are paid in time to motivate them. This can reduce the suppliers who do fail to honor the orders issued and resolve immediate problems that would disrupt the work. It is important also to do recognize contributions. The management should consult with suppliers on challenges affecting them and keep suppliers informed about management actions to enhance procurement performance.

Recommendations for Further Research

A review of literature indicated that there has been limited amount of research on influence of supplier management on supply chain performance in public health institutions in the Kenyan context. Thus, the findings of this study serve as a basis for future studies on supply chain performance in public health institutions in Kenya. The four independent variables that were studied explained 68.20% of the supply chain performance in public health institutions in Kenya. This therefore meant that other factors not studied in this study contributed 31.80% to the supply chain performance in public health institutions in Kenya. There is need to carry out further study on other supplier management factors such as supplier payment, supplier evaluation, supplier contracting how they influence supply chain performance in public health institutions in Kenya.

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