

**THE JOINT INTERVENING EFFECT OF PLANNING FUNCTION OF
MANAGEMENT AND MODERATING EFFECT OF REGULATORY
FRAMEWORK ON THE RELATIONSHIP BETWEEN
INTERNATIONAL PROCUREMENT PRACTICES AND SUPPLY
CHAIN PERFORMANCE OF ENERGY DEVELOPMENT AGENCIES
IN KENYA**

¹ Solomon Kyalo Mutangili, ² Dr. Emmanuel Awuor & ³ Dr. John Cheluget

^{*1} Post Graduate Student, Management University of Africa

² Lecturer, School of Management & Leadership, Management University of Africa

³ Lecturer, School of Management & Leadership, Management University of Africa

* Corresponding Author's email: solomonkyalomutangili@yahoo.com

ABSTRACT

Background of the Study: Kenya has regularly experienced frequent breaks in the supply of energy products over the years despite the state spending about Kshs. 234 billion per year in the energy sector. This study contributes to the body of knowledge by establishing the relationship between international procurement practices and supply chain performance of energy development agencies in Kenya, as well as shedding light on the intervening role of planning function of management and moderating influence of regulatory framework on this relationship.

Objective of the Study: The objective was to establish if the joint intervening effect of planning function of management and moderating effect of regulatory framework on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya is significantly different from their separate effect. The study's theoretical review is based on four theories that are relevant to international procurement practices and supply chain performance. These theories include: social network approach theory, Fayol classical theory of management, contract theory and bullwhip theory.

Methodology: The study adopted a cross-sectional survey research design aimed at collecting large number of quantitative data at a point in time so as to establish patterns of value addition in the Kenyan energy sector. The study's target population consisted of six energy development agencies in Kenya as outlined by the Ministry of energy (2019). These agencies include: Rural Electrification and Renewable Energy Corporation (REREC), Geothermal Development Company (GDC), Kenya Electricity Transmission Company (KETRACO), Kenya Generation Company (KENGEN) and Kenya Power, Lighting Company (KPLC) and Nuclear Power and

Energy Agency (NUPEA). The study's respondents was drawn from all the 224 top and middle managers from the energy development agencies. Yamane formula was used to obtain a sample size of 144. The study used stratified random sampling to pick the 144 respondents. Primary data was obtained using self-administered questionnaires. The questionnaire was made up of closed questions relating to the study's objectives.

Findings: The study found that there was significant relationship between international procurement practices and supply chain performance of energy development agencies in Kenya. There was a partial intervening effect of planning function of management in the relationship between international procurement practices and supply chain performance. There is a significant moderating effect of regulatory framework in the relationship between international procurement practices and supply chain performance of energy development agencies in Kenya. Lastly, the joint intervening effect of planning function of management and moderating effect of regulatory framework on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya was different from their separate effects.

Conclusions and recommendations: The study recommended that the management of energy corporations should put measures in place to ensure that all the drawn ethical policies and codes are adhered to by all the supply chain staff as well as by the suppliers that they deal with. For the best supply chain performance in the energy corporations, the management should maintain the highest standards of integrity in its everyday dealings.

Keywords: *International Procurement Practices, Planning Function of Management, Regulatory Framework Supply Chain Performance, Energy Development Agencies & Kenya.*

1.0 INTRODUCTION

1.1 Background of the Study

Globally, effective management of international procurement practices should recognize complexity, locate the right skills and systematize the work, develop sound strategy, manage schedule effectively, follow sound bid evaluation and develop reasonable contract (Georghiou, Edler, Uyarra & Yeow, 2014). Dawar and Evenett (2011) observe that international procurement practices have a direct or indirect impact on economic performance and living standards, therefore effective procurement policies that incorporate both domestic and international procurement practices can help improve the completing of infrastructure projects, yielding export and growth benefits. UNCTAID (2010) points out that in a global economy, international procurement practices have three primary benefits namely: increased consumer base, lower costs and incentive of a global economy.

In most developing African countries, there is need to develop sound international procurement practices as they strive to overcome numerous domestic challenges that are attributed to the fact that organizations are engaged in a lot of international procurement processes mainly due to increased domestic prices, substandard quality and product scarcity (Johnson & Flynn, 2015). For example, the South African government is faced with the challenge of balancing the allocation of limited funds; the appointment of contractors among former government beneficiaries and previously disadvantaged individuals (Ambe, 2016). According to Fayomi (2013), Nigeria can be described as a country of irony as the socio-economic performance over the years remained superficial and unimpressive. This was largely attributed to high level of corruption or mismanagement of public resources closely linked up with the public sector procurement systems.

In Kenya for instance, despite government concentrated efforts in reforming procurement systems, there is still a problem attributable to huge losses in improper procurement to about Kshs 30 billion (CBK, 2013). Kimandi and Senelwa (2017) also indicated that the government losses close to Kshs. 121 billion, about 17 per cent of the national budget due to inflated procurement quotations. This is seconded by PPOA (2010) report which indicated that inefficiency and incompetence of administration and management of the procurement function has contributed to a loss of Kshs 50 million annually. Given that Kenya is a developing economy that intends to be industrialized by the year 2030, there is need to develop sound strategies that improve supply chain performance of energy development agencies. Therefore, the motivation of this study was to establish the extent to which international procurement practices influence supply chain performance of energy development agencies in Kenya.

Supply chain performance refers to the extended supply chain's activities in meeting end-customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner (Lusch, 2011). Supply Chain Performance crosses company boundaries since it includes basic materials, components, subassemblies and finished products, and distribution through various channels to the end customer.

Energy is one of the key enablers of the Vision 2030 and energy security remains a matter of national priority (MoEP, 2017). Under the fourth Schedule of the Constitution of Kenya 2010, the Ministry of Energy, on behalf of the National Government, is responsible for energy policy and regulation of electricity while County Governments are responsible for planning and development of electricity and regulation. The Energy Act of 2006 brought the regulations affecting all the energy sub-sectors under one umbrella body, which is the Energy Regulatory Commission (ERC). These energy agencies includes; Kenya Electricity Generating Company (KenGen), Kenya Power and Lighting Company (KPLC), Kenya Electricity Transmission Company (KETRACO), Geothermal Development Company Limited (GDC), Rural Electrification and Renewable Energy Corporation (REREC) and Nuclear Power and Energy Agency (NUPEA).

1.2 Statement of the Problem

As Kenya races towards an energy-sufficient future, driven by Kenya Vision 2030 and Government's 'Big Four' agenda set around housing, manufacturing, agriculture and health, there are many opportunities for energy agencies to help secure the country's economic future (Ministry of Energy Agencies, 2019). However, energy agencies are facing serious challenges which include; inadequate power supply capacity due to rise in demand for electricity, which is growing faster than the ability to install additional generation plants, shortage of transformers and overstressed distribution network, long delays in development of power infrastructure because building of power generation, transmission and distribution network is capital intensive and takes inordinately long time from conception to commissioning (MEA, 2019). KenTrade (2016) reported that the performance of Kenya energy sector in terms of supply chain performance in the recent past has been below expectation and this has raised anxiety among the stakeholders. KenTrade (2016) further indicates that among the main reasons for these variations are the dependence on importation of raw materials and inefficient supply chains as a result of unavailability of raw materials. Moreover, Kenya has regularly experienced frequent breaks in the supply of energy products over the years despite the state spending about Kshs. 234 billion per year in the energy sector. As a result, energy development agencies have registered a high number of complaints relating to blackouts, poor supply and delayed responses to emergency cases as well as repairs (KenTrade, 2016).

Various scholars have also undertaken studies relating to procurement practices and supply chain performance and they found mixed findings. Majority of the studies found a positive significant relationship (Okulo, 2015; Sengbeh, 2015; Caritas *et al.* 2016; Mrope, Namusonge & Iravo, 2017; Wei, Govindan, Li & Zhao, 2015 and Chen and Paulraj, 2014). Other studies find an insignificant relationship (Chokshi *et al.*, 2015; Awino & Marende-Getuno, 2014 and Anderson, 2011)

However, from the inconclusive findings the relationship between international procurement practices and supply chain performance of energy development agencies in Kenya is therefore open to further enquiry as to whether other variables affect this relationship. This study addressed these gap by introducing planning function of management and regulatory framework as intervening and moderating variables respectively to examine whether international procurement practices influence on supply chain performance of energy development agencies in Kenya can be improved by adopting efficient management practices and effective regulatory framework. This study therefore sought to investigate if international procurement practices, planning function of management and regulatory framework affect supply chain performance of energy development agencies in Kenya.

1.3 Objective of the Study

To establish if the joint intervening effect of planning function of management and moderating effect of regulatory framework on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya is significantly different from their separate effect.

1.4 Hypotheses of the Study

Ho: The joint intervening effect of planning function of management and moderating effect of regulatory framework has no significant effect on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya from their separate effect.

2.0 Literature Review

2.1 Theoretical Framework

The study's theoretical review is based on four theories that are relevant to international procurement practices and supply chain performance. These theories include: social network approach theory, The Classical Management Theory, contract theory and bullwhip theory. The study was however underpinned by the social network approach theory.

Social network theory views social relationships in terms of nodes and ties where nodes are the individual actors within the networks, and ties are the relationships between the actors. Social network approach theory is a combination of ideas drawn from the structuralist network tradition and more recent thinking, particularly the embeddedness and social capital perspectives. The theory is relevant in supply chain performance as social network analysis assist in understanding the relationships and structures of the supply chain involved in international procurement as a network, whereby the nodes of the network are the procurement professionals, suppliers, agents and end users, while the links are the relationships between these actors. In addition, nodes are also used to represent events, ideas and objects related to international procurement supply chain. The theory therefore helped in focusing on the interaction between actors in international procurement and the organization's supply chain from a relational, contextual and systematic approach. This theory informs international procurement practices variable.

The classical management theory by Fayol (1841-1925) emphasizes how managers and supervisors relate to their organizations in the knowledge of its goals, the implementation of effective means to get goals accomplished and how to motivate employees to perform to the highest standard. This theory is relevant to this study since it informs planning function of management variable. Managers needed specific roles in order to manage work and workers. This became known as the administrative school of management and was founded on the six functions, or roles, of management: Forecasting, Planning, Organizing, Commanding, Coordinating and Controlling.

Contract theory was put forward by Arrow (1960). As it is applied in economics, the contract theory observes how economic actors are capable of and develop contractual arrangements with the asymmetrical information. The theory is relevant in the Kenyan energy sector as the sector handles numerous informed clients that demand quality service provision as energy is a primary need both for domestic and commercial purposes. Therefore, it is important to all the energy agencies in the sector abide by the set terms and conditions of the international procurement and supply chain contracts. Any changes as to affect the contract terms have to be communicated in time to obviate any loss due to customer frustration or legal suit. This theory informs regulatory framework variable.

Bullwhip theory was authored by Forrester (1961). The bullwhip effect is a distribution channel phenomenon in which forecasts yield supply chain inefficiencies. It refers to increasing swings in inventory in response to shifts in customer demand as one move further up the supply chain. This theory is relevant to this study since it informs the dependent variable which is the supply chain performance. Increased variation is a concern for distribution chains since it leads to increased costs in the form of increased inventory requirements, expediting, or customer shortages. In the last few years, supply chain managers, as well as academics, have focused attention on the operational causes of the bullwhip effect, and these causes include demand signal processing, inventory rationing, order batching and price variations

2.2 Empirical Review

Licenji (2015) be yielding undertook an empirical review of studies that looked into public procurement and supply chain management using descriptive survey research design and highlighted that supply chains are becoming increasingly complex; there are numerous elements in the supply chain that may stop companies from achieving their business objectives unless they embrace good procurement practices. In addition, regulations help in measuring the performance of procurement and is found to benefits to organizations such as enhanced profitability, cost reduction, constant and reliable supplies, quality enhancements and competitive advantage. Licenji (2015) further highlighted that in today's highly competitive environment, supply chain performance is very important for the continued existence of firms because customers judge the performance of firms based on their supply chain performance. Therefore, the adoption of good practices in procurement is one of the ways organizations can be to make their supply chains more competitive.

Anderson (2011) similarly reviewed empirical literature on public procurement regulations and reported that government purchasing has more involving procedures consisting of a variety of phases with different sets of regulations governing those phases. As compared to the private sector, public agencies would not enter into contracts with other parties when and how they prefer. There are specific regulatory frameworks for the government to abide by with respect to when, how, and with whom to enter into contracts. Public procurement regulations are different according to different jurisdictions, in systems operating under the rule of law, they

share major governing principles such as transparency, competition and accountability (Anderson, 2011).

Weishaar (2013) after undertaking comparative analysis of procurement practices in different countries concluded that the inception of legislation in different countries has had a number of effects, namely: procurement legislation helps to get the best sources of goods and services in the market by establishing the best suppliers to contract, reduction of supply base opens up the way to higher degree of efficiency in procurement performance which in turn translates to success in an organization’s performance; procurement systems in the public sector maximize overall value for money for citizens mainly due to the following: considerations of issues such as fair play, client satisfaction, public interest, justice, honesty and equity; and, (4)the application of the highest ethical standards in public procurement helps to a large extent in ensuring value for public resources and national development.

2.3 Conceptual Framework

The study’s conceptual framework is conceptualized the joint effect of international procurement practices, planning function of management and regulatory framework on the supply chain performance of energy development agencies in Kenya. The study’s conceptual framework is illustrated in Figure 1.

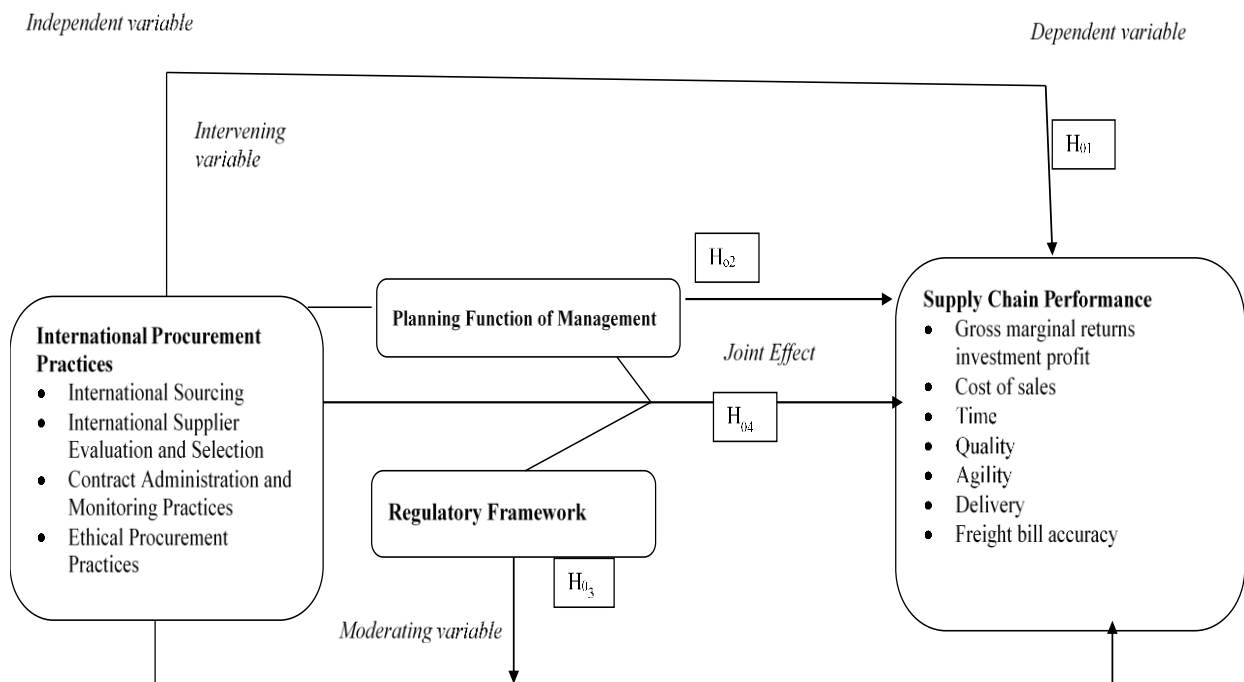


Figure 1: Conceptual Framework

3.0 Research Methodology

Positivistic philosophy approach was adopted for the study. The study adopted a cross-sectional survey research design with an aim of collecting large number of quantitative data at a point in time so as to establish patterns of value addition in the Kenyan energy sector. The study's target population consisted of six energy development agencies in Kenya as outlined by the Ministry of energy (2018). These agencies include: Rural Electrification and Renewable Energy Corporation (REREC), Geothermal Development Company (GDC), Kenya Electricity Transmission Company (KETRACO), Kenya Generation Company (KENGEN), Kenya Power and Lighting Company (KPLC) and Nuclear Power and Energy Agency (NUPEA). The justification for picking the 6 agencies is because they are energy sub-sectors under one umbrella body, which is the Energy Regulatory Commission (ERC). The unit of analysis was the energy development agencies. The study purposely sampled only the top managers and middle managers since they are the key individuals handling the strategic issues within the departments. The study used primary data. Primary data was obtained using self-administered questionnaires. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS).

Before estimating the joint model, each individual model was estimated and the R squared obtained was used to compare with the R squared of the joint model. The stepwise regression models are presented below

$$\text{Step 1: } SCP = \beta_0 + \beta_1 IPP + e$$

$$\text{Step 2: } SCP = \beta_0 + \beta_1 PFM + e$$

$$\text{Step 3: } SCP = \beta_0 + \beta_1 RF + e$$

$$\text{Step 4: } SCP = \beta_0 + \beta_1 IPP + \beta_2 PFM + \beta_3 RF + \beta_4 IPP * PFM + \beta_5 IPP * RF + \beta_6 PFM * RF + \beta_7 IPP * PFM * RF + e$$

Where:

SCP = Supply Chain Performance

β_0 = Intercept

$\beta_1 \dots \beta_7$ = Coefficients

IPP = International Procurement Practices

RF = Regulatory Framework

PFM = Planning Function of Management

ϵ = Error term

To the test the level of significance of hypotheses, t statistic values and P-values was used. If the $t > 1.96$ and P value < 0.05 , it indicates that the relationship between the variables are significant and vice versa.

4.0 Results and Findings

4.1 Descriptive Statistics

4.1.1 Descriptive Statistics for International Procurement Practices

The objective of the study was to establish the relationship between international procurement practices and supply chain performance. The mean showed the average values, the mode showed the most common value and the median indicated the middle number in set numbers. The results are as depicted in Table 1.

Table 1: Descriptive Statistics for International Procurement Practices

Measure	International Sourcing	International Supplier Evaluation & Selection	Contract Administration and Monitoring Practices	Ethical Procurement Practices	Supplier Relationship Management
N	132	132	132	132	132
Mean	3.081	3.117	3.154	3.067	3.0706
Median	3.200	3.100	3.150	3.150	3.555
Mode	2.100	3.000	3.000	3.000	3.660
Std. Deviation	1.100	1.195	1.145	1.157	0.810
Skewness	-0.200	-0.043	-0.228	-0.251	-0.473
Std. Error of Skewness	0.211	0.211	0.211	0.211	0.211
Kurtosis	-0.898	-1.214	-0.930	-1.143	-1.414
Std. Error of Kurtosis	0.419	0.419	0.419	0.419	0.419

The results from the Table 1 shows the descriptive statistics that indicates central tendency and dispersion of all the measures of international procurement practices. The total number of respondents in each measured was 132. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The results show that international sourcing had a mean of 3.081, median of 3.200 and mode of 2.100. This implied that the mean of 3.081 implied that majority were agreeing with the statement. The standard deviation of 1.100 showed that the members of the group differed from the mean value of 3.081 for the group in the observation.

The measures of kurtosis and skewness are used to determine if indicators met normality assumptions (Kline, 2005). According to Bai and Ng (2005), if skewness is less than -1 or greater than 1, the distribution is highly skewed, if skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed, if skewness is between -0.5 and 0.5, the distribution is approximately symmetric. Skewness for international sourcing was -0.200. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis

results showed that leadership style had -0.898. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The results show that international supplier evaluation and selection had a mean of 3.117, median of 3.100 and mode of 3.000. This implied that the mean of 3.117 implied that majority were agreeing with the statement. The standard deviation of 1.195 showed that the members of the group differed from the mean value of 3.117 for the group in the observation. Skewness for international supplier evaluation and selection was -0.043. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that international supplier evaluation and selection had -1.214. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The results showed that contract administration and monitoring practices had a mean of 3.154, median of 3.150 and mode of 3.000. This implied that the mean of 3.154 implied that majority were agreeing with the statement. The standard deviation of 1.145 showed that the members of the group differed from the mean value of 3.154 for the group in the observation. Skewness for contract administration and monitoring practices was -0.228. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that contract administration and monitoring practices had -0.930. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The results showed that ethical procurement practices had a mean of 3.067, median of 3.150 and mode of 3.000. This implied that the mean of 3.067 implied that majority were agreeing with the statement. The standard deviation of 1.157 showed that the members of the group differed from the mean value of 3.154 for the group in the observation. Skewness for contract administration and monitoring practices was -0.251. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that contract administration and monitoring practices had -1.143. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

4.1.2 Descriptive Statistics for Planning Function of Management

Descriptive statistics were carried out on planning function of management and the results are shown in Table 2.

Table 2: Descriptive Statistics for Planning Function of Management

Measure	Planning Function of Management
N	132
Mean	2.927
Median	3.200
Mode	4.800
Std. Deviation	1.326
Skewness	0.061
Std. Error of Skewness	0.211
Kurtosis	-1.546
Std. Error of Kurtosis	0.419

The results from the Table 2 shows the descriptive statistics for planning function of management. The total number of respondents in each measured was 132. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The results show that planning function of management had a mean of 2.927, median of 3.200 and mode of 4.800. The standard deviation of 1.326 showed that the members of the group differed from the mean value of 2.927 for the group in the observation. The standard deviation of 1.326 further implies that the data points tend to be very close to the mean of the data and a high standard deviation implies that the data points are spread over a wide range of the values.

Skewness for planning function of management was 0.061. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that planning function of management had -1.546. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers. Planning function of management was evenly distributed and the measure between the high and low score was small and exhibits normality in planning function of management.

4.1.3 Descriptive Statistics for Planning Function of Management

Descriptive statistics were carried out on regulatory framework and the results are shown in Table 3.

Table 3: Descriptive Statistics for Regulatory Framework

Measure	Regulatory Framework
N	132
Mean	2.893
Median	3.150
Mode	2.000
Std. Deviation	1.301
Skewness	-0.001
Std. Error of Skewness	0.211
Kurtosis	-1.522
Std. Error of Kurtosis	0.419

The results from the Table 3 shows the descriptive statistics for regulatory framework. The total number of respondents in each measured was 132. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The results show that regulatory framework had a mean of 2.893, median of 3.150 and mode of 2.000. The standard deviation of 1.301 showed that the members of the group differed from the mean value of 2.893 for the group in the observation. The standard deviation of 1.301 further implies that the data points tend to be very close to the mean of the data and a high standard deviation implies that the data points are spread over a wide range of the values.

Skewness for regulatory framework was -0.001. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that regulatory framework had -1.522. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers. Regulatory framework

was evenly distributed and the measure between the high and low score was small and exhibits normality in regulatory framework.

4.1.4 Descriptive Statistics for Supply Chain Performance

Descriptive statistics were carried out on supply chain performance and the results are shown in Table 4.

Table 4: Descriptive Statistics for Supply Chain Performance

Measure	Supply Chain Performance
N	132
Mean	3.470
Median	3.500
Mode	3.500
Std. Deviation	0.402
Skewness	0.177
Std. Error of Skewness	0.211
Kurtosis	-0.169
Std. Error of Kurtosis	0.419

The results from the Table 4 shows the descriptive statistics for supply chain performance. The total number of respondents in each measured was 132. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The results show that supply chain performance had a mean of 3.470, median of 3.500 and mode of 3.500. The standard deviation of 0.402 showed that the members of the group differed from the mean value of 3.470 for the group in the observation. The standard deviation of 0.402 further implies that the data points tend to be very close to the mean of the data and a high standard deviation implies that the data points are spread over a wide range of the values.

Skewness for supply chain performance was 0.177. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that supply chain performance had -0.169. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers. Sustainability was evenly distributed and the measure between the high and low score was small and exhibits normal supply chain performance.

4.2 Correlation Analysis

Table 5 below presents the results of the correlation analysis.

Table 5: Correlation Matrix

Variables		Supply Chain Performance	International Procurement Practices	Planning function	Regulatory Framework
Supply Chain Performance	Pearson Correlation	1.000			
	Sig. (2-tailed)				
International Procurement Practices	Pearson Correlation	.739**	1.000		
	Sig. (2-tailed)	0.000			
Planning function of Management	Pearson Correlation	.730**	.515**	1.000	
	Sig. (2-tailed)	0.000	0.000		
Regulatory Framework	Pearson Correlation	.754**	.550**	.537**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	

The results in Table 5 indicated that international procurement practices was positively and significantly associated to supply chain performance ($r= 0.739$, $p=0.00<0.05$). Planning function of management was positively and significantly associated to supply chain performance ($r=0.730$, $p=0.00<0.05$). Regulatory framework was positively and significantly associated to supply chain performance ($r=0.754$, $p=0.00<0.05$). This was an indication that international procurement practices, planning function of management and regulatory framework portrayed a strong connection with and supply chain performance.

4.3 Hypothesis Testing

The objective of the study was to establish if the joint intervening effect of planning function of management and moderating effect of regulatory framework on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya is significantly different from their separate effect. The hypothesis stated in the null form is as follows:

Ho: The joint intervening effect of planning function of management and moderating effect of regulatory framework has no significant effect on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya from their separate effect.

The individual and combined regression coefficients for the independent international procurement practices, planning function of management, regulatory framework and supply chain

performance were performed. The joint effect was analyzed in 4 models as guided by the following models:

$$SCP = \beta_0 + \beta_{13}IPP + e$$

$$SCP = \beta_0 + \beta_{14}PFM + e$$

$$SCP = \beta_0 + \beta_{15}RF + e$$

$$SCP = \beta_0 + \beta_{16}IPP + \beta_{17}PFM + \beta_{18}RF + \beta_{19}IPP*PFM + \beta_{20}IPP*RF + \beta_{21}PFM*RF + \beta_{22}IPP*PFM*RF + e$$

The R² for international procurement practices, planning function of management, regulatory framework and supply chain performance are as shown in Table 6.

Table 6: R² for International Procurement Practices, Planning Function of Management, Regulatory Framework and Supply Chain Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.740	0.550	0.544	0.271
2	.731	0.535	0.531	0.275
3	.755	0.570	0.566	0.265
4	.856	0.733	0.718	0.214

The results in Table 6 shows that the R squared for the first model for regressing international procurement practices against supply chain performance had 55% while the second step of regressing Planning Function of Management against supply chain performance had 66.4%. The third step which regressed planning function of management against supply chain performance had 53.5%. The third step where regulatory framework was regressed against supply chain performance had 57.0%. In the last step where the joint model of international procurement practices; planning function of management; regulatory framework; the interaction of international procurement practices and regulatory framework (IPP*RF); the interaction term of international procurement practices and planning function of management (IPP*PFM); the interaction term of planning function of management and regulatory framework (PFM*RF); and lastly the interaction term of international procurement practices, planning function of management, regulatory framework (IPP*PFM*RF) against supply chain performance. The Rsquare for the joint model was the highest at 73.3% were above 50% and thus indicated a high level of variation between the variables.

The ANOVA for international procurement practices, planning function of management, regulatory framework and supply chain performance is a shown in Table 7.

Table 7: ANOVA for International Procurement Practices, Planning Function of Management, Regulatory Framework and Supply Chain Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.589	1	11.589	157.57	.000
	Residual	9.562	130	0.074		
	Total	21.151	131			
2	Regression	11.306	1	11.306	149.295	.000
	Residual	9.845	130	0.076		
	Total	21.151	131			
3	Regression	12.051	1	12.051	172.155	.000
	Residual	9.1	130	0.07		
	Total	21.151	131			
4	Regression	15.498	7	2.214	48.561	.000
	Residual	5.653	124	0.046		
	Total	21.151	131			

The ANOVA results indicated that all the four models were significant at $0.000 < 0.05$. The F-Statistic for model one was ($F=157.57$, $p = 0.000 < 0.05$), the F-Statistic for Model two was ($F=149.295$, $p = 0.000 < 0.05$), the F-Statistic for model three was $F=172.155$, $P = 0.000 < 0.05$. Lastly, the F-Statistic for the joint model four was $F=48.561$, $P = 0.000 < 0.05$. The joint regression coefficients international procurement practices, planning function of management, regulatory framework and supply chain performance is a shown in Table 8.

Table 8: Regression Coefficients International Procurement Practices, Planning Function of Management, Regulatory Framework and Supply Chain Performance

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	2.83	0.056		50.398	0.000
	International Procurement Practices	0.224	0.018	0.74	12.553	0.000
2	(Constant)	2.821	0.058		48.454	0.000
	Planning function of Management	0.222	0.018	0.731	12.219	0.000
3	(Constant)	2.795	0.056		49.632	0.000
	Regulatory Framework	0.233	0.018	0.755	13.121	0.000
4	(Constant)	2.035	0.125		16.246	0.000
	International Procurement Practices	0.017	0.03	0.055	0.546	0.586
	Planning function of Management	0.001	0.032	0.002	0.024	0.981
	Regulatory Framework	0.028	0.033	0.09	0.845	0.400
	IPP*RF	0.294	0.046	0.436	6.373	0.000
	IPP*PFM	0.005	0.005	0.082	0.999	0.320
	PFM*RF	0.007	0.003	0.127	2.141	0.034
	IPP*PFM*RF	0.003	0.001	0.222	2.333	0.021

The regression of coefficients results shows that in step one, the regression model of supply chain performance on international procurement practices was significant with $\beta=0.224$, $p=0.000<0.05$) and supported by $T_{\text{Calculated}}=(1, 131)=12.513> T_{\text{Critical}}(0.05, 131)= 1.658$.

In step two, the results show that the regression model of planning function of management on supply chain performance was significant with ($\beta=0.222$, $p=0.000$) and supported by $T_{\text{Calculated}}=(1, 131)= 12.553 > T_{\text{Critical}}(0.05, 131)= 1.658$. In step three, the results show that the regression model of regulatory framework on supply chain performance was significant with ($\beta=0.233$, $p=0.000$) and supported by $T_{\text{Calculated}}=(1, 131)=13.121 > T_{\text{Critical}}(0.05, 131)= 1.658$. In step four where the joint model was conducted, the results show that the joint model IPP*PFM*RF was positive and significant at ($\beta=0.003$, $p=0.021$) 0.003 and supported by $T_{\text{Calculated}}=(1, 131)=2.333> T_{\text{Critical}}(0.05, 131)= 1.658$).

The fitted models were:

$$\text{SCP}= 2.83+ 0.224\text{IPP}$$

$$\text{SCP}= 2.821+ 0.222\text{PFM}$$

$$\text{SCP}= 2.795 + 0.233\text{RF}$$

$$\text{SCP}= 2.035+ 0.017\text{IPP}+ 0.001\text{PFM}+ 0.028\text{RF}+ 0.005\text{IPP*PFM}+ 0.294\text{IPP*RF}+ 0.007\text{PFM*RF}+ 0.003\text{IPP*PFM*RF}$$

Where;

SCP= Supply Chain Performance

IPP= International Procurement Practices

PFM= Planning function of Management

RF= Regulatory Framework

IPP*RF= interaction term of International Procurement Practices* Regulatory Framework

IPP*RF = interaction term of International Procurement Practices* Regulatory Framework

IPP*PFM= interaction term of International Procurement Practices* Planning function of Management

PFM*RF= interaction term of Planning function of Management* Regulatory Framework

IPP*PFM*RF= interaction term of International Procurement Practices* Planning function of Management* Regulatory Framework

Since the P value of the joint interaction term (IPP*PFM*RF) is $0.021< 0.05$ and the R^2 increased from 19%, 20% and 16% to 73% at the joint model, thus, we conclude that the joint effect of international procurement practices, planning function of management and regulatory framework on supply chain performance of energy development agencies in Kenya is significantly different from their separate effects. The study thus rejected the null hypothesis and adopted the alternative hypothesis that the joint intervening effect of planning function of management and moderating effect of regulatory framework have a significant effect on the relationship between international procurement practices and the supply chain performance of energy development agencies in Kenya is significantly different from their separate effect.

4.4 Discussions

The objective of the study was to examine if the joint effect of international procurement practices, planning function of management and regulatory framework on the supply chain performance of energy development agencies in Kenya is significantly different from their separate effects. The individual and combined regression coefficients for the independent international procurement practices, planning function of management, regulatory framework and supply chain performance were performed. The individual and combined regression coefficients for the independent international procurement practices, planning function of management, regulatory framework and supply chain performance were performed. The joint effect was analyzed in 4 models.

The Rsquare for the first model for regressing international procurement practices against supply chain performance had 55% while the second step of regressing Planning Function of Management against supply chain performance had 66.4%. The third step which regressed planning function of management against supply chain performance had 53.5%. The third step where regulatory framework was regressed against supply chain performance had 57.0%. In the last step where the joint model of international procurement practices; planning function of management; regulatory framework; the interaction of international procurement practices and regulatory framework (IPP*RF); the interaction term of international procurement practices and planning function of management (IPP*PFM); the interaction term of planning function of management and regulatory framework (PFM*RF); and lastly the interaction term of international procurement practices, planning function of management, regulatory framework (IPP*PFM*RF) against supply chain performance. The Rsquare for the joint model was the highest at 73.3% were above 50% and thus indicated a high level of variation between the variables

The ANOVA results indicated that all the four models were significant at $0.000 < 0.05$. The F-Statistic for model one was ($F=157.57$, $p = 0.000 < 0.05$), the F-Statistic for Model two was ($F=149.295$, $p = 0.000 < 0.05$), the F-Statistic for model three was $F=172.155$, $P = 0.000 < 0.05$. Lastly, the F-Statistic for the joint model four was $F=48.561$, $P = 0.000 < 0.05$. The regression of coefficients results shows that in step one, the regression model of supply chain performance on international procurement practices was significant with $\beta=0.224$, $p=0.000 < 0.05$) and supported by $T_{\text{Calculated}}=(1, 131)=12.513 > T_{\text{Critical}}(0.05, 131)= 1.658$. In step two, the results show that the regression model of planning function of management on supply chain performance was significant with ($\beta=0.222$, $p=0.000$) and supported by $T_{\text{Calculated}}=(1, 131)= 12.553 > T_{\text{Critical}}(0.05, 131)= 1.658$. In step three, the results show that the regression model of regulatory framework on supply chain performance was significant with ($\beta=0.233$, $p=0.000$) and supported by $T_{\text{Calculated}}=(1, 131)=13.121 > T_{\text{Critical}}(0.05, 131)= 1.658$. In step four where the joint model was conducted, the results show that the joint model IPP*PFM*RF was positive and significant at ($\beta=0.003$, $p=0.021$) 0.003 and supported by $T_{\text{Calculated}}=(1, 131)=2.333 > T_{\text{Critical}}(0.05, 131)= 1.658$.

Since the P value of the joint interaction term (IPP*PFM*RF) is $0.021 < 0.05$ and the R^2 increased from 19%, 20% and 16% to 73%% at the joint model, thus, we conclude that the joint effect of international procurement practices, planning function of management and regulatory framework on supply chain performance of energy development agencies in Kenya is not significantly different from their separate effects. The study thus rejected the null hypothesis and adopted the alternative hypothesis that the joint effect of international procurement practices, intervening effect of planning function of management and moderating effect of regulatory framework on supply chain performance of energy development agencies in Kenya is significantly different from their separate effects.

The results are consistent with Licenji (2015) and established that supply chains are becoming increasingly complex; there are numerous elements in the supply chain that may stop companies from achieving their business objectives unless they embrace good procurement practices. In addition, regulations help in measuring the performance of procurement and is found to benefit organizations such as enhanced profitability, cost reduction, constant and reliable supplies, quality enhancements and competitive advantage. The study by Licenji (2015) further highlighted that in today's highly competitive environment, supply chain performance is very important for the continued existence of firms because customers judge the performance of firms based on their supply chain performance. The results are in perspective with Anderson (2011) who reported that government purchasing has more involving procedures consisting of a variety of phases with different sets of regulations governing those phases. As compared to the private sector, public agencies would not enter into contracts with other parties when and how they prefer. There are specific regulatory frameworks for the government to abide by with respect to when, how, and with whom to enter into contracts. Public procurement regulations are different according to different jurisdictions, in systems operating under the rule of law, they share major governing principles such as transparency, competition and accountability.

The study findings are also consistent with Weishaar (2013) after undertaking comparative analysis of procurement practices in different countries concluded that the inception of legislation in different countries has had a number of effects, namely: procurement legislation helps to get the best sources of goods and services in the market by establishing the best suppliers to contract, reduction of supply base opens up the way to higher degree of efficiency in procurement performance which in turn translates to success in an organization's performance; procurement systems in the public sector maximize overall value for money for citizens mainly due to the following: considerations of issues such as fair play, client satisfaction, public interest, justice, honesty and equity; and the application of the highest ethical standards in public procurement helps to a large extent in ensuring value for public resources and national development.

Mburu (2017) study found that contracting, comprehensive outsourcing, licensing agreement and selective outsourcing strategies were main determinants of procurement performance of universities in Kenya. The target population was all university (66) entities in Kenya. The study collected both primary and secondary data. The study recommends that universities should put more emphasis on training and information sharing in order to improve procurement performance, all procurement process should be automated so as to reduce the error rates and discrepancies in the process and align their procurement procedures to Public Procurement and Disposal Act since efficient procurement process could be used as competitive advantage. Ristovska, Kozuharov and Petkovski, (2017) findings of the study revealed that reducing cost of each logistics activity influences the total amount of costs and enhances company's performance. The study determined and defined the logistics activities that are of key importance to the company's success. The study was conducted on a sample of eighty examinees from eighty different companies in the Republic of Macedonia. Adequate inventory, storage, warehousing, transport and information management are key targets for logistics managers in order to reduce the overall costs of the company. Findings include the confirmation of the necessity of logistics managers to optimally manage all logistics activities in order to gain increased business efficiency, customer satisfaction and competitiveness.

Oballah, Waiganjo, and Wachiuri (2015) study revealed that inventory investment and inventory records accuracy have a positive influence on organizational performance while inventory shrinkage have a negative effect on organizational performance thus recommended that the

hospital should ensure that losses resulting to inventory shrinkage related to medicines are reduced. This can be done by ensuring that inventory records are accurately kept. A study by Masudin, Kamara, Zulfikarijah and Dewi (2018) found that automated procurement practice like e-product enhance organizational performance; implementation of world class procurement practices also enhance organizational performance. The study also found that inventory management enhance organizational performance.

5.0 Conclusions

The study concluded that the joint effect of international procurement practices, planning function of management and regulatory framework on supply chain performance of energy development agencies in Kenya is not significantly different from their separate effects. Supply chain performance where the combined input of international procurement practices, planning function of management, regulatory framework are enjoined in supply chain of the energy development agencies compared to their individual effects. The international procurement practices consisting of international sourcing, international supplier evaluation, contract administration and monitoring practices, ethical procurement practices, planning and following the laid regulatory frameworks were found to work best jointly as the supply chain process range from compliance with cross tough border laws and regulations, communication barriers, fluctuating currency exchange rates and payment, tight customs regulations, lead-time, transportation, foreign government regulations and trade agreements.

6.0 Recommendations

The study recommended that the management of energy corporations should put measures in place to ensure that all the drawn ethical policies and codes are adhered to by all the supply chain staff as well as by the suppliers that they deal with. The energy corporations should therefore firmly deal with conflicts of interest in supply chain, ensure fair dealings with the suppliers, treat suppliers' information with utmost confidentiality and adhere strictly to all their ethical policy statements, so as to improve their supply chain performance. Since the establishment of corruption prevention committees is not entrenched in our public procurement law, the study also recommended that the management of all the energy corporations should establish corruption prevention committees that will be mandated with ensuring that all corruption, fraudulent, coercive and collusive practices are prevented and firmly dealt with.

For the best supply chain performance in the energy corporations, the management should maintain the highest standards of integrity in its everyday dealings. Where senior management behaves dishonestly, corruption and fraud will spread to all levels. Management's responsibility is to set the highest standards of integrity and to be an example for everybody in the organization to follow. Managers should also point out correct behavior to employees and draw the line between acceptable and unacceptable behavior. Management is also ultimately responsible for the operations and assets under their command. It is their responsibility, and in their interest, to ensure that the organization has the necessary procedures and control systems in place to ensure maximum security and minimize the risk of corruption and fraud.

The policy on financial approval for supply chain actions should be clearly communicated to all relevant staff. The consequence of abuse should be defined. Approval levels should not be set artificially low, but at a realistic level sufficient to enable employees to do their jobs efficiently. Standard terms and conditions of contract, and standard forms should be included in all solicitation documents as well as in all contracts and purchase orders. Standard forms used in supply chain

should be developed. Lastly, the study recommends on the adoption of new advanced technology in e-procurement for goods and services.

7.0 References

- Chen, I. J., & Paulraj, A. (2004). Understanding supply chain management: critical research and a theoretical framework. *International Journal of production research*, 42(1), 131-163.
- Chokshi, M., Farooqui, H. H., Selvaraj, S., & Kumar, P. (2015). A cross-sectional survey of the models in Bihar and Tamil Nadu, India for pooled procurement of medicines. *WHO South-East Asia journal of public health*, 4(1), 78.
- Disdier, A. C., Fontagné, L., & Tresa, E. (2018). Public Procurement-Related Protection: Insights from the Global Trade Alert Database.
- European Commission (2016). *Report from the Commission to the Council and the European Parliament - EU Anti-Corruption Report*, accessed online on 8 June 2018 at http://ec.europa.eu/dgs/home-affairs/e-library/documents/policies/organized-crime-and-human-trafficking/corruption/docs/acr_2016_en.pdf
- Golafshani, K. (2003). Entry regulation as a barrier to entrepreneurship. *Journal of Financial Economics*, 82,591-629.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American journal of sociology*, 91(3), 481-510.
- Handfield, R.B., & Nichols Jr., E.L. (2012). *Introduction to Supply Chain Management*. Upper Saddle River, NJ: Prentice-Hall.
- Kamotho, K. D. (2014). *E-Procurement and procurement performance among state corporations in Kenya*. University of Nairobi.
- Kenya Trade Network Agency (Kentrade) (2016). *Procurement Review Report*. Available from:<http://www.ppoa.go.ke/images/downloads/review-reports>
Kenyan Energy Sector (University of Nairobi).
- Kusi, L. Y., Aggrey, G. A., & Nyarku, K. M. (2014). Assessment of Public Procurement Policy Implementation in the Educational Sector (A Case Study of Takoradi Polytechnic). *International Journal of Academic Research in Business and Social Sciences*, 4(10), 260.
- Lysons (2016), *Procurement and Supply chain management* 8th Edition, New York: Prentice Hall publishers.
- Ministry of Energy Agencies (2019). *Semi-Autonomous Agencies in the State Department of Energy*. Retrieved from: <http://energy.go.ke/energy/> on 24th January 2019.
- Molenaar, K. R., Sobin, N., & Antillón, E. I. (2010). A synthesis of best-value procurement practices for sustainable design-build projects in the public sector. *Journal of Green Building*, 5(4), 148-157.
- Mrope, N. P., Namusonge, G. S., & Iravo, M. A. (2017). Does Compliance with Rules Ensure Better Performance? An Assessment of the Effect of Compliance with Procurement Legal and Regulatory Framework on Performance of Public Procurement in Tanzania. *European Journal of Logistics, Purchasing and Supply Chain Management*, 5(1), 40-50.
- Muange, E., & Chirchir, M. (2016). Procurement Legislation and Performance of Constituency Development Fund Committees in Kenya. *International Journal of Supply Chain Management*, 1(1), 19-33.

- Nantege, G. (2011). *Procurement management and financial performance of banks in Uganda: case study-Fina Bank Uganda Limited* (Doctoral dissertation, Uganda Martyrs University).
- Ngugi, J. K., & Mugo, H. W. (2012). Internal factors affecting procurement process of supplies in the public sector; a survey of Kenya government ministries. In *5th International Public Procurement Conference was held on August 17th*.
- Osoro, A. (2018). *Challenges Affecting Performance of Supply Chain Systems in the Petroleum Industry in Kenya* (Doctoral dissertation, COHRED-JKUAT).
- Owili, A. (2013). E-procurement implementation and transaction cost among the Non-governmental organizations in Kenya.. *University of Nairobi, Kenya*.
- Puschmann, T., & Alt, R. (2015). Successful use of e-procurement in supply chains. *Supply Chain Management: an international journal*, 10(2), 122-133.
- Thai, K. V. (2017). International public procurement: Concepts and practices. In *International handbook of public procurement* (pp. 33-56). Routledge.
- Thoumrungroje, A. & P. Tansuhaj. B. (2017). Globalization effect and firm performance. *Journal of International Business Research*, 6(2): 43-58
- UNCTAID (2010). *Managing international Logistics* “Module 10 of ITC Modular
- World Bank (2016). *National Competitive Bidding (NCB)* [Online]. Available at <http://go.worldbank.org/QNQHR747P0>.
- Zhong, R. Y., Newman, S. T., Huang, G. Q., & Lan, S. (2016). Big Data for supply chain management in the service and manufacturing sectors: Challenges, opportunities, and future perspectives. *Computers & Industrial Engineering*, 101, 572-591.