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EFFECT OF E-PROCUREMENT ON EFFECTIVE SUPPLY CHAIN MANAGEMENT PROCESS IN ENERGY SECTOR IN KENYA

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Purpose: The purpose of the study is to assess the effect e-procurement on effective supply chain management process in energy sector in Kenya.

Methodology: The study apply the research design where both qualitative and quantitative techniques was used. The study aims at collating and collecting information from the respondents. The study employ stratified random sampling technique in coming up with sample size of 152 respondents from a total of 246 target population in the energy sector. The questionnaires were circulated to all the respondents with the help of researcher. The study used Slovin's fomula: $n=N/ (1+e^2)$ in sampling while Semi-structured questionnaire was used to collect data. Pilot study was carried out to establish the reliability and validity of the research instruments. The data were organized, edited, analyzed and interpreted using descriptive and inferential statistics with the help of statistical package for social sciences version 21. The data was analyzed and presented through a form of tables, figures, pie charts and bar charts followed by the presentation, interpretation and discussion of the findings.

Results: All the variables, that is, electronic data interchange, e-tendering, supply chain integration were found to have influence on effective supply chain management process on energy sector.

Unique Contribution to Theory Practice and policy: The study recommended that a similar research should be conducted with an aim at investigating the effects of e-procurement on supply chain management process with other variables or of other firms in other sectors, including the products industry in the Kenyan market.

Keywords: *E-Procurement, E-Tendering, Supply Chain Management*

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1.0 INTRODUCTION

1.1 Background of the Study

In today's dynamic global competitive business environment, technology-based service is no longer an afterthought; rather it is a must for public and private organizations. It has become necessary for companies to provide their customers with cost-effective total solution and better customer satisfaction with innovative ideas and methods. E-procurement has become the most important driver of change in social, political and economical aspect of life in the world. We are living in the information and communication technology age where computer and telecommunication technology are the backbone of industrial and commercial activities as well as every fact of human endeavors.

In the automation of the Supply Chain process, e-Procurement provides several advantages which every organization should consider adopting. Internet, with an added feature of multimedia advance processing capability in the 2000s, widely enabled and provided an essential resource for the automation of procurement. Supply Chain (SC) practices cannot on their own improve efficiencies individually since the efficiency can only be achieved through the interaction of various Supply Chain practices. Quality has improved, costs have been reduced, and speed has increased. Many communication channels are available like Internet, email, telephone, mobile communications, fax, video conference calls, and GPS (Raymond, 2005).

On the other hand, some companies have collapsed due to undersigned systems or use of wrong software and hardware application of management information system. Hence, the mere fact of using e-procurement does not itself automatically bring benefit to an organization, (Beynon, 2005). E-procurement has had a significant effect on purchasing philosophies, process and procedure as there is increased interdependence across national and geographical boundaries of people, trade and commerce driven in large parts by e-procurement and technology generally, (Lysons & Farrington, 2006). Procurement process involves the purchase of goods or services at the best possible cost to meet the needs of the purchaser in terms of quality and quantity, time and location. Procurement as a supply chain function has developed significantly over the decades; initially it was a purely administrative function until Porter (2006), prompted firms to think of procurement as a strategic function rather than an administrative one in his five forces model where he show cases supplier and buyer power as two critical forces for competitiveness.

Purchasing traditional procedure has had inefficiencies over a long time resulting from a sequence of non-value adding clerical procedures, excessive documentation, excessive time in order processing both internally and externally and excessive of purely transactional activities, (Lysons, 2006). It is against this background that purchasing systems have developed in line with changes in e-procurement, forcing organizational restructuring and new strategic contents of e-commerce and internet to cope with technological tide of change in e-procurement. It is acknowledged readily that e-procurement supports and boosts supply chain management and logistic strategies greatly. This has totally made a difference in development of business in the whole world, (Kaucharan, 2006). It is because of such inefficiencies that many organizations are increasingly recognizing that administrative paperwork serves merely to document a chain of events or to provide a logistical trail. Leading age purchasing organizations need to transform

this administrative function into value-added processes by reducing, eliminating or combining steps whenever possible, (Lysons & Farrington, 2006).

Computers prepare invoices, issue checks, and keep track of the movement of stock, and store personnel and payroll records. The personal computers are changing the patterns of office work, and the spread of information technology is affecting the efficiency and competitiveness of business, the structure of the work force, and the overall growth of economic output (Chismar & Kriebel, 2007). If e-procurement system is misapplied or installed without sufficient analysis of the real management or organization problem, then no benefit will be gained and money will be wasted. The impact of e-procurement should be productive increase, lead time reduction, good inventory management and fewer mistakes, (Driscoll & Dolden, 2007). Though tremendous progress has been made in supplier enablement, all involved parties end users, suppliers, and solution providers continue to work to make enablement as simple and cost effective as possible. Individual end users and entire business units will naturally resist any change in business processes that takes away buying power and buying flexibility (Lui, 2008). E-procurement is transforming the way that business is conducted.

1.1.1 The Energy Sector

Kenya Power Company is a limited Company with the main purpose of transmitting electricity. The company acquires the power in large quantities from Kenya Electricity Generating Company (KENGEN) and Independent Power Producers (IPP). Kenya Power began its operations in 1954 where the company distributed power from Tororo in Uganda under East Africa Power and Lighting Company (E.A.P.C & L), (Bounds, 1996). In 1983 East Africa Power and Lighting Company (E.A.P.C & L) was changed to Kenya Power and Lighting Company (KPLC) with the responsibility of generating, distributing and transmitting power. In 1997, Kenya Power was relived the task of generating to transmitting and distributing power only. In 2004, Energy Sector Recovery Project (ESRP) was in cooperated in the sector to boost quality, reliability and access of power supply in rural areas.

Recently, energy sector has been focusing using e-procurement on supply chain management process so as to enhancing their performance by reducing the period in which their customers are connected to electricity after their application to less than a month. The company's target is to streamline the customer connection and modernize the society through investments. The company has managed to achieve this by awarding tenders to the local manufactures such as Pan African transformers and continental transformers. As such, the company is determined to reduce lead time. Kenya's economy has remained resilient, growing at 5.5% in the second half of 2014 up from 4.7% in 2013, 4.6% in 2012 and 4.4% in 2011 due to implementation of appropriate broad-based policies leading to a stable macroeconomic environment. The setting up of county governments after the general elections held in 2013 have also impacted positively on economic growth as public expenditure rose in line with the devolved system of government. Despite this outcome, low productivity in agriculture, weak manufacturing sector and weak transport system in the face of rising imports and stagnating exports are major concerns.

Energy is a critical component in the economy, standard of living and national security of a country. The level and the intensity of energy use in a country is a key indicator of economic

growth and development. The Kenya Vision 2030 identified energy as one of the infrastructure enablers of its socio-economic pillar. Sustainable, competitive, affordable and reliable energy for all citizens is a key factor in realization of the Vision

1.2 Statement of the Problem

Procurement function has been one of the vital departments in any organization. It contributes tremendously to the organizational efficiency and effectiveness. The problems of e-procurement and effective supply chain management process are expanded in this environment due to a number of factors: costs and available resources, expertise levels and technical skills, and the nature of technology. Organizations continue to face business related problems like collection of timely reliable and accurate information, processing, storing, and retrieval for decision making and control of the organization. As compared to modern based e-procurement, traditional procurement was paper-based and conversation-based (Bartezzaghi & Ronchi, 2006). According to Stratman, (2007) poor records management, documentation and filing system, lack of proper procurement planning and effective post award contract management, inconsistency in making mandatory reporting to Public procurement oversight authority and lack of use of standard requisitions were a clear indication of a failed process.

However, most of the studies conducted in this area are limited to various sectors. There are therefore, little known empirical study on the role of information technology on supply chain management process. Therefore, given the above scenario, the researcher is found imperative and therefore, this study intends to bridge knowledge gap and effect of e-procurement on effective supply chain management process in energy sector in Kenya. The independent variables are; Electronic data interchange, e-tendering, supply chain integration and enterprise resource planning whereas the dependent variables is the effective supply chain management process.

LITERATURE REVIEW

In this 21st century, the internet and internet-based technologies are impacting business in several ways. These new technologies are promising to save costs, to improve customer and supplier relationships, business processes and performance, and to open new business opportunities. These technologies allow organizations to respond better to existing challenges and improve the anticipation of future developments. As with the case with earlier innovations, rich multi-facetted interactions are occurring between developments in the place, global business environment, work environments, and technical innovations (Thompson & Cats-Baril 2003). One area that has recently and significantly gained attention is the Business-to-Business (B2B) procurement that encompasses of goods and services as well as higher-level management tasks and logistics. Even if the benefits of adoption and the potential strategic implications of technology are the list of impediments for an organization includes items that are major potential barriers for an effective adoption: risk, uncertainty, inefficiencies from supplier and catalogue-content.

E-tendering is an electronic procurement system whose wider application context is e-business. E-business refers to the implementation of business activities through digital technologies over

the internet (or extranet) (Piderit *et al.,* 2011). E-procurement system can improve the effectiveness of operation processes and transparency of supply chain (Ochara, 2011). Ribarsky, (2013) also defines e-tendering as the electronic integration and management of all supply chain activities including purchase request, authorization, ordering delivery and payment, between a purchaser and the supplier. E-tendering systems is probable means in reducing operation costs allowing wider choice of products, deducting manual order processing costs and administrative costs. E-tendering is an electronic system used to automate all of the supply chain function by enabling the scanning, storage and retrieval of invoice and other documents, management approvals; routing of authorization requests; interfaces to other finance systems and matching documents to validate transactions.

According to Connolly and Olson, (2010), e-procurement is the one of the largest drivers of change in any industry. As much as e-business technologies have great potential to influence the direction of the productivity in an organization, the willingness to adopt is determined by a number of factors among them, reduction of transaction Costs, improvement of customer service quality, defensive reaction to competitor's adoption, requirement by customers that their suppliers link their system as a condition for doing business, Thong (2011). These factors take into consideration companies' external environment. Supply chain complexity refers to the number of entities interacting with a particular company. In addition it takes into account the number of suppliers, their proximity as well as the complexity of transactions. Critical mass of users reflects the number and importance of supply chain partners that are using ICT applications (Markus, 2013). The level of collaboration is another important factor, Long term relationships among firms which are characterized by trust have proved to facilitate electronic integration (Konsynski & McFarlan, 2011).

Enterprise resource planning (ERP) integrates internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders (Telgen, Zomer, & de Boer, 2007). Enterprise resource planning (ERP) as an extension of material requirements planning (MRP), later accounting resource planning and computer-integrated accounting.

3.0 RESEARCH METHODOLOGY

The study utilized a descriptive research design. The target population of this study was 246 staff members from the energy sector in various subsectors who are directly relate to area of study. The study used stratified random sampling technique in choosing the sample size from the various energy sector A total sample size of 152 respondents was taken. The study used questionnaires to collect the required data. Descriptive statistics was used mainly to summarize the data. SPSS was used for analysing complex data. Data presentation was through the use of pie charts, bar charts, graphs and frequency tables. Regression analysis was used to establish the relationship between the independent and dependent variables.

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4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Demographic Data

4.1.1 Gender of the Respondents

The study sought to determine the respondent's gender. The findings indicate that most of the respondents were male at 66% while 34% of the respondents were female. Fawcett *et al* (2008) found that organizations with gender balance were motivated to perform better towards organizational goals as women and men compete favorably to deliver on their assignments.

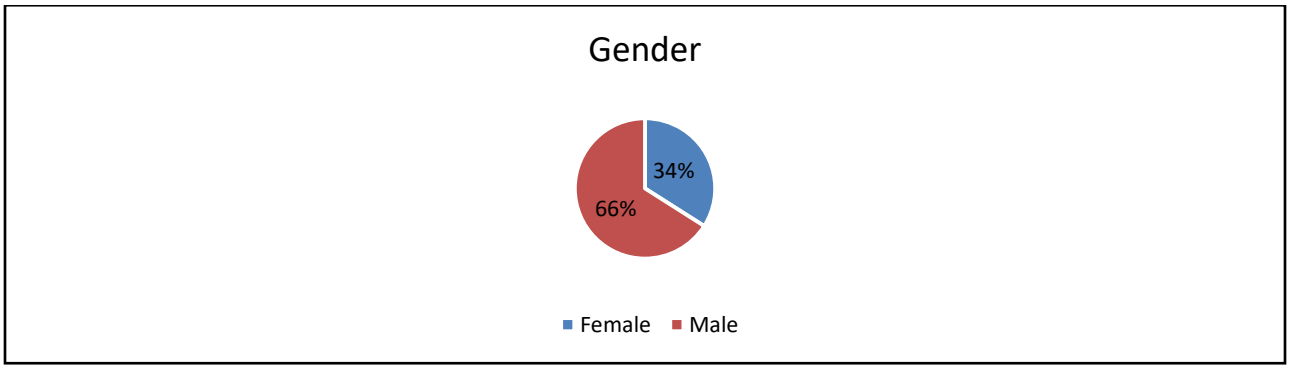

Figure 1: Gender of the Respondents

4.1.2 Age of the Respondents

The respondents were requested to indicate their age bracket. The results were as shown in figure 2. From the findings, 41.5% of the respondents were between 30-39 years of age, 22.3% of the respondents were 50 years and above of age, 21.5% of the respondents were 40-49 years of age and 14.6% indicated between 20-29 years. This means that a large number of those interviewed were from age between 30 and 39 years give accurate information.

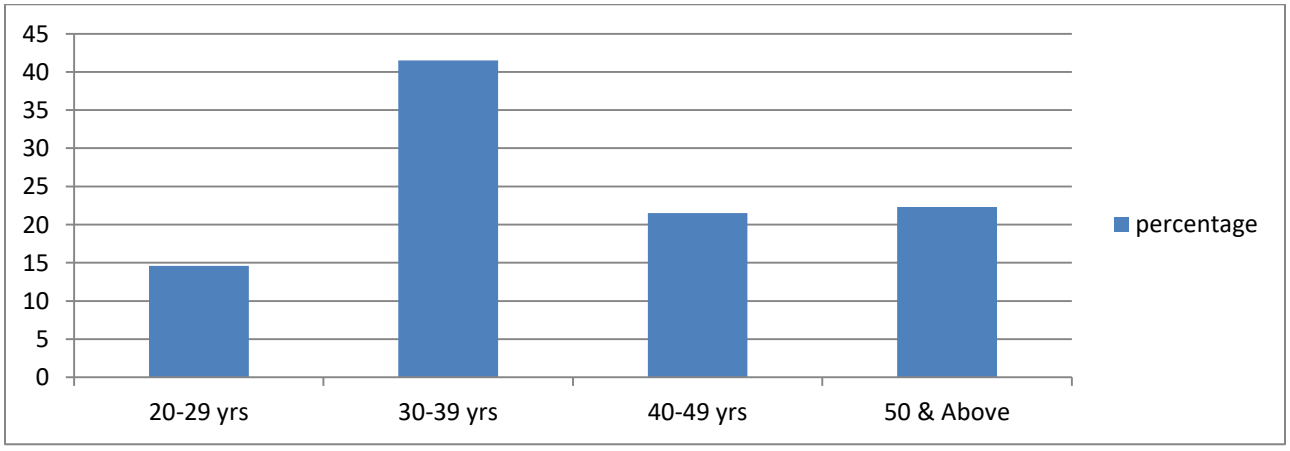

Figure 2 Age bracket of the respondents

4.1.3 Highest level of Education

The respondents were further requested to indicate their highest level of education. The results were as presented in figure 3. According to the findings, 40.8% of the respondents indicated that they had university education as their highest level of education, 32.3% had Diplomas, 16.9% indicated that they had postgraduate and 10% indicated that they had secondary education as their highest level of education. This shows that most of the staff in the energy sector had university education as their highest level of education.

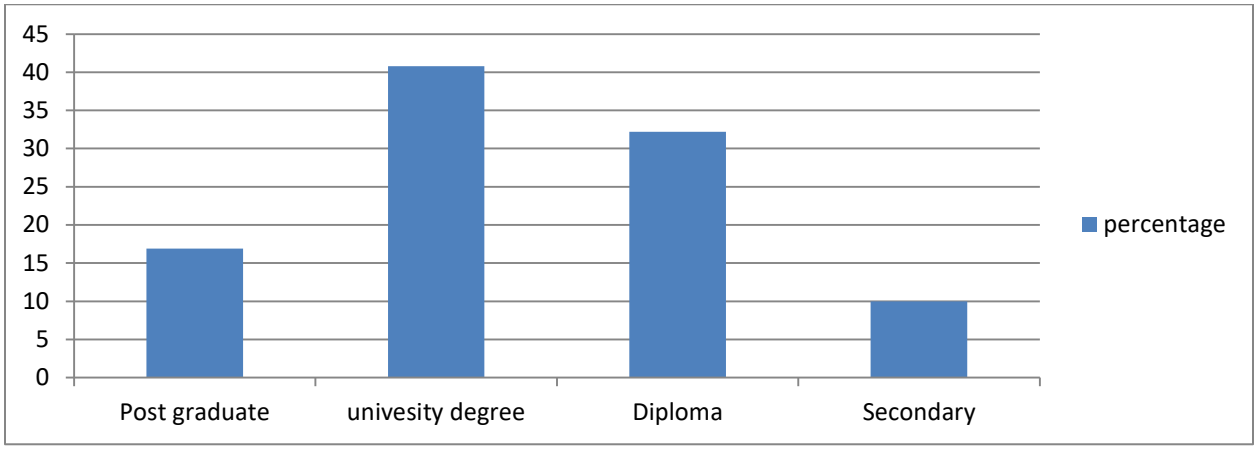

Figure 3: Respondents' Highest Level of Education

4.1.4 Highest level of Education

The respondents were asked to indicate the duration of time that they had worked in the energy sector. The results were as presented in figure 4. From figure 4. 56.2% of the respondents reported that they had been working in their institution for between 6 and 9 years, 22.3% indicated for between 2 and 5 years, 13.1% indicated between 10 and 13 years and 8.5% indicated for less than 2 years. This implies that most of the staff in the subsector in the energy sector in Kenya had been working in their institution for between 6 and 9 years.

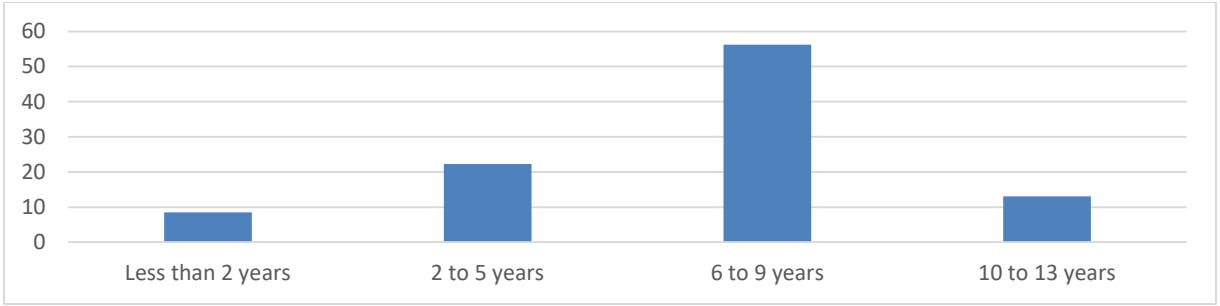

Figure 4: Duration Worked in the Energy Sector

4.2 Results and Discussion

4.2.1 Electronic Data Interchange in Effective Supply Chain Management Process

The respondents were requested to indicate the extent to which electronic data interchange influences effective supply chain management process in the energy sector in Kenya. The results were as shown in figure 5. According to the findings, 50% of the respondents indicated that electronic data interchange influences effective supply chain management process in the energy sector to a great extent, 20% indicated to a very great, 16.9% indicated to a moderate extent and 3.1% indicated to a low extent. This implies that electronic data interchange influences effective supply chain management process in the energy sector to a great extent.

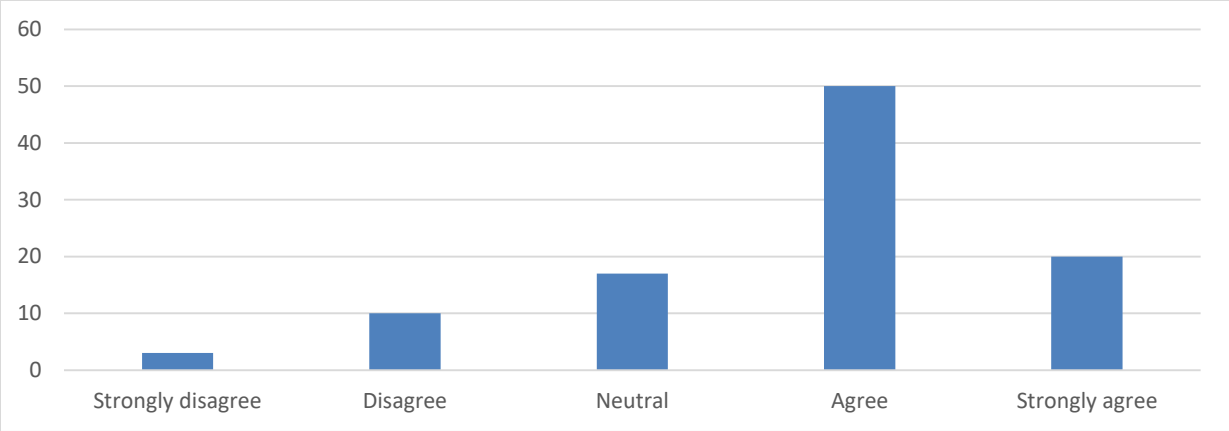

Figure 4.5: Influence of Electronic Data Interchange on Effective Supply Chain

The respondents were asked to indicate the extent of usage of elements of electronic data interchange in its effective supply chain management process in the energy sector. The results were as shown in Table 1. From the findings, the respondents indicated that they used direct communication of structured business information in their organization to a great extent (M=4.053) and they used automatic transfer of information to a great extent as shown by mean of 4.0154. Further, the respondents indicated that they used automated order processing and real-time visibility into transaction status to great extent as indicted as indicated by means of 3.9846 and 3.9769, respectively. The respondents further indicated that they used automated order processing in their organization to a great extent as indicated by mean of 3.9615.

Table 1: Usage of Electronic Data Interchange in Supply Chain Management Process

	Mean	Sd. Deviation
Automatic transfer of information	4.015	0.797
Automatic order processing	3.961	0.810
Real-time visibility into transaction	3.976	0.751
Direct communication of structured business information	4.053	0.856

The respondents were asked to indicate whether electronic data interchange influences effective supply chain management process of the energy sector. The results were as presented in figure 6. According to the findings, 88% of the respondents indicated that electronic data interchange influences effective supply chain management process of the energy sector while 12 % indicated otherwise. This electronic data interchange influences effective supply chain management process of the energy sector in Kenya..

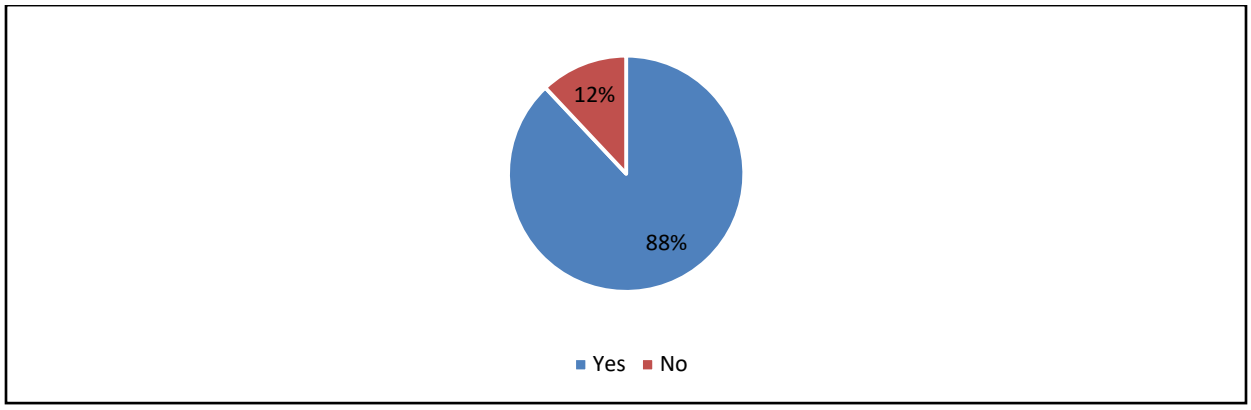

Figure 4.6: Electronic Data Interchange and Effective Supply Chain Management Process

4.2.2 E-Tendering in Effective Supply Chain Management Process

The respondents were asked to indicate the effective supply chain management process that their organizations used e-tendering. The results were as presented in Table2. From the findings, 76.2% of the respondents indicated that e-tendering was used in prequalification of suppliers stage of supply chain management process in the energy sector, 72.3% indicated that it was used in the invitation of bids and submission of bids stages and 71.5 % indicated that they agreed that e-tendering was used in evaluation of bids stage in supply chain management process in the energy sector. This implies that electronic tendering was used in the prequalification of suppliers, evaluation of bids, invitation of bids and submission of bids.

Table 2: E-Tendering in Effective Supply Chain Management Process

	Frequency		Percent	
	Yes	**No**	**Yes**	**No**
Prequalification of suppliers	99	31	76.2	23.8
Invitation of bids	94	36	72.3	27.7
Submission of bids	94	36	72.3	27.7
Evaluation of bids	93	37	71.5	28.5

The respondents were asked to indicate how their organizations used various elements of e-tendering in the effective supply chain management process. The results were as shown in table

3. According to the findings, the respondents indicated that energy sector used e-evaluation element of e-tendering in its effective supply chain management process to a great extent as indicated by a mean of 4.046. The respondents also indicted that the energy sector was using e-bidding in its supply chain to a great extent (4.000). Further, the respondents indicated that energy sector was using e-sourcing in its supply chain to a great extent as shown by mean of 3.969. Also, the respondents indicated with a mean of 3.961 that the energy sector was using electronic authorization and e-payment in a great extent.

Table 3 Usage of E-Tendering in its Effective Supply Chain Management Process

	Mean	Std. Deviation
E-sourcing	3.969	0.806
E-bidding	4.000	0.736
Electronic authorization	3.961	0.751
E-payment	3.961	0.781
E-evaluation	4.046	0.852

4.2.3 Effect of Supply Integration in Effective Supply Chain Management Process

The respondents were asked to indicate the extent to which supply chain integration influences to the effective supply chain management process in energy sector in Kenya. The results were as presented in the table 4. According to the findings, 53.8% of the respondents indicated that supply chain integration influences effective supply chain management process of energy sector in Kenya to great extent, 26.9% Indicated to a very great extent, 13.1% indicated to a moderate extent and 6.2% indicated to a low extent. This implies that supply chain integration influences effective supply chain management process of the energy sector to great extent.

Table 4: Extent of Supply Chain Integration on Effective Supply Chain Management Process

	Frequency	Percent
Low extent	8	6.2
Moderate extent	17	13.1
Great extent	70	53.8
Very great extent	35	26.9
Total	130	100

The respondents were asked to indicate the factors influencing supply chain management process in the energy sector. The results were as presented in table 5. From this findings, 80.8% of the respondents indicated that policies governing integration influenced supply chain integration in the energy sector, 80% indicated that the level of trust with suppliers influences supply chain integration and 78.5% indicated compatibility of e-procurement influences supply chain integration. These findings imply that level of policies governing integration, trust with suppliers

and compatibility of information systems were affecting supply chain integration in energy sector in Kenya

Table 5: Factors influencing supply chain integration

	Frequency		Percent	
	Yes	No	Yes	No
Level of trust with suppliers	104	26	80	20
Policies governing integration	105	25	80.8	19.2
Compatibility of information systems	102	28	78.5	21.5

The respondents were requested to indicate how they used various elements of supply chain integration in the energy sector. The results were as presented in table 6.

Table 6: Usage of Supply Chain Integration

	Mean	Std. Deviation
Information sharing	4.000	0.681
Buyer-seller relationship	4.069	0.661
Organization coordination	3.969	0.714
Customer and supplier integration	3.961	0.761
E-Briefing/ Debriefing	4.061	0.765
Corporate responsibility with stake-holders	4.030	0.714

The respondents were requested to indicate how supply chain integration affected the supply chain management process in the energy sector. The results were as shown in figure 7. According to the findings, 66% of the respondents indicated that supply chain integration affected the effective supply chain management process in the energy sector while 34% indicated otherwise. This implies that supply chain integration affects the effective supply chain management process in energy sector in Kenya. These findings agree with Ojha and Pandey (2014) argument that supply chain integration influences the effective supply chain management process in public institutions.

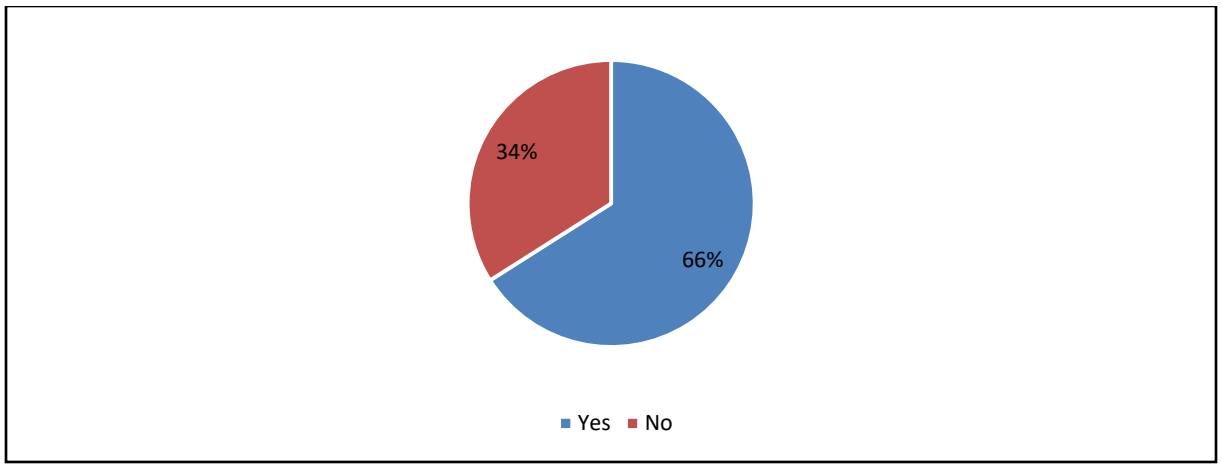

Figure7: Ways that supply chain integration on the effective supply chain management process

The respondents indicated that supply chain integration influences effective supply chain management process by increasing competitive advantage when firms are highly integrated over their competitors due to the increased information visibility and operational knowledge shared among members of their supply chain, as well as the reduction of the overall supply chain costs.

4.2.4 Enterprise Resource Planning in Effective Supply Chain Management Process

The respondents were asked to indicate the extent to which enterprise resource planning affected the effective supply chain management process in energy sector in Kenya. The results were as presented in table 7. According to the findings, 38.5% of the respondents indicated that enterprise resource planning influences effective supply chain management process of the energy sector to a very great extent, 34.6% of indicated to a great extent, 22.3% indicated to a moderate extent and 4.6% indicated to a no extent at all. This implies that enterprise resource planning influences effective supply chain management process of the energy sector in Kenya to a very great extent.

Table 7: Enterprise Resource Planning on the Effective Supply Chain Management Process

	Frequency	Percentage
No extent at all	6	4.6
Moderate extent	29	22.3
Great extent	45	34.6
Very great extent	50	38.5
Total	**130**	**100**

The respondents were requested to indicate enterprise resource planning system that they used in the organization. The results were as shown in table 4.10. From the findings, 57.7% of the

respondents indicated that they used Columns resource planning systems in their organization, 32.3% indicated they used ACCPAC, 6.2% indicated they used Oracle and 3.8% indicated they did not know the type of resource planning system their organization used. This shows that most of the staff in the energy sector in Kenya used columns and ACCPAC resource planning system in the energy sector.

Table 8: Types of Enterprise Resource Planning System

	Frequency	Percent
Oracle	8	6.2
ACCPAC	42	32.3
Columns	75	57.7
I don`t know	5	3.8
Total	**130**	**100**

The respondents were asked to indicate the extent to which their organization used various elements of resource planning in effective supply chain management process. The results were as presented in Table 9. According to the findings, the respondents indicated that they used budgeting in effective supply chain management process to a great extend as shown by a mean of 4.192. The respondents also indicated with a mean of 4.169 that the energy sector used shipping of products in its supply chain to a great extent. The respondents further indicated with a mean of 4.138 that their organization used warehousing to a great extent. In addition, the respondents indicated they used material flow and the flow information in the energy sector to a great extent as indicated by means of 4.046 and 4.123 respectively.

Table 9: Usage of Enterprise Resource Planning in its Effective Supply Chain Management Process

	Mean	Std. Deviation
Budgeting	4.192	0.727
Shipping of products	4.169	0.716
Warehousing	4.138	0.775
Material flow	4.046	0.852
The flow information	4.123	0.715

The respondents were asked to indicate whether Enterprise Resource Planning affected the supply chain management process in Kenya. The results were as presented in figure 8. From the findings, 67% of the respondents indicated that enterprise resource planning affected the effective supply chain management process in energy sector in Kenya while 33% disagreed. This implies that enterprise resource planning affected the effective supply chain management process in energy sector in Kenya.

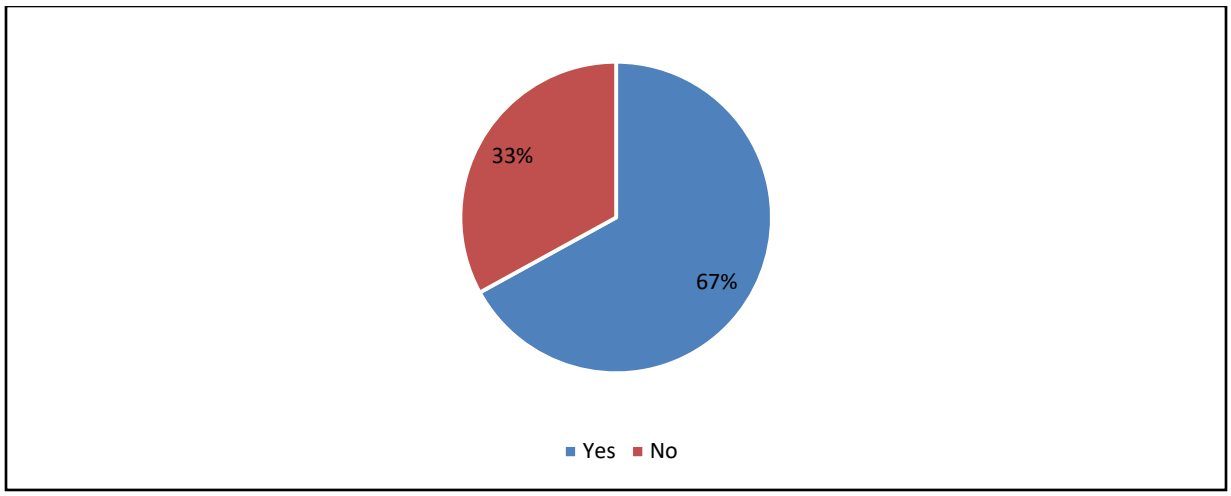

Figure 8: Enterprise Resource Planning in effective supply chain management process

The respondents indicated that enterprise resource planning influences effective supply chain management process by integration of the internal and external management information across the energy sector by facilitating the flow of information between all business functions inside the boundaries of the organization and managing the connections outside stakeholders.

4.2.5: Supply Chain Management Process

The respondents were asked to indicate whether in the last one year, customers` satisfaction with energy sector services had increased or decreased. The results were as presented in figure 9. From the findings, 84% of the respondents indicated that in the last one year, customers` satisfaction with energy sector services had increased while 16% indicated that it had decreased. This shows that in the last one year, customers` satisfaction with energy sector services had increased.

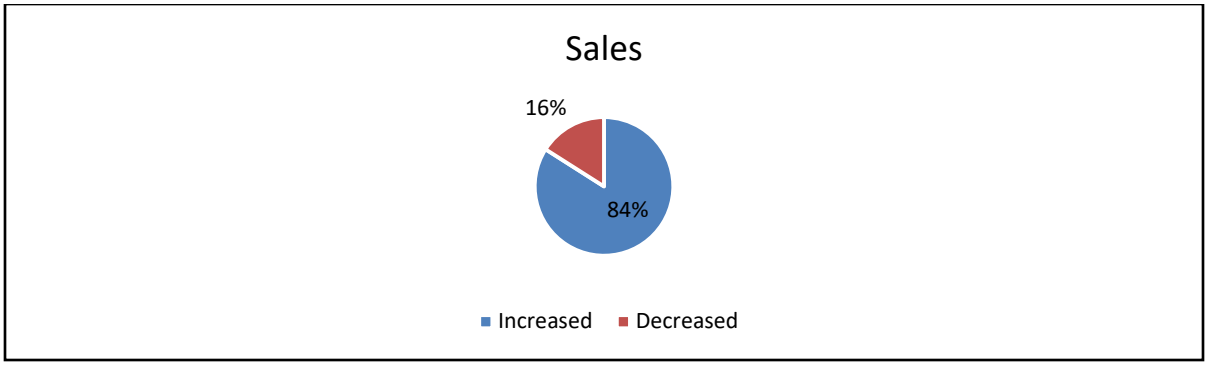

Figure 9: Customers` satisfaction with energy sector services

The respondents were asked to indicate the number of times that their organizations had experienced stock out in any of the materials required for its operations. The results were as presented in table 10. According to the findings, 53.8% of the respondents indicated that their

organizations had experienced stock out in the materials required for its operations twice, 34.7% indicated once, 7.7% indicated none times and 3.8% indicate three times. This implies that the energy sector in Kenya had experienced stock out in the materials required for its operations twice.

Table 10: Frequency of Experience of Organization Stock Out

	Frequency	Percent
None	10	7.7
Once	45	34.7
Twice	70	53.8
Three times	5	3.8
Total	**130**	**100.0**

The respondents were asked to indicate the rating f measure of supply chain management process in their organization. The results were as shown in table 11. From the findings, the respondents rated timely delivery of supply chain management process in the energy sector as good (M=4.092). In addition, efficiency in service delivery was rated as good (M=4.046). Further, the respondents rated cost minimization as good (M=4.030). Also, the respondents rated customer satisfaction as good (M=4.000).

Table 11: Ratings of the Measures of Supply Chain Management Process

	Mean	Std. Deviation
Timely delivery	4.092	0.782
Efficiency in service delivery	4.046	0.766
Cost Minimization	4.038	0.829
Customer satisfaction	4.000	0.853

4.3 Inferential Statistics

4.3.1 Correlation analysis

The study used Pearson correlation analysis to establish whether the independent variables had any influence on the dependent variable. The results indicate that there is a positive association between electronic data interchange and effective supply chain management process in energy sector (r=0.976). The relationship was significant because the p-value (0.000) was less than the significant level (0.05). In addition, the results indicated that e-tendering is very positively correlated with effective supply chain management process in the energy sector (r=0.979). The association was significant because p-value (0.000) is less than the significance level (0.000). The results also show that supply chain integration is positive associated with effective supply chain management process in the energy sector (r=0.942). The association was significant as the p-value (0.000) was less than the significant level (0.05). Further, the results show that enterprise resource planning is positively associated with effective supply chain management in the energy

sector (r=0.969)**.** The association was significant because the p-value (0.000) was less than the significance level (0.05).

Table 12: Correlation Analysis

		Effective Supply Management Process	Electronic data Interchange	E-Tendering	Supply Chain Integration	Enterprise Resource Planning	
Effective Supply Chain Management Process	Pearson Correlation	1					
	Sig (2-tailed)						
	N	130					
Electronic Data Interchange	Pearson Correlation	.976**	1				
	Sig (2-tailed)	.000					
	N	130	130				
Electronic Tendering	Pearson Correlation	.979**	.342	1			
	Sig (2-tailed)	.000	.000	.000			
	N	130	130	130			
Supply Chain Integration	Pearson Correlation	.942**	.324	.324	1		
	Sig (2-tailed)	.000	.220	.220			
	N	130	130	130	130		
Enterprise Resource Planning	Pearson Correlation	.969**	.229	.109	.342	1	
	Sig (2-tailed)	.000	.000	.000	.000		

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

4.3.2 Regression Analysis

The R-Squared is the proportion of variable in the dependent variable which can be explained by the independent variable. From the findings, the R-Squared in this study was 0.645, which shows that the four independent variables (electronic data interchange, e-tendering, supply chain integration and enterprise resource planning) can explain 64.5% of the variation in the dependent variation in the dependent variable. This clearly shows that other factors not considered in this study explain 35.5% of the variation in the dependent variable, effective supply chain management process.

Table .13 Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	0.752	0.645	0.539	0.4012

From the findings, the analysis of variance in this study was used to determine whether the model is a good fit for the data. The results indicate that the model was significant since the p-value (0.000) was less than 0.05 thus the model is statistically significance is establishing the effect of electronic data interchange, e-tendering, supply chain integration and enterprise resource planning on the effective supply chain management process. Further, the F-calculated (44.541) was found to be more than the F-critical (2.4472) which shows that the models was fit in establishing the influence of the four independent variables on the dependent variable.

Table 13: Analysis of Variance

Model		Sum of df Squares	Mean Square	F	Sig.
1	Regression	52.340	4	12.335	44.541	.000[b]
	Residual	13.10	125	0.010		
	Total	78.650	129	3.594		

From table 14, the findings show that there is a positive significant relationship between electronic data interchange and supply chain management process with a regression coefficient of 0.290. This shows that a unit increase in electronic data interchange would lead to a 0.290 improvement in supply chain management process in the energy sector in Kenya. The p-value (0.005) was less than the significance level (0.005), hence the relationship was significant. The results also show that there is a positive significant relationship between e-tendering and effective supply chain management process in the energy sector in Kenya with a regression coefficient of 0.263. This shows that a unit increase in e-tendering would lead to a 0.263 improvement in the effective supply chain management in the energy sector in Kenya. The relationship was significant as the p-value (0.002) was less than the significant level (0.05). From the findings, the study found that there is a positive relationship between supply chain integration and effective supply chain management process in the energy sector in Kenya with a regression coefficient of 0.102. This indicates that a unit increase in supply chain integration would lead to a 0.102 improvement in the effective supply chain management process in energy sector in Kenya. The relationship was found to be significant as the p-value (0.017) was less than the significance level (0.05). Lastly, the study results show that there is a positive

significant relationship between enterprise resource planning and effective supply chain management process in the energy sector in Kenya as shown by a regression coefficient of 0.404. This indicates that a unit improvement of enterprise resource planning would lead to a 0.404 improvement in effective supply chain management process in energy sector in Kenya. This relationship was significant as the p-value (0.000) was less that of the significant level (0.05). These findings infer that enterprise resource planning influence the effective supply chain management process in the energy sector in Kenya most, followed by electronic data interchange, electronic tendering and supply chain integration.

Table 14: Regression Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**St.Error**	**Beta**		
(Constant)	0.258	0.055	0.021	4.726	0.000
Electronic Data-Interchange	0.290	0.101	0.289	2.870	0.005
E-Tendering	0.263	0.113	0.256	2.325	0.022
Supply Chain Integ-ration	0.102	0.042	0.089	2.417	0.017
Enterprise Resource Planning	0.404	0.040	0.379	2.029	0.000

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The study concluded that electronic data interchange has a positive and significant influence on effective supply chain management process in energy sector in Kenya. The study concludes that electronic tendering has positive and significant influences on effective supply chain management process in energy sector in Kenya. The study concludes that supply chain integration has a positive and significant influence on effective supply chain management process in the energy sector in Kenya.Lastly, the study concludes that enterprise resource planning has a positive and significant influence on effective supply chain management process in the energy sector in Kenya. The study found that the energy sector was using elements of enterprise resource planning such as budgeting, shipping of products, warehousing, material flow and the flow of information.

5.2 Recommendations

The study recommends that the energy sector in Kenya should involve the use of supply chain integration and joint decision making as a way of enhancing effective supply chain management process in the energy sector. The study recommends that organization should automate their systems so as to improve effective supply chain management process in energy sector. The study further recommends that organizations should integrate their systems as a way of gaining competitive advantage and risk reduction. The study also recommends that organization should integrate the internal and external management information across all departments, facilitate the flow of information between all business functions as a way of enhancing its effective supply chain management process.

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