



INFLUENCE OF INVENTORY MANAGEMENT ON PERFORMANCE OF THE ENERGY SECTOR IN KENYA

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Abstract: Every firm whether big or small that wants to achieve success must take inventory management into consideration. The most important and challenging aspect of inventory management is achieving a balance between inventory supply and to ensure there is no overstocking or understocking. The general objective of this study was to determine the influence of inventory management on the performance of the energy sector in Kenya. Specifically, the study sought to determine the influence of order processing, warehouse management, inventory management systems and inventory tools and techniques on the performance in the energy sector in Kenya. This study used of a descriptive explanatory research design. The research targets a population of 170 staff working in supply chain departments in Kenya Electricity Generating Company, Kenya Electricity Transmission Company and Rural Electricity Authority. Slovin's Formula was adopted in this study to determine the sample size. Both purposive sampling and a simple random sampling were used in the selection of the sample size. The study used primary data, which was used by use of semi-structured questionnaires. The research instruments generated both qualitative and quantitative data. For analyses of descriptive data, thematic content analysis was used and for easy understanding, the results were presented in form of prose. Descriptive and inferential statistics with the assistance of SPSS version 22) was used in the analyses of quantitative data. Presentation of the research findings was in the form of figures and tables that was inclusive of pie and bar charts. The association between dependent and independent variables sought using regression analysis, content analysis and inferential statistics. The study found out that order processing has a significance influence on performance of energy sector in Kenya. The study also established that order preparation has a positive significance influence on performance of energy sector in Kenya. Moreover, the study found out that order consolidation has a positive influence on significance influence on performance of energy sector in Kenya. Further, the study established that order transmittal has a significance influence on cost minimization, satisfaction of customers, and firms' profitability. The study recommends that the energy transmission and generation companies should adopt order processing so as to cope up with the increase in market demands related to the flexibility, speed, and efficient delivery of goods and services. The study also recommends that energy transmission and generation companies should improve on its warehouses to cater for special storage requirements. Further, the study recommends that energy generation and transmission companies should adopt the use of the just in time, lean production and material requirement planning so as to improve on their storage management and accessibility and retrieval of resourceful information.

Key Words: Order Processing, Warehouse, Inventory, Tools, Techniques, Performance

Introduction

The advantages of inventory management add the planning and scheduling of production activities are evident to most companies. Chalotra (2013) highlights the benefits that the North American, Japanese

and European companies have achieved when it comes to efficient and effective manufacturing and distribution due to inventory management. Since the 1980s many companies have used inventory management but in recent times these activities have been heightened by the integration of other firms when it comes to their supply chain. For example most firms share supply and demand information with others in the industry so that they are able to respond better to variable demand.

Buyukkaramikli, Ooijen and Bertrand (2015) argue that the achievement of productivity enhancement in the western nations was possible because of the reduction the direct labor expended per output unit. This strategy was successive as manufacturing firms often had high labor content. In recent times, more firms are able to reduce their labor costs per unit manufactured. In the last two decades for instance, the ratio of bought materials to sales in USA companies reduced to 60% in dollars (Dimitrios, 2008). This means that there is high potential for inventory management to enhance productivity and supply chain operations. In the 1980 many Japanese companies were subject to a lot of attention due to their commendable achievement of improved inventory and quality management (Rachmania & Mursyid 2013). The high interest in Just in Time manufacturing showcases that there is great potential for improvement if work-in-progress inventory management is to be done effectively (Fernandes, Pinho & Gouveia, 2013).

Kenyan firms rely much in inventory as it accounts for 56% of their yearly turnover. Today there is a lot of pressure to be the best in any industry due to the stiff competition. This has led many companies to be more inventive and top uptake better methods that help them reduce wastage and better use their resources for improved performance (Kamau & Kagiri, 2015). The new method of inventory management requires the right person for the job. For the case of the Kenyan companies the key concern is how the inventory processes are organized and the people responsible for these processes. The high competition in the service firms has led to more attention to the effective of the company resources. It is important that firms try to achieve a competitive advantage by reducing their costs. The current processes that can improve a firm's competition is buying the right supplies, competitive buying, reducing the inventory investments and costs and having suppliers who are reliable and effective (Oballah, Waiganjo & Wachiuri, 2015).

Supply of electricity is an essential influencer when it comes to sustainable development thus there should be adequate supply of electrical energy in terms of price affordability, quality and quantity. It is also important to note that Power Generation Projects call for huge capital outlay (for example, it costs about eight to ten billion Kenya Shillings to construct a 70 MW Thermal Power Generation Plant and about Twenty five to Twenty Seven Billion Kenya Shillings to construct a 70 MW Geothermal Power Plant. This means supply chain activities should be well managed to ensure projects are completed to achieve the primary objectives of cost, performance, and timeliness. Wauna and Obwogi (2015) indicates that Kengen in 2015 experienced 8% stock out in the first quarter of the year and 12% overstocking in the third quarter of the year. In addition, Muthami and Bwisa (2017) found that in the year 2016 the delivery of inventory in Kenya Electricity Generating Company Limited was poor with the company experiencing 13% overstocking. The study done by Mutai and Moronge (2017) indicates that warehouse management and stock control were poor, which negatively affected timeliness of service delivery and customer satisfaction. Okinyi (2015) found out that 76% of the delays in power lines and transformers repairs are caused by lack of inventory in KPLC. In addition, the Kenya Power and Lighting Limited (2017) annual report indicated that more than 50% of the total inventories in the organization were delivered after the expected time, which negatively affected service delivery. KPLC (2017) Customer satisfaction survey of 2015, 2016 and 2017, indicates that the percentage index has been decreasing, that is, 70%, 67% and 66% respectively.

Several studies have been done on inventory management in Kenya. For instance, Lwiki et al. (2013) conducted a study and found that there is a positive relationship between management of inventory and sales and equity returns. In addition, Oballah, Waiganjo and Wachiuri (2015) carried out a study and according to the findings, it was deduced that the accurate keeping of inventory records and investment in inventory management have a positive influence on firm's performance while inventory shrinkage was observed to negatively affect the performance of the firm. However, most of the studies conducted in this area are limited to various sectors and institutions. There is therefore minimal empirical evidence showing the effect of inventory management on performance of energy sector within Kenya. This research therefore sought to examine the influence of inventory management on the performance of the energy sector in Kenya.

The specific objectives of the study were;

1. To determine the influence of order processing on the performance in the energy sector in Kenya
2. To establish the influence of warehouse management on the performance in the energy sector in Kenya
3. To examine how inventory management systems influence the performance in the energy sector in Kenya
4. To assess the influence of tools and techniques on the performance in the energy sector in Kenya

Literature Review

Theoretical Review

Greener (2008) explains that, a theory is made up of a group of coherent and tested propositions that are deemed as accurate and can be used as predications and explanations of study phenomenon. Based on this explanation, this research used four theories related to the four independent variables of the study. These theories include queuing theory, theory of constraints, diffusion of innovation theory and systems theory.

Queuing Theory

Queuing theory, developed by Agner Krarup Erlang, is often used in mathematics to study queues and waiting lines (Sundarapandian, 2009). The model allows for the analysis of different processes that are related such as being served at the front of waiting queue which is associated with storage process and arriving at the end of the queue (Sundarapandian, 2009). The methods that are currently being used to minimize the material handling expenditures are often based on the material handling and layout design processes. This is regardless of the observation that accumulation of work-in progress at different production processes is caused by the existing variability which negatively affects the competitive advantages of the firm in terms of quality and cost of products (Harchol-Balter, 2012). There is therefore need to come up with a method that in addition to looking at the material handling and layout design processes also takes into consideration the variability in manufacturing. The queuing theory can be used to showcase the variations occurring in the material handling processes and genetic algorithm used to provide a solution of the existing integration optimization challenge (Sundarapandian, 2009).

In this study, the queuing theory is used to explain the association between warehouse management and organizational performance. The use of the queuing theory helps organization to enhance facilities layout design and material handling processes while minimizing storage cost (Sundarapandian, 2009). Warehouse management in energy production companies helps to reduce the number of staff required, storage area as well as time taken to store or retrieve various materials for use.

Theory of Constraints

Elyahu Goldratt developed this theory at the start of 1980. The theory was once a production technology but today it is recognized as a management philosophy (Spector, 2011). The Theory of Constraints looks at the system under study as a system made up of different activities and tasks. The goal is to come up with solutions that can optimize the entire system rather than improving one task or activity. To achieve this, the model comes up with tools and methods that are clear and user-friendly. The method is referred to as focusing steps and can be used for the entire system or on each task in the project depending on the projects scope (Naor, Bernardes & Coman, 2013). In this study, the constraints that cause undesirable effects to energy production companies include overstocking, poor material quality and stock outs. Stock outs in the energy sector led to delays in power line repairs and blackouts, which subsequently lead to a reduction in customer satisfaction (Chou, Lu & Tang, 2012). On the other hand, overstocking holds up money that could have been used in financing other activities necessary in service delivery.

Diffusion of Innovation Theory

The named theory was developed in 1995 by Rogers. It sought to explain the way diffusion of innovation happens in a social system. The theory has five adoption processes that include confirmation, implementation, decision, persuasion and knowledge. In the knowledge step, a person gets to know of the innovation and learns how it operates. In the persuasion step, the individual gets an unfavorable or favorable feeling towards the new innovation. In the step of decision the individual get engaged in actions that resulted to the adoption or rejection of the innovation. Implementation enables an individual to use the innovation. Finally comes the confirmation stage which involves the evaluation of whether the decision to adopt the innovation was worthwhile or not. Further, Rogers (1995) postulated three important insights: which are the innovation quality, communication between peers and comprehending on various users segment which can help in the use of the innovation. Diffusion of technology was used in this study to explain the fundamental role of inventory management system on the performance. Various technologies adopted in inventory management include Electronic Data Interchange, Electronic Point of Sale, RFID systems, VMI systems, ERP systems and E-Procurement Systems. These systems are meant to help an organization in cost reduction, increasing efficiency and improving customer satisfaction.

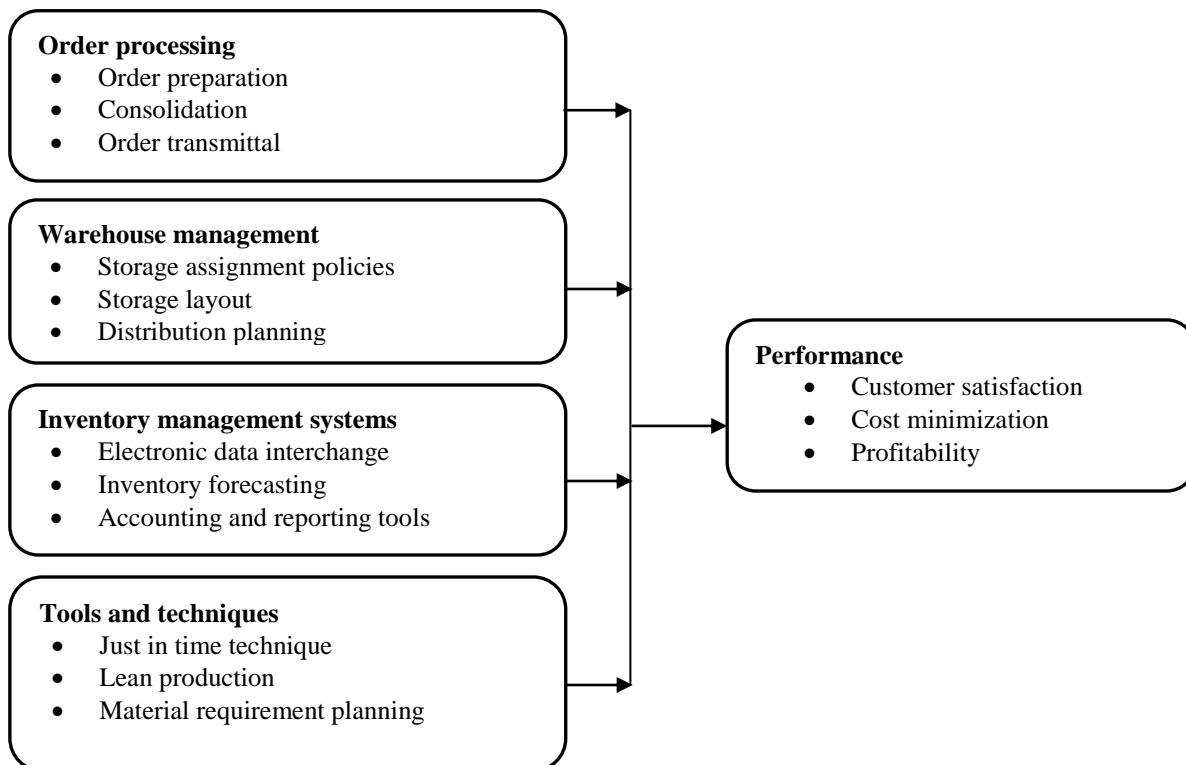
Systems Theory

System Theory was founded by Ludwig von Bertalanffy in the year 1972. The theory considers an organization as an integrated system of connected functions and structures. A biological organism consists of cells. A cell is made up of molecules that work together for the organism to function. A system comprises of four things, namely; objects, attributes, internal relationships among objects and environment (Kast & Rosenzweig, 2011). Attributes are the properties, characteristics of qualities of a system and its objects. Every system has internal relationships that exist among its objects. In addition, a system exists in an environment (Zenko et al., 2013). Organizations operating in the energy sector can be considered to be systems as they comprise of various departments and personnel and is highly

influenced by the external environment (Rivard, Lapointe & Kappos, 2011). Departments in organization in the energy sector include finance, marketing, operations, warehouse, customer care, human resource and procurement/supply chain. For a company to achieve efficiency and effectiveness in service delivery effective communication and sharing of information on inventory is of paramount importance (Koumanakos, 2012). This plays a major role in ensuring appropriate inventory management through ensure that there are no stock outs and overstock. Effectiveness and efficiency in service delivery is not an outcome of one department but a result of interaction between various departments.

Conceptual Framework

The conceptual framework shows the association between inventory management and organizational performance as depicted in figure 2.1 below. The independent variables in this research project include order processing, warehouse management, inventory management systems and tools and techniques. The dependent variable was the performance of the energy sector in Kenya.



Independent Variables

Dependent Variable

Figure 1: Conceptual Framework

Empirical Review

This section gives a review of literature on the influence of order processing, warehouse management, inventory management systems and tool and techniques on organizational performance.

Order Processing

The process of order processing changes the customer order to a product order and ends in the delivery of the product in line with the customer quantity, quality and at the specified time (Chalotra, 2013). If

the needs of the customer are to be met, then the order process should ensure that the demand needs and the order provided match. This means that the demand and production system characteristics do affect the ordering process (Chan & Prakash, 2012). For instance, as it is hard to predict the products the customer order or the time or quantities they order, demand is often not known. This is also means that production is also not certain because it is affected by factors such as unavailability of resources, staff unavailability and machine and equipment breakdown. Raw materials challenges can also lead to uncertainties as suppliers might not deliver the raw materials on time or might even deliver the wrong quantity or quality (Dimitrios, 2008). Welker (2004) conducted a study on alignment for order-processing performance in manufacturing firms. A cross-sectional explanatory research design was used. According to the results, firms should align the ERP systems with their operational needs if they are to deliver orders on line and to the satisfaction of their ERP systems. Another study was conducted by More (2016) which used 172 European firms as the study sample and further employed Partial Least Squares (PLS) modeling. The study found that procurement alignment improved the performance of the firm with time and these firms became better than their competitors.

Warehouse Management

A warehouse is a supply chain facility that is used for the storage of products for the achievement of economies of scale, lower the cost of transportation or to lower the response time and give the customer value added services. Warehousing is another resource that enable a particular firm to gain competitive advantages as they are used to give customer specific services enhancing customer satisfaction (Rachmania & Basri, 2013). It is paramount that the resources used in warehousing be used appropriately to reduce the costs and ensure there is maximum productivity. An important factor to consider when it comes to warehousing is the location for storage of numerous products that are kept in the warehouse (Seungjae, Ennis & Spurlin, 2015). Factors that influence warehouse storage such as method used to pick orders, size of the inventory, layout of the warehouse, characteristics of products, system used to handle materials, space needs, turnover rates and the demand have been looked into by many scholars. Mutai (2017) researched on the influence of warehouse management on organizational productivity in Kenya Electricity Generating Company Limited. The study applied a descriptive research method and established that stock control influence organizational productivity in state corporations in Kenya. In addition, the study found out distribution planning influence organizational productivity in state corporations in Kenya.

Inventory management systems

The use of automation systems in inventory management can highly affect the different areas of inventory management such as recording, accounting, monitoring, retrieval of inventory items and anticipation and handling of inventory needs (Genevieve, 2017). This is also true for systems that are not part of other business systems. However analysts advise businesses to integrate their other systems like the accounting and sales systems with the automated inventory management systems for enhanced productivity and profitability (Mutai & Moronge, 2017). In Kenya, Kimaiyo and Ochiri (2014) assessed the influence of inventory management systems on the performance of manufacturing companies. The research employed a descriptive research design. The results showed that utilization of inventory management systems has a positive influence on the implementation of a functional and quality inventory management system. In addition, inventory management was influential in the reduction of costs which led to increased profitability. The findings further revealed that expected developments at the new KCC led top enhanced organization performance. The new technologies and

innovations to be used in the future were aimed at decreasing costs and enhancing the performance of new KCC. The inventory management systems use processes and tools that allow for the realization of enhanced service delivery and integrity in the firm processes.

Inventory Management Tools and techniques

Inventory management tool and techniques are tools and techniques used for the effective and efficient management of inventory (Okinyi, 2015). These techniques aim to lower costs that have to do with inventory, improve the relationship between the supplier and the firm, improve collaboration among the different firm departments, ensure inventory is quickly retrieved, reduce the expenditure used in inventory and manage inventory movement among others (Rachmania & Mursyid, 2013). More recently, better inventory management methods are being used by firms so as to minimize inventory management cost and to ensure there is enhanced efficiency (Rachmania & Basri, 2013). In Kenya, Kinyua (2017) conducted a study on the effects of inventory management techniques on performance of the county government of Laikipia. The researcher adopted a descriptive research design. The study found that inventory management techniques (JIT, VMIT, ERP and demand forecasting) have an influence on the performance of the Laikipian county government. The study suggested that firms should adopt the said inventory management methods so as to benefit from them. Some of the advantages of using these methods which include: decreased inventory expenditures due to decreased inventory holding costs, enhanced firm efficiency because of elimination of activity duplication and time saving because of adequate inventory levels. Other advantages include; improved relationships between the suppliers and the management, enhanced communication and decreased administrative expenditure.

Research Methodology

This research used of a descriptive explanatory research design. This design was chosen because explanatory research seeks to explain rather than just describe a phenomenon. The target population comprised of 170 staff working in various departments of supply chain, within the electricity generation and transmission companies in Kenya. Slovin's Formula was adopted in this study to determine the sample size. The formula is a random sampling technique that is used in the estimation of the sampling size.

$$n = \frac{N}{1 + Ne^2}$$

Where by:

n = number of samples

N = target population

E = margin of error (0.05)

$$n = \frac{170}{1 + (170 * 0.05^2)}$$

$$n = 119$$

Table 1: Sample Size

Category	Target population	Sample Size
KENGEN	54	38
Kenya Power	63	44
KETRACO	32	22
REA	21	15
Total	170	119

To select the sample of the staff who are employed in the supply chain departments in the four-energy generating and transmission companies in Kenya, the research used the purposive sampling technique. In addition, the study utilized a simple random sampling to choose a sample of 119. This sampling method was preferred because it provides equal chances for each sample to be selected. This study only used primary data, which was collected by use of semi-structured questionnaires. The questionnaires were semi-structured, which meant that it they comprised of both structured (closed ended) and unstructured (open ended) questions.

A pilot test was conducted to assess the validity and reliability. The pilot test comprised 10% of the sample size and the pilot group was selected using simple random sampling. Content validity improvement for this research was achieved by seeking experts such as the supervisor's opinions on the research tool. Face validity enhanced by conducting a pilot test and correcting any unclear queries. Internal consistencies of the responses were used to measure the reliability of the research instrument. In statistics, internal consistency is normally quantified using Cronbach's Alpha. The values of Cronbach's Alpha should be between 0 and 1. The value of one shows the highest reliability while 0 shows the lowest reliability. A Cronbach's Alpha of 0.7 was deemed reliable.

The research instruments give qualitative and quantitative data. The two types of data were analyzed with the help of different methods. Thematic content analysis was used to analyze qualitative data and the results given in prose form. Quantitative data was analyzed with the help of inferential and descriptive statistics and statistical software (SPSS version 22). Descriptive statistics that were used comprised of percentages, frequencies, mean and standard deviation. The findings presented in form of figures and tables. The association between the dependent (performance in the energy sector) and independent variables (order processing, warehouse management, inventory management and tools and techniques) were deduced using inferential statistics such as multivariate regression and correlation analysis at 95% confidence level and significance level of 0.05.

The regression equation to be used for the multivariate regression analysis is given below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y = performance; X₁ = Order processing; X₂ = Warehouse management; X₃ = Inventory management systems; X₄ = Inventory management tools and techniques; ε = Error Term; β₀ = Constant Term; β₁, β₂, β₃, β₄ = Beta Co-efficient

Research Findings and Discussions

The sample size comprised of 119 staffs working in the various supply chain departments within electricity generation and transmission companies in Kenya. Out of 119 staff, 109 participants duly filled the data collection instruments and this provided a response rate of 91.60 %. However, a response rate of 100% was not achieved as some of the responses had inconsistent information were

others were incomplete thus could not be used for analysis in this study. With regard to the statements of Kothari (2011), a response rate which is above 50% is adequate for data analysis thus the response rate of 91.60% was within the acceptable limit for drawing conclusions.

Influence of Order Processing on Organizational Performance

The staffs working in the supply chain departments of energy generation and transmission firms were asked to specify the extent to which order preparation influenced customer satisfaction, cost reduction and profitability. According to the results, as shown in Table 2, the staffs pointed out that order preparation influenced profitability in their organizations to a great extent (mean=4.321, std. dev = 0.859). They also indicated that order preparation influenced cost reduction in their organizations to a great extent (mean = 4.220, std. dev= 1.065). Furthermore, with a mean of 4.220 (std. dev= 1.108), they indicated that order preparation influenced customer satisfaction to a great extent. The findings are in agreement with the findings of Rachmania and Basri (2013) that order preparation has a positive and significant influence on cost reduction, profitability and customer satisfaction.

Table 1: Influence of Order Preparation on Organizational Performance

	Mean	Std. Deviation
Influence of order preparation on the customer satisfaction	4.220	1.108
Influence of order preparation on cost reduction	4.220	1.065
Influence of order preparation on profitability	4.321	.859

The staffs working in the supply chain departments of the energy generation and transmission firms were asked to specify the extent in which order consolidation influenced satisfaction of customers, cost minimization and firm's profitability. The results were as shown in Table 3. With a mean of 4.293 (std. dev=0.905), the staff indicated that order consolidation influenced cost reduction of their organizations to a great extent. They also indicated that order consolidation influenced profitability of their organizations to a great extent (mean = 4.183, std. dev= 1.046). Further, they indicated that order consolidation influenced customer satisfaction of their organizations to a great extent (mean= 4.183, std. dev= 1.090). The findings are in line with the statement of Okinyi (2017) that order consolidation is one of the best ways of enhancing customer satisfaction and profitability of an organization.

Table 2: Influence of Order Consolidation on Organizational Performance

	Mean	Std. Deviation
Influence of order consolidation on customer satisfaction	4.183	1.090
Influence of order consolidation on cost reduction	4.293	.905
Influence of order consolidation	4.183	1.046

The participants were also requested to indicate the extent to which order transmittal influenced profitability, customer satisfaction and cost reduction of their organizations. According to the findings, as shown in Table 4, the staff indicated that order transmittal influenced the profitability of their organizations to a great extent (mean= 4.220, std. dev=1.065). In addition, they indicated that order transmittal influenced the customer satisfaction of their organizations to a great extent (mean= 4.183, std. dev=0.851). With a mean of 4.082 (std. dev= 0.759), they indicated that order transmittal influenced the cost reduction of their organizations to a great extent.

Table 3: Influence of Order Transmittal on Organizational Performance

	Mean	Std. Deviation
Influence of order transmittal on profitability	4.220	1.065
Influence of order transmittal on customer satisfaction	4.183	.851
Influence of order transmittal on cost reduction	4.082	.759

Influence of Information Technology on Performance

The staffs working in the departments of supply chain of energy generation and transmission firms were asked to specify the types of information technology their organizations were using. The results are presented in Table 5. According to the results, 69.7% of the staff indicated that their organizations were using Planning (ERP) systems, 64.2% indicated that their organizations were using Inventory (VMI) systems, 61.5% indicated that their organizations were using Electronic Data Interchange, 59.6% indicated that their organizations were using Electronic Point of Sale, 56.9% indicated that their organizations were using Radio Frequency Identification (RFID) systems and the same per cent indicated that their organizations were using E-Procurement Systems. This implied that most of the organizations were using Planning (ERP) systems. The findings are in line with the statement of Muhayimana (2015) that most organizations have adopted inventory management systems such as Planning ERP, ERP, RFID and E-procurement so as to improve on their performances.

Table 4: Types of Information Technology

	Frequency		Percent	
	Yes	No	Yes	No
EDI systems	67	42	61.5	38.5
EPS systems	65	44	59.6	40.4
VMI systems	70	39	64.2	35.8
RFID systems	62	46	56.9	42.1
ERP systems	76	33	69.7	30.3
Electronic procurement systems	62	47	56.9	43.1

The staffs working in supply chain departments of energy generation and transmission firms were asked to specify the extent in which electronic data interchange influenced customer satisfaction, profitability and cost reduction of their organizations. The results were as presented in Table 6. With a mean of 4.651 (std. dv= 0.750), the staff indicated that electronic data interchange influenced the customer satisfaction in their organizations to a very great extent. They also indicated that electronic data interchange influenced cost reduction in their organizations to a great extent as shown by a mean of 4.357 (std. dv=0.822). Furthermore, they indicated that electronic data interchange influenced profitability in their organizations as shown by a mean of 4.183 (std. dv= 0.883). The findings are in line with the findings of Mathiasa and Owuor (2015) that electronic data interchange have a positive and significant influence on organizational performance.

Table 5: Influence of Electronic Data Interchange on Organizational Performance

	Mean	Std. Deviation
Influence of electronic data interchange on customer satisfaction	4.651	.750
Influence of electronic data interchange on cost reduction	4.357	.822
Influence of electronic data interchange on profitability	4.183	.883

The staffs working in supply chain departments of energy generation and transmission were asked to

point out the extent to which inventory forecasting influenced satisfaction of customers, cost minimization and firm's profitability. According to the results, as shown in Table 7, the staff indicated that inventory forecasting influence cost reduction of their organizations to a great extent as shown by a mean of 4.449 (std. dv= 0.775). They also indicated that inventory forecasting influenced customer satisfaction of their organizations to a great extent (mean=4.266, std. dv= 1.042). Further, with a mean of 4.192 (std. dv= 1.084), they indicated that inventory forecasting influenced profitability of their organizations to a great extent.

Table 6: Influence of Inventory Forecasting on Organizational Performance

	Mean	Std. Deviation
Influence of inventory forecasting on customer satisfaction	4.266	1.042
Influence of inventory forecasting on cost reduction	4.449	.775
Influence of inventory forecasting on profitability	4.192	1.084

The employees working in supply chain departments of energy generation and transmission were asked to specify to what extent accounting tools did influenced satisfaction of customers, cost minimization and firm's profitability. The results are as presented in table 8. With a mean of 4.183 (std. dv=1.106), the staff indicated that accounting and reporting tools influenced the cost reduction of their organizations to a great extent. They also indicated that accounting and reporting tools influenced the profitability of their organizations (mean=4.137, std. dv=0.966). Furthermore, with a mean of 4.110 (std. dv=0.955) they indicated that accounting and reporting tools influenced the customer satisfaction of their organizations to a great extent.

Table 7: Influence of Accounting and Reporting Tools on Organizational Performance

	Mean	Std. Deviation
Influence of accounting and reporting tools on customer satisfaction	4.110	.955
Influence of accounting and reporting tools on cost reduction	4.183	1.106
Influence of accounting and reporting tools on profitability	4.137	.966

Influence of Warehouse management on Organizational Performance

The staffs working in the supply chain departments of energy generation and transmission firms were asked to specify the extent in which storage assignment policies influenced customer satisfaction, cost reduction and profitability in their organizations. The results were as presented in Table 9. With a mean of 4.018 (std. dv= 0.932), the staff indicated that storage assignment policies influenced profitability in their organizations to a great extent. They also indicated that storage assignment policies influenced cost reduction in their organizations to a great extent (mean =3.963, std. dv= 0.999). Further, they indicated that storage assignment policies influenced the customer satisfaction in their organizations to a great extent (mean= 3.825, std. dv= 0.848). The findings are in line with the findings of Nee (2014) that availability of stringent storage assignment policies have positive and significant effect on organizational performance.

Table 8: Influences of Storage Assignment Policies on Organizational Performance

	Mean	Std. Deviation
Influence of storage assignment policies on customer satisfaction	3.825	.848
Influence of storage assignment policies on cost reduction	3.963	.999
Influence of storage assignment policies on profitability	4.018	.932

The respondents were asked to indicate the extent to which storage layout influenced cost reduction, customer satisfaction and profitability of their organizations. According to the results, the staff indicated that storage layout influenced customer satisfaction of their organizations to a great extent as shown by a mean of 4.018 and a standard deviation of 0.849. With a mean of 3.880 (std. dv = 0.997), they indicated that storage layout influenced profitability of their organizations to a great extent. Further, they indicated that storage layout influenced cost reduction of their organizations to a great extent (mean = 3.825, std. dv = 0.755).

Table 4.9: Influence of Storage Layout on Organizational Performance

	Mean	Std. Deviation
Influence of storage layout on cost reduction	3.825	.755
Influence of storage layout on customer satisfaction	4.018	.849
Influence of storage layout on profitability	3.880	.997

The respondents at the supply chain departments of energy generation and transmission firms were asked to specify the extent to which receiving and issuing procedures influenced satisfaction of customers, cost minimization and firm's profitability. According to the results, as shown in Table 11, the respondents indicated that receiving and issuing procedures influenced the profitability of their organizations to a great extent (mean = 4.119, std. dv = 0.930). They also indicated that receiving and issuing procedures influenced cost reduction of their organizations to a great extent (mean = 3.871, std. dv = 0.806). With a mean of 3.853 (std. dv = 1.043), they indicated that receiving and issuing procedures influenced customer satisfaction of their organizations to a great extent.

Table 10: Influence of Receiving and Issuing Procedures on Organizational Performance

	Mean	Std. Deviation
Influence of receiving and issuing procedures on customer satisfaction	3.853	1.043
Influence of receiving and issuing procedures on cost reduction	3.871	.806
Influence of receiving and issuing procedures on profitability	4.119	.930

Influence of inventory techniques on Performance

The staffs working in the supply chain departments of energy generation and transmission were requested to point out various types of inventory management systems used in their organizations. According to the results, as shown in Table 12, 72.5% of the staff indicated that their organizations were using total quality management systems, 67.9% indicated that their organizations were using continuous Improvement systems, 62.4% indicated that their organizations were using economic order quantity, 58.7% indicated that their organizations were using just in time techniques, 51.4% indicated that their organizations were using material requirement planning and 50.5% indicated that their organizations were using first in first out systems. This implied that most of the supply chain departments in electricity generation and transmission companies in Kenya had adopted the use of total quality management systems.

Table 11: Types of Inventory Management Systems in the Organizations

	Frequency		Percent	
	Yes	No	Yes	No
Just in time technique	64	45	58.7	41.3
Material requirement planning	56	53	51.4	48.6
Continuous Improvement	74	35	67.9	32.1
Total Quality management	79	30	72.5	27.5
First in first out	55	54	50.5	49.5
Economic order quantity	68	41	62.4	37.6

The staffs working in the supply chain departments of energy generation and transmission were requested to specify the extent in which just in time technique influenced customer satisfaction, cost reduction and profitability in their organizations. The results were as presented in Table 13. With a mean of 4.412 (std. dv= 0.795), the staff indicated that just in time technique influenced customer satisfaction in their organizations to a great extent. They also indicated that just in time technique influenced cost reduction in their organizations to a great extent (mean= 4.036, std. dv=1.088). Further, they indicated that just in time technique influenced profitability in their organizations to a great extent (mean= 4.009, std. dv= 0.995).

Table 12: Influence of Just in Time Technique on Organizational Performance

	Mean	Std. Deviation
Influence of just in time technique on the customer satisfaction	4.412	.795
Influence of just in time technique on cost reduction	4.036	1.088
Influence of just in time technique on profitability	4.009	.995

The staffs working in the supply chain departments of energy generation and transmission were also requested to specify the extent to which lean production influenced cost reduction, customer satisfaction and profitability of their organizations. With regard to the results, as shown in Table 14, the staff indicated that lean production influenced profitability of their organizations to a great extent (mean= 3.853, std. dv= 0.767). They also indicated that lean production influenced cost reduction in their organizations to a great extent (mean= 3.844, std. dv= 0.954). Furthermore, they indicated that lean production influenced customer satisfaction in their organizations to a great extent (mean= 3.743, std. dv= 0.975).

Table 13: Influence of Lean Production on Organizational Performance

	Mean	Std. Deviation
Influence of lean production on cost reduction	3.844	.954
Influence of lean production on customer satisfaction.	3.743	.975
Influence of lean production on profitability	3.853	.767

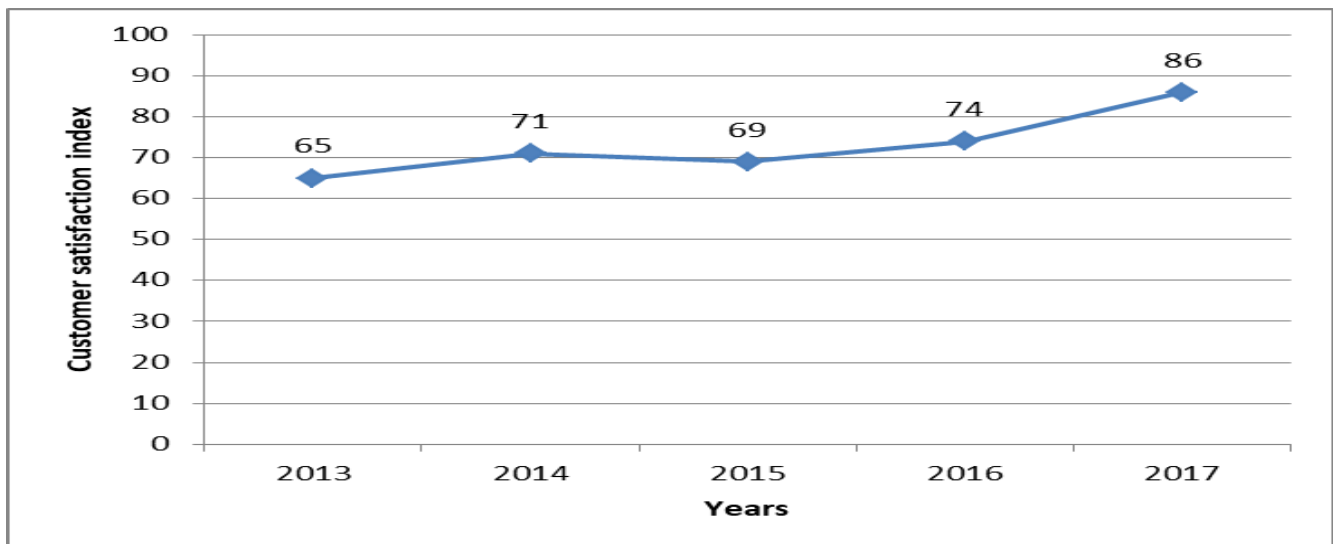
The staffs working in the supply chain departments of energy generation and transmission were asked to specify the extent to material requirement influenced customer satisfaction, cost reduction and profitability in their organizations. With a mean of 4.201 (std. dv= 1.060), the staff indicated that material requirement planning influenced customer satisfaction of their organizations to a great extent. They also indicated that material requirement planning influenced the cost reduction of their organizations to a great extent (mean=4.091, std. dv= 0.811).

Table 4.14: Influence of Material Requirement on Organizational Performance

	Mean	Std. Deviation
Influence of material requirement planning on customer satisfaction.	4.201	1.060
Influence of material requirement planning on the cost reduction.	4.091	.811
Influence of material requirement planning on profitability	3.715	1.131

Performance of energy sector

Organizational performance of the supply chain departments in electricity generation and transmission companies in Kenya was measured in terms of customer satisfaction, cost minimization and profitability. According to the results, customer satisfaction index of the electricity generation and transmission companies was 65% in the year 2013. In the year 2014 the figure increased to 69%, however, in the year 2015 the customer satisfaction index declined to 74%, in the year 2016, the customer satisfaction index increased to 84% and in the year 2017 the customer satisfaction index increased to 86%.

**Figure 4: Customer Satisfaction Index**

The cost of reduction in the energy and transmission companies in Kenya for the last five years (from 2013 to 2017) was as presented in figure 4.7. According to the results, the cost of reduction in the year 2013 was Ksh 20.1 million. This figure declined to 18.4 Ksh million in the year 2014 before increasing to Ksh 24.5 million in the year 2015. In the year 2016, the cost of minimization increased to Ksh million 32.9 and in the year 2017 it increased to Ksh 36.7 million.

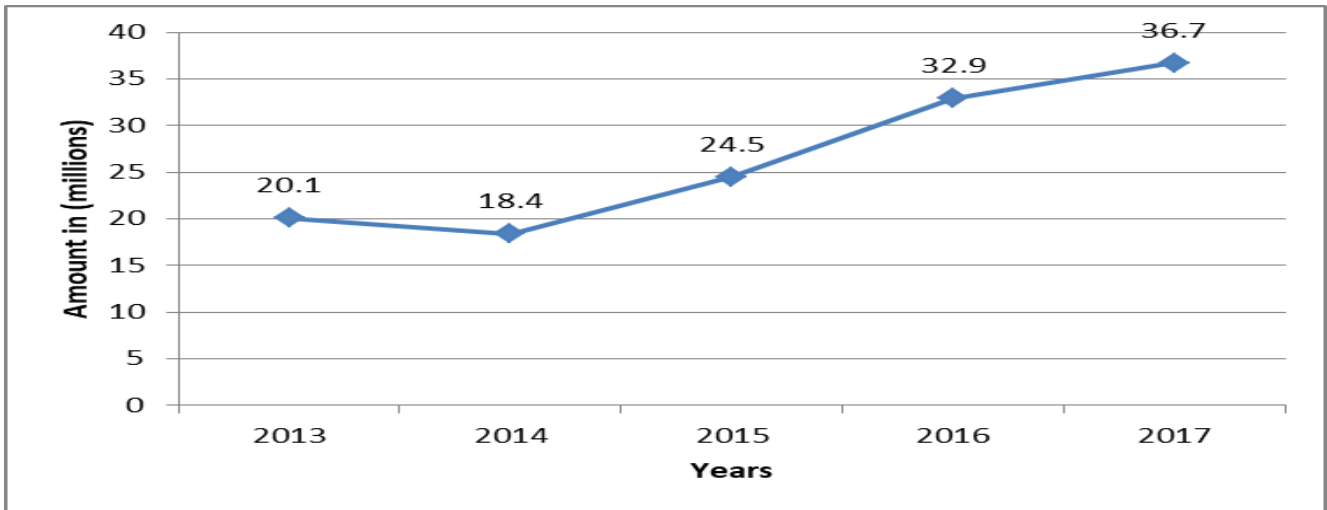


Figure 5: Cost Reduction in Electricity Generation and Transmission Companies

The profitability of the electricity generation and transmission companies in Kenya from the year 2013 to the year 2017 was as presented in Figure 4.8. According to the results, the profitability in of the electricity generation and transmission companies in the year 2013 was 5.22 billion, in the year 2014 it declined to 2.82 billion, in the year 2015 it increased to 11.5 billion, however in the year 2016 it declined to 6.74 billion and in the year 2017 the profit increased to 9.05 billion.

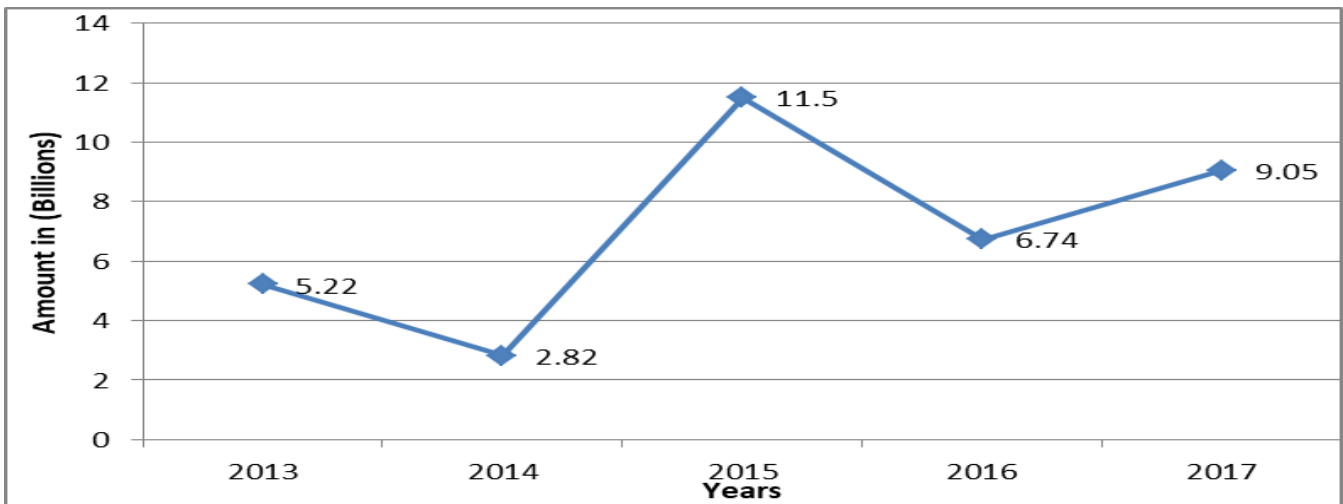


Figure 6: Profitability of Electricity Generation and Transmission Companies

Inferential Statistics

Correlation and regression analysis were used to assess the relationship between warehouse management, order processing, and information technology as well as inventory techniques (independent variables) and performance of energy sector (dependent variable).

Correlation Analysis

According to the findings, there was a positive association between warehouse management and performance of energy sector ($r=0.906$, $p\text{-value}=0.000$). The relationship was deemed significant since

the p value 0.000 was less than the significant level of this study which was 0.05. This implied that an improvement in warehouse management led to improvement in performance of the energy sector.

The results also showed that there was a positive association between order processing and performance of energy sector ($r=0.892$, $p\text{-value}=0.000$). The association was considered significant since the p value 0.000 was less than the significant level of 0.05. This implied that an improvement in order processing led to improvement in performance of energy sector. The findings are in line with Dimitrios (2008) that order processing is considered as one the core competency which enhances organizational performance.

Further, the results revealed that there was a positive association between information technology and performance of energy sector ($r=0.911$, $p\text{-value}=0.000$). The relationship was significant as the p value 0.000 was less than the significant level of this study which was 0.05. This implied that a unit increase in information technology led to improvement in performance of the energy sector.

Further, the results showed that there was a positive association between inventory techniques and performance of energy sector ($r=0.917$, $p\text{-value}=0.000$). The association between inventory techniques was considered significant as the p value 0.000 was less than the significant level of this study which was 0.05. The findings are in agreement with the findings of Okinyi (2015) that organizations tend to use inventory techniques to improve their return of investment which is a key component for measuring organizational performance.

Table 15: Correlation Coefficients

		Performance of energy sector	of Warehouse management	Order Processing	Information technology	Inventory techniques
Performance of energy sector	Pearson Correlation	1				
	Sig. (2-tailed)					
Warehouse management	Pearson Correlation	.906**	1			
	Sig. (2-tailed)	.000				
Order Processing	Pearson Correlation	.892**	.979**	1		
	Sig. (2-tailed)	.000	.000			
Information technology	Pearson Correlation	.911**	.991**	.991**	1	
	Sig. (2-tailed)	.000	.000	.000		
Inventory techniques	Pearson Correlation	.917**	.983**	.988**	.991**	1
	Sig. (2-tailed)	.000	.000	.000	.000	

Regression Analysis

Multivariate regression was used to assess the association between independent variables (inventory management, order processing, and information technology and inventory techniques) and the dependent variable (performance of energy sector).

The regression equation model was as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Whereby; Y denotes performance of energy sector, X_1 = Warehouse management, X_2 = Order processing, X_3 = Information technology, X_4 = Inventory techniques, ε = Error Term, β_0 = Constant Term, $\beta_1, \beta_2, \beta_3, \beta_4$ = Beta Co-efficient

The R-squared showed the variation in the dependent variable that can be explained by the independent variables being studied. The R-squared in this study was 0.857. This implied that the four independent variables (inventory management, order processing management, information technology and inventory techniques) could explain 85.7% of the performance of energy sector.

Table 16: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.926	.857	.853	.37416

The analysis of variance showed whether or not a model was a good fit for the data. The F-calculated (156.681) was greater than the F-critical (2.447) and this implied that the model could be used in predicting the influence of inventory management, order processing management, information technology and Inventory techniques (independent variables) on the dependent variable (performance of energy sector). In addition, the p-value (0.000) was below the significance level (0.05) and this implied that the relationship between independent and dependent variables was significant. Therefore the model was a good fit for the data.

Table 17: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.945	4	28.986	156.681	.000
	Residual	19.320	104	.185		
	Total	135.265	108			

From the findings, warehouse management has a positive and significant influence on the performance of energy sector as shown by a regression coefficient of 0.412. The association was significant because the p-value (0.026) was less than the significance level (0.05). The results also showed that order processing has a positive and significant influence on the performance of energy sector as shown by a regression coefficient of 0.872. The association was significant because the p-value (0.000) was less than the significance level (0.05). The findings are in agreement with the findings of Chalotra (2013) that effecting order processing in organizations enhance timely delivery of product and service thus improve of customer satisfaction which is ultimately result to improvement of organizational performances.

In addition, information technology had a significant influence on the performance of energy sector as shown by a regression coefficient of 0.672. The association was significant because the p-value (0.018) was less than the significance level (0.05). Further, the results showed that Inventory techniques have a positive and significant influence on the performance of energy sector as shown by a regression coefficient of 0.786. Since the p-value (0.000) was less than the significance level (0.05), the association between inventory techniques and performance of energy sector could be considered significant. The findings are in agreement with the finding of Okinyi (2015) that inventory techniques such as just in time enhance organizational performance.

Table 4.1: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.322	0.321		4.118	0.000
Inventory management	0.412	0.189	0.389	2.180	0.026
Order Processing	0.872	0.278	0.802	3.137	0.000
Information technology	0.672	0.234	0.604	2.872	0.018
Inventory techniques	0.786	0.263	0.731	2.989	0.000

Conclusions

The study concludes that order processing has a significance influence on performance of energy sector in Kenya. The study found that order preparation, order consolidation and order transmittal have a significance influence on cost minimization, satisfaction of customers, and firms' profitability. The study also concludes that information technology has a significant influence on performance of energy sector in Kenya. The study found out that electrical data interchange, inventory forecasting, accounting and reporting tools have significance influence on profitability, customer satisfaction and cost minimization of the organizations. Moreover, the study concludes that warehouse management systems have positive and significant influence on performance of energy sector in Kenya. The results revealed that storage assignment policy, storage layout receiving and issuing procedures have significance influence on cost reduction, profitability and customer satisfaction of the organizations. Furthermore, the study concludes that inventory techniques have positive and significance influence on performance of energy sector in Kenya. The study found out that just in time techniques, lean production and material requirement planning has significance influence on cost reduction, profitability and customer satisfaction of the organizations.

Recommendations

The study found that order preparation, order consolidation and order transmittal play have a significance influence on cost reduction, profitability and customer satisfaction of the organizations. Therefore the study recommends that the energy transmission and generation companies should adopt order processing so as to cope up with the increase in market demands related to the flexibility, speed, and efficient delivery of goods and services.

The study established that special storage needs influence the performance energy transmission and generation companies. Energy transmission and generation companies special storage needs which include special equipment and chemicals. This study therefore recommends that energy transmission and generation companies should improve on its warehouses to cater for special storage requirements.

The study also found that information technology has an influence on cost reduction, profitability and customer satisfaction of the organizations. Hence, the study recommends that energy generation and transmission companies should adopt the use of information technology so as to reduce their labor cost, improve on information management and security and improve on their strategic thinking which ultimately result to improvement in organizational performance. In addition, energy generation and transmission companies should involve the use of supply chain integration, joint decision making and electronic data interchange as a way of enhancing performance.

Moreover, the study established that just in time technique, lean production and material requirement

planning have significance influence on performance of energy generation and transmission companies in Kenya. Therefore, the study recommends that energy generation and transmission companies should adopt the use of the just in time, lean production and material requirement planning so as to improve on their storage management and accessibility and retrieval of resourceful information.

Areas for Further Research

This research was limited to the energy generation and transmission companies in Kenya. Hence, the finding of this study cannot be generalized to other sectors in Kenya due to variation in legal jurisdiction as well as regional boundary. Therefore, the study recommends that further studies should be conducted in on the influence of inventory management on organizational performances in other public institutions in Kenya. The study found that inventory management influences 85.7% of the performance of energy sector in Kenya. Therefore, the study recommends that further studied should be carried out so as to determine other factors which influence performance of energy sector in Kenya.

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