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SUPPLY CHAIN OPTIMIZATION PRACTICES AND PERFORMANCE OF PUBLIC ENERGY SECTOR IN NAIROBI REGION IN KENYA

[1] Onserio Ezra Kiboma, [2] Dr. Osoro Anthony

[1]Masters Student, Jomo Kenyatta University of Agriculture and Technology
[2]Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

The general objective was to examine effect of supply chain optimization practices on performance of public energy sector in Nairobi Region in Kenya. The specific objectives were:, inventory management, supplier management on performance of state corporations. The study was guided by various theories. The study applied a descriptive research design. The study targeted 10 firms in the public energy sector in Nairobi Region in Kenya. The unit of observation was 638 management staff involved in key procurement and supply chain decisions. The sample size of 246 staff. Data was collected using questionnaires. Results show that supply chain optimization practices (inventory management and supplier management have a significant relationship with performance of public energy sector in Nairobi Region in Kenya. The study concludes that supply chain optimization practices—specifically inventory management and supplier management—have significant positive effects on the performance of public energy sector corporations in Nairobi, Kenya. Notably, supplier and inventory management had the strongest impacts. However, challenges such as high operational costs, persistent customer complaints, and limited adoption of best practices were evident. The study recommends integrating advanced forecasting technologies, adopting Just-in-Time and flexible labor strategies, enhancing supplier evaluations, and modernizing logistics infrastructure. These interventions are essential to improve cost-efficiency, customer satisfaction, and overall service delivery in the sector.

Key Words: Supply Chain Optimization Practices, Inventory Management, Supplier Management, Performance of State Corporations

Background of the Study

The requirement for survival in most supply chains is providing the right product, in the right quantity and quality, at the right cost, at the right time to the right customer. In order to manage the supply chain networks, there is a need to increase information flows along the supply chain (Kuwornu et al., 2023). Supply chain management helps organizations achieve efficiency and quality management practices for new customer value creation, which is expected to result in improved organizational performance (Alghasawneh, et al., (2021), Across the globe, organizations are starting to recognize the strategic importance of SCM. More and more organizations in both the public and private sectors are realizing the value SCM plays in ensuring they can deliver on all aspects of their value chain (Thneibata et al., 2023).

Davis-Sramek et al. (2022) asserted that sustainable supply chain management practices in developed countries in USA included green procurement, reverse logistics and green transportation processes. A firm that is sustainably carrying out its supply chain practices engages suppliers who can supply them with environmentally friendly products and materials (green purchasing/procurement) and ensures that its delivery processes that are considerate of the environmentally friendly measures (green distribution). Alahmad (2021) suggests that Supply Chain Management Practices (SCMPs) in different industries in the Kingdom of Saudi Arabia include supply chain planning (SC planning), level of information sharing (IS), customer relationship management (CRM), and supplier relationship management (SRM).

Supply chain practices have not been given adequate attention both in theory and in practice in Africa (Saberi et al., 2019). Africa presents a unique landscape where sustainable supply chain practices are often influenced by socio-economic factors, resource constraints, and the need for inclusive development. Initiatives in Africa focus on promoting local sourcing, community engagement, and fair-trade practices. Innovative approaches include the use of alternative and locally sourced materials, as well as the development of eco-friendly packaging solutions. Additionally, collaboration between businesses and local communities plays a significant role in fostering sustainable practices and creating a positive impact on the social and environmental aspects of the supply chain (Okoye, et al., 2024).

Zhou (2023) defined supply chain optimization as the strategic process of refining the supply chain to meet specific objectives, such as reducing costs, improving service levels, or enhancing product quality. It encompasses a wide range of activities, including inventory management, and supplier management. By optimizing these elements, businesses can respond more effectively to customer demands, adapt to market changes, and maintain a competitive edge.

In today's highly dynamic and globalized economy, supply chain optimization (SCO) has become a strategic imperative for organizations seeking to remain competitive, resilient, and sustainable. The COVID-19 pandemic, geopolitical tensions, inflationary pressures, and climate-related disruptions have exposed vulnerabilities in global supply networks, underscoring the urgent need for more adaptive and intelligent supply chain systems (McKinsey & Company, 2022).

Sustainability has also emerged as a core pillar of supply chain optimization. Companies are increasingly aligning with circular economy principles to reduce waste, enhance resource efficiency, and meet environmental, social, and governance (ESG) goals. McDonald's is transitioning toward regenerative agriculture practices to reduce emissions and enhance resilience across its food supply chain. McDonald's is also steering its agricultural practices towards regenerative agriculture to enhance supply chain resilience and meet climate goals. This includes methods like cover cropping and reduced tillage, aiming to cut agriculture-linked emissions by 16% by 2030 compared to 2018 levels (Reuters, 2025). Moreover, resilience and agility have become crucial considerations. Practices such as nearshoring, multi-sourcing, and

hybrid logistics models are being adopted to reduce dependency on single sources and improve responsiveness to market changes. Smart warehousing and automation are also being widely implemented to improve operational efficiency and reduce human error. Technologies such as robotics, RFID, augmented reality, and drones are being integrated into inventory management systems, enabling real-time monitoring and rapid response capabilities (Vogue Business, 2025). These strategies ensure continuity and adaptability in the face of disruptions such as natural disasters or political instability

Statement of the Problem

Kenya Vision 2030 and the Second Medium Plan 2013-2017 identify energy as one of the infrastructure enablers for transformation into "a newly-industrializing, middle-income country providing a high quality of life to all its citizens in a clean and secure environment". Access to competitively priced, reliable, quality, safe and sustainable energy is essential for achievement of the Vision. Electricity serves as a key factor of production for manufacturing firms in Kenya. The sector contributes about 9.49% of the gross domestic product (GDP). The country's supplier rate increased from 19% in 2010 to 77% in 2021. This was identified as one of the fastest rises in supplier rates within sub-Saharan Africa since 2013 (KNBS, 2023)

Regardless of the significance of the sector to the economy, Kenya's energy sector is faced with various challenges. The energy sector in Kenya is plagued by inefficiencies and corruption, leading to higher costs and reduced access to electricity for many consumers. In 2019, the Kenya Power (KP) reported a total system loss of 21.12%, with distribution losses accounting for 9.22% of the total. Current estimates show system losses of up to 35% with distribution losses accounting for 18% (Muigua, 2022). The Kenyan Government has consistently allocated significant funds to the construction of electricity infrastructure, amounting to approximately Kshs. 338 billion and Kshs. 339 billion in fiscal years 2019 and 2018, respectively. However, the rate of absorption ranged between 47 and 48 percent, which was low and indicated a downward trend in energy sector growth (Kenya's Economic Survey, KIPPRA, 2020). There has been complaints from entrepreneurs who are faced with power shortages resulting to monthly loss of 6.3 million Kenyan shillings (Takase, Kipkoech, & Essandoh, 2021).

Objectives of the Study

The general objective was to examine the relationship between supply chain optimization practices and performance of public energy sector in Nairobi Region in Kenya.

i. To establish effect of inventory management on performance of public energy sector in Nairobi Region, Kenya.
ii. To investigate effect of supplier management on performance of public energy sector in Nairobi Region, Kenya.

LITERATURE REVIEW

Theoretical Literature Review

Inventory Control Theory

Inventory control theory was developed by Starr and Miller in 1962. The basic principle of the theory is that companies have a lot of and assets and managing them becomes difficult. Big enterprises with a big branch network and many processing plants and units that require a diverse range of assets and inventories (raw materials, components and completed goods) must have a strategy. The inventory control theory is concerned with all actions related to the storing of items and the consequences, both positive and negative, thereof. One of the most common applications of inventory control theory is in the determination of the optimal quantity of inventory to be held. There are several mathematical models in use that can act as a useful tool

in inventory control. These models strive to balance storage costs with order costs; the cost of shortages is also considered. While inventory control theory tends to be a bit shortsighted regarding the non-monetary costs of storage and it makes assumptions regarding future demand and delivery that could not be known, inventory control theory is still a cost-saving and tool and is considered part of good business practice in manufacturing environments (O'Farrell 2010). Inventory control theory is applicable to the variable on inventory management. Inventory management helps to control the stocks and achieve optimum stock levels.

The Partnership Theory

The Partnership theory was developed by Sir Francis Hill (1966). The partnership theory depicts the buyer and supplier as partners with a common interest which is customer satisfaction (Petroni & Braglia, 2010). Partnership is a business relationship based on mutual trust, openness, shared risks and rewards that enables an organization gain competitive advantage leading in the company achieving a performance that's far much greater than the firm would have achieved when operating as single entities. This model requires efficient electronic vendor evaluation systems between the buyer and supplier which is a critical element of any partnership (Ribeiro & Henriques, 2011).

Partnership is systems of formalized co-operation, grounded in legally binding arrangements or informal understandings, co-operative working relationships and mutually adopted plans in an organization. They involve agreements on policy and programme objectives and the sharing of responsibility, resources, risks and benefits over a specified period of time. The purpose of entering into a partnership may be to gain extra resources for an area, project or organisation, to release synergy through collaboration and joining various types of resources, or to transform one or more of the partner organisations. This may include letting them act more entrepreneurially through loosening some constraints and introducing new ways of doing things which are more effective or efficient (McGregor et al., 1995). The theory is applicable to the objective on supplier management. A good relationship with the suppliers will ensure smooth flow material required to effectively carry out firm processes.

Conceptual Framework

A conceptual framework is a basic structure that consists of the study variables (Alan, 2019). The conceptual framework in Figure 2.1 shows that changes in the independent variable may cause changes in the dependent variable. The figures also shows the metrics used to measure the study variables.

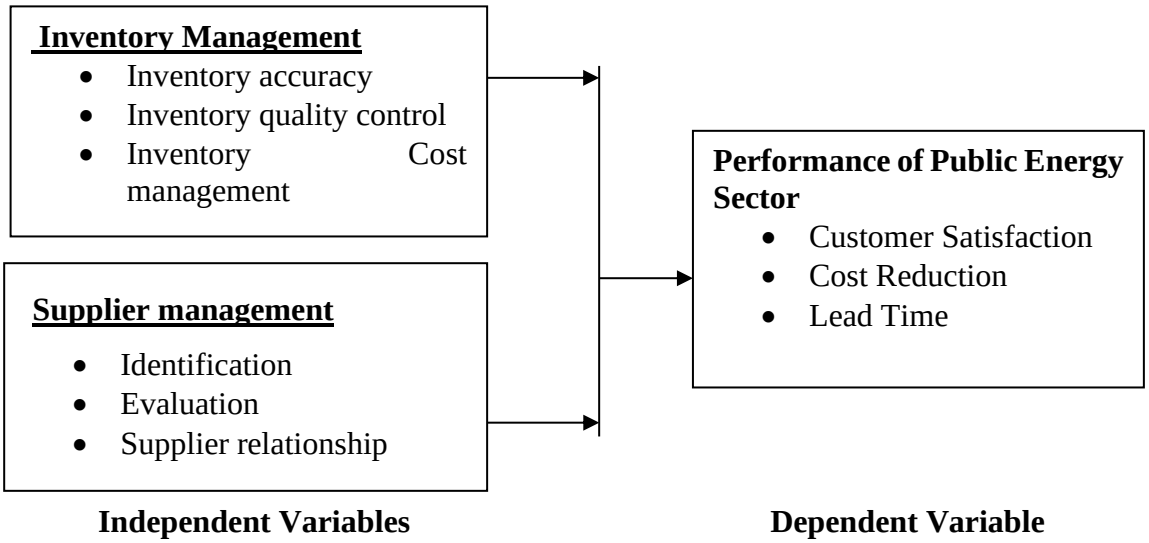

Figure 2. 1: Conceptual Framework

Inventory Management

Inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (working-in-progress) and finished good so that adequate supplies are available and the costs of over or understocks are low. Inventory management is primarily about specifying the size and placement of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods (Bashar, Rahman, & Sakib, 2024). Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials or goods Inventory management (Vessils, 2020).

Inventory management strengthens internal controls to ensure optimal and quality inventory while providing value to customers. It basically reduces unnecessary inventory wastages, shortages, thefts, production costs while ensuring sales growth, customer satisfaction, competitiveness and eventually survival of manufacturing firms. Proper inventory management enables manufacturing firms to mitigate risk by hedging against fluctuations arising from major risk-related issues such as economic, financial, market, weather and/or demand. It also serves as a buffer to handle uncertainties and process out variations (Opuku & Fiati, 2020).

Efficient inventory management performance should include stock tracing and batch tracking. This indicates that tracing a particular item backward or forward from source to finished product and identify the other items in the batch is much easier. Automation of inventory management system makes tracking relatively straight forward and it is time saving. Manual inventory management system can use coding to ease the tracking process of particular batches (Obermaier, 2022).

Supplier Management

Supply management refers to the act of finding, obtaining and managing resources and suppliers that are vital to the operations of an organization. Supply Management consists of the buying of physical goods, data, services and any other essential resources that allow an organization to operate and grow continuously (Jenkins & Holcomb, 2021). Supplier management is the relationship that is established between a buyer and supplier, subject to goods or services being obtained and supplied into your organization which in turn defines the type of working relationship that you should look to develop with your suppliers. Supplier relationship management is a fundamental soft skill for all managers involved in purchasing and supply (Salimian, Rashidirad & Soltani, 2021).

Investing in supplier development programs can yield significant benefits in the long run. These programs can include training initiatives, knowledge-sharing sessions and process improvement workshops. Helping suppliers enhance their capabilities can drive performance improvements and foster innovation. Supplier development programs demonstrate a commitment to mutual growth and can strengthen the overall supplier relationship (Vashisht, 2023). Proper management of the supply chain has been known to diminish the potential risks and uncertainty that may be incurred by a firm, lead to the optimization of the inventory levels and process cycle time this performance is increased through satisfied customers and increased profit margins. In the case of manufacturing firms, the purchasing function must receive enough consideration with the consideration increasing as the cost of outsourcing and purchasing assume a greater portion of the total cost of the manufacturing process (Moore, 2021).

Performance of Public Energy Sector

Firm performance refers to how well an organization achieves its market-oriented goals as well as its financial goals (Kim, 2020). Energy in Kenya describes energy and electricity production, consumption, import and export in Kenya. Reforms in the energy sector in Kenya have continued to take place especially with the Energy policy development of 2018 and the subsequent enactment of the Energy Act of 2019, which established Energy and Petroleum Regulatory Authority (EPRA).

Despite the electricity tariff reforms and organizational restructuring, Kenya Power, which is the sole distributor of commercial electricity, has continued to manifest weak financial performance, which has impeded access to domestic and international money markets for the needed system reinforcement and expansion. Furthermore, such performance has largely influenced the demand for and degree of onerous payment security guarantees from lenders and IPPs, further aggravating the already weak financial situation of KP. Kenya Electricity Transmission Company (KETRACO) is involved in the planning, designing, building, and maintaining electricity transmission lines and associated substations. The Rural Electrification Authority mandate is to accelerate the pace of rural electrification in the country, in order to promote sustainable socioeconomic development. KenGen accounts for about 82.1% of the total installed capacity, the private sector for about 15.2%, imports for about 2.4% and the Government under the Rural Electrification Programme for less than 1%.

Direct Government involvement in the petroleum industry is in the oil refinery where it co-owns the Kenya Petroleum Refineries Ltd (KPRL) with three private companies (Shell, BP Petroleum and Caltex) on a 50-50 % equity basis and in oil storage facilities at Kipevu, capable of holding 1.5 million barrels. The storage facilities are available to all licensed importers at a fee. The Government is also the sole owner of the National Oil Corporation of Kenya (NOCK), which is involved in oil supply and distribution. NOCK also undertakes oil exploration on behalf of the Government. The Geothermal Development Corporation (GDC) is a State-Owned Enterprise with the mandate to fast-track development of geothermal resources in the country.

Empirical Literature

Inventory Management

Gakwaya and Irechukwu (2022) examined the impact of inventory management activities on retailer satisfaction in manufacturing industries in Rwanda. The study used qualitative and quantitative research designs with 121 respondents. The results established that a retailer's satisfaction can be associated with inventory storage management, inventory order processing, and inventory distribution management. The research recommends that companies adopt inventory practices all the time to minimize inventory costs and retailers should accurately forecast demand to avoid experiencing stock-outs.

Mweshi (2022) studied effect of overstocking and stockouts on the manufacturing sector. Secondary data was collected for the study. The advantages resulting from inventories were identified as buffer against various types of operational risks (such as uncertain demand, uncertain supply and/or uncertain processes). Furthermore, inventories allow fast deliveries to customers even in cases of long production lead times. Out-of-stock events caused by, for instance, machine breakdowns or unreliable suppliers very likely dissatisfy customers, cause extra costs and harm future demand because demand depends on organizational behavior and is not exogenous from it.

Muchaendepi et al. (2019) assessed the inventory management strategies employed by small medium enterprises in Zimbabwe. The study used a qualitative research design. The study sample was 244 respondents. The findings revealed that SMEs used only the Just -In Time methods and were not aware of other inventory control systems. Akankwatsa (2019) examined

the nexus between inventory management and the performance of construction companies in Uganda. The study was done on Roko Construction Ltd. Some of the inventory control systems examined included inspection of goods upon receipt, fixing the stock levels to avoid inadequate stocks and cost controls. The results revealed inadequate stock control mechanisms for instance lack of inspection of goods upon receipt and lack of the stock levels. This resulted in poor performance. Further, the results of the correlation study revealed a strong association between project success and inventory control strategies

Supplier Management

Hamad (2020) analyzed the effect of supplier evaluation on procurement functions performance of the publicc sector organization in Tanzania. Primary data was collected using questionnaires. The regression results showed that there are significant and positive effects of supplier evaluation on procurement function performance. The supplier capacity, supplier financial capacity and supplier quality management were all found significant and positive effects on procurement function performance

Sauda and Ngeny (2019) examined effect of supplier evaluation on the performance of procurement contract at the coast provincial general hospital. The study used a stratified sampling technique where 70 respondents were involved. The study revealed that supplier evaluation has strong effects on procurement contract performance where supplier collaboration, financial stability, supplier technical competency and supplier ethics had all statistically significant effect on procurement contract performance in Coast Provincial General Hospital.

Onyango (2020) sought to establish the effect of supply chain collaboration, supplier development and supply selection and evaluation on supply chain performance of the alcoholic beverage companies in Kenya. The study adopted a descriptive design. The study population was 48 beverage alcoholic manufacturing entities in Kenya. Data was collected using questionnaires. The study noted that while supply chain collaboration and supply selection and evaluation had significant effect on supply chain performance of the alcoholic beverage companies in Kenya, supplier development was not significant. The study concluded that supply chain collaboration and supply selection and evaluation had significant effect on supply chain performance of the alcoholic beverage companies in Kenya.

Chebet, Sang, and Chapkwony (2020) studied effect of supplier relationship management practices on financial performance in KTDA Tea processing firms in Kericho County. The research adopted a descriptive survey design. The target was 700 respondents and 210 were sampled. Questionnaires were used to collect data. The findings showed that supplier relationship management mutual relationship is very crucial as the company are able to engage competitively, reduce costs, allow the mutual sharing of risks and flow of information, flexibility in change management and effective utilization of resources. The study concluded that supply chain management practices are significant on the financial performance of the tea processing firms in Kericho County, Kenya.

Mwangi and Muli (2022) investigated the influence of supplier relationship management on the performance of Food and Beverage manufacturing firms in Kenya. The study sampled 189 Officers from procurement, warehousing and logistics department. Data was collected by using questionnaires. The study established that supplier relationship management have a positive influence on performance of food and beverages manufacturing firms in Kiambu County. Results from correlation analysis showed that, supplier segmentation, information slow, supplier collaboration and supplier development were positively and significantly correlated with performance of food and beverages manufacturing firms.

RESEARCH METHODOLOGY

The study applied a descriptive research design. According to Fraenkel and Wallen (2019), descriptive research designs are often used when researchers aim to provide a view of a situation or phenomenon, examining the frequency of events or the relationships between variables. The target population was 638 respondents drawn from there 10 state corporations in the energy sector in Nairobi Region. The state corporations were the study unit of analysis. The unit of observation was the management staff involved in key procurement and supply chain decisions. The departments were accounts, marketing, procurement and supply chain, information communication technology and business strategy development. The sample size of the study was determined using Yamane's Formula (Yamane, 1997) of 246.

Stratified random sampling was used to determine the sample size. The management staff was stratified according to their departments where equal number of respondents were selected from each stratum (accounts, marketing, procurement and supply chain, information communication technology and business strategy development) until 246 respondents are selected. The study data was collected using questionnaires. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) Version 28. The descriptive statistics included frequency, percentage, mean and standard deviation. Frequency distribution is distribution and patterns of as marked by respondents from lowest to highest. The inferential statistics included correlation and regression.

RESEARCH FINDINGS AND DISCUSSIONS

The response rate for the study was based on the distribution and collection of 221 questionnaires, out of which 180 were returned, representing a response rate of 80.4%. This response rate is considered satisfactory and aligns with the recommendations by Mugenda and Mugenda (2023), who suggest that a response rate of above 70% is excellent for survey-based research. The high response rate indicates a strong engagement from the participants, which enhances the reliability and validity of the study findings.

Descriptive Analysis

This section presents the findings from the Likert scale questions where respondents indicated their level of agreement with various statements regarding supply chain optimization practices and performance of public energy sector in Nairobi Region in Kenya. A 5-point Likert scale was used, with mean values and standard deviations calculated to interpret the findings. A mean value of 1.0-1.80 was strongly disagree1.80-2.60 disagree, 2.61-3.20 neutral, 3.21-4.20 agree and 4.21-5.00 strongly agree. On the other hand, a standard deviation greater than 2.0, suggests that the responses had a close range of scores across the participants.

Inventory Management

The first objective sought to establish effect of inventory management on performance of public energy sector in Nairobi Region in Kenya. Respondents were asked to tick on the extent to which they agree/disagree with statements related to inventory management. Findings are shown in Table 1.

Table 1: Inventory Management

Key: SD=Strongly disagree, D=Disagree, NS=Not Sure, A=Agree, SA= Strongly agree, M=Mean, Std=Standard Deviation.

Statements	SD %	D %	N %	A %	SA %	M	Std.
The firm avails resources on demand in order to manage wastage	16.1	1.7	5.0	7.8	69.4	4.13	1.502
The firm has a daily schedule commitment to ensure faster production on time	15.6	10.6	6.7	16.1	51.1	3.77	1.536
The firm orders raw materials from the suppliers only when there is demand for production from customers	5.0	15.6	1.7	8.9	68.9	3.79	1.320
The firm avails labor on demand in order to manage labor costs.	45.6	12.8	2.2	23.3	16.1	2.52	1.615
The firm adopts best practices in the industry such as JIT and efficient customer response to prevent inventory buildup.	52.8	21.7	3.9	13.3	8.3	2.03	1.364
The firm produces on demand in order to manage inventory costs	15.0	20.6	2.2	1.7	60.6	3.72	1.655
The firm has automated its inventory management systems to improve the levels of service delivery	4.4	5.0	6.1	10.0	74.4	4.45	1.100
Inventory control levels have been set to control the various inventory related costs.	1.7	1.7	5.0	16.7	75.0	4.38	0.800
Average						**3.60**	**1.145**

N=180

Results show that the firms avail resources on demand in order to manage wastage (M=4.13, Std.=1.502) as strongly agreed by 69.4%. The firms have a daily schedule commitment to ensure faster production on time (M=3.77, Std.=1.536) as strongly agreed by 51.1%. The firms order raw materials from the suppliers only when there is demand for production from customers (M=3.79, Std.=1.320) as strongly agreed by 68.9%. The firms rarely avail labor on demand (M=2.52, Std.=1.615) as strongly disagreed by 45.6%. The firms have not adopted best practices in the industry such as JIT and efficient customer response to prevent inventory buildup (M=2.03, Std.=1.364) as strongly disagreed by 52.8%.

The firms produce on demand in order to manage inventory costs (M=3.72, Std.=1.655) as strongly agreed by 60.6%. The firms have automated inventory management systems to improve the levels of service delivery (M=4.45, Std.1.100) as strongly agreed by 74.4%. Inventory control levels have been set to control the various inventory related costs (M=4.38, Std.=0.800) as strongly agreed by 75%. The aggregate mean of 3.60 (SD = 1.145) suggests that respondents generally agree on the effectiveness of inventory management which helps to avoid wastage as production is based on the demand of the products. Labor will also be availed based on service demand which o enhance performance through suitable service delivery.

Findings imply that ; there is a strong commitment to resource optimization and cost efficiency, there are efforts toward structured production processes, but there may be room for improvement in adherence and efficiency, there is a lean approach to inventory management, reducing unnecessary stockholding cost, there is a lack of flexibility in workforce management, which could impact operational efficiency, especially during peak demand periods, there is a suggests a gap in optimizing inventory control methods, leading to inefficiencies. The firms

also produce on demand which support the lean manufacturing approach, ensuring that production aligns with actual market needs. The public energy sector in Kenya has implemented automated inventory management systems, particularly through the adoption of Enterprise Resource Planning (ERP) systems. A study focusing on Kenya Power and Lighting Company (KPLC) found that 93% of respondents confirmed the use of ERP in inventory management. The inventory control levels indicate a well-structured inventory control mechanism that helps in cost reduction. Results are in agreement with Mweshi (2022) that inventories allow fast deliveries to customers even in cases of long production lead times. Out-of-stock events caused by, for instance, machine breakdowns or unreliable suppliers very likely dissatisfy customers, cause extra costs and harm future demand because demand depends on organizational behavior and is not exogenous from it.

Supplier Management

The second objective sought to investigate effect of supplier management on performance of public energy sector in Nairobi Region in Kenya. Respondents were asked to tick on the extent to which they agree/disagree with statements related to supplier management. Findings are shown in Table 2.

Table 2: Supplier Management

Key: SD=Strongly disagree, D=Disagree, NS=Not Sure, A=Agree, SA= Strongly agree, M=Mean, Std=Standard Deviation.

Statements	SD %	D %	N %	A %	SA %	M	Std.
The company assesses the suitability of suppliers before contracts are given	6.1	7.2	13.9	40.6	32.2	3.86	1.134
Appraisal procedures incorporate sustainability aspects and support the supplier performance	11.7	7.8	5.6	34.4	40.6	3.84	1.134
The company conducts due diligence to establish the capacity of the suppliers	7.8	23.9	11.7	21.1	35.6	3.47	1.384
The suppliers are always required to provide proof of their technical competence in order to be considered for supply.	10.0	21.1	9.4	25.6	33.9	3.48	1.400
The firm always shares procurement related information with suppliers	49.4	24.4	11.7	7.2	7.2	1.98	1.248
Our suppliers always inform us in advance when they expect disruptions in supplies	8.9	6.7	2.2	18.9	63.3	4.21	1.299
The organization communicates to the suppliers about performance and client feedback	0.6	1.7	0	70.6	27.2	4.24	0.532
The organization maintains its production level by ensuring continuous evaluation of its suppliers	16.1	1.7	7.8	18.9	55.6	3.96	1.470
Average						**3.63**	**1.200**

N=180

Results show that the firms assesses the suitability of suppliers before contracts are given (M=3.86, Std.=1.134) as agreed by 40.6%. Appraisal procedures incorporate sustainability aspects and support the supplier performance (M=3.84, Std.=1.134) as strongly agreed by 40.6%. The firms conduct due diligence to establish the capacity of the of the suppliers (M=3.47, Std.=1.384) as strongly agreed by 35.6%. The suppliers are always required to

provide proof of their technical competence in order to be considered for supply (M=3.48, Std.=1.400) as strongly agreed by 33.9%. The firms rarely shares procurement related information with suppliers (M=1.98, Std.=1.248) as strongly disagreed by 49.4%. The suppliers always inform the firms in advance when they expect disruptions in supplies (M=4.21, Std.=1.299) as strongly agreed by 63.3%. The firms communicate to the suppliers about performance and client feedback (M=4.24, Std.=0.532) as agreed by 70.6%. The firms maintain their production level by ensuring continuous evaluation of its suppliers (M=3.96, Std.=1.470) as strongly agreed by 55.6%. The aggregate mean of 3.63 (SD = 1.200) suggests that respondents generally agree on the effectiveness of supplier management which helps to share information with suppliers effectively. This ensures that products and services are supplied on time to avoid delay in delivery which may prompt bad reviews from the customers and loss of market share.

Results imply that the firms have a structured procurement process, though a significant portion of firms may not be conducting rigorous evaluations. Results also indicate that firms recognize the importance of sustainable sourcing but may need to strengthen their sustainability criteria. While due diligence is conducted, the level of agreement suggests that some firms may not be thoroughly evaluating supplier capabilities. There is however moderate level of agreement indicating that some firms may not strictly enforce this requirement. The poor procurement information sharing shows lack of transparency which could hinder supplier performance and collaboration. Supplier communications on disruptions reflects good supplier relationships and proactive risk management. Firm-supplier communication on performance suggests an established feedback mechanism to improve supplier performance. There is continuous supplier evaluation which indicates an effort to ensure supplier reliability and supply chain stability. Results are in agreement with Chebet, Sang, and Chapkwony (2020) who showed that supplier relationship management mutual relationship is very crucial as the company are able to engage competitively, reduce costs, allow the mutual sharing of risks and flow of information, flexibility in change management and effective utilization of resources.

Performance of State Corporations

The staff were asked to tick on the extent to which they agree/disagree with statements related to performance of state corporations in energy sector in Nairobi Region in Kenya. Findings are shown in Table 3.

Table 3: Firm Performance

Key: SD=Strongly disagree, D=Disagree, NS=Not Sure, A=Agree, SA= Strongly agree, M=Mean, Std=Standard Deviation.

Statements	SD %	D %	N %	A %	SA %	M	Std.
Number of complaints from customers has reduced	43.9	34.4	9.4	9.4	2.8	1.07	1.078
The operations costs have been reducing	46.1	26.7	6.1	8.3	12.8	1.85	1.412
Number of days to procure materials, manufacture goods and deliver finished products has reduced	6.1	10.6	6.1	23.9	53.3	4.08	1.253
Average						**2.33**	**1.247**

N=180

Results show that the number of complaints from customers has not been reducing ((M=1.07, Std.=1.078) as strongly disagreed by 43.9%. The operations costs have not been reducing (M=1.85, Std.=1.412) as strongly disagreed by 46.1%. The number of days to procure materials, manufacture goods and deliver finished products has reduced (M=4.08, Std.=1.253) as strongly agreed by 53.3%. Results imply that despite ongoing operations, customer

satisfaction remains low, possibly due to product quality, service inefficiencies, or unmet expectations. The increasing operations costs indicates that the firms are struggling to control or reduce expenses, which could be due to inefficiencies in procurement, production, or distribution. Results further show that the firm has made improvements in supply chain efficiency, leading to faster processing and delivery. Results support Muigua (2022) who found that the energy sector in Kenya is plagued by inefficiencies and corruption, leading to higher costs and reduced access to electricity for many consumers. Takase, Kipkoech and Essandoh (2021) added that there has been complaints from entrepreneurs who are faced with power shortages resulting to monthly loss of 6.3 million Kenyan shillings.

Correlation Analysis

The correlation analysis was conducted to examine the relationships between the dependent variable (performance of state corporations in energy sector in Nairobi Region in Kenya) and the independent variables (inventory management, supplier management). The Pearson correlation coefficients between these variables are presented in Table 4.9 below. According to Cohen (1988), the strength of the relationship is interpreted as small if the coefficient is between ±0.1 and ±0.29, moderate if it is between ±0.3 and ±0.49 and strong if it is ±0.5 or above. Results are presented in Table 4.

Table 4: Correlation Results

Variables		Firm performance	Inventory management	Inventory management
Firm performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	180		
Inventory management	Pearson Correlation	.601**	1	
	Sig. (2-tailed)	.000		
	N	180	180	
Supplier management	Pearson Correlation	.823**	.556**	1
	Sig. (2-tailed)	.000	.000	
	N	180	180	180

The Pearson correlation coefficient between inventory management and the performance of state corporations in energy sector in Kenya is 0.601, with a p-value of 0.000. This indicates a strong positive and statistically significant relationship between these two variables. The strong correlation suggests that as the effectiveness of inventory management increases, so does the performance of state corporations in energy sector. Results concur with Akankwatsa (2019) study which revealed a strong association between project success and inventory control strategies.

The Pearson correlation coefficient between supplier management and the performance of state corporations in energy sector in Nairobi Region in Kenya is 0.823, with a p-value of 0.000. This indicates a strong positive and statistically significant relationship between these two variables. The strong correlation suggests that as the effectiveness of supplier management increases, so does the performance of state corporations in energy sector. Findings are in line with Hamad (2020) which showed that there are significant and positive effects of supplier evaluation on procurement function performance.

Multiple Regression Analysis

The multiple regression analysis was conducted to determine the inventory management, supplier management on performance of public energy sector in Nairobi Region in Kenya. The model summary, ANOVA and regression coefficients are presented to explain the effect of these variables.

Inventory management show a statistically significant positive coefficient (β =.269, sig =.000), indicating that improvements in inventory management practices result to an increased performance in performance of state corporations in energy sector in Nairobi, Kenya. Inventory management accounts for 22.6% (std Beta =.226) changes in firm performance. The findings concur with Gakwaya and Irechukwu (2022) that a retailer's satisfaction can be associated with inventory storage management, inventory order processing, and inventory distribution management.

Supplier management show a statistically significant positive coefficient (β =.665, sig =.000), indicating that improvements in supplier management practices result to an increased performance in performance of state corporations in energy sector in Nairobi, Kenya. Supplier management accounts for 66.5% (std Beta =.665) changes in firm performance. The findings concur with Onyango (2020) study that supply selection and evaluation had significant effect on supply chain performance of the alcoholic beverage companies in Kenya.

The regression equation derived from the analysis is as follows:

Performance of State Corporations = 3.177 + 0.269 Inventory management + 0.741 Supplier management

Conclusion

Inventory Management and Performance of State Corporations

The state corporations in the energy sector have implemented on-demand resource allocation and inventory control mechanisms which improves cost efficiency and service delivery. Automated inventory management systems are widely adopted, enhancing operational efficiency. Despite these advancements, firms lack flexibility in labor management, potentially affecting responsiveness to production demands. The absence of best practices like JIT and efficient customer response may result in excess inventory and inefficiencies. The inventory management practices have a significant effect on firm performance.

Supplier Management and Performance of State Corporations

The state corporations in the energy sector prioritize supplier assessment and sustainability in procurement, but there is room for improvement in due diligence and technical competence verification. Information sharing with suppliers is poor, which could impact supply chain efficiency and responsiveness. Suppliers proactively communicate supply disruptions, helping firms manage risks effectively. The state corporations engage in continuous supplier evaluation to maintain production levels, but more stringent assessment practices may be needed. The supplier management practices have a significant effect on firm performance.

Performance of State Corporations in Energy Sector

While lead time for procurement, production and delivery has improved, customer complaints remain high, suggesting that faster service does not necessarily mean better service. Operational costs have not decreased, which may indicate inefficiencies in cost management, possibly in procurement, production, or logistics. The lack of reduction in customer complaints suggests that service or product quality is not meeting expectations despite improvements in process speed.

Recommendations

Inventory Management and Performance of State Corporations

The corporations should implement Just in Time and efficient customer response strategies to reduce inventory buildup and optimize control. The corporations should also establish a flexible labor management system such as on-call staffing or part-time labor pools to align work force availability with changes in demand. The corporations should utilize real-time data

analytics and AI-driven forecasting to refine production schedules and improve efficiency. The corporations should develop supplier partnerships to ensure just-in-time raw material procurement and reduce lead times.

Supplier Management and Performance of State Corporations

The corporations should implement more rigorous supplier assessments, incorporating both qualitative (sustainability, ethics) and quantitative (financial strength, delivery performance) factors. They should establish a structured communication framework for procurement updates, demand forecasts and inventory levels to enhance supplier coordination and performance. The firms should conduct regular audits and performance reviews to ensure suppliers meet quality, capacity and technical competence standards. Adoption of e-procurement and supplier management systems may as well enhance procurement processes, improve transparency and enhance supplier collaboration.

Areas for Further Study

The study focused on state corporations in the energy sector in Kenya. A similar study should be conducted to focus on all state corporations in Kenya. Results show that the supply chain optimization practices contribute to 78.8% of the performance, therefore a further study should be conducted to establish other supply chain optimization practices that probably explain 21.2% of state corporations' performance.

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