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LEAN SUPPLY CHAIN PRACTICES AND SUPLY CHAIN PERFORMANCE OF MOTOR VEHICLE ASSEMBLING COMPANIES IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Lean is a management approach that involves the identification and elimination of wastes through the continuous improvement of a product to ensure customer satisfaction is achieved. The goal of the lean approach is to create more value for the customers at a less cost. The general objective was to examine the effect of lean supply chain practices and supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. The specific objectives were to; determine effect of lean procurement, and waste management on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. The study was guided by resource-based view theory and lean theory. The researcher employed descriptive research design. The target population of this study was 8 motor vehicle assemblers in Nairobi City County. The study adopted stratified sampling to sample 180 staff. The sample for piloting was 10% of the sample hence 18 staff. This study used both construct validity and content validity. The Cronbach Alpha coefficient was used to measure questionnaires' reliability. Construct validity results show that lean procurement had an AVE value of 0.552,waste reduction AVE of 0.560, and supply chain performance an AVE of 0.541. Reliability results show that lean procurement 0.857, and waste reduction0.818. The findings show that lean procurement (coefficient = 0.232, p=0.003), and waste reduction (coefficient = 0.216, p=0.006) significantly enhance supply chain performance. The study concludes that adopting these lean practices is essential for improving efficiency and effectiveness in the supply chain. It recommends strengthening procurement processes, and advancing waste reduction strategies to achieve better performance.

Key Words: Lean Supply Chain Practices, Supply Chain Performance, Lean Procurement, Waste Management, Performance, Motor Vehicle Assembling Companies, Waste Reduction

Background of the Study

Lean in a supply chain context is a term that means eliminating non-useful activities through the supply chain. Lean is a management approach that involves the identification and elimination of wastes through the continuous improvement of a product to ensure customer satisfaction is achieved. The goal of the lean approach is to create more value for the customers at a less cost (Singh &Pandey, 2015). Lean supply management practices hence involve different stakeholders in the supply chain involved in the production and sale of a product. For lean management to be achieved, it can involve different companies or departments within an organization (Hu et al., 2015). Drohomeretski et al. (2014) summarized lean supply chain objectives as the elimination of sources of waste in the supply chain, improvement of customers' value delivery, supply chain partners' involvement, collaboration with suppliers and customers, and development of effective suppliers.

Adoption of lean supply chain management enables the firms to tailor their supply chain processes and organizational roles to support lean supply chain principles. Organizations within a lean supply chain are able to leverage their own lean journey more easily, delivering better customer value by responding more efficiently, quickly, and predictably to customer needs (Margaret, 2013). Lean supply chain management (LSCM) is increasingly commanding a significant contribution in daily performance of most manufacturing organizations. Adoption of LSCM by the organizations has given rise to competitive edge in the global market via constant supply of quality products at affordable costs thus commanding good market share and reaping high profits.

Statement of the Problem

The motor vehicle assembling companies accounts for 6% of GDP contribution which recorded a deficit of $1.1 billion thus raising concerns in the sector. Motor sector has continued to report deteriorating performances over the last decade occasioned by stiff competition, changes in operational environment, changes in the demands of customers as well as dynamic customers preferences. The poor performances have seen the sector contribute minimally to the country's economic growth. According to Kenya Automotive Association (2020), the productivity levels of the auto industry has shown a decline in annual sales. In the financial year 2018/2019, the sector was operating at low capacity of 16% and recorded an annual sale of $600. The Kenya Association of Manufacturers (KAM) pointed out that the industrial growth in Kenya has stagnated with a GDP contribution of 10 % over the last 10 years, and a further reported decline to 9.2 % in 2019 (KAM, 2020). Data from the Kenya Motor Industry Association shows that the volume of sales of locally assembled vehicles fell from a high of 20,168 vehicles in to 14,876 units in the years 2018 and 2019 respectively (KMIA, 2020). This scenario has been blamed on a growing appetite for imported second-hand vehicles.

Kathikeyan (2016) noted that the key challenges facing the supply chain performance of firms are logistical activities such transportation, storage and handling as well as inefficient ways of managing information. Failure in the performance of a firm's supply chain courtesy of inefficient logistics activities results in competitive losses and can ultimately lead to collapse of an organization. In recent years, there has been substantial interest in lean thinking by researchers especially in the manufacturing sector. Wambui and Odari (2021) study on the influence of lean supply chain practices on the performance of food and beverage manufacturing firms in Kenya found a strong positive correlation between performance and waste management, and performance and quality assurance. Kimari and Muli (2022) study on influence of lean supply chain management practices on the performance of manufacturing firms found that Just in Time Procurement had an insignificant negative influence on performance, Six Sigma lean supply chain practice had a significant positive influence on performance and Total quality management had an insignificant positive influence on performance. Yala (2016) study on lean supply chain management practices and operational

performance of the manufacturing firms in Kenya found that lean supply chain management practices have very strong correlation with manufacturing firms in Kenya with demand management having the highest level of effect. This is an indication that there is study limitation on lean supply chain management and supply chain performance in agro processing firms in Nairobi Kenya. This study hence seeks to fill the knowledge gap by examining the effect of lean supply chain practices on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya.

Research Objectives

General Objective

To examine the effect of lean supply chain practices on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya.

Specific Objectives

i To determine effect of lean procurement on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya.
ii To establish effect of waste reduction on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya.

LITERATURE REVIEW

Theoretical Review

Resource Based View Theory

The theory was propounded by Barney (1991) and it states that organizations are profit-oriented entities functioning in distinct markets that are predictable and advancing towards an equilibrium (Barney, 1991). According to Shalakha (2015), identifying and owning internal strategic resources adds to an organization's capacity to develop and sustain a competitive advantage. Using the Resource-Based View (RBV) Theory, a resource is regarded as strategic if it fits particular features such as being unique, non-substitutable, valuable, and easily imitated to contribute to the organization's improved supply chain performance. Given the external shifting conditions that a company experiences in a competitive business environment, resources must be efficiently managed and utilized (Lippman & Rumelt, 2003).

According to Orina (2015), an organization's competence is indicated by its potential and ability to achieve a competitive edge. Every company has actual and potential weaknesses and strengths, and it is critical to strive to identify them and differentiate each. As a result, what a corporation can achieve is determined not only by the possibilities that it faces, but also by the resources that the organization can harness. Tangus (2015) defines resource-based theory as viewing the company as a set of assets or capacities. The majority of these assets and capacities are intangible in today's market. Organizations with distinctive skills possess traits that others cannot duplicate, even when they recognize the value they give to the company that owns them. The idea is significant to this study since it aims to construct lean procurement as a process that necessitates proper resources to enhance an supply chain performance.

Lean Theory

Lean theory was introduced by James, Womack, Jones and Roos (1991). The theory was later developed by Nash, Poling and Ward (2006) who saw it as a systematic approach that aims at enhancing a continuous flow of quality product or service to customers just at the time they need it. According to the theory, processes that aim at fully satisfying customers' needs should follow prescribed principles while minimizing all forms of loss. According to Ciarniene and Vienazindiene (2012), lean is a functional model comprising of comprehensive techniques which aim at reducing and eliminating wastage when combined together in a production process hence making a firm more responsive and flexible to changes in demand. Lean theory

capitalizes on a continuous quality delivery to customers basing on customers' needs at specific time. By doing so, the production process eliminates waste characterized by unnecessary planning meetings, unnecessary inventories, overproduction, and unnecessary transport and over processing (Rand, 2011).

Organizations aiming at applying lean theory in their production lines should have a strong focus on customers, should be willing to remove production wastes form all production processes on daily routine and must be willing to grow and survive prevailing stiff competition. Firms applying this strategy aim at increasing efficiency while at the same time decreasing waste since they receive goods just when they are needed in production process. The strategy enables producers to accurately forecast demand. Bautista and Santos (2016) asserts that organizations are able to reduce the amount of working capital due to the reduction in inventory levels. Consequently, the strategy ensures step by step inspection of the production process hence minimizing wastage. Lean theory forms the basis of this research as it evaluates and brings out lean practices that aim at removing production overburden, inconsistency and minimizing waste.

Conceptual Framework

A conceptual framework is a diagrammatic representation of the research variables. The relationship of the study variables visualized to show their interconnectedness (Oso & Onen, 2009). This conceptual framework comprises of the independent variable (lean supply chain practices) and the dependent variable (supply chain performance). The conceptual framework of this study is presented in Figure 2.1 below.

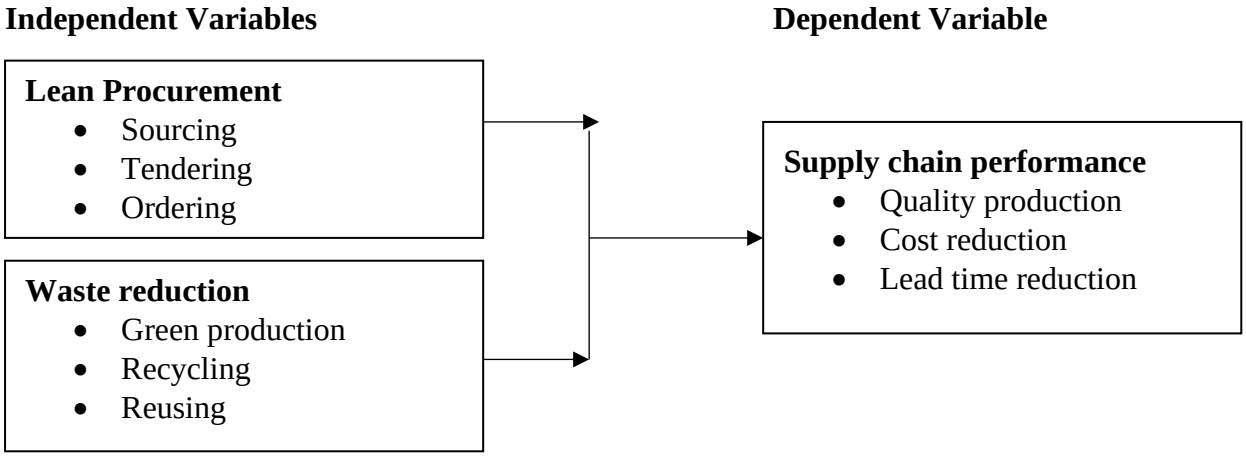

Figure 2.1: Conceptual Framework

Lean Procurement

Procurement refers to the acquisition of goods and services at the best possible total cost of ownership, in the right quantity and quality, at the right time and in the right place, generally through a contract (Munzhedzi, 2016). Agaba and Shipman (2017) described procurement practices as the process used by companies or public institutions to plan purchasing activity for a specific period of time. This is commonly completed during the budgeting process. According to Behn (2014), procurement practice is the process used by companies or public institutions to plan purchasing activity for a specific period of time. This is commonly completed during the budgeting process. Effective implementation of procurement practices is determined by the level of compliance with procurement regulations, minimization of procurement expenditure, transparency and accountability of procurement funds and quality of procured goods and services.

Ezeh (2012) asserts that procurement planning entails determining what needs to be sourced, how the firm's requirements can be best achieved, the purpose of the supplies, the procurement

approaches to be used, establishing time scales, and the responsible team for the entire procurement cycle. The procurement process consist of three main phases, the identification phase which consist of notification of the need to purchase and this is done by either requisition issued by the stores or potential user or bill of materials issued by the drawing office. The second phase is the ordering phase. The requisition or bill of materials is checked for accuracy, and conformity to specification and purchase records to ensure whether it's a rebuy or new buy. If it's a rebuy a repeat order will be issued. However if it is a new buy a request for quotation is sent to possible suppliers, and a quotation will be received in response to the enquires. A purchase order is then issued to the vendor that gave the quotation. Thirdly is the post ordering phase (Zhou & Benton, 2017).

Waste Reduction

Waste management is the process of ensuring that a company manufactures environmentally friendly products and the manufacturing process emits as less waste as possible. Professional buyers who consider environmentally preferable strategies of procurement have the power to reduce or even eliminate waste as well as environmental impacts leading to reduced costs. Additionally, many green products have been found to work as well or even better than traditional products and have been proved to save money. Moreover, firms that have switched to safer products, especially cleaning products, have been found to have reduced health incidents. Some of such incidents include allergic reactions, burns, asthma, significant organ damage, eye damage, and cancer, linked to the hazardous chemicals used in many traditional products (Saleena & Ahammed, 2019).

Manufacturing operations must scour their processes to identify areas that produce waste. . The industrial war on water consumption starts with designing and redesigning processes to use less water to begin with while aiming at doing more with less. A common problem in processing plants is leaky water pipes, fittings, and valves. Often leaks occur because standard proper pipe fitting and plumbing techniques have not been used, such as using incompatible piping material and sealant compounds. Leaks should be repaired and maintained to avoid unnecessary water loss. Green procurement has the potential of reducing expenses relating to waste management fees while offering solutions to hazardous material management costs (Yook et al., 2018).

Empirical Review

Lean Procurement and Supply Chain Performance

Simatupan (2015) examined impact of procurement strategies on company performance in India. The sample was 22 businesses. The study employed longitudinal research design. Results revealed a considerable correlation between procurement procedures and successful provision of products and services. Aladejebi and Adedeji (2015) analyzed influence of procurement strategy on Nigerian agricultural manufacturing enterprise performance. The researchers used questionnaires to collect data from ten agricultural processing enterprises. The results revealed a mutual relationship between procurement planning and the success of agricultural enterprises. In the procurement process, the businesses employed a highly ineffective functional Enterprise Resource Planning system. The key role that established the foundation for later procurement actions was procurement planning. Ahmed (2019) examined effect of procurement practices on organizational performance in Somalia's telecommunications industry. He employed a descriptive research approach in the study and questionnaires to collect data. According to the findings, procurement planning has a major influence on corporate performance.

Macha (2021) investigated the impact of procurement design on the execution of procurement tasks in Tanzanian public administration. A cross-sectional research design was used in the study. They employed a purposive sampling method to collect data from 67 respondents. Data

was gathered via questionnaires. The findings revealed a favorable and substantial association between timely procurement plan creation, quality planning, cost estimation, and procurement function performance. Consequently, the quality planning had a considerable impact on the procurement function. Chepkesis and Keitany (2018) researched effects of procurement strategy on the performance of suppliers in public entities. The study employed an explanatory research design while the survey included 119 suppliers. All the suppliers were sampled using a census. The team used interview schedules and questionnaires to collect data. According to their findings, procurement planning improves procurement decision making, product quality, creativity, and procurement issue resolution.

Waste Reduction and Supply Chain Performance

Younis, Sundarakani, and Vel (2016) investigated implementation of green supply chain management (GSCM) on firm performance in the United Arab Emirates. Questionnaires were used to collect data from 117 manufacturing firms. Findings showed that GSCM practices enables a company to design and develop better products hence increasing firms' opportunities of accessing international market and gaining a higher market share locally. GSCM practices also helped to enhance corporate image and enhance staff satisfaction. Anane (2020) examined green procurement practices and organization performance in Ghana. The study adopted a descriptive and explanatory research designs. Convenient sampling was used in sampling 160 respondents. Primary data was collected using questionnaires while secondary data was collected from company records. Findings revealed that green procurement was a significant determinant of organization performance. Green procurement enable firms to effectively use resources, reduce waste, reduce energy consumption, reduce packaging costs, and recycle waste

Mekasha (2020) examined effect of green logistics practices on performance of large manufacturing firms in Ethiopia. Simple random sampling was used in selecting 260 respondents. Questionnaires were used to collect dat. Results showed that green purchasing, green manufacturing, and reverse logistics had a significant positive relationship with performance of manufacturing firms. Nderitu and Ngugi (2014) sought to establish contribution of green procurement on performance of East African Breweries Limited (EABL). The study applied a descriptive research design. The study targeted 122 staff and 37 were sampled. Data was collected using questionnaires. Findings showed that green procurement practices was a significant contributor to organization performance. Kebenei (2016) assessed effect of green supply chain management on productivity of textile firms in Eldoret. The study adopted a descriptive research design. Data was collected using questionnaires. Findings showed that green procurement, green manufacturing, and reverse logistics has a significant relationship with firm productivity.

Kimani (2021) sought to find out effects of sustainable supply chain practices on the performance of sugar sub-sector in Kenya. The study employed descriptive research design. The target population was 600 respondents and stratified random sampling was in sampling 180 respondents. The study collected data using questionnaires. It was concluded that proper implementation of green supply chain management practices leads to better performance in sugar sub-sector in Kenya. The study recommended that manufacturing firms should implement environmentally sound practices in all phases of the supply chain, beginning with procurement of raw materials to manufacturing.

RESEARCH METHODOLOGY

The researcher employed descriptive research design. The target population of this study was motor vehicle assembling companies in Nairobi County, Kenya. According to Kenya Association of Manufactures (KAM), there are eight vehicle assembling companies in Nairobi County. The study unit of observation was the staff of the vehicle assembling companies. The study sampling frame was 328 staff of the vehicle assembling companies. The study used

Yamane (1967) Sampling to get the sample size of 180; The staff was stratified according to their management level department (senior, middle, and functional level). The staffs' names were collected from the motor vehicle assemblers, listed in alphabetical order, and 180 names of the staff selected randomly.

The study used questionnaires for data collection; Structured questionnaires. According to Singh and Masuku (2014) the size of a sample to be used for pretesting should be between 5-10% of the sample. Therefore, the study sampled 10% of the sample hence 18 staff were sampled for the piloting. The ten managers will not be included in the final data collection. The raw data collected from the field was organized to facilitate analysis. Quantitative data obtained from questionnaires will be coded and analyzed with the use of a computer in Statistical Package for Social Sciences (SPSS) Version 28 program. Primary data was analyzed using both descriptive statistics (frequency, percentage, mean) and inferential statistics that included Pearson correlation and regression.

RESEARCH FINDINGS AND DISCUSSION

Having found that the questionnaire was valid and reliable, it was issued to the selected sample of 180 staff members. The returned questionnaires were checked for accuracy and completeness, out of which 169 were found to be ideal for analysis. This represents a response rate of 93.9%, According to Babbie (2004), a response rate of 70% and above is considered very good, indicating a high level of engagement and reliability in the collected data.

Descriptive Analysis of Study Variables

This section presents the descriptive statistics for each of the lean supply chain practices: lean procurement, and waste reduction. They used a 5-point Likert scale where 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree. The means and standard deviations were used to interpret the findings where a mean value of 1-1.4 was strongly disagree, 1.5-2.4 disagree, 2.5-3.4 neutral, 3.5-4.4 agree and 4.5-5 strongly agree. Standard deviation values were also considered to understand the variability of responses.

Lean Procurement

The fisty specific objective of the study was to determine effect of lean procurement on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. Respondents therefore gave the level to which they agreed or disagreed with statements on lean procurement. Table 1 presents the findings obtained.

Table 1: Descriptive Statistics for Lean Procurement

Statement	Mean	Std. Dev.
The firm prepares an annual Procurement plan	4.215	0.787
Most suppliers selected to do business with the company are competent	4.142	0.715
The company involves key suppliers early in the procurement process	3.824	0.925
The company manages supplier relationship at every stage of the procurement process	3.924	0.823
All procurement processes are automated using an e-procurement system	3.604	1.105
Thorough needs assessment is undertaken by respective department heads for goods and services needed	4.021	0.914
The choice of a procurement method is guided by the firm procurement policies	4.327	0.683
Aggregate Score	**4.008**	**0.864**

The study established that respondents generally agreed on the effectiveness and implementation of lean procurement practices in their firms. The highest mean score was observed for the guidance of procurement methods by firm procurement policies (M = 4.327, SD = 0.683). This indicates a strong adherence to established guidelines, contributing to more efficient procurement processes. Similarly, thorough needs assessment undertaken by department heads scored high (M =4.021, SD = 0.914), reflecting the importance placed on understanding and meeting requirements accurately. Competent supplier selection also received a favorable response (M = 4.142, SD = 0.715), indicating confidence in the capabilities of suppliers. Early involvement of key suppliers (M = 3.824, SD = 0.925) and managing supplier relationships (M = 3.924, SD = 0.823) were also positively rated. However, the study noted a lower mean score for the automation of procurement processes (M = 3.604, SD = 1.105), highlighting an area for potential improvement. These findings align with Behn (2014), who emphasizes the importance of planning purchasing activities and compliance with procurement regulations for effective implementation. Ezeh (2012) also underscores the significance of thorough needs assessments and competent supplier selection in procurement success.

The overall aggregate score for lean procurement practices was 4.008, indicating a generally positive perception. This means that the respondents agreed, on average, that lean procurement significantly affects the supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. These findings align with empirical studies such as those by Simatupan (2015), who found a considerable correlation between procurement strategies and successful provision of products and services in Indian businesses. Additionally, Ahmed (2019) examined procurement practices in Somalia's telecommunications industry and concluded that effective procurement planning and supplier management have a major influence on corporate performance. The high aggregate score in this study echoes these empirical insights, demonstrating that well-implemented lean procurement practices are perceived to positively impact overall supply chain performance in the industry.

Waste Reduction

The study's second objective was to establish effect of waste reduction on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. Respondents gave the extent to which they agreed with statements about waste reduction and the results are as shown in Table 2.

Table 2: Descriptive Statistics for Waste Reduction

Statement	Mean	Std. Dev
There has been an increased number of products with reduced effects on environment and human health	4.304	0.602
Proper waste management improves the company's image in the last one year	4.215	0.712
The company purchases environmentally friendly materials	4.031	0.801
The company designs products that can be remanufactured	4.084	0.692
The company has reduced the purchase of hazardous materials	4.003	0.819
The company cooperates with customers for product eco-design	3.912	0.902
We have been practicing cleaner production strategies	4.215	0.703
Our processes are designed to reduce the generation of hazardous waste	4.091	0.704
Aggregate Score	4.107	0.742

The descriptive statistics for waste reduction practices reveal high mean scores, ranging from 3.912 to 4.304, with an aggregate score of 4.107. The highest mean score was for the increased number of products with reduced environmental and health impacts (M = 4.304, SD = 0.602). This reflects a strong commitment to sustainability and environmental responsibility. Proper waste management improving the company's image scored a mean of 4.215 (SD = 0.712), highlighting the positive impact on corporate reputation. The purchase of environmentally friendly materials scored a mean of 4.031 (SD = 0.801), and designing products that can be remanufactured scored a mean of 4.084 (SD = 0.692). Practicing cleaner production strategies scored a mean of 4.215 (SD = 0.703), and reducing the purchase of hazardous materials scored a mean of 4.003 (SD = 0.819). The study noted a slightly lower mean score for cooperation with customers for product eco-design (M = 3.912, SD = 0.902), suggesting an area for potential improvement.

The overall aggregate score for waste reduction practices was 4.107, suggesting that respondents generally agreed that waste reduction significantly affects the supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. This finding is in line with the study by Younis, Sundarakani, and Vel (2016), which demonstrated that the implementation of green supply chain management practices, including waste reduction, enhances firm performance by increasing market share and improving corporate image. Additionally, Mekasha (2020) found that green logistics practices, such as waste reduction and green purchasing, had a significant positive relationship with the performance of large manufacturing firms in Ethiopia. These empirical studies underscore the importance of waste reduction practices in boosting supply chain performance, reflecting the positive perceptions observed among respondents in this research.

Supply Chain Performance

The main objective of the study was to examine the effect of lean supply chain practices on supply chain performance of motor vehicle assembling companies in Nairobi County, Kenya. The study evaluated respondents' agreement on various statements related to supply chain performance, focusing on the impact of lean production practices. Table 3 presents the findings obtained.

Table 3: Descriptive Statistics for Supply Chain Performance

Statements	Mean	Std. Dev
We receive minimal complaints from our clients regarding quality	4.215	0.755
Lean production practices enhance timely delivery of products	4.183	0.782
Lean production practices have improved the quality of products	4.265	0.708
Lean production practices have reduced the supply chain costs	4.142	0.798
Lean production practices have led to improved flexibility in production	4.201	0.773
Aggregate Score	**4.201**	**0.763**

The highest mean score of 4.265, with a standard deviation of 0.708, indicates strong agreement that lean production practices have improved product quality. This suggests that implementing lean practices contributes significantly to enhancing the overall quality of products. Similarly, the minimal client complaints regarding quality (M = 4.215, SD = 0.755) further emphasize the positive impact of lean production on maintaining high-quality standards. Respondents also agreed that lean production practices enhance timely delivery of products (M = 4.183, SD = 0.782), reflecting the effectiveness of lean methods in streamlining operations and meeting delivery schedules. Additionally, the reduction in supply chain costs (M = 4.142, SD = 0.798) highlights the cost-efficiency benefits of lean practices, while the improvement in production

flexibility (M = 4.201, SD = 0.773) indicates enhanced adaptability and responsiveness to market demands.

The aggregate score of 4.201 indicates a strong overall agreement that lean production practices positively affect supply chain performance. These findings are consistent with those of Panagiotis and Malindretos (2020), who found that logistics and lean management practices are crucial for improving organizational performance. Similarly, the study by Mihretu (2019) demonstrated that effective transport management and lean practices significantly enhance logistics performance, supporting the positive perceptions observed in this research.

Correlation Analysis

The study computed Correlation analysis to determine the strength and the direction of the relationship between the variables being studied. The Pearson correlation analysis was conducted to determine the relationships between lean supply chain practices (lean procurement and waste reduction) and supply chain performance. If the correlation values are r = ±0.1 to ±0.29 then the relationship between the two variables is small, if it is r = ±0.3 to ±0.49 the relationship is medium, and when r= ±0.5 and above there is a strong relationship between the two variables under consideration. Table 4 presents the findings obtained.

Table 4. 1: **Correlation for Lean Supply Chain Practices and Supply Chain Performance**

Variable		**Supply Chain Performance**	**Lean Procurement**	**Waste Reduction**
Supply Chain Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	169		
Lean Procurement	Pearson Correlation	.720**	1	
	Sig. (2-tailed)	.000		.
	N	169	169	
Waste Reduction	Pearson Correlation	.710**	.317	1
	Sig. (2-tailed)	.000	.123	
	N	169	169	169

. Correlation is significant at the 0.05 level (2-tailed).

The correlation between supply chain performance and lean procurement is significant and strong ($r = .720$, $p < .05$). This indicates that improvements in lean procurement practices are closely associated with enhanced supply chain performance. Effective procurement strategies, such as thorough needs assessments and competent supplier selection, lead to more efficient and responsive supply chains. This finding aligns with Simatupan (2015), who found a considerable correlation between procurement strategies and successful provision of products and services, and Ahmed (2019), who highlighted the significant influence of effective procurement planning on corporate performance.

Waste reduction practices exhibit a strong positive correlation with supply chain performance ($r = .710$, $p < .05$). This suggests that effective waste management strategies, such as using environmentally friendly materials and implementing cleaner production processes, significantly contribute to overall supply chain efficiency. The correlation emphasizes the role of sustainability practices in enhancing supply chain performance. These findings align with Younis, Sundarakani, and Vel (2016), who demonstrated that green supply chain management practices improve firm performance, and Mekasha (2020), who found that green logistics practices positively impact the performance of manufacturing firms.

Regression Analysis

From the coefficients table, the regression equation was fitted.

Table 5: Beta Coefficients of Study Variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.481	0.201		7.368	.000
Lean Procurement	0.232	0.079	0.251	2.937	.003
Waste Reduction	0.216	0.082	0.016	2.634	.006

From the coefficients in Table 5, the following regression model was fitted:

$$Y = 1.481 + 0.232\ X_1 + 0.216\ X_2$$

Where: Y is the Supply Chain Performance; X_1 is Lean Procurement; X_2 is Waste Reduction.

Lean procurement had a coefficient of 0.232 (P=0.003), indicating that a unit increase in lean procurement would result in a 23.2% increase in supply chain performance. This finding aligns with Simatupan (2015), who found a considerable correlation between procurement strategies and successful provision of products and services. Efficient procurement practices, such as thorough needs assessments and strategic supplier selection, are critical for ensuring the timely and cost-effective acquisition of high-quality materials. Effective procurement processes help in building strong supplier relationships, which can lead to better negotiation outcomes and more reliable supply chains.

Waste reduction had a coefficient of 0.216 (P=0.006), suggesting that a unit increase in waste reduction leads to a 21.6% improvement in supply chain performance. This is consistent with Younis, Sundarakani, and Vel (2016), who demonstrated that green supply chain management practices, including waste reduction, enhance firm performance by improving corporate image and market share. Effective waste reduction strategies, such as minimizing waste generation and implementing recycling practices, contribute to a more sustainable and efficient supply chain. These practices not only reduce environmental impact but also lead to cost savings and enhanced operational efficiency.

Conclusions

The study concludes that lean procurement is a critical determinant of supply chain performance. Effective procurement strategies, such as competent supplier selection and adherence to procurement policies, significantly enhance the efficiency and responsiveness of the supply chain. The high level of agreement among respondents on the importance of these practices underscores their value in achieving superior supply chain performance.

The study concludes that waste reduction practices are integral to enhancing supply chain performance. Sustainable practices, such as using environmentally friendly materials and implementing cleaner production strategies, not only improve operational efficiency but also enhance the company's reputation. The strong correlation between waste reduction and supply chain performance underscores the importance of integrating green practices into the supply chain strategy.

Recommendations

To further strengthen lean procurement practices in motor vehicle assembling companies, it is essential to enhance the needs assessment procedures. Regular reviews and updates of these processes will ensure that they accurately reflect the requirements of various departments, particularly those involved in vehicle assembly and component sourcing. Involving all relevant stakeholders, including engineers and procurement officers, in the assessment process and

employing data-driven methods to forecast needs more accurately will be beneficial. Developing a more rigorous supplier evaluation and selection process that emphasizes not only cost but also quality, reliability, and sustainability is crucial. Implementing a supplier scorecard system can help in monitoring and managing supplier performance effectively, ensuring that the chosen suppliers meet the high standards required for vehicle assembly. Ensuring that procurement policies are not only well-documented but also strictly followed is vital. Regular training sessions for procurement staff on the importance of adhering to these policies can help maintain consistency and reduce errors. Moreover, fostering closer relationships with key suppliers by involving them early in the procurement process can lead to better innovation, cost savings, and improved supply chain coordination. Investing in advanced e-procurement systems to automate procurement processes will reduce manual errors, increase efficiency, and provide better tracking and reporting capabilities. Training employees on the effective use of these systems will ensure maximum utilization.

Advancing waste reduction practices in motor vehicle assembling companies involves continuously seeking out and adopting environmentally friendly materials and cleaner production practices. This can include using recycled materials, reducing the use of hazardous substances, and implementing energy-efficient processes specific to vehicle assembly. Developing comprehensive waste management systems that focus on reducing, reusing, and recycling waste, such as setting up waste segregation units and implementing recycling programs, is essential. Encouraging the design of products that can be easily recycled or remanufactured by collaborating with designers and engineers to incorporate eco-friendly features into vehicle components can reduce waste and environmental impact. Fostering collaboration with customers to design products that meet their needs while also being environmentally sustainable can include gathering customer feedback on eco-design features and promoting the benefits of such products. Cultivating a culture within the organization that prioritizes sustainability through regular training, awareness programs, and incentives for employees who contribute to waste reduction initiatives will further embed sustainable practices into the company's operations.

Suggestions for Further Studies

Future research could conduct a comparative analysis of lean supply chain practices across different industries in Kenya to understand their applicability and impact in various contexts. Another area of interest could be investigating the barriers to full adoption of lean practices in the motor vehicle assembling industry could provide insights into how these challenges can be overcome. Additionally, evaluating the impact of digital transformation on lean supply chain practices could offer valuable perspectives on the integration of technology and lean methodologies. Finally, a study on the role of leadership in the successful implementation of lean supply chain management could provide important guidance for organizations looking to enhance their lean practices.

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