

Influence of Just-In-Time on Supply Chain Performance in Sugar Manufacturing Companies in Western Kenya

Cosmas Rutto Cheptoo¹
Fredrick Kiongera²
Reuben Kipkurui Rutto³

ccheptoo@mmust.ac.ke¹
fkiongera@mmust.ac.ke²
rrutto@mmust.ac.ke³

¹<https://orcid.org/0009-0005-8959-2827>

²<https://orcid.org/0000-0002-2615-7343>

³<https://orcid.org/0000-0001-7492-1249>

^{1,2,3}Masinde Muliro University of Science and Technology, Kenya

ABSTRACT

Supply chain practices have experienced significant transformation in many years of its existence resulting to numerous instances of success and achievements across most entities embracing lean concept implementation such as Just in Time (JIT), Total Quality Management (TQM), and Total Prevention Maintenance (TPM). Such organizations join a growing number of businesses cutting across various Industries that have undergone operational restructuring to enhance efficiency and to streamline operations. The study specifically sought to determine the influence of just-in-time on supply chain performance, The study was guided by lean theory. A descriptive cross-sectional research design was adopted in the study. The target population was 95 employees comprising procurement officers, finance officers, production officers, quality assurance officers, operations officers, director of audit services, logistics, and firm engineers from 11 sugar manufacturing firms in western Kenya. The survey utilized a census approach, specifically targeting all 95 employees. The research employed primary data sources, with primary data gathered by administering closed-ended questionnaires. Descriptive statistics was employed to analyze the data, displayed as tables, pie charts, and bar graphs. In this study, inferential statistics was employed to examine hypotheses and to evaluate data. Concisely, the researcher utilized Pearson correlation and linear regression models to demonstrate the association between lean production techniques and the supply chain performance of sugar manufacturing enterprises in western Kenya. A pilot study was undertaken using a sugar manufacturing firm in the Ramisi Sugar factory in Kwale County and involved respondents drawn from the firm. The findings from the pilot study were crucial in determining the reliability and validity of the instruments. An increased Cronbach's Alpha coefficient indicated a higher level of internal consistency, improving the research instruments' reliability. Data analysis was conducted using SPSS version 27. On hypothesis testing, H₀₁: Just In Time has no significant impact on supply chain performance in Sugar manufacturing factories in Western Kenya was rejected with a significance value of 0.001 is less than the predetermined significance limit of 0.05. The research revealed that an increase in just-in-time results in a measurable enhancement of 0.078 in supply chain performance, according to the study ($t(85) = 7.312, M < .05$). This indicates that just-in-time provides sugar factories in Western Kenya with a substantial impact on supply chain performance. The study suggests that manufacturing firms should prioritize JIT as a LSCM approach and allocate more resources for its adoption.

Keywords: Just In Time, Sugar Manufacturing Firms, Supply Chain Performance

I. INTRODUCTION

Throughout the years, numerous practices and concepts have been implemented in an effort to enhance the quality of products, expedite responses, and reduce lead times at the lowest possible cost. Operational practices, including Supply Chain Management, Just-In-Time, and Total Quality Management, have been regarded as a means of enhancing organizational performance and operational performance. Just-in-Time eliminates waste by utilizing a straightforward production process that streamlines the flow of materials, reduces preparation time, and efficiently allocates resources. According to Danese and Romano (2011), the practice of just-in-time (JIT) is regarded as a potent instrument for optimizing production processes, minimizing waste and inefficiency, and enhancing delivery performance.

Psomas and Antony (2019) define JIT as a manufacturing philosophy focused on eliminating all forms of waste through careful planning. JIT encompasses the efficient execution of all operational activities that implement LSCM and extends across product life cycle, encompassing activities like design engineering to final delivery. Those practices involve the strategic management of supplier relationships with long-term perspective, geared towards

elimination of waste and maximization of value. They are deeply influenced by the Toyota Production System, a renowned Japanese production model, which is widely recognized as the leading framework for lean operations (Yamamoto et al., 2019). United States of America accounts for its 12% GDP on the manufacturing sector, employing approximately 9% of the national workforce; this has a significant impact on the U.S. economy.

However, the manufacturing sector faced challenges in recent years. Holding non-responsive stock within the supply chain led to increased costs which have negatively affected the company's profitability, Managers have strived to optimize inventory levels that maintain thresholds meeting customer expectations while minimizing costs consistently (Tarafdar & Qrunfleh, 2017; Yao, 2017). Supply chain management techniques that maximize the efficiency of inventory levels, enhance supply chain performance (SCP) encompassing both technological solutions and non-technological solutions, Further, as highlighted by Levinson (2018) highlights that while the USA's output growth has outperformed that of many European countries and Japan in the past decade, it has still trailed behind the growth rates compared to Asian countries furthermore, from 2002 to 2012, the United States witnessed a decrease in its global manufacturing activity, dropping from 30% to 17.4%. China surpassed the USA as the largest manufacturing economy in 2010 Klynveld Peat Marwick Goerdeler (KPMG International, 2015), China's GDP growth decreased from 2013 to 2014, reaching 7.4%, partially due to challenges within the manufacturing sector. China's manufacturing sectors contributes 13.9% lower GDP compared to the service sector, which accounts for 73% (Gallego et al., 2015).

Japan's renowned capability for continuous improvement played a significant role in establishing their manufacturing superiority, as highlighted by studies conducted in the 1980s and 1990s. During that time, the automotive industry drew attention when it became evident that Japanese cars surpassed American cars in terms of durability and required less maintenance (Wada, 2020). Toyota's production system, (TPS), was considered a unique and philosophical approach to manufacturing. However, there has been a recent questioning of the overall effectiveness of the Japanese system, leading to a decreased interest in Japanese firms as a global business model (Oliver et al., 2022).

Over past few decades, manufacturing performance in the African continent has been notably poor compared to developing countries (Rodrik, 2018). Production had significant impact on the process of modernization within any country and serves as a distinguishing factor between developed and developing nations. Developing countries are generally characterized by a lack of significant industrialization relative to their populations. Typically, developing countries have mechanisms to low standard of living (Urquiza et al., 2019).

Despite JIT becoming more prevalent in both developed and developing nations, its adoption rate in low-income countries remains relatively low. As an illustration, manufacturing output in Tanzania is considerably inferior to that of other developing nations. According to Mapunda (2019), the estimated adoption rate across all categories of manufacturing industries is 8%. In line with findings from other scholarly sources, it has been observed that developing nations including Tanzania (Kafuku, 2019), Kenya (Kirui, & Maina, 2018), and Ghana (Negrão et al., 202) report the status of lean implementation adoption according to the practices that occur most frequently, as opposed to relying on overall statistical data (Negrão et al., 2020). Moreover, the growth of lean implementation maturity levels within organizations has been phenomenal (Pinto et al., 2022).

The manufacturing sector is considered a critical component in achieving the targeted annual economic growth rate for Kenya, as it aims to enhance and maintain the GDP of the country, making it an essential component of the national economy. Moreover, this industry is vital in promoting social progress through the creation of jobs, facilitating the influx of foreign capital, and attracting both domestic and international investments. The Just-in-Time (JIT) philosophy seeks to optimize supply chain performance through waste reduction, increased efficiency, and enhanced responsiveness in production operations. This study examines the impact of Just-in-Time (JIT) on the performance of supply chains in sugar producing enterprises located in Western Kenya.

1.1 Statement of the Problem

The sugar manufacturing industry in Western Kenya plays a vital role in the regional economy by generating employment opportunities, facilitating agricultural activities, and making a substantial contribution to the overall national sugar production. Nevertheless, this sector faces numerous challenges, such as exorbitant operational expenses, inefficiencies in production procedures, and unpredictable fluctuations in supply and demand. One potential approach to tackling these difficulties is to implement Just-in-Time (JIT) inventory management procedures.

Although JIT has the potential to bring advantages, a significant number of sugar production businesses in Western Kenya have not yet fully adopted these methods. This may be attributed to a multitude of issues, such as limitations in infrastructure, a scarcity of proficient workforce, inadequate collaboration with suppliers, and external disruptions. Consequently, numerous firms still face challenges with excessive inventory, extended production lead times, and inconsistent product quality, all of which detrimentally affect their overall supply chain performance.

The objective is to assess the impact of Just-in-Time (JIT) on the supply chain performance of sugar manufacturing companies in Western Kenya. It is crucial to examine how Just-in-Time (JIT) might help these firms minimize waste, enhance efficiency, and enhance the reliability of their supply chain. Extensive research has been carried out on lean practices in sugar manufacturing companies (Wanjihia, 2021; Wanjiku, 2018; Achieng, 2021). However, there is still a lack of understanding regarding the impact of lean supply chain on organizational performance, particularly in sugar manufacturing firms in western Kenya. Despite evidence supporting the effectiveness of lean supply chain concepts in manufacturing, this specific area remains understudied. It is with this that study sought to determine the influence of lean production practices on supply chain performance in Sugar manufacturing factories in Western Kenya.

1.2 Objectives of the Study

To determine the influence of just in time on supply chain performance in Sugar manufacturing factories in Western Kenya.

1.3 Research Hypothesis

H₀₁: Just In Time has no significant impact on supply chain performance in Sugar manufacturing factories in Western Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Review

The study was guided by lean theory. The basics of Lean can be traced back to Toyota, a Japanese company. The development can be credited to notable individuals including Sakichi Toyoda, his sons Kiichiro Toyoda and Eiji Toyoda, and Taiichi Ohno, distinguished engineers. (Hino, 2005). The research was grounded in Lean theory, which examined and highlighted the implementation of lean practices aimed at eliminating production overload, inconsistency, and waste reduction. Ciarniene and Vienazindiene (2012) describe lean as a comprehensive model comprising various techniques that work together to reduce and to eliminate waste within the production process, enabling organizations to become more responsive and adaptable to changes in demand. Building upon this, Liker (2021) The theory further expands by conceptualizing the Lean systematic approach to ensure a seamless and uninterrupted flow of high-quality products or services to meet customer needs precisely when they require them. The underlying theory highlights the importance of processes focused on satisfying customer requirements while adhering to established principles of waste elimination. Furthermore, the operating system should embody streamlined values that were applied throughout the entire process, starting from the initial stage and extending to the final delivery (Ciarniene & Vienazindiene, 2012).

Customer satisfaction was prioritized by organizations that adopt lean theory in their production lines., actively eliminate production waste on a daily basis, and possess the determination to grow and thrive in a competitive environment. Bellgran and Säfsten (2010) suggest that a well-designed production process should strive for consistent and predictable product delivery while minimizing waste. Lean theory emphasizes the continuous delivery of high-quality products tailored to meet specific customer needs at the right time. By prioritizing customer satisfaction, organizations that adopt lean theory in their production lines can eliminate waste associated with unnecessary planning meetings, excessive inventory, overproduction, unnecessary transportation, and excessive processing in the production process. JIT is a strategic approach embraced by organizations to synchronize their supply orders from suppliers with production schedules, as outlined by Ciarniene and Vienazindiene (2012). Organizations that adopt the JIT strategy strive to enhance efficiency and reduce waste by receiving goods precisely when needed in the process. This approach enables producers to forecast demand and optimize their inventory levels accurately. According to Bautista and Fortuny-Santos (2016), implementing JIT practices allows organizations to minimize working capital requirements by reducing stock levels. Additionally, the strategy promotes a step-by-step inspection of the production process, leading to waste reduction and improved overall efficiency.

2.2 Conceptual Review

Conceptual review is the categorization and describing concepts relevant to the study outlined of a relationship between them including relevant theories and empirical research.

2.2.1 Just In Time

Just-in-time is a manufacturing organization method that aims to achieve excellence by continuously eliminating waste (Singh & Singh, 2021). The global need for critical resources is on the rise, and it is anticipated that

future availability may not be sufficient to meet this demand. Certain materials possess such a scarcity that augmenting output becomes unattainable. Just in Time is a concept that uses Kaizen in the production processes while taking cognizance of errors and elimination of waste. It was measured by the following parameters Labour availability, Supplier rationalization and Resource availability.

2.2.2 Supply Chain performance

It is the extent of performance that an organization attains in meeting its financial objectives and satisfying market-based criteria (Pinto, 2019). It represents the effectiveness with which an organization executes its market-oriented and financial goals. Assessing organizational performance usually entail considering both financial and non-financial indicators (Williams et al., 2019).

Several of empirical studies done to investigate the correlation between supply chain management (SCM) and organizational performance. (Ahmad & Karadas, 2021; Sahoo & Vijayvargy, 2021). The measures often used to evaluate organizational performance include factors such as increased sales, enhanced costing accuracy, improved inter-departmental coordination, enhanced collaboration with suppliers, and improved customer coordination (Kumar & Singh, 2022).

According to Alam (2022), any organization, particularly adopting a lean supply chain approach, is expected to result in improved organizational performance. Embracing a lean supply chain philosophy, organizations promote employee involvement and empower every member to actively participate in identifying and eliminating waste, addressing issues, and driving continuous improvements throughout the supply chain. This approach also emphasizes on the importance of achieving shorter lead times, enabling a smooth and continuous flow of people, materials, equipment, and processes (Kumar et al., 2023). The aim is to deliver defect-free products to customers, precisely the supply chain facilitates seamless movement of goods, ensuring that they are delivered to the appropriate locations, precisely whenever required, and in the right quantities. within the manufacturing process, the presence of waste can significantly impact a business's profitability. In recent times, researchers, particularly in the manufacturing sector, have shown significant interest in the concept of lean philosophy.

2.3 Empirical Review

The system made a substantial contribution to human resource development, which sought to establish a self-directed workforce. Tripathi and Tiwari (2018) undertook a study investigating the correlation between lean manufacturing practices and firm performance measurement. The objective of this research was to determine the degree to which lean manufacturing management practices impact the financial performance of Indian manufacturing companies. According to the study's findings, organizations that implemented lean manufacturing practices enjoyed a greater competitive advantage than those that did not. culture and a cross-functional framework that collaborates to resolve issues that arise along the production line (Tripathi & Tiwari, 2018). In addition, Just-In-Time (JIT) production enhances a company's market share by ensuring that customers have uninterrupted access to superior goods, while simultaneously minimizing wastage. Furthermore, the statistics indicate that JIT production not only ensures customer retention but also draws new consumers. Determine the effect of Supplier Rationalization on Supply Chain Performance (SCP) using this study.

Khalil et al. (2019) studied the link between supply chain management approaches and company performance, using innovation as a mediator. Data was collected from 207 small and medium-sized enterprises (SMEs) situated in Punjab, Pakistan. The findings indicate that strategic supplier alliances and the level of information exchange did not have any noticeable effect on organizational performance. Furthermore, the influence of lean methods, internal supply chain operations, and the quality of information sharing on organizational performance was significant.

Lubis et al. (2022) conducted a study on the analysis of forecasting rice demand and production in the Indonesian province of North Sumatra. This study investigated the comparative advantages of linear, quadratic, and exponential trend analysis in forecasting rice demand and production from 2010 to 2021. Based on the results, quadratic trend analysis was the most efficient method for highlighting production and demand estimates. The study determined that a significant amount of rice was produced.

Tripathi and Tiwari (2018) examined the impact of lean manufacturing practices on corporate profitability. A study was carried out to examine the influence of the Kanban system, JIT production, flexible workforce, and innovative thinking on lean manufacturing techniques in the Indian manufacturing industry. Data was gathered from production firms in India, and the correlation between these practices and firm output was analyzed. The study results indicated that financial constraints led to a dearth of resources. The purpose of the present study is to remedy the void by examining time, cost, and quality to enhance the performance of the supply chain.

Kwadwo (2015) investigated the effect of effective inventory management on the bottom line of Ghanaian manufacturing companies. A decade's worth of secondary data was gathered from the Ghana Stock Exchange for the



purposes of this study. Inventory management pertaining to basic materials has a positive and statistically significant effect on the profitability of manufacturing companies, according to the findings.

The study conducted by Mersha et al. (2018) aimed to evaluate the effects of the Integrated Water Resources Management (IWRM) policy on water availability and demand satisfaction in Ethiopia. A scenario analysis was performed in the Awash Basin of Ethiopia for the investigation. A comparison was made between the simulated and monthly stream volumes at five control locations for fifteen years. As a consequence of the implementation of irrigation strategies to combat food insecurity, water resources were overutilized, according to the findings. As a consequence, the disparity between smallholder and commercial producers is exacerbated.

Sayid (2017) found a positive correlation between JIT and the performance of the The Bangladeshi footwear industry examined the impact of JIT processes and single-piece flow on the sector. The implementation of JIT production resulted in various advantages, including reduced lead times, decreased revision levels, and less waste, all while maintaining the same quantity of footwear. The attainment of these advantages was accomplished by using JIT production. JIT manufacturing enhanced operational effectiveness and efficiency by enabling enterprises to meet market needs by creating exactly what was required at any given time.

Sumo (2015) did a study to investigate the relationship between lean assembly practices and SCP in automotive manufacturing enterprises in Kenya. The research focused on the implementation of lean principles in the automobile industry, specifically analyzing the use of Jidoka, value stream mapping, Five (5) S, and JIT production. The study found that companies adopted lean approaches, including the implementation of JIT production. This strategy enhanced companies' capacity to sustain a competitive advantage in the sector by allowing them to swiftly respond to emerging demand. According to the study's findings, JIT production has a significant impact on the SCP of automotive firms. It achieves this by ensuring that supplies are only made available when they are needed, resulting in reduced inventory and waste costs. The objective of this research is to enhance the comprehension of just in time by investigating the influence of resource and labor availability on lean production and SCP.

Mutua et al. (2021) looked at how food and drink manufacturing companies in Nairobi County fared when they used a JIT procurement strategy. The investigation utilized a causal research design. The information was gathered via questionnaires. The sample consisted of 83 department leaders. Organizing performance of food and beverage manufacturing companies in Nairobi County is enhanced by the JIT Procurement strategy, according to the findings of the study.

III. METHODOLOGY

A descriptive cross-sectional research design was adopted in the study. The target population was 95 employees comprising procurement officers, finance officers, production officers, quality assurance officers, operations officers, director of audit services, logistics, and firm engineers from 11 sugar manufacturing firms in western Kenya. The survey utilized a census approach, specifically targeting all 95 employees. These sugar companies were; Chemelil, Muhoroni, Mumias, Nzoia, South Nyanza, Kibos, Sony, Butali, West Kenya, Sukari, and Olepito Busia. The research employed primary data sources, with primary data gathered through the administration of closed-ended questionnaires. Descriptive statistics was employed to analyze the data, which was displayed as tables, pie charts, and bar graphs. In this study, inferential statistics was employed to examine hypotheses and to evaluate data. Concisely, the researcher utilized Pearson correlation and linear regression models to demonstrate the association between lean production techniques and the supply chain performance of sugar manufacturing enterprises in western Kenya. Data analysis was conducted using SPSS version 27.

The analyzed data was presented by the use of frequency tables, pie charts and bar graphs.

The study used the following regression models.

$$Y = \beta_0 + \beta_1 X_1 + \epsilon \dots \dots \dots (i)$$

Where Y is the predicted value of the dependent variable for any given value of an independent variable (x)

β_0 denoted the intercept, which represented the expected value of y's change with increasing x when x is zero;

β_1 signifies the regression coefficient, which indicates the magnitude of the change in y's expected value with increasing x;

x was the independent variable, which we hypothesize to have an impact on y;

ϵ signifies the error of the estimate or the amount of variation in our estimation of the regression coefficient

IV. FINDINGS & DISCUSSIONS

4.1. Rate of Questionnaire Return

Respondents comprised of logistics and firm engineers, procurement officers, finance officers, production officers, quality assurance officers, operations officers, and directors of audit services. A total of 95 questionnaires were distributed to these groups.

Table 1

Response Return Rate

Unit of observation	Data collection method	Target population	Sample size	Usable response	% effective response rate
Respondents	Questionnaires	95	95	87	92

From Table 1, a total of 87 questionnaires were used for data analysis. This represented 92% of questionnaire return rate. Schindler and Cooper (2009) recommended that return rate spanning from 50 percent or higher is sufficient for investigation purposes.

4.2. Descriptive Statistics

4.2.1 Just In Time on Supply Chain Performance

The objective of the study was to determine the impact of JIT on the performance of supply chains in Western Kenyan sugar manufacturers. Participants were instructed to provide their ratings on a five-point Likert scale in response to five statements. A rating of five corresponded to 'Strongly Agree' and a rating of one to 'Strongly Disagree'. The frequencies, mean, standard deviation (Std), composite mean, and composite standard deviation were utilized to analyze the ratings. Table 4.4 displayed the results, with the following categories: SA (Strongly Agree), A (Agree), FA (Fairly Agree), D (Disagree), and SD (Strongly Disagree).

Table 2

Likert on Just in time

No.		SD	D	FA	A	SA	Mean	Std.
1	There is availability of labour in the sugar manufacturing firm	0 (0%)	0 (0%)	10 (11.5%)	19 (21.8%)	58 (66.7%)	4.55	0.695
2	Availability of labour affects the supply chain performance of sugar manufacturing firms	3 (3.4%)	2 (2.3%)	2 (2.3%)	21 (24.1%)	59 (67.9%)	4.51	0.926
3	The sugar manufacturing firms contacts supplier rationalization of supplier chain practices	0 (0%)	1 (1.1%)	7 (8.0%)	21 (24.1%)	58 (66.8%)	4.56	0.694
4	Supplier rationalization affects supply chain performance of sugar manufacturing firms	1 (1.1%)	0 (0%)	5 (5.7%)	26 (29.9%)	55 (63.3%)	4.54	0.712
5	There is availability of resources in the sugar manufacturing firms	0 (0%)	6 (6.9%)	15 (17.2%)	18 (20.7%)	48 (55.2%)	4.24	0.976
6	The availability of resources affects supply chain performance in the sugar manufacturing firm	2 (2.3%)	1 (1.1%)	0 (0%)	11 (12.7%)	73 (83.9%)	4.75	0.735
Composite Mean and Std							4.53	0.789

Table 2 shows that when queried about the degree to which labor is readily available at the sugar manufacturing company, 77 (88.5%) of the respondents indicated agreement with the statement, whereas 10 (11.5%) agreed fairly. With an average score of 4.55 and a standard deviation of 0.695, the findings suggest that a significant proportion of the participants concurred that sugar manufacturing companies do indeed have access to labor. The positive impact on the composite mean was indicated by the fact that the item mean was greater than the composite mean of 4.53. The item's standard deviation was smaller than the composite standard deviation of 0.789, suggesting that the item's response had a narrower range than that of the variable.

Concerning the impact of labor availability on the SCP of sugar manufacturing companies, a majority of the respondents (80% or 92%) expressed agreement with the statement. Conversely, a minority of 5 (5.7%) disagreed with the notion, and a mere 2 (2.3%) maintained a neutral stance. The data indicates that a substantial number of the participants (0.626) concurred that the presence of labor had a discernible effect on the SCP of sugar manufacturing enterprises, as demonstrated by the average score of 4.51. When compared to the composite mean of 4.53, the item mean was significantly lower, indicating a negative influence on the composite mean. A lower standard deviation for the item (0.789) than for the variable (0.789) suggests that the range of possible responses to the item is more limited.



The participants were also requested to provide their assessment on whether or not the supplier contacts of the sugar manufacturing firms rationalize their supply chain practices. A significant majority of the respondents (79 individuals, or 90.9%) agreed with this statement. Conversely, a minority of one respondent (1.1%) disagreed, and seven individuals, or 8.0 percent, remained undecided. Based on the data, the majority of respondents (0.694) agreed that sugar manufacturing firms contact suppliers to rationalize their supply chain practices, as indicated by the mean score of 4.56. The positive impact on the composite mean was indicated by the fact that the item mean was greater than the composite mean of 4.53. The item's standard deviation was smaller than the composite standard deviation of 0.789, suggesting that the item's response had a narrower range than that of the variable.

In regard to the impact of supplier rationalization on the SCP of sugar manufacturing companies, a significant proportion of the participants (1.1%), or 81 individuals (93.2%), expressed agreement with the statement. Conversely, 5 individuals (5.7%) maintained a neutral stance. Based on the data, the majority of respondents (n=4.54) and the standard deviation (0.712) agreed that supplier rationalization has an impact on the SCP of sugar manufacturing firms. The mean score was 4.54. The item mean exceeding the composite mean of 4.53 served as evidence of the favourable influence on the composite mean. The standard deviation of the item was found to be less than the composite standard deviation of 0.789. This indicates that the response range of the item was more limited in scope compared to that of the variable.

The participants were also requested to provide their assessment on the availability of resources in sugar manufacturing firms. A majority of the respondents (66 individuals, or 75.9%) agreed with this statement, while a minority (6.9%) and 15 individuals (17.2%) objected. Based on the calculated mean score of 4.24 and standard deviation of 0.976, it can be concluded that a significant proportion of the participants concurred that resources are accessible within sugar manufacturing companies. The negative impact on the composite mean was indicated by the fact that the item mean was lower than the composite mean of 4.53. The item's standard deviation exceeded the composite standard deviation of 0.789, suggesting that the item exhibited a more extensive range of responses compared to the variable.

In relation to the impact of resource availability on the SCP of the sugar manufacturing company, a significant majority of the participants (33.4%) agreed with the statement, while 84 individuals (96.6%) disagreed. Based on the data, the majority of respondents (0.735) agreed that sugar manufacturing firms contact suppliers to rationalize their supply chain practices, as indicated by the mean score of 4.75. The positive impact on the composite mean was indicated by the fact that the item mean was greater than the composite mean of 4.53. The item's standard deviation was smaller than the composite standard deviation of 0.789, suggesting that the item's response had a narrower range than that of the variable.

4.2.2 Supply Chain Performance

The researcher sought to determine the influence of lean production practices on the supply chain performance of the Sugar manufacturing factories in western Kenya.

Table 3
Likert on Supply Chain Performance

No.		SD	D	FA	A	SA	Mean	Std.
1	The just-in-time has led to time management in the supply chain	0 (0%)	1 (1.1%)	11 (12.6%)	10 (11.5%)	65 (74.8%)	4.60	0.754
2	The just-in-time has led to reduced costs in the supply chain	3 (3.4%)	1 (1.1%)	7 (8.0%)	13 (14.9%)	63 (72.6%)	4.52	0.951
3	The just-in-time has improved the quality of services in the supply chain	2 (2.3%)	3 (3.4%)	9 (10.3%)	11 (12.6%)	62 (71.4%)	4.47	0.975
4	Total prevention maintenance improved the quality services of supply chain performance	1 (1.1%)	1 (1.1%)	3 (3.4%)	18 (20.7%)	64 (73.7%)	4.64	0.715
5	Value chain management practices affect supply chain performance	4 (4.6%)	1 (1.1%)	6 (6.9%)	11 (12.6%)	65 (74.8%)	4.52	1.01
Composite Mean and Std							4.55	0.88

The respondents were required to rate their opinions on whether just in time has led to time management in the supply chain, the results show that the majority of them represented by 75(86.3%) agreed while 1(1.1%) disagreed and 11(12.6%) fairly agreed with the statement. The mean score was 4.60 with a standard deviation of 0.754 which shows that most respondents were in agreement that just in time has led to time management in the supply chain. The item mean was above the composite mean of 4.55 indicating a positive influence on the composite mean. The standard



deviation for the item was below the composite standard deviation of 0.88 indicating a narrow spread in response for the item than the variable. The results of the research agree with Mukula (2023), who discovered different degrees of influence each JTI purchasing strategy has on the operational performance of manufacturing companies. More precisely, just two of the strategies shipment and quality have a favourable impact on operational performance; the other two quantity and supplier have a detrimental effect on the same.

On whether the just-in-time has led to reduced cost in the supply chain, the results show that a larger proportion represented by 76(87.6%) were in agreement with the statement while 4(4.4%) and 7(8%) fairly agreed with the statement. The mean score was 4.52 with a standard deviation of 0.951 which shows that most respondents agreed that the just-in-time has led to reduced cost in the supply chain. The item mean was below the composite mean of 4.55 indicating a negative influence on the composite mean. The standard deviation for the item was above the composite standard deviation of 0.88 indicating a wider spread in response for the item than the variable.

The respondents were also required to rate their opinions on the just in time has improved the quality of services in the supply chain, the majority of respondents represented by 74(87%) were in agreement with the statement while 5(5.7%) disagreed and 9(10.3%) were neutral on the same statement. The mean score was 4.47 with a standard deviation of 0.975 which shows that most respondents were in agreement that just in time has improved the quality of services in the supply chain. The item mean was below the composite mean of 4.55 indicating a negative influence on the composite mean. The standard deviation for the item was above the composite standard deviation of 0.88 indicating a wider spread in response for the item than the variable.

Pertaining whether total prevention maintenance improved the quality services of supply chain performance, the majority of the respondents represented by 82(94.3%) agreed while 2(2.3%) disagreed and 3(3.4%) remained undecided on the same statement. The mean score was 4.64 with a standard deviation of 0.715 which shows that most respondents were in agreement that total prevention maintenance improved the quality services of supply chain performance. The item mean was above the composite mean of 4.55 indicating a positive influence on the composite mean. The standard deviation for the item was below the composite standard deviation of 0.88 indicating a narrow spread in response for the item than the variable.

Lastly, the researcher was interested to determine whether value chain management practices affect supply chain performance, majority of the respondents represented by 76(87.6%) agreed with the statement while 5(5.7%) and 6(6.9%) of the respondents fairly agreed. The mean score was 4.52 with a standard deviation of 1.01 which shows that most respondents were in agreement that value chain management practices affect supply chain performance. The item mean was below the composite mean of 4.55 indicating a negative influence on the composite mean. The standard deviation for the item was above the composite standard deviation of 0.88 indicating a wider spread in response for the item than the variable.

4.3. Inferential Analysis on the Influence of Just In Time on Supply Chain Performance

The study sought to test H_{01} : Just in Time has no significant impact on supply chain performance in Sugar manufacturing factories in Western Kenya. A linear regression analysis was utilized to ascertain this. The research employed the subsequent null hypothesis, which was examined at a significance level of 0.05. The results are shown in Table 4 to 6.

Table 4
Model Summaryb; Just In Time and Supply Chain Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.621 ^a	.386	.379	2.631

a. Predictors: (Constant), Just in time

b. Dependent Variable: Supply chain performance

As shown in Table 4, R-squared equals 0.386. According to the findings of this research, 38.6% of the observed variability in SCP among sugar manufacturing firms in Western Kenya can be attributed to just in time. The remaining 61.4% may be ascribed to additional variables that were not overtly investigated in the research, which centered on assessing the correlation between JIT and SCP.



Table 5
ANOVA^a; Just In Time and Supply Chain Performance

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	370.056	1	370.056	53.460	.000 ^b
	Residual	588.381	85	6.922		
	Total	958.437	86			

a. Dependent Variable: Supply chain performance

b. Predictors: (Constant), Just in time

The results presented in Table 5 demonstrate that the independent variable, just in time, significantly influences the SCP of sugar manufacturing companies in Western Kenya in a predictive manner. The aforementioned deduction is supported by the results of the analysis of variance (ANOVA) performed with a significance level of 0.05 ($p=0.001 < 0.05$). The finding that the significance value of 0.001 is less than the predetermined significance limit of 0.05 lends credibility to this claim.

Table 6
Just In Time and Supply Chain Performance

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.705	2.756		.982	.329
	Just in time	.738	.101	.621	7.312	.000

a. Dependent Variable: Supply chain performance

A significant impact of Just in Time on the SCP of sugar manufacturing enterprises in Western Kenya was identified based on the study's results (t -statistic=7.312, p -value = $0.001 < 0.05$) as perceived by sugar manufacturing enterprises in Western Kenya. Thus, the null hypothesis was rejected at a 5% level of significance; indicating the existence of a significant correlation between JIT and SCP. There was therefore a correlation of 0.738 between an increase in SCP and just-in-time by one unit. Consequently, the null hypothesis that just-in-time production has no significant impact on SCP in sugar production enterprises in Western Kenya is rejected.

Thus the model equation is

$$Y = 2.705 + 0.738X$$

Where

Y-Supply chain performance

X-Just in time

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The findings of this study indicate that the implementation of just-in-time practices has a significant effect on the performance of supply chains in sugar mills located in Western Kenya. The quick surge in demand may have been caused by a shortage in the supply of consumer products and the lack of stocks to maintain output levels. The findings demonstrated that the manufacturing industry adopted lean supply chain solutions, such as Just-in-Time (JIT) and comparable approaches, to reduce both time and cost inefficiencies. Consequently, companies experienced enhanced profitability and consistency in their operations.

5.2 Recommendations

Based on the results and conclusions, the study recommends several strategies. To reduce inventory costs and minimize waste, it is advised to order raw materials as needed. This approach lowers holding costs and decreases unnecessary stockpiling. Additionally, developing excellent relationships with suppliers is crucial to ensure timely and consistent delivery of raw materials.

To avoid overproduction and underproduction, companies should use flexible and efficient production schedules that align with demand estimates. Strong communication links with suppliers are also essential to ensure alignment and allow for prompt reactions to changing demands. Establishing strategic partnerships and long-term

agreements with suppliers can ensure stability and mutual benefit. Furthermore, integrating all areas of the supply chain, including procurement, production, and distribution, with Enterprise Resource Planning (ERP) systems can enhance overall efficiency. Finally, investing in automation technologies can improve process flow, eliminate errors, and boost efficiency throughout the supply chain.

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