African Journal of Emerging Issues
Peer reviewed | Double blind | Interdisciplinary

African Journal of Emerging Issues (AJOEI)
Online ISSN: 2663 - 9335
Available at: https://ajoeijournals.org

SUPPLY CHAIN

EVALUATING THE IMPACT OF QUALITY MANAGEMENT ON SUPPLY CHAIN PERFORMANCE IN KENYA'S MANUFACTURING INDUSTRY

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Publication Date: March 2024

ABSTRACT

Purpose of Study: The purpose of the study was to establish if Quality Management affect supply chain performance in manufacturing sector in Kenya.

Problem Statement: The manufacturing sector in Kenya has faced stagnation and decline since the 1970s, with new firms having a low survival rate and the sector's contribution to GDP and exports remaining minimal. Despite the competitive environment demanding high efficiency, there's limited research on the effect of Quality Management on operational performance within the country.

Methodology: This study employed descriptive research design to achieve these objectives. The study population comprised of 400 managers working at East Africa Breweries Limited in the following management positions: senior management, middle level management and lower level

management. This study sampled 10% of the target population using stratified random sampling technique. Data collected was analyzed using descriptive, inferential and content analysis methods. IBM SPSS Statistics version 21 was used to aid in data analysis. Quantitative data analysis results were presented using charts and tables.

Result: The results revealed that that quality management (94.6%) affect supply chain performance at EABL. Quality management (β=.607, *p*=.000) was also found to positively and significantly affect supply chain performance at EABL.

Conclusion: This study concludes that quality management significantly and positively impacts supply chain performance at East African Breweries Limited (EABL), indicating the critical role of quality management practices in enhancing operational efficiency within the company.

Recommendation: This study recommends that East African Breweries Limited (EABL), should continue to invest in and strengthen its quality management practices. This should involve adopting advanced quality management frameworks, continuous training for employees on quality standards, and integrating cutting-edge technology to monitor and enhance quality throughout the supply chain.

Keywords: *Quality management, supply chain performance, operational efficiency, continuous improvement, manufacturing industry.*

INTRODUCTION

Supply chain performance has become increasingly critical in the manufacturing sector due to its direct impact on operational efficiency, cost-effectiveness, and overall competitiveness (Tripathi & Talukder, 2023). According to Bag, Rahman, Srivastava, Shore and Ram (2023), as businesses operate within complex global networks, the efficiency and effectiveness of their supply chains significantly influence their ability to meet customer demands, respond to market changes, and sustain growth. Supply chain performance encompasses various factors, including lead times, inventory management, transportation logistics, and supplier relationships, all of which directly impact production schedules, product quality, and customer satisfaction (Gopal, Rana, Krishna & Ramkumar, 2024).

In today's competitive global business environment, the goal of all manufacturing systems is long-term survival (ElMaraghy, Monostori, Schuh & ElMaraghy, 2021). A company's survival in an increasingly competitive market closely depends upon its ability to produce highest quality product at lowest possible cost and in a timely manner with shortest possible lead time (Khan Singh & Khan, 2023). In addition, these goals should be achieved by paying utmost respect to the humanity of the employees who make the system work. Sometime, the difficulty of achieving the goals lies in the complexity of operations. It is not difficult to build the high quality product, but is extremely difficult to do so while maintaining excellent quality, and at some time respecting the humanity of people who do the actual work of building that product (Bag *et al.*, 2023).

Quality Management (QM) is poised to meet the objectives previously attributed to Just-in-Time (JIT) manufacturing (Gopal, Rana, Krishna & Ramkumar, 2024). QM is not just a philosophy but also a comprehensive set of principles that harmonizes basic management techniques, ongoing improvement endeavors, and technical tools. This approach highlights the enduring advantages of eliminating waste and continuously enhancing systems, programs, products, and personnel (Balaji, Gopal & Rashmi, 2021). QM significantly influences quality control, procurement processes, and organizational culture by advocating for cost efficiency, adherence to delivery schedules, empowerment and development of employees' skills, strengthening supplier relationships, and fostering innovation in new products (Rehmani, Ahmad, Naseem & Syed, 2020).

Quality Management, by its very nature, aims at improving the quality of products and services through systematic quality assurance and control measures (Fernandes, 2020). It has evolved from various quality improvement philosophies, distinguishing itself from JIT, which mainly focuses on reducing inventories and production lead times. QM's broader objective is to improve the overall quality across all operational facets of an organization. QM calls for the elimination of all processes that do not add value to the product or service (Ammar, Haleem, Javaid, Walia & Bahl, 2021). It is steadfast in its pursuit of high quality and commits to the perpetual enhancement of activity efficiency. Simplification and greater process transparency are key, enabling the identification and removal of non-value-adding activities (Rehmani *et al.*, 2020).

In the face of stiff competition in the industrial sector, manufacturing firms grapple with challenges ranging from waste management to performance enhancement (Edh, Mirzaei, Hilletofth & Pal, 2021). The adoption of comprehensive QM systems has emerged as a strategic response to maintain competitiveness (Balaji *et al.,* 2021). Emphasizing operational efficiency, cost reduction, quality improvement, profit stability, and customer satisfaction has become paramount. The implementation of QM strategies can yield both operational and strategic benefits for manufacturing entities (Lee et al., 2023; Bag, Kilbourn & Pisa, 2023).

Conceptually, QM melds seemingly divergent goals such as cost minimization, quality maximization, manufacturing agility, and delivery reliability (Albderi, Hasan & Flayyih, 2023). Its impact on the overall organizational performance is significant. Although there is no standardized method for QM implementation, the ultimate aim is to consistently deliver quality that meets or exceeds customer expectations. Despite these challenges, the benefits of QM are manifold. For manufacturing companies facing issues like unreliable lead times, subpar quality, productivity challenges, high scrap and defect rates, material shortages, and the underutilization of labor and equipment, a QM approach can provide substantial relief (Dutta, Kumar, Sindhwani & Singh, 2020).

Today's manufacturing industry is characterized by strong interdependencies between companies operating in globally distributed production networks. The operation of such value-added chains has been enabled by recent developments in ICT's and computer networking (Culot, Orzes, Sartor & Nassimbeni, 2020). To gain competitive advantages and efficiency improvements such as reduced inventory and higher delivery reliability, companies are introducing information exchange systems that communicate demand to suppliers and production progress information to customers in the network (Pal, 2020). Manufacturing sectors in developing world are still run on the basis of old production systems that include so many activities that add little value to the final production process. Production processes are therefore slow, wasteful and characterized by avoidable complexities (Rehmani *et al.,* 2020). Gupta, Singh and Gupta (2022) emphasized on human resources modification efforts undertaken in preparation before JIT implementation.

STATEMENT OF THE PROBLEM

Kenya's manufacturing firms have declined steadily since 1970s and new firms have only a 35 per cent chance rate of surviving in the market (World Bank, 2022). The contribution of manufacturing to GDP and exports has been stagnant. A World Bank report of 2022 indicates that manufacturing growth trailed overall economic growth in Kenya between 2010 and 2013. Compared with other countries, manufacturing growth was lesser in Kenya. According to the report, the manufacturing sector only contributed 11% of GDP in 2013 and employed only 12% of the 2.3 million who make up Kenya's labor force translating to a partly 280,000 individuals. The manufacturing sector contributed 26% of Kenya's merchandise exports out of which 40% was sold in the East African Community (World Bank, 2022).

Manufacturing firms in Kenya are operating in a highly competitive environment where resources are scarce and where uncertainty in business opportunities is common. The market has therefore imposed high efficiency standards and firms that fail to meet them quickly lose their competitive edge (Chirchir, 2022). Kenya just like other developing countries has had scanty research on JIT manufacturing and its effect on operational performance (Kunyoria, 2023). Previous studies have concentrated on lean manufacturing practices in individual firms' case studies and not the whole manufacturing industry (Dieste, Panizzolo & Garza-Reyes, 2020; Maware, Okwu & Adetunji, 2022; Ciano, Dallasega, Orzes & Rossi, 2021). The previous studies have not clearly detailed the implementation of JIT in manufacturing firms in Kenya and its implication on supply chain performance. This study therefore sought to investigate the effects of quality management on supply chain performance in manufacturing sector in Kenya, a case of East African Breweries Limited.

RESEARCH OBJECTIVE

To establish if Quality Management affect supply chain performance in manufacturing sector in Kenya.

RESEARCH HYPOTHESIS

H_0: Quality Management has no statistically significant effect on supply chain performance in manufacturing sector in Kenya.

THEORETICAL REVIEW

Theories refers to ways of thinking that help to identify and analyze important factors and relationships within envisaged situations (Simons, 2009). This study was anchored on collaborative theory. Collaborative theory emphasizes on group decision-making at a senior management level (Handfield, 2000). The role of the management according to Handfield (2000) is to employ group dynamics and brainstorming approaches to involve managers in both strategy formulation and implementation phases. The management plays a key role in coordination, encouraging and promoting differing ideas as well as building consensus among various implementation groups. According to Wynarczyk and Watson (2005), the organization management is coordinator rather than commander and to achieve desired supply chain management performance results, teamwork is strongly encouraged. The driver behind such collaboration was the desire to extend the control and co-ordination of operations across the entire supply process, replacing both the market and vertical integration as the means of managing the flow process (Cristopher, 2004). In this way collaborative theory expects a firm to have a formalized supply chain integration system.

CONCEPTUAL FRAMEWORK

This study conceptualized that quality management as the independent variable would affect supply chain performance among manufacturing firms in Kenya. This conceptualization is presented in Figure 1.

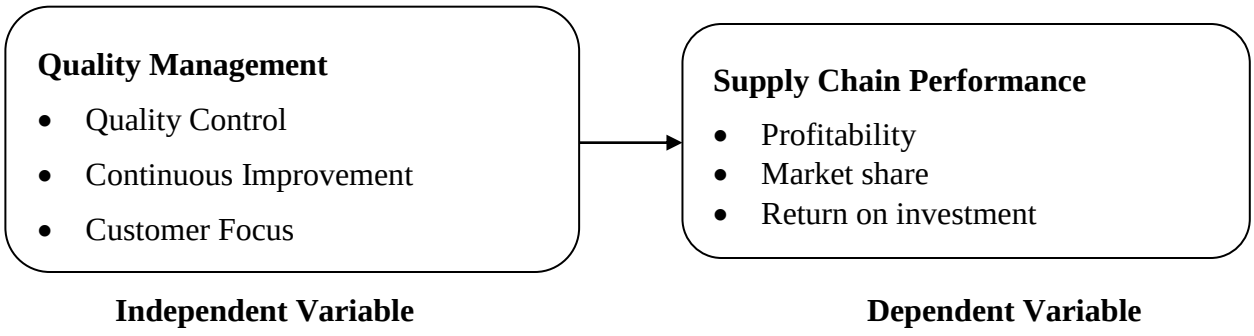

Figure 1: Conceptual Framework

EMPIRICAL REVIEW

Quality management refers to practices of organizations that implement principles such as customer focus, continuous improvement and teamwork to improve product and service quality (Faeq, Garanti & Sadq, 2021). Quality management is therefore a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance. Alzoubi and Aziz (2021) contend that an organization should make strategic decision to adopt a quality management system based on the organization's strategy, objectives, structure, size, products and services offered. A study by Agyabeng-Mensah, Afum, Agnikpe, Cai, Ahenkorah and Dacosta (2021) which explored the mediating influences of total quality management and just in time between green supply chain practices and performance, indicated that quality management is an important role in JIT as it encourage workers to help in the development of cost savings measures to get job done, and many other areas of reduction.

As indicated by Nugroho, Christiananta, Wulani and Pratama (2022), quality management can be applied in team based initiatives; the basic worker focused concepts include visualizing the procedure in less steps if possible, remembering that inventory is a moving item not a stable one, placing emphasis on synchronization of each procedure, elimination of unnecessary activities and waste reduction. Routine employees properly in the workshop can save labor cost without delaying the production flow (Nugroho et al., 2022). JIT is a tool for senior management to implement quality management. JIT quality principle seeks long-term commitment to enhancing product quality and ensuring never ending task quality control efforts. It seeks to continuously identify and correct all quality related problems as continuous improvement is a requirement of JIT (Foster & Gardner, 2022).

Supply chain management (SCM) has been a major component of competitive strategy to enhance organizational productivity and profitability (Lee, 2021). Supply chain performance measurement and metrics have received much attention from researchers and practitioners. The role of these measures and metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control. According to Kamble Gunasekaran, Ghadge and Raut (2020), performance measurement and metrics have an important role to play in setting objectives, evaluating performance, and determining future

courses of actions. Supply chain performance is defined as the overall output across the supply chain link which is aligned to the objectives of a firm in terms of profitability, stock turn over, market share, investment expenditure and customer satisfaction (Zanon *et al.*, 2021).

A study by Rajab, Ngugi and Kiarie (2021) explored the influence of supplier relationship management on performance of manufacturing firms in Kenya. This study employed descriptive research design and targeted 499 manufacturing companies which were all located in Nairobi and its environs. In order to come up with a representative sample, stratified random sampling method was used since the population is heterogeneous. There were 217 respondents sampled from the 499 manufacturing firms out of 217, 180 respondents returned the questionnaires for analysis. The study adopted a descriptive survey design. Data was collected using self-administered questionnaires which were tested for validity and reliability using 10% of the total sample respondents. The findings revealed that there existed a positive influence of supplier relations management on performance management of manufacturing firms in Kenya at 5% level of significant. This indicates that as the level of supplier relationship management increases also performance of manufacturing firms in Kenya increases significantly. Furthermore, long-term supplier relationships have both direct and indirect significant effects on performance; the indirect effect via the effect on information integration and logistics integration.

Saragih, Tarigan, Pratama, Wardati and Silalahi (2020) evaluated the impact of total quality management, supply chain management practices and operations capability on firm performance. The study provided empirical support about the influence of QM on the relation of supply chain operations capability and performance. The SEM-PLS was used as an analysis tool, which was among the most robust structural equation modelling technique. The study used the survey-based methodology to achieve the objectives of the current study. The random sampling was used, and the response rate was 54 percent which was considered higher than the minimum response rate. The findings revealed that sustainable competitive advantage could be achieved through supply chain management. Further, evidence was provided by the study for the direct influence of SCM practices and operations capability on the firm's performance.

RESEARCH METHODOLOGY

Research design refers to the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in the procedure (Babbie, 2002). Kothari (2004) observed that research design is a blue print which facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible hence yielding maximum information with minimal expenditure of effort, time and money. This study employed descriptive research design. This research design is considered appropriate as it involves collecting data in order to answer pertinent questions concerning the phenomenon under study (Mugenda, 2008). Descriptive research design is able to provide facts and suggestions on major connections between the variables.

The study population comprised of 400 managers working at East Africa Breweries Limited in the following management positions: senior management, middle level management and lower level management. The sampling frame that was used for this study was obtained from EABL human resource management. This study sampled 10% of the target population. Ten percent (10%) of 400 is 40 respondents as recommended by Mugenda and Mugenda (2003) and Kothari (2004). This study adopted stratified random sampling technique to select sample size. The respondents were selected in such a way that the sample consisted of all the three sub-groups of managers. A semi-structured questionnaire containing both open-ended and close-ended questions was used to collect primary data for this study. Data collected was analyzed using descriptive, inferential and content analysis methods. Descriptive statistics such as frequencies mean scores, and percentages were used to analyze quantitative data. Inferential statistics such as regression analysis and Pearson Correlation Coefficient were also used to analyze quantitative data.

FINDINGS AND DISCUSSION

The researcher targeted 40 respondents from EABL. However, 37 questionnaires were filled correctly and returned. This translates to 92.5%. This response rate was considered adequate as recommended by Babbie (2002). Table 4.1 shows the response rate. Demographic information results revealed that rrespondents aged 31-40 years were 40.5% while respondents aged 41-50 years and above 51 years were 21.6% each. Only 16.2% of the respondents were aged 21-30

years. Majority of the respondents were found to be graduates (62.2%) while 21.6% of the respondents had post graduate qualifications. Only 16.2% of the respondents had tertiary or college as their highest level of education. Moreover, respondents who had worked at BL for 3-6 years were 40.5% while those that had worked for 7-10 years were 27%. Respondents who had worked at EABL for 11 years and above were 21.6% while only 10.8% of the respondents indicated that they had worked at EABL for less than 3 years.

In addition, respondents who indicated their position as lower level manager were 45.9% while middle level managers and senior managers were 32.4% and 21.6% respectively. Table 4.4 shows these results. The results show that respondents were distributed across many departments. Respondents drawn from supply chain department were 37.8% while those drawn from quality assurance were 27%. Respondents drawn from finance department were 10.8% while those from human resource were 8.1%. Respondents drawn from ICT, legal affairs, and corporate relations were 5.4% of the respondents each. Table 4.5 summarizes these results.

Descriptive Statistics

Respondents were asked to indicate whether quality management on JIT implementation affect supply chain performance at EABL. The results show that majority of the respondents (94.6%) indicated yes as compared to 5.4% of the respondents who indicated no. Figure 2 shows these results.

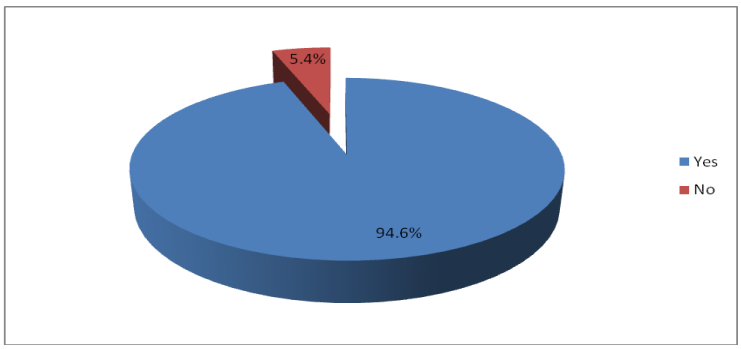

Figure 1: Quality management affect supply chain performance at EABL

The respondents were asked to indicate their agreement or disagreement with three statements regarding quality management at EABL. The results show that respondents agreed with the statements that there is continuous improvement as a result of quality management on JIT

implementation (M=4.03, SD=.499) and that customer focus in production has been improved as a result of quality management on JIT implementation at EABL (M=4.03, SD=.287). Respondents were neutral on the statement that quality management on JIT implementation has strengthened quality control at EABL (M=3.86, SD=.481). Table 1 shows these results.

Table 1: Quality Management

	N	Mean	Std. Deviation
Quality management on JIT implementation has strengthened quality control at EABL	37	3.86	.481
There is continuous improvement as a result of quality management on JIT implementation	37	4.03	.499
Customer focus in production has been improved as a result of quality management on JIT implementation at EABL	37	4.03	.287
Valid N (listwise)	37		

Table 2 shows the descriptive statistics results on supply chain performance.

Table 2: Supply Chain Performance

	N	Mean	Std. Deviation
Profitability has increased as a result of JIT implementation at EABL	37	4.68	.580
EABL has a bigger market share that can be attributed to JIT implementation in the firm	37	3.78	.584
Customer satisfaction has improved as a result of JIT implementation at EABL	37	4.24	.723
Valid N (listwise)	37		

Regression Analysis Results

The coefficients of determination show the contribution of each independent variable to the change in the dependent variable. Based on the coefficient results, Quality Management (β=.607, p=.000) was found to positively and significantly affect supply chain performance at EABL.

The new regression model became;

Y= -0.631+ 0.607X

Where;

Y is Supply Chain Performance

X is Quality Management

Hypothesis Testing

$H_{0:}$ Quality Management has no statistically significant effect on supply chain performance in manufacturing sector in Kenya.

The study tested the null hypothesis that quality management has no statistically significant effect on supply chain performance in manufacturing sector in Kenya. Regression analysis results revealed that quality management had a coefficient of 0.607 with a p-value of 0.000<0.05 leading to the rejection of the null hypothesis. The study thus found that quality management has statistically significant effect on supply chain performance in manufacturing sector in Kenya.

CONCLUSION

This study concludes that having a clear organizational policy on quality management implementation is important in an organization as it has been found to positively affect supply chain performance. This study also concludes that quality management integration is crucial to JIT implementation. Evidence have shown that quality management in JIT implementation positively affect supply chain performance in organizations. This study concludes that in JIT implementation, it is important to consider the quality management ability as it have been revealed to positively affect supply chain performance.

RECOMMENDATION

This study recommends that EABL should review its organizational policy on JIT implementation to improve its supply chain performance especially in regards to better human resource management practices. EABL should also enhance its quality management Integration to enhance supply chain performance. This study recommends that EABL should utilize JIT to strengthen its quality control.

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