Effect of employee capabilities on the supply chain performance of sugar manufacturing firms in the western region, Kenya

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ABSTRACT

Supply chain performance refers to the ability of an extended supply chain to meet end-customer demands through responsive inventory and capacity management, timely delivery, and product availability. This study sought to establish the influence of employee capabilities on supply chain performance. The study was anchored on the Resource-Based View Theory. A descriptive survey research design was employed, targeting four sugar manufacturing firms with a total population of 281 respondents. A sample size of 165 was selected using purposive and simple random sampling techniques. Data was collected using structured questionnaires. A pilot study conducted at Kibos Sugar Company in Kisumu County tested the reliability and validity of the research instruments. Reliability was confirmed with Cronbach's alpha coefficients of 0.7 and above, while validity was ensured through expert reviews. Data analysis involved descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics, including linear regression. The findings revealed that employee capabilities ($r = 0.664$, $R^2 = 0.441$, $p = 0.000$) had significant positive effects on supply chain performance. The study recommends that sugar manufacturing firms invest in enhancing employee competencies, streamline production cycles, improve fleet management systems, and promote effective information sharing. Additionally, adopting democratic management styles that encourage employee participation and innovation is essential for optimizing supply chain performance.

Keywords: Employee Capabilities, Supply Chain Performance, Sugar Manufacturing Firms, Western region, Kenya

I. INTRODUCTION

Within the modern competitive market landscape, companies are no longer able to use only internal capabilities to achieve an outstanding performance of the supply chain. The cooperation with strategic partners and the improvement of the logistics possibilities have been acknowledged as critical in terms of efficiency, flexibility, and customer satisfaction (Wu et al., 2015; Nimmy et al.., 2019). The most common supply chain performance measures are the cost of each unit, the level of inventory turnover, the level of affirmative order fulfilment, and customer responsiveness Sugar business, mostly found in the Western Region of Kenya, including Kakamega, Bungoma, and Busia counties, is an important source of economic development, job creation in the countryside, and livelihoods to farmers (Kenya National Bureau of Statistics [KNBS], 2020). Nevertheless, poor supply chain efficiency, lack of appropriate infrastructure, and fluctuating market prices are some of the issues in the sector that impair competitiveness and profitability (Owino, 2021; Njeru, 2021).

The performance of supply chains, which is determined by aspects such as cost, quality, speed, flexibility, and customer satisfaction, is essential in the sustainability of the industry (Christopher, 2016; Barney & Hesterly, 2019). Inefficiencies in the Kenyan sugar industry including lack of good logistics, consistency in raw material supply, and delays in production, are some of the factors contributing to the undermining of efficiencies in the sugar industry of Kenya (Mwangi, 2019). Procurement, logistics, inventory control and quality assurance processes are handled mainly through employee capabilities such as knowledge, skills, competencies and attitudes (Collis & Montgomery, 2011; Grant, 2016; Leuschner et al., 2013). Trained workers increase the efficiency of production and minimize disruptions and build strong relationships with suppliers and customers (Huo, 2012; Mutua, 2019).

Highly skilled workers are optimizing the process of acquisition, inventory levels and supply chain predictions, contributing to reductions in expenditure, and increasing supply chain resiliency (Fawcett et al., 2019; Basu, 2016; Melnyk, 2021). Additionally, engagement and employee motivation perform the role of operational efficiency and

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innovation, which are crucial in terms of a competitive advantage (De Vries et al., 2020). Nonetheless, only a few empirical studies have been done on how employee capabilities can influence the supply chain performance of sugar firms in the Western Region of Kenya. This research will fill this gap by investigating how employee capabilities can affect the performance of the supply chain to provide an understanding of human resource development strategy to enhance competitiveness in the manufacture of sugar.

1.1 Statement of the Problem

The sugar manufacturing industry in the Western Region of Kenya plays a crucial role in the country's economy through employment creation, revenue generation, and rural development. However, despite its importance, the industry faces persistent challenges in achieving effective supply chain performance, largely due to deficiencies in logistical capabilities. Poor logistics—such as weak transportation systems, inadequate storage facilities, ineffective inventory management, and limited use of information technology—have contributed to delays, high operational costs, and reduced competitiveness (Njeru, 2021).

Reports by the World Bank (2016) highlight stagnation in Kenya's manufacturing sector, driven partly by logistical inefficiencies and unstable management practices. These challenges have resulted in declining earnings, reduced market share in the East African Community, and overall poor growth in the manufacturing sector. Specifically, sugar manufacturing firms in Western Kenya continue to struggle with these issues, making it difficult to meet market demands and maintain a competitive advantage. Although previous studies have examined employee capabilities and supply chain performance in various sectors, little focus has been given to the sugar manufacturing sector in this region, particularly with regard to the moderating role of management style. This has left a significant knowledge gap, especially in understanding how specific employee factors like adaptation to emerging trends, knowledge exchange through benchmarking and knowledge integration in the firm influence supply chain performance in this context. Therefore, the problem this study seeks to address is to bridge the gap between logistics capabilities on supply chain performance of sugar manufacturing firms in Western Region, Kenya, while considering the moderating effect of management style.

1.2 Research Hypotheses

$H0_1$: There is no significant effect of employee capabilities on supply chain performance of sugar manufacturing firms in Western Region, Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Review

The study is grounded in the Resource-Based View (RBV) Theory, initially introduced by Wernerfelt (2014) and later expanded by Barney (1991). RBV posits that organizations can attain and sustain a competitive advantage by acquiring, developing, and deploying valuable, rare, inimitable, and non-substitutable (VRIN) resources and employee capabilities (Barney, 2005). While the theory highlights the importance of internal resources, it faces criticism for its broad definitions, subjectivity in valuing intangible assets such as reputation and knowledge, and challenges in adapting to rapidly evolving technologies and market trends. In the context of logistics, RBV underscores the strategic role of capabilities such as supplier partnerships, IT systems, transportation, warehousing, and inventory management. These resources, when unique, difficult to imitate, and non-substitutable, can significantly enhance a firm's competitive position (Paulraj et al., 2017).

Employee capabilities, especially in supply chain management, are also recognized within RBV as strategic resources. Employees' skills, expertise, and knowledge directly influence operational efficiency, adaptability, and problem-solving, ultimately improving supply chain performance (Conner, 1991). In the sugar manufacturing sector of Kenya's Western Region, such human resource competencies meet the VRIN criteria, enabling firms to meet lead time, delivery performance, production life cycle time, order accuracy and fulfilment and compliance rate in the face of external challenges. This study applies RBV to explain how leveraging employee capabilities can drive sustained competitive advantage and superior supply chain performance in this context.

2.2 Conceptual Review

2.2.1 Employee Capabilities

The performance of employees plays a crucial role in improving supply chain management (SCM) and achieving success as a supply chain manager in the firm (Zaman *et al.*, 2019). The efficiency of a supply chain depends on the competence of the staff working in the operational divisions of the organization (Fawcett et al. 2019). According to a study conducted by Williams et al. (2019), investing in technology has few benefits, even though these technologies are easily accessible and affordable to everyone. Employees must have the ability to effectively use the mentioned

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technologies in order to give their firm a competitive advantage. Companies need to obtain information about the skills and abilities of supply chain managers and how they might influence the organization's performance. In order to enhance supply chain management, companies need to assess the capabilities, creativity, and competencies of their staff (Krajcsak, 2020).

Fawcett *et al.,* (2019) emphasize that an employee's ability to effectively manage and enhance a company's supply chain largely depends on their competencies. The proficiency of staff within functional departments significantly influences supply chain success or failure. For competitive advantage, employees must demonstrate strong technological skills, while organizations need to fully understand the capabilities of supply chain managers and their potential impact on overall performance. Similarly, Essex *et al.,* (2016) found a strong correlation between the individual abilities of supply chain managers and their overall performance, noting that dynamic and adaptable skills are key to long-term success. Wagner et al. (2020) further argue that supply chain managers must continually update and expand their abilities to respond effectively to emerging challenges. Overall, versatile skills remain a critical determinant of success in supply chain management, enabling managers to adapt, improve performance, and secure a sustainable competitive edge (Essex et *al.,* 2016; Fawcett *et al.,* 2019; Wagner *et al.,* 2020).

Supply chain performance refers to the measures that the extended supply chain takes to meet end-user demands, including product availability, on-time delivery, and the supply network's capacity and inventory holdings (Dametew et al., 2018). Ambe (2014) argues that qualitative, quantitative, and temporal indicators are utilized to assess a company's performance, as opposed to more conventional metrics such as efficiency, effectiveness, technology, and adaptability.

2.3 Empirical Review

The need to understand the role of employee capabilities in enhancing supply chain performance has gained attention in recent years. Scheibe and Blackhurst (2018) applied a grounded theory case study on large and mid-sized U.S. manufacturing companies, revealing that the shortage of qualified supply chain managers poses a significant challenge, although their study lacked specificity on the skills, attributes, and behavioral goals required.

Similarly, Phan *et al.,* (2022) found that dynamic employee capabilities positively influenced supply chain finance performance, Fintech adoption, and innovative work behavior in Vietnamese financial institutions, underscoring the importance of workforce creativity. Flöthmann et al. (2018) demonstrated that both individual supply chain management (SCM) skills and organizational knowledge significantly enhance SCM performance globally, highlighting the pivotal role of human resource management in competency development.

Wisedsin et al. (2020) also affirmed that human capital, employee empowerment, and advanced manufacturing technology are beneficial to the supply chain in the Indonesian manufacturing, where organizational innovation mediates the benefits of these factors. The skills directed at leadership are also important; Mencl et al. (2016) determined that leadership effectiveness is promoted by interpersonal and emotional intelligence capabilities, and this beneficial effect might be applied to the supply chain situations as well. Although such studies indicate the importance of innovation, skills, and technology in the improvement of the supply chain performance, the bulk of evidence is obtained in the Asian and Western context. Empirical research on the impact of such factors on the outcomes of supply chains of the African manufacturing industries, especially in the sugar industry of Kenya, where the problems of inefficiency, outdated technology, and employee empowerment remain, is still missing. Filling this gap will offer localized knowledge that will expand the discourse on supply chain management across the world to unexplored regions.

In Kenya, Onyando (2018) showed that learning capabilities—a component of dynamic capabilities—directly influence manufacturing firm performance in Nairobi County. While these studies collectively affirm the value of employee competencies in supply chain success, most are context-specific and industry-limited, leaving a gap in understanding their role within the Kenyan sugar manufacturing sector, which the current study seeks to address.

III. METHODOLOGY

The research was carried out in Bungoma and Kakamega counties in western Kenya because of the presence of quite four large sugar companies of the region, namely Mumias Sugar Company, Nzoia Sugar Company, West Kenya Sugar Company, and Butali Sugar Company which were also selected based on their strategic roles in the sugar sector and varied operational characteristics. Descriptive survey design has been followed in order to come across patterns and relationships among employee capabilities and supply chain performance.

From a population of 281 procurement, finance, logistics and marketing staff, a sample of 165 respondents was drawn through purposive and simple random sampling based on a population size of 281 according to Yamane formula. Structured questionnaires were used and the questions included both closed and open-ended questions to collect the data. Drop and pick-place was used.

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Validity and reliability of instruments were tested using a pilot study at the Kibos Sugar Company, the criterion being Cronbach alpha (0.7 and above). Its validity was also checked by the use of expert review. Examination of data included cleaning, coding and testing using descriptive statistics, data were shown in tables.

Ethical issues were taken care of: informed consent, confidentiality, voluntary participation, and a limit on data utilization to academic only.

IV. FINDINGS & DISCUSSION

4.1 Employee Capabilities

Table 1 presents descriptive data utilized to determine the impact of staff capabilities on the supply chain performance of sugar production enterprises in the western region. Key note: N=140; 5- strongly Agree, 4 is Agree, 3 is fairly agree 2 is Disagree and 1 is strongly disagree.

Table 1

Descriptive Statistics: Employee Capabilities

Statement	5	4	3	2	1	Mean	SD
When there is new information, it is shared within the departments through meetings to enhance supply chain performance.	2.9 (4)	48.6 (68)	44.3 (62)	2.9 (4)	1.4 (2)	3.49	0.68
Knowledge integration in the firm is achieved through exploring, identifying and synthesizing ideas to assess experience and solve problems.	2.9 (4)	27.1 (38)	57.1 (80)	8.6 (12)	4.3 (6)	3.16	0.79
Exchange of information and knowledge through benchmarking within the organization takes place frequently, formally and timely to improve on supply chain performance	0 (0)	44.3 (62)	47.1 (66)	2.9 (4)	5.7 (8)	3.30	0.79
The employees are highly proficient, they can help to create an atmosphere that fosters innovation and influence the companies supply chain performance.	0 (0)	31.4 (44)	57.1 (80)	8.6 (12)	2.9 (4)	3.17	0.70
Employees adapt to new trends quickly thus enhancing supply chain performance	5.7 (8)	67.1 (94)	25.7 (36)	0 (0)	1.4 (2)	3.76	0.62

The descriptive findings show that information and knowledge management practices are very important in improving the supply chain performance in the surveyed companies. A greater number of the respondents (51.5) affirmed that each department shares new information in a systematized manner through meetings (M = 3.49, SD = 0.68) which indicates that the company has well-developed communication mechanisms that facilitate integration. The finding is consistent with Phan et al. (2022), who stressed the importance of timely information sharing to reduce uncertainties and enhance coordination between the supply chain functions. On the contrary, exploration and synthesis of knowledge were moderately supported with 30 percent agreeing and 57.1 percent fairly agreeing (M = 3.16, SD = 0.79), which implies partial implementation. This can be compared to the study by Wisedsin et al. (2020), who found out that knowledge integration improves organizational learning, but its uptake varies between companies. In the same vein, the knowledge exchange mechanism of benchmarking had moderate-to-high agreement, with 44.3 percent agreeing and an equal proportion fairly agreeing (M = 3.30, SD = 0.79). This is in line with Flothmann et al. (2018) who suggested that best practice is adopted through benchmarking but the divergence in responses suggests that it is institutionalized differently in different organizations. Another factor was also based on employees proficient: 31.4% strongly agreed and 57.1% fairly agreed that proficient employees can contribute to innovation and increase the performance of supply chains (M = 3.17, SD = 0.70), which confirms the ideas of Wisedsin et al. (2020) and Phan et al. (2022) that note human capital as an innovation driver. Lastly, the most powerful factor was adaptability as 72.8% of the respondents strongly agreed or agreed that workers quickly adapt to emerging trends (M = 3.76, SD = 0.62). This is similar to Flothmann et al. (2018), who found adaptability to be the key to resilient and responsive supply chains. Collectively, these findings provide evidence that although all the analysed variables have an effect on the performance of supply chain, employee adaptability seems to be the factor that has the greatest impact in the analysed companies.

From a managerial perspective, the findings imply that organizations should prioritize continuous training and capacity-building programs that enhance employee adaptability and innovation, as these appear to yield the strongest impact on performance. At the same time, firms should institutionalize knowledge integration processes and strengthen benchmarking practices to ensure that best practices and lessons learned are consistently applied across departments. By balancing investments in human capital with robust knowledge management systems, managers can build more resilient, innovative, and high-performing supply chains.

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4.2 Supply Chain Performance

Table 2 presents descriptive on the supply chain performance of sugar production enterprises in the western region.

Table 2

Supply Chain Performance

Statement	5	4	3	2	1	Mean	SD
The firm has shortened the lead time period between placement of an order and delivery of the same to clients	1.4 (2)	70 (98)	28.6 (40)	0 (0)	0 (0)	3.73	0.48
The firm has efficient delivery means that ensure faster movement of goods to final destinations	2.9 (4)	65.7 (92)	31.4 (44)	0 (0)	0 (0)	3.71	0.51
The firm's production systems have reduced on the average time it takes to process raw materials into completed end-products	2.9 (4)	50 (70)	47.1 (66)	0 (0)	0 (0)	3.56	0.555
The firm has ensured strict adherence to the degree to which an order's specifications match the original order request from a client without any deviations	10 (14)	55.7 (78)	31.4 (44)	0 (0)	2.9 (4)	3.70	0.77
The firm has improved on required adherence standards of companies in relation to relevant laws, regulations and industry standards regarding to product and process qualities	10 (14)	55.7 (78)	31.4 (44)	0 (0)	2.9 (4)	3.70	0.77

The descriptive findings indicate that most of the respondents felt that the firm had reduced the lead time between making of the order and when it gets delivered, and that a total of 71.4 percent of the respondents strongly agreed or agreed. It is consistent with Phan et al. (2022), who note that minimizing the lead time will improve customer satisfaction and increase responsiveness of the supply chain. The high mean score (M = 3.73, SD = 0.48) in the present research also serves to support the fact that timely delivery is seen as one of the most important forces of operational efficiency.

Likewise 68.6 percent of the respondents revealed that they were in agreement with the fact that the firm possesses efficient delivery systems that enable goods to move faster. This is analogous with Flothmann et al. (2018), who state that logistics and distribution networks play a direct role in supply chain agility and competitiveness. These findings are consistent with findings carried out in the past and hence the importance of strong delivery mechanisms in minimizing delays and enhancing service quality is therefore justified.

As to the efficiency of production, 52.9% of the participants affirmed that the production systems have resulted in decreased average processing times of the firm, but a significant proportion of 47.1% moderately affirmed. The average (M = 3.56, SD = 0.555) indicates that the progress has been achieved, but there is the possibility of improvement. Wisedsin et al. (2020) also had similar findings that although process optimization can lead to a decrease in the production cycle time; the impact of that depends on the level of technology adoption and the continuous improvement of the process, which could be the cause of the moderate perceptions experienced in this study.

Lastly, 65.7 percent of the respondents stated that the firm has a strong compliance to order requirements with no deviations, with a very minimal percentage (2.9) strongly not agreeing. The average result of 3.70 and a slightly larger variance (SD = 0.77) is a mirror of a rather positive perception but with varying opinions among the respondents. This is in line with Onyando (2018), who observed that the accuracy of order-related is one of the pillars of customer loyalty and supply chain credibility. Nevertheless, the inconsistency also implies that sometimes the lapses can still exist, and Onyando states that strict quality compliance should be only monitored and the personnel should be trained.

Altogether, the descriptive findings indicate that the company has achieved significant improvement in its working performance in terms of reduced lead times, effective delivery patterns, lean manufacturing process, and compliance with order requirements. These findings are a direct correlation to the research aims of the study of the contribution of logistical and production efficiencies to better service delivery and customer satisfaction. The high level of agreement of the respondents shows that the operational strategies that the firm embraces align with the best practices that are emphasized in the previous literature. Nevertheless, the average attitudes toward efficiency of production and the frequent failure in accuracy of orders indicate what areas should be improved through the continuous improvement. The results, therefore, offer empirical evidence to the aims of the study besides indicating areas of actions to be undertaken to enhance operational performance.

4.3 Linear Regression Analyses

To ascertain the effect of effect of employee capabilities on supply chain performance of sugar manufacturing firms in Western Region, a regression analysis was conducted. Findings are shown in Table 3.

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Table 3

Effect of Employee Capabilities on Supply Chain Performance

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.664[a]	.441	.437	.65162	.441	108.739	1	138	.000
a. Predictors: (Constant), Employee Capabilities									

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.172	1	46.172	108.739	.000[b]
	Residual	58.597	138	.425		
	Total	104.769	139			
a. Dependent Variable: Supply Chain Performance						
b. Predictors: (Constant), Employee Capabilities						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.386	.301		1.284	.201
	Employee Capabilities	.870	.083	.664	10.428	.000

a. Dependent Variable: Supply Chain Performance

The model summary tabulation reveals a moderately positive correlation between employee capabilities on supply chain performance of sugar manufacturing firms in Western Region, Kenya as indicated by the R value of 0.664. Consequently, an increase in employee capabilities is expected to result in enhanced outcomes. The coefficient of determination, commonly referred to as R square, indicates that employee capabilities explain 44.1% of the variability observed in supply chain performances (R^2=0.441). This implies that employee capabilities significantly influence the outcomes attained. The results of the F test suggest that the model well captures the variability in the dependent variable, as evidenced by an F value of 108.739 and a p-value of 0.00 is less than 0.05. Furthermore, this illustrates that the employee capabilities is a dependable measure of supply chain performance.

Based on the findings presented in Table 6, it can be shown that the unstandardized regression coefficient (β) for employee capabilities was determined to be 0.870 at a significance level of 0.00<0.05. This finding indicates that a change of one unit in employee capabilities would result in a significant improvement in supply chain performance by 87.8%. The regression equation was used to quantify the impact of employee capabilities on supply chain performance. Supply chain performance = 0.386 + 0.870 employee capabilities

Based on the research findings, it is evident that employee capabilities significantly contribute to the supply chain performance of sugar manufacturing firms in Western Region. Wisedsin *et al.*, (2020) investigated the effects of employee capabilities and advanced manufacturing technology on supply chain performance. This found employee capabilities as positive and significant. Similarly, Onyando (2018) found a positive significant relationship between dynamic capacities and firm performance of manufacturing enterprises in Nairobi County, with one of the objectives being to discover how learning capabilities effect performance. It is in disagreement with the study by Flothmann et al. (2018) tried to help understand SCM competencies better by breaking them down into human and organizational parts and looking at how these parts affect SCM performance who found employee competencies significant on SCM performance.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study aimed at establishing the effect of employee capabilities on supply chain performance of sugar manufacturing firms in Western Region, Kenya**.** Employee capabilities and the level of output is 0.664(p value 0.00) on supply chain performance. The study gave an R^2 of 0.441. This implies that employee capabilities significantly influence supply chain performance of sugar manufacturing firms in Western Region.

Given that employee capabilities was a significant predictor of supply chain performance, it was clear that employee capabilities had a major beneficial effect on supply chain performance of sugar manufacturing firms. This suggested that sugar manufacturing firms that had stronger employee capabilities can achieve higher levels of supply chain performance.

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5.2 Recommendations

The study recommends that employees should realize their potential by adapting to emerging trends in procurement sector that would facilitate performance. It is also important that employees improve their knowledge through benchmarking initiatives from other players. Lastly sugar manufacturing firms should make knowledge integration part and parcel of their duties

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