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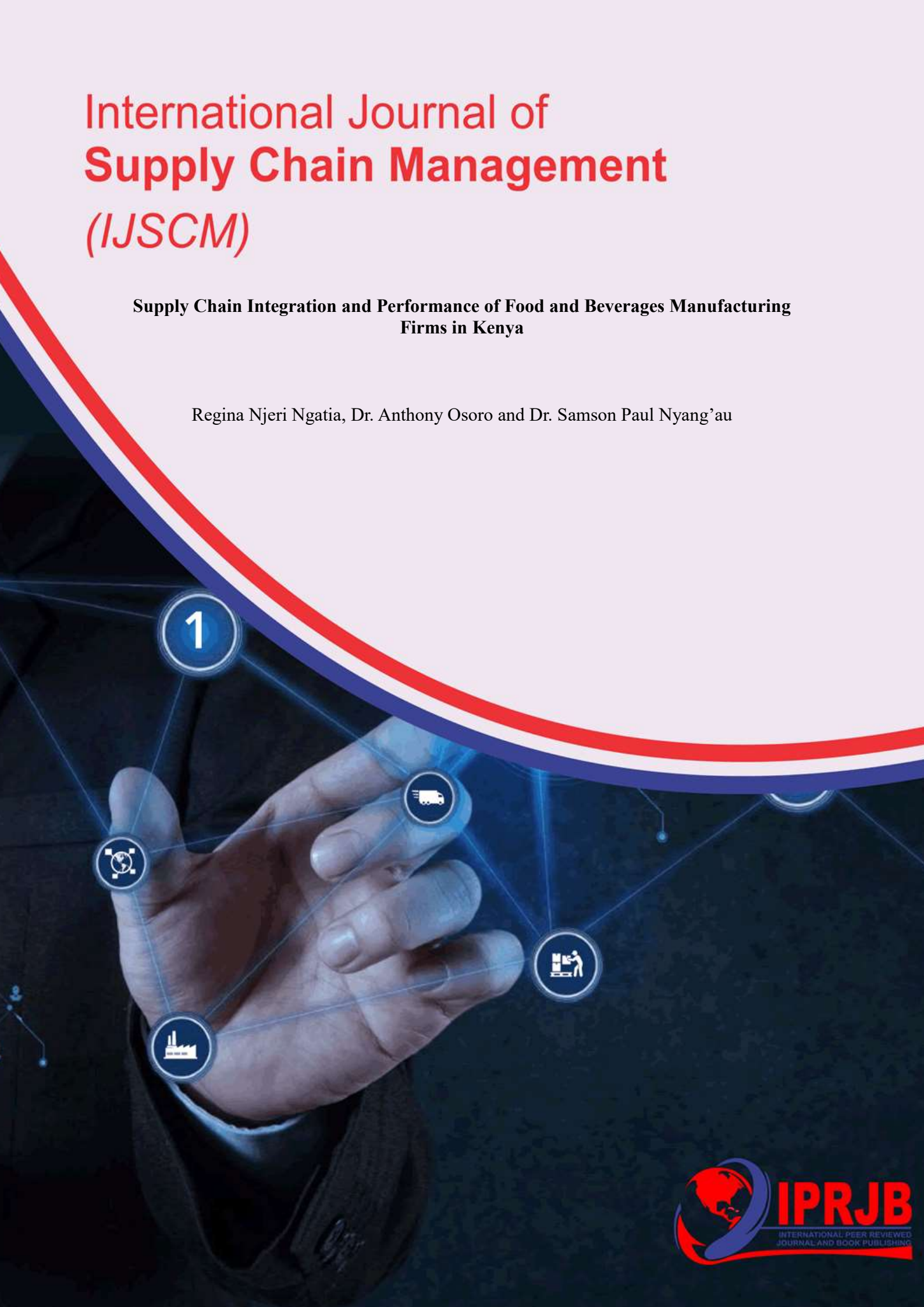

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Supply Chain Integration and Performance of Food and Beverages Manufacturing Firms in Kenya

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Abstract

Purpose: The major aim of this study was to analyze the effect of supply chain integration and performance of food and beverages manufacturing firms in Kenya.

Methodology: The study adopted a cross-sectional survey. The target population was senior procurement managers from 246 food and beverage manufacturing firms in Kenya. A sample size of 150 respondents was determined using Krejcie and Morgan (1970). The sample was selected using simple random sampling. Pilot study of 10% of sample size was conducted consisting 15 firms and 13 questionnaires were returned. The researcher used semi-structured and self-administration questionnaires. 135 questionnaires were distributed to respondents but only 119 questionnaires were returned. Data analysis was done through descriptive statistics by use of mean, standard deviation, skewness and kurtosis. Inferential statistics was also done by use of correlation, regression and hypothesis testing. The data obtained was processed using SPSS version 28. Data was presented by use of tables. The reliability results indicates that all the variables meet the threshold of a Cronbach's alpha value of above 0.7. Validity was also tested using content, construct and criterion.

Results: Supply chain integration and performance of food and beverage manufacturing firms in Kenya had a significant and positive relationship (R2=.491, p =.000), according to the data. This meant that supply chain integration enhances performance of Kenyan food and beverage manufacturers. Supply chain integration and performance of food and beverage manufacturing firms in Kenya revealed a positive and statistically significant relationship (R2=.491), according to the study. As a result, supply chain integration accounted for 49.1 percent of the variation in food and beverage manufacturing firm's performance.

Unique Contribution to Theory, Practice and Policy: Process Theory may be used to anchor future studies in the manufacturing sector. The study recommended that managers of companies that manufacture food and beverages develop procedures and policies that link to a superior understanding of the client in order to meet their expectations, even though the existing theory was validated. The study suggests that regulators overseeing the food and beverage industry should develop policies that permit manufacturers to collaborate with third parties, thereby mitigating losses that could affect the productivity of these companies and ultimately the whole economy. According to the report, in order to improve performance, the government should ensure that supply chain integration in Kenyan food and beverage manufacturing companies grows and develops in a more methodical manner. Furthermore, in order to determine how supply chain integration affects the productivity of other manufacturing sectors in the economy, empirical study must be done.

Keywords: *Supply Chain Integration, Performance, Internal Integration, Customer Integration, Supplier Integration, Product Integration*

JEL Codes of Classification: *L66, O13, M11*

INTRODUCTION

Supply chain integration plays a vital role in creating value, which leads to performance improvements and affects performance measures such as reliability and responsiveness. The integration between supply chain parties whether the downstream or upstream is considered very crucial to improvement of firm's performance and value addition to the network (Ataseven & Nair, 2017). According to Kumara, Chibuzob, Garza-Reyesc, Kumaria, Rocha-Lonad and Lopez-Torrese (2017), SCI requires collaboration among internal functions and external firms. Internal integration within the firm allows cost reduction and improves process while external integration with suppliers enabling firms to access better technologies for modern manufacturing and positioning of the better value chain while customer integration allows synchronization of future demand, delivery schedule, collaborative product design, inventory data, and customer needs. Integration is required to enable responsiveness to new changes, joint inventory management and reduced lead time (Rajaguru & Matanda, 2019). Barakat, Ali, Abdelbary and Haroun (2020) explore the impact of supply chain integration on operational performance through resilience under covid-19 pandemic in order to adopt market in volatile market environment. The findings reveal that SCI can improve performance significantly by the following measures cost, quality and delivery. Supplier integration involves linkage with suppliers by sharing information. It aims at joint problem solving, quality improvements, teamwork, customer feedback, knowledge transfer and quick responsiveness to the needs of the customers (Pakurar, Haddad, Nagy, Popp & Olah, 2019).

Kenya had been experienced a declining contribution of the manufacturing sector to the gross domestic product (GDP), which was evidenced by a paltry 5.4 % , in 2020, 4.3% in and 2019 ,7.5% .in 2021 (AEU, 2022). In addition, previous studies on SCMP done in Kenya had primarily sought to explain its impact on performance. Kenyan food and beverage firms are vulnerable to SC disruptions and challenges which are rooted in the lack of effective internal and external supply chain (Mideva & Moronge, 2019). As such, the disjointed nature of the food and beverages manufacturing subsector, presents a significant challenge in performance (Maina, Njehia & Eric, 2020). Little attention has been paid to the relative importance of performance of various parameters of supply chain integration. Admittedly, food and beverage manufacturers are integrating their supply chains (Chirchir, Stephen &John, 2022). Together with SCI having no clear topology, just a few theories explained how it functions, and only a handful of studies used cross-sectional surveys as well as longitudinal research designs. In addition to the limited empirical and academic literature on cases involving SCI, this is a convincing argument for further study (Chelimo, 2019). This study therefore seeks to fill these gaps in supply chain management literature by analyzing the effect of supply chain integration and the performance of food and beverage manufacturing firms in Kenya.

LITERATURE REVIEW

Theoretical Review

Process Theory

Process theory is thought to be relevant for this study in order to understand the effect of SCI on performance of food and beverage manufacturing firms in Kenya, hence it gives a theoretical background of this study. Process theory explains organizational behavior in terms of information that must be gathered, interpreted, coordinated and synthesized to make decisions (Schoenherr & Swink, 2012). Internal integration is characterized by interconnected

information systems and tasks aimed at improving lateral relations like the creation of cross-functional teams, it also provides links by which externally sourced information can be internally absorbed. An organization's level of internal integration can therefore be viewed as the source of its capability to effectively recognize, evaluate, assimilate and apply the information it collects from its customer and supplier integration efforts (Lambert, 2004).

Hammer's (2001) process theory integration of business processes across firms in the supply chain where the real "gold" can be found. Process integration across and within members of the supply chain can make transactions and relationship structures more efficient and effective (Lambert, 2004). Chen and Landry's (2009) process theory creates sustainable performance by ensuring better response to the customer changing needs, market trends and reduced departmental conflict. Chege, Gathenya and Muturi's (2018) process theory facilitates SC process automation on a firm's performance. It enabling information flow both internally and externally leading to better performance, rational decision making and credibility. This theory is relevant to this study as it facilitates integration in SC partners enabling collaborative and communicative networks, breaks boundaries for circulation of information on production, inventory and demand forecasting; and connects immediately with customers. Supply chain collaborating enables product development, inventory management and response, production and capacity planning, customer service and logistics planning.

Empirical Review

Kim and Chai (2017) study revealed a significant positive relationship between external and internal chain integration on firms' performance. Therefore, to for firm to overcome competition in this contemporary business environment, it had to efficiently and effectively integrate internal departments and relate them with the external operations of SC parties to enhance performance Qi et al (2017). Supply chain integration is a key element of performance whilst striving to improve firms' profitability and productivity through supplier, customer and internal integration (Asnordin, Sundram& Noranee, 2021). Lack of SCI produce significant challenges such as high inventory cost, delayed procurement, poor quality product and inaccurate demand, which may lead to customer dissatisfaction (Rasib, Sundram &Noranee, 2021). SCI enhance the performance of the SCM integration are instrumental to initiate agility in firms' SC, this marked SCA as a strategic capability that allows a firm to rapidly sense and react to internal and external uncertainties by transforming challenges and change speedily into opportunities Fayezi *et al.,* (2017). Lu *et al.,* (2018) notion of SCI affects operational performance and the degree of integration too influences efficiency and cost of SCM.

Pakurar, Haddad, Nagy, Popp and Olah (2019) SCI involves suppliers, customers and organizations and should be well managed to improve performance. Supplier integration promotes effective communication with the organization yielding direct quality improvement programs, product design and production planning. That is, it facilitates the smooth and systematic flow of information and materials within SC ensuring no potential barrier to production and procurement processes. Customer integration is crucial as it enhances customer satisfaction leading to increasing sales volume because their expectations, needs and opinions are adhered resulting in customized products and services. Internal integration means combining knowledge and resources available in processes, activities and strategies to produce innovative products and services. To conclude integration involves teamwork, information sharing, joint planning, collaboration to ensure smooth movement of the products, money and resources, cost reduction and quick delivery. For an organization to gain better performance

integration must be well coordinated to enable demand forecasting, product delivery, production planning and inventory levels to attain customer satisfaction. Mose, Shukl and Peter (2015) investigated the impact of supply chain integration strategies on performance. They concluded that all these factors had a positive relationship with performance. Internal integration promotes teamwork, better decision making and quality product. Information integration significantly improves communication with partners, reduces supply chain costs, increases the flow of materials, fast delivery, improves coordination, order fulfillment, and ultimately improves customer satisfaction. Suppler integration enhances product demand forecasting and customer integration promotes joint product development.

Wambua and Kenduiwo (2021) supplier integration and performance of manufacturing firms in Nairobi County. Customer integration which significantly affect performance through information sharing, development of the product and demand planning. Supplier integration positively influence performance by enhancing innovativeness in product, supplier participation and coordinating and organizing operations. Internal integration had negative and insignificant effect on performance. Chebichii, Namusonge and Makokha (2021) supplier integration on organizational performance in food and beverage manufacturing companies in Kenya. The findings indicated that supplier integration had a positive effect on performance of food and beverage manufacturing companies in Kenya, with their suppliers and enabling control of risks ranging from failure to supply or poor quality of products, pro-longed lead times, related with supplier's operations. Supply chain integration positively influences the performance. Internal integration focuses on teamwork, sharing and allocation of resources and appropriate channel of communication. While supplier integration enhance quality, joint product development and agility. Finally, customer integration promotes customer-centric collaboration, co-development of the products with product co-development with customers, creativity innovative ideas for new products (Njagi and Muli, 2020).

The existing literature on supply chain integration and performance in food and beverage manufacturing firms in Kenya reveals several conceptual, contextual, and methodological gaps. Conceptually, there is a lack of differentiation between the unique impacts of supplier, customer, and internal integration on firm performance, and an incomplete exploration of all integration dimensions such as technological and strategic alignment. Contextually, studies tend to focus on specific regions like Nairobi County without comprehensively addressing the entire Kenyan context, and fail to deeply contextualize industry-specific challenges. Additionally, temporal changes affecting supply chain dynamics are not adequately considered. Methodologically, most studies are cross-sectional and rely on basic statistical methods, lacking advanced analytical techniques like structural equation modeling (SEM) or panel data analysis that could provide deeper insights. Moreover, there is a need for larger, more diverse samples and a mixed methods approach to offer a holistic understanding. Addressing these gaps would enhance the comprehension of how supply chain integration influences the performance of food and beverage manufacturing firms in Kenya.

Conceptual Framework

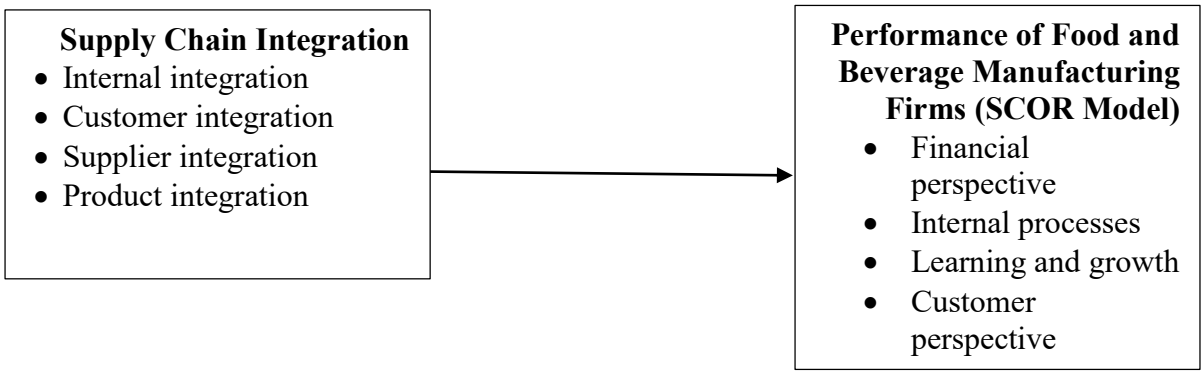

Figure 1: Conceptual Framework

METHODOLOGY

The study adopted a cross-sectional survey as it enabled the researcher to examine, often multiple characteristics at once, of a subset at a specific point in time it also provided information about the current status of a population the way they exist (Dag & Petter, 2015). The target population was senior procurement managers from 246 food and beverage manufacturing firms in Kenya. A sample size of 150 respondents was determined using Krejcie and Morgan (1970). The sample was selected using simple random sampling. Pilot study of 10% of sample size was conducted consisting 15 firms and 13 questionnaires were returned (Hair & Brunsveld, 2019). The researcher used semi-structured and self-administration questionnaires to collect primary data. 135 questionnaires were distributed but only 119 questionnaires were returned. Data analysis was done through descriptive statistics by use of mean, standard deviation, skewness and kurtosis. Inferential statistics was also done by use of correlation, regression and hypothesis testing. The data obtained was processed using SPSS version 28. Data was presented by use of tables.

RESULTS AND DISCUSSION

Descriptive Analysis of Supply Chain Integration

Table 1 indicates that 98.3% of food and beverage manufacturing firms had integrated functional department with a mean score of 4.6387 and a standard deviation of 0.5164. 88.3% agreed that integration facilitate continuous coordination and accurate data with a mean score of 4.6050 and a standard deviation of 0.5243. In addition, 98.3% agreed that integration ensures sharing information between firms and customers with a mean score of 4.5882 and a standard deviation of 0.5274. Consequently, 61.4% showed that integration facilitate customer feedback mechanism with a mean score of 3.7059 and a standard deviation of 1.1743. The finding revealed that 58% of the firms do not plan quality with suppliers with a mean score of 2.6303 and a standard deviation of 1. 0646. Similarly, 69.1% disagreed that integration improve processes through joint decision making with a mean score of 2.2689 and a standard deviation of 0.7330. 65.6% disagreed that firms had been practicing marketing mix with a mean score of 2.3277and a standard deviation of 0.7714. Finally, 58% agreed that firms keep on innovating their products with a mean score of 3.5882 and a standard deviation of 1.2172 it is clear that a major section of the respondents agreed with the statement. The findings are consistent with

Njagi and Muli (2020), internal integration focuses on teamwork, sharing and allocation of resources and appropriate channel of communication. Customer integration promotes customer-centric collaboration, co-development of the products with product co-development with customers, creativity innovative ideas for new products as a result, increased performance. However, it is clear that most firms disagree that supplier integration enhance quality, joint product development and quality planning. Similarly, the findings concurred with Ataseven & Nair, (2017) who stated that the integration between supply chain parties whether the downstream or upstream is considered very crucial to improvement of firm's performance and value addition to the network. The findings reflect the importance of functional integration, customer integration and supplier integration in determining performance of food and beverages manufacturing firms as observed by (Muricho & Muli, 2018)

Table 1: Supply Chain Integration Descriptives

Statements	SD	D	N	A	SA	Mean	Std Dev
The firm had integrated functional departments	0.0%	0.0%	1.7%	32.8%	65.5%	4.6387	.5164
Integration facilitates continuous coordination and accurate data.	0.0%	0.0%	1.7%	36.1%	62.2%	4.6050	.5243
Integration ensures sharing information with customers	0.0%	0.0%	1.7%	37.8%	60.5%	4.5882	.5274
Enables customer feedback mechanism	6.7%	7.6%	24.4%	31.1%	30.3%	3.7059	1.1743
Firm plan quality management with suppliers	6.7%	51.3%	24.4%	7.6%	10.1%	2.6303	1.0646
Improving processes through joint decision making	10.1%	59.7%	23.5%	6.7%	0.0%	2.2689	.7330
Firm had practice marketing mix	10.1%	55.5%	26.1%	8.4%	0.0%	2.3277	.7714
Firm keep on innovating its products	8.4%	9.2%	24.4%	31.1%	26.9%	3.5882	1.2172

Correlation Analysis for Supply Chain Integration

The study found that supply chain integration had a positive significant linear relationship with performance of food and beverages manufacturing firms in Kenya with a Pearson correlation coefficient of .701 at .000 level of significance. This implied that there was a strong positive relationship between supply chain integration and performance of food and beverage manufacturing firms in Kenya. The findings are consistent with Mose, Shukl and Peter (2015) findings that adoption of supply chain integration strategy enhances performance. In addition, Njagi and Muli (2020) established a positive relationship between integration practices and performance of manufacturing firms. However, the findings disagreed with those of Wambua and Kenduiwo (2021) who found that internal integration had negative and insignificant effect on performance.

Table 2: Pearson Product-Moment Correlations between Supply Chain Integration (SCI) & Performance (P)

Variable		P	SCI
Performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N		
Supply Chain Integration	Pearson Correlation	.701**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed)

Regression Analysis for Supply Chain Integration

The influence of supply chain integration on performance of Kenyan food and beverage manufacturing firms was studied by employing regression analysis. The following hypothesis was examined:

Ho_1: Supply chain integration has no significant effect on performance of Kenyan food and beverage manufacturing firms in Kenya.

The ordinary least square regression model was used. Model 1 results are shown in Table 3 Supply chain integration and performance have a positive relationship (R = .701 R2 = .491) and F (1,135) = 112.743, p = .000, according to the findings in the table below (Table 3). Supply chain integration can account for 49.1 percent of the variability in performance of food and beverage manufacturing firms in Kenya, according to an R2 of .491.

Table 3: Supply Chain Integration Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701[a]	.491	.486	.40055

Predictors: (Constant), Supply Chain Integration (SCI)

Analysis of Variance

The results showed here that F-ratio was 112.743, with a P value of.000 is < .05. This indicates that the regression model used in the investigation has a high degree of goodness of fit.

Table 4: ANOVA for Supply Chain Integration (SCI)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.088	1	18.088	112.743	.000[b]
	Residual	18.771	117	.160		
	Total	**36.859**	**118**			

Table 5 shows the significance of test results for supply chain integration and performance. The results of model 1 revealed a positive and significant relationship between supply chain integration and performance (b1 = .925, p= .000, β = .701). Performance is anticipated to grow by .925 for every unit increase in supply chain integration. The study's OLS regression model was: $Y = \alpha + \beta 1X1 + \varepsilon$.

OLS Model: Performance = .912 + 0.925 supply chain Integration.

As such, the OLS regression model that resulted was as follows:

Y =.912+ 0.925X1 + ε (1)

According to the regression findings, the predictor (supply chain integration) has a positive and significant relationship with performance of Kenyan food and beverage manufacturing firms, with β1 =.701 P-Value = .000, and t = 10.618. This showed that increasing supply chain integration will result in a .701 increase in performance for Kenyan food and beverage manufacturers. Generally, this indicates that when there is improved supply chain integration, food and beverage firms enhance performance. At the 95 percent significance level, the null hypothesis that supply chain integration had no significant effect on performance of food and beverage manufacturing firms in Kenya was rejected.

Table 5: Significance of Test Results for Supply Chain Integration (SCI)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.912	.312		2.926	.004
	Supply Chain Integration	.925	.087	.701	10.618	.000

a. Dependent Variable: Performance (P)

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The study concluded that there is a positive significant relationship between supply chain integration and performance of food and beverages manufacturing firms in Kenya. Additionally, the performance is anticipated to grow for every unit increase in supply chain integration. This indicated that when there is improved supply chain integration, food and beverage manufacturing firms enhance performance. Further, the research concluded that food and beverages manufacturing firms have practiced supply chain integration through internal integration, customer integration, supplier integration and product integration to improve their performance. Moreover, the research concluded that food and beverages manufacturing firms in Kenya had already embraced supply chain integration to enhanced performance.

Recommendations

According to the study, food and beverages manufacturing firms should adopt joint strategic sourcing and joint processing to meet the customer demand. The study further suggests that supplier knowledge management should be embraced to manage supply chain uncertainty. Knowledge transfer to promote synergy of expertise to enhance product brand of quality. Forming strategic partnership and trust to facilitate sharing of information especially in new product development. The study also recommends that food and beverages manufacturing firms should adopt integrate to facilitate cross-functional teams, constant and timely customer feedback mechanism and resource allocation.

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