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Functional integration and competitive advantage of food and beverages manufacturing firms in Kenya

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Abstract: The major aim of this study was to establish the relationship between functional integration and competitive advantage of food and beverages manufacturing firms in Kenya. The study adopted a cross-sectional survey. The target population was managers working along the supply chain from 270 food and beverage manufacturing firms in Kenya. The two-stage sampling design was employed. The first stage, cluster random sampling, obtained 73 food & beverages manufacturing firms. Second stage, convenience sampling, selected two participants from the 73 selected firms. Thus, a sample size of 146. Questionnaires were used to collect primary data using both the drop and pick and mailing methods. Secondary data was obtained through document analysis. Data were analyzed using SPSS version 28 to generate descriptive and inferential statistics. The study found that functional integration had a positive significant linear relationship with a competitive advantage. Additionally, the competitive advantage is anticipated to grow for every unit increase in functional integration. Thus, the study concludes that the parameters of functional integration are crucial in enhancing a company's competitive advantage in the food and beverage industry. Consequently, the study recommends that improvements in integrating functions internally should be strategically implemented.

Keywords: functional integration, competitive advantage, procurement integration, production integration, distribution & warehousing integration, marketing integration.

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1. Introduction

Functional integration covers different functions/operational activities within the buying, marketing and advertising, production/manufacturing, storage and distribution of companies (De Abreu & Alcântara, 2015). To provide effective customer service, it is clear that these roles need to be combined. The efficiency of the structure of collaboration between departments that are needed to achieve unity of effort by the demands of the environment has been described as functional integration (Njagi & Muli, 2020). As intrinsic to the company, this meaning relates to integration.

Most of the SCM & logistical research has explored organizational inter-functional alignment and integration, concentrating on cooperation between various departments including collaboration (Turkulainen & Ketokivi, 2012). The disjointed nature of the manufacturing sector, presents a significant challenge in relation to performance and competitive advantage (Georgise, Thoben & Seifert, 2014). Because of price shifts in products, the food and beverage subsector are the most affected manufacturing sector in the economy, resulting in high operational expenses (KNBS, 2018). Disjointed strategies and procedures, misaligned steps and benefits, and missing knowledge that does not endorse a process view of the organization can be the product of lack of progress with functional integration efforts (Wolf, 2011).

The ability of a corporation to incorporate efficiently through internal functional areas makes organizational designs that are more process-oriented. Companies structured around structures are more likely to support integration and thus constitute a SCO (Zhu, Sarkis & Lai, 2012). Only at lowest overall system expenditure, the integration of all internal functions from materials management to manufacturing, sales, and distribution is key to meeting consumer requirements (Foerstl, Schleper & Henke, 2017). Internal integration is thus characterized by complete visibility of processes through functions including procurement, marketing, production, logistics, distribution, warehousing and sales (Thornton, Esper & Autry, 2016).

Cheruiyot (2013) provided practitioners with key recommendations in his study on the effect of the integrated supply chain on performance at the Kenya Tea Development Agency to improve supply chain integration inside an enterprise, acknowledging internal, supplier as well as consumer integration as a key approach towards competitive advantage, because competition today is focused on supply chain against supply chain integration. Cheruiyot (2018) also recommended that a survey method as well as the design established and evaluated in this study can be used by academicians and educators to comprehend the existence of operational (organizational, supplier and consumer) integration system and its impact on the performance of the supply chain in organizations.

While previous studies addressed the vital function of integrating logistics and supply chains in enhancing the competitiveness of the firm (Mellat-Parast & Spillan, 2014), limited attention has been paid to the strategic significance of the competitiveness of various types of integrating the supply chain in food and beverage manufacturing firms (Ratanya, 2013; Wamalwa, 2014; Kibera & Orwa, 2015; Odongo, 2017; Njagi & Muli, 2020); especially in the Kenyan context. The most frequently held gap that still allows room for flexibility is between processes of demand formation as marketing, advertising and processes of demand fulfillment as supply chain operations (Christopher, 2017). Integrating processes of demand formation and fulfillment is often seen as the gateway to producing goods that transmit superior consumer value whilst efficiently distributing resources. Instead of concentrating on individual process optimization, exploring the interdependencies between processes can lead to market success (Williams *et al.,* 2013). Thus, the study aimed to establish the relationship between functional integration and competitive advantage of food and beverages manufacturing firms in Kenya.

2. Literature review

2.1. Functional integration

Functional integration along with the introduction of procurement activities, integration of procurement into the decision-making phase of the business has a big effect on production efficiency (Swink & Schoenherr, 2015). Nevertheless, this is also based on internal integration, whilst the production logistics process is clearly controlled by internal and external activities in another primary field of alignment (De Leeuw, Schippers & Hoogervorst, 2015). In this light, the integration of the supply

chain is required to be related to the activities and development projects carried out at the level of production (Basnet & Wisner, 2014). The context of marketing/manufacturing integration goes back to the 1970s when Shapiro first emphasized that both are areas of collaboration essential but possible conflict. The market research/manufacturing interface has further grown in significance in the following decades as the pace of change in the external business climate increased (Oliva & Watson, 2011).

The collaboration should allow the manufacturing plant to respond efficiently and cheaply to rapid changes in the market, thereby guaranteeing the customer's value creation (Peters, Hofstetter & Hoffmann, 2011). Across all internal divisions, coordination and integration is integration from incoming materials to delivery. In order to satisfy the requirements of consumers, it requires integration through divisions and functions under manufacturing control (Mackelprang, Robinson, Bernardes & Webb, 2014). This indicates that interplay in the center of functional divisions, such as production, procurement, logistics, inventory, marketing, sales and distribution, should be given more thought. SCM has been influenced by logistics as the role of handling material and knowledge flows to the degree that researchers emphasized the need to extend SCM's reach beyond logistics (Da Silva Poberschnigg, Pimenta & Hilletofth, 2020).

The strong relation in both logistics, sales and marketing would be clarified either by the roots of logistics as the physical side of distribution and therefore marketing (Otchere, Annan & Quansah, 2013) or by the positive impact of inter-functional communication on results linked to customer value and service. Empirical research on collaborations between marketing and logistics show either a significant positive (Stolze, Mollenkopf, Thornton, Brusco & Flint, 2018) or even a mediating effect on a number of measures of quantitative or qualitative results. Functional integration illustrates the degree to which an organization can collaboratively and organizedly create all its roles and procedures to satisfy the needs of customers (Richey *et. al.,* 2009). Consequently, the roles and divisions inside a manufacturer's plant work together as one cohesive and organized structure to meet the needs of customers, maximize performance and enhance competitiveness.

Systems theory offers an interpretation of functional integration within companies manufacturing food and beverages in Kenya (Rudolf, 2011). The organizational (autonomous) units controlling the different output elements embody the first concept of the theory. A critical feature of the theory of modular manufacturing is how complex structures can be separated into smaller components and evaluated separately to improve their performance and competitiveness. To this point, Helou and Caddy (2006) applied the theory of systems to the production concepts of separating the complex system into smaller systems and to the management system in order to increase the quality and effectiveness of the production process. This notes that in the current exploration, the device theory fits investigation of supply chain integration-based manufacturing.

The second premise of the theory is that there are no barriers to handling various processes and roles and, hence, the need to resolve problems in the system by careful planning. Via the excellent knowledge exchange mechanism, core components of supply chain relationship management, proper communication in the supply chain takes place. Autry & Golicic (2010) noted that manufacturing supply chains would be affected by communication problems that result in poor performance without good knowledge sharing amongst their internal functions. Puche *et al.,* (2016) emphasize that collaboration is required at both internal and external levels in the supply chain system

2.2. Competitive advantage

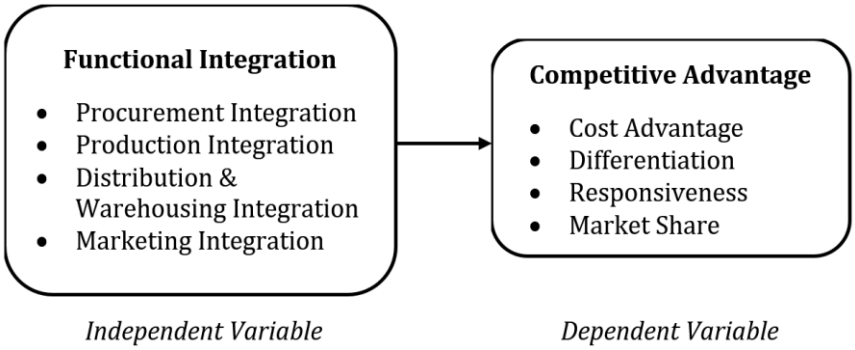
In the modern environment, supply chains concentrate on the mastery on the evolving markets including needs such as competition in providing timely goods, low prices, short life cycle as well as better quality (Avelar-Sosa, García-Alcaraz & Cedillo-Campos, 2014). More than ever, the competitive landscape of today's companies is dynamic, varied and comprehensive, making it a major concern for managers to maintain and foster sustainable competitive advantage (Gunasekaran, Subramanian & Papadopoulos, 2017). The achievement of a competitive advantage helps a company to build a defensible position over its rivals. It also helps companies to separate themselves from rivals. It is difficult for businesses to sustain a competitive edge across a significant amount of time in today's evolving global market environment (Mellat-Parast & Spillan, 2014).

The importance of cost reduction in logistics for cost leadership capacity and the need for strict quality control on logistics operations for quality enhancement at the company level (Sakchutchawan,

Hong, Callaway & Kunnathur, 2011). Companies with expertise, practices and/or information that help them differentiate the value they deliver to their customers from that delivered by their rivals have the opportunity to build a competitive advantage and superior results for the company (Sandberg & Abrahamsson, 2011). Enhanced integration will contribute to improved customer experience, performance in logistics, and overall company performance (Liu & Luo, 2012). Businesses take production capabilities as a source of their competitive advantages in the form of cost, quality, and time (Vanpoucke, Vereecke & Wetzels, 2014). To gain a competitive edge, the business needs to respond to rivals with better customers. Some businesses that are attentive to consumer needs as well as want to have a competitive edge, thus the supply chain would compete with many other supply chains in the coming years (Chen, 2019). Munizu, Pono and Alam (2019), showed that overall businesses needed much more time than the leading manufacturers to respond to changes in consumer demand.

Hypothesis: $\boldsymbol{H_{o1}}$*: Functional integration has no significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

2.3. Conceptual framework



3. Methodology

The research followed a cross-section survey design. Kothari (2017) noted that a cross-sectional survey design assists in formulating hypotheses and testing the relationship analysis among study variables. The choice of this design is suitable for this study since it makes use of a questionnaire as a data collection tool. The population of this study was 270 food and beverage manufacturing firms in Kenya (KAM, 2020). The sampling frame for this study was a list of managers working in operations, logistics and supply chain functions. Two-stage sampling was used by the study. In the first stage, cluster random sampling was used to select 73 food and beverages manufacturing firms from a list of 270 companies with the aid of the Nassiuma formula (2000).

In the second stage, convenience sampling was used to select two participants from each of the participating organization. Thus, the sample size of the study was 146 respondents from 73 food and beverage manufacturing firms in Kenya. Primary data was obtained by means of research questionnaires. For secondary data collection, the study utilized document analysis. Data collection was carried out using the drop and pick method as well as mailing questionnaires. Quantitative data collected was analyzed by using SPSS version 28 to calculate the response rate using descriptive statistics including frequencies, percentages, mean, and standard deviation. Qualitative data analysis was conducted using content analysis (computer-aided). Inferential analysis focusing on correlation analysis, and regression analysis were done. The results were summarized in this analysis using tables.

4. Results

4.1. Competitive advantage findings

The study sought to examine the effect of functional integration on the competitive advantage of food and beverages manufacturing firms in Kenya. According to Margaret (2017), the Likert scale of mean ($\bar{x}$ =4.2 to 5 Strongly Agree; 3.4 to 4.2 Agree; 2.6 to 3.4 Undecided; 1.8 to 2.6 Disagree; and 1 to 1.8 Strongly Disagree) was used. The findings are presented descriptively focusing on means and standard

deviations. Competitive advantage was measured by the following constructs; Cost Advantage, Differentiation, Responsiveness and Market Share. The means and standard deviations are depicted in the descriptive findings of competitive advantage in table 1. On cost advantage, the findings illustrated that majority of food and beverages manufacturing firms did not balance between operational cost and product and service quality ($\bar{x}$ = 2.355, σ = .4803). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, the importance of cost reduction in supply chains for cost leadership capacity and the need for strict quality control on operations for quality enhancement at the company level (Sakchutchawan *et al.,* 2011).

Further, the study found out that majority of food and beverages manufacturing firms did not facilitate the coordination and alignment of organizational processes ($\bar{x}$ = 2.232, σ = .4236). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, agility, ability to adapt, and coordination characterized best-value supply chains have been theorized as a vital means for businesses to achieve a competitive advantage which is sustainable as well as superior company efficiency (Otchere, Annan & Anin, 2013). Moreover, Mutunga & Minja (2014), noted that there are multiple ways for a firm to acquire a cost advantage: by adopting a different or more efficient way to design, distribute, or market a product, or by redesigning the value chain through adopting a unique or more competitive way of designing, distribute, or sell a product by food and beverage manufacturers.

On differentiation, the findings illustrated that majority of food and beverages manufacturing firms have improved the quality of its products ($\bar{x}$ = 3.512, σ = .4648). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. The findings are in concurrence with those of Vanpoucke, Vereecke and Wetzels, 2014), who stated that businesses take production capabilities as a source of their competitive advantages in the form of cost, quality, and time.

In addition, the study found out that majority of food and beverages manufacturing firms have not differentiated prices to broaden their market share ($\bar{x}$ = 2.239, σ = .4281). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. Further, the study established that majority of food and beverages manufacturing firms do not have a differentiated service niche customer with premium price products ($\bar{x}$ = 2.217, σ = .4139). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, Curzi and Olper (2012), stated that differentiated products enhance the performance and competitiveness of a food and beverage manufacturing firm.

On responsiveness, the findings illustrated that majority of food and beverages manufacturing firms improved responsiveness ($\bar{x}$ = 3.688, σ = .5895). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. The findings concur with those of Leuschner, Rogers, and Charvet (2013), who indicated that the responsiveness of a company's supply network will boost the company's ability to quickly launch new products and functionality in the industry (i.e., compete on the basis of product creativity and lead times), as well as boost the company's ability to deliver on time (i.e., increase its delivery reliability).

In addition, the study found out that majority of food and beverages manufacturing firms developed responsiveness strategies to improve on volume flexibility ($\bar{x}$ = 3.841, σ = .7569). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. Further, the study established that majority of food and beverages manufacturing firms improved delivery schedules to achieve efficient customer response ($\bar{x}$ = 3.638, σ = .8099). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. The findings are in agreement with those of Vanathi and Swamynathan (2014), who indicated that, in terms of time and efficiency, a supply chain characterized by rapid customer responsiveness would be competitive.

Table 1: Competitive advantage descriptive statistics

Statements	Mean	Std. Deviation
Our firm balances between operational cost and product and service quality.	2.355	.4803
Our firm facilitates the coordination and alignment of organizational processes.	2.232	.4236
Our firm has improved the quality of its products.	3.512	.4648
Our firm has differentiated prices to broaden our market share.	2.239	.4281
Our firm has a differentiated service niche customer with premium price products.	2.217	.4139
Our firm improved responsiveness.	3.688	.5895
Our firm developed responsiveness strategies to improve on volume flexibility.	3.841	.7569
Our firm improved delivery schedules to achieve efficient customer response.	3.638	.8099

4.2. Descriptive findings for functional integration

Functional integration was measured by the following constructs; Procurement Integration, Production Integration, Distribution & Warehousing Integration and Marketing Integration. The means and standard deviations are depicted in the descriptive findings of functional integration in table 2. On procurement integration, findings show that majority of food and beverages manufacturing firms increased involvement of professionals in procurement joint decision making ($\bar{x}$ = 4.000, σ = .5795). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. Therefore, manufacturing companies must find a way to engage the professionals in the user departments in order to increase purchasing efficiency while reducing overall costs (Mishra, Devaraj & Vaidyanathan, 2013). The involvement of budget owners or user departments is the most important, and thus they are the most important stakeholders. Besides, upper management participation is always seeking visibility; procurement's role is more than just negotiating cost saving; it is the CPO's (Chief Procurement Officer) responsibility to ensure that management recognizes the value rendered by procurement. More importantly, the value must be expressed in monetary terms.

In addition, the study found observed that procurement integration did not enable majority of food and beverages manufacturing firms to reduce the ordering cycle time ($\bar{x}$ = 2.225, σ = .8373). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, reduced purchase order cycle time is a critical step more and more towards strategic procurement (Jha, Thakkar & Thanki, 2020). One of most effective way to streamline procurement activities is to incorporate a well-thought-out purchase order cycle into your purchasing processes, one which allows firms to plan for expenditures and spending plan for operating costs (Boström & Karlsson, 2013). Reduced purchase order cycle time is an essential step in streamlining procurement processes and optimizing inventory control. Continuing to improve internal systems will help to reduce cycle time. Purchase order cycle time is often a performance indicator that can be used to assess the efficiency of your procurement function and inventory control activities, allowing you to identify reducing waste prospects and reduced costs.

Further, the findings illustrated that majority of food and beverages manufacturing firms did not reduce data asymmetries thus not providing the firms with optimal value ($\bar{x}$ = 1.732, σ = .7973). Given the five-point scale Likert mean of less than ($\bar{x}$ = 1.8) and an average standard deviation, it is clear that a major section of the respondents disagreed strongly with this statement. However, the effects of information asymmetry are greater for firms with high growth potential. Many corporate decisions, it is generally argued, are influenced by the existence of information asymmetry between firm managers and their shareholders. Finally, Swink and Schoenherr (2015), poised that integration of procurement into the decision-making phase of the business has a big effect on production efficiency.

On production integration, findings show that majority of the food and beverages manufacturing firms improved the level of coordination across organizational processes and activities ($\bar{x}$ = 3.841, σ = .6861). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, a major section of the respondents agreed with this statement. Therefore, coordination among various production and manufacturing processes and activities aids in enhancing performance of the supply chain (Singh, 2015). Moreover, failure to coordinate, on the other hand, generally results in inaccurate forecasts, low consumption capacity, high levels of inventory, as well as customer dissatisfaction (Kagira, Kimani & Githii, 2012).

Further, the study established that majority of the food and beverages manufacturing firms prevented unforeseen problems and streamlined communication with internal stakeholders ($\bar{x}$ = 2.058, σ = .7425). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, the significance of correspondence with internal stakeholders as well as external stakeholders cannot be overstated. It is necessary to turn around inadequate communication and ensure supply chain success by taking the right steps and making the necessary changes. Therefore, in order to satisfy the requirements of consumers, it requires integration through divisions and functions under manufacturing control (Mackelprang *et al.,* 2014).

On distribution and warehousing integration, the findings illustrated that majority of food and beverages manufacturing firm's distribution and warehousing operations are centrally planned ($\bar{x}$ = 3.775, σ = .8373). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that major section of the respondents agreed with the statement. Therefore, companies frequently struggle to integrate, plan and coordinate the entire product-flow interface within and between supply chain participants (Yi, 2013). To deal with such complexities, all supply chain partners must work together to create a unified system and coordinate their efforts (Wanjari, 2020). Amongst the most difficult aspects of distribution as well as warehousing integration is developing the system amongst these various companies involved in the complex product-flow channel.

In addition, the study established that majority of food and beverages manufacturing firm's distribution and warehousing activities are guided by the layout design and flow of operations ($\bar{x}$ = 3.659, σ = .6993). Given the five-point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. In the modern era, only several warehouses are primarily storage facilities, and that the last thing firms want is to just have to expand their facilities or outsource certain activities due to inadequate design requirements (Wanjari, 2020). Designing a functional warehouse layout is a critical process because it has a significant effect on a company's warehouse's efficiency and productivity.

Further, the study established that majority of food and beverages manufacturing firm's distribution and warehousing network is not designed to allow for fast pick-to-ship cycle times ($\bar{x}$ = 1.768, σ = .7178). Given the five-point scale Likert mean of less than ($\bar{x}$ = 1.8) and an average standard deviation, it is clear that a major section of the respondents strongly disagreed with the statement. However, the network layout must organize the operations in a logical sequence to help streamline operational activities, increase productivity, and cut costs (Kalaitzidou *et al.,* 2014). Additionally, a well-executed layout design of a network can improve order fulfillment rates by allowing easy access to stored goods, reducing travel time. While meeting deadlines is crucial in logistics, so is controlling costs and delivering quality; timely delivery, well-organized storage and inventory control, quick and precise picking and packaging, and dispatch of the right goods to the right place at the right time are all essential components of an efficient and competitive supply chain (Stolze *et al.,* 2018).

On marketing integration, the findings show that for majority of food and beverages manufacturing firms, marketing integration does not enhance faster penetration of new products to the market ($\bar{x}$ = 2.174, σ = .7341). Given the five-point scale Likert mean of less than ($\bar{x}$ = 2.6) and an average standard deviation, it is clear that a major section of the respondents disagreed with the statement. However, it takes time and planning to develop and market a new product (Jemaiyo, 2013). Several team members may be working in parallel to meet an aggressive deadline. Coordination of efforts necessitates the use of an effective liaison to ensure that supplies are ordered and delivered in time for use in production activities.

Moreover, the study found out that majority of the food and beverages manufacturing firms build rapport with customers and improved their firm's brand visibility ($\bar{x}$ = 4.123, σ = .8056). Given the five-

point scale Likert mean of more than ($\bar{x}$ = 3.4) and an average standard deviation, it is clear that a major section of the respondents agreed with the statement. Therefore, integrating supply chain visibility has now become smoother simply because information regarding products is passed around the world, which is more a matter of priorities and investment, which is not the case when sharing published information concerning customers (Hossain *et al.,* 2020). Manufacturing companies recognized that if it continues on its current path of global expansion, it would need to find new ways to survive in this competitive environment, including increasing supply chain visibility through the information sharing and data to monitor, supervise, as well as merge the crucial component of their own industry (Bauer *et al.,* 2020). In order to competitively maintain an end consumer and industry viewpoint across the businesses even within the entire network of the supply chain, company-level marketing tactics need to be "infused" into intra-organizational existing systems (Murillo-Oviedo *et al.,* 2019).

Table 2: Functional integration descriptive statistics

Statements	Mean	Std. Deviation
Our firm increased involvement of professionals in procurement joint decision making.	4.000	.5795
Procurement integration enabled our firm to reduce the ordering cycle time.	2.225	.8373
Our firm reduced data asymmetries thus providing the firm with optimal value.	1.732	.7973
Our firm improved the level of coordination across organizational processes and activities.	3.841	.6861
Our firm prevented unforeseen problems and streamlined communication with internal stakeholders.	2.058	.7425
Our firm's distribution and warehousing operations are centrally planned.	3.775	.8373
Our firm's distribution and warehousing activities are guided by the layout design and flow of operations.	3.659	.6993
Our firm's distribution and warehousing network is designed to allow for fast pick-to-ship cycle times.	1.768	.7178
Marketing integration enhances faster penetration of new products to the market.	2.174	.7341
Our firm build rapport with customers and improved our firm's brand visibility.	4.123	.8056

4.3. Correlation analysis for functional integration

The study found that functional integration had a positive significant linear relationship with competitive advantage of food and beverages manufacturing firms in Kenya with a Pearson correlation coefficient of .626 at .01 level of significance. This implied that there was a positive correlation between functional integration and competitive advantage of food and beverages manufacturing firms in Kenya. The findings are inconsistent with those of Otchere, Annan and Anin (2013), who established a negative relationship between internal integration and competitive advantage. However, the findings are also consistent with those of Sukati *et al.* (2012), who established a positive relationship between internal firm integration and competitive advantage.

Table 3: Pearson product-moment correlations between functional integration (FI) & competitive advantage (CA)

Variable		CA	FI
CA	Pearson Correlation	1	
	Sig. (2-tailed)		
FI	Pearson Correlation	.626**	1
	Sig. (2-tailed)	.000	

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

4.4. Regression analysis for functional integration

The ordinary least square regression model was used. Model 1 results are shown in Table 4. Functional integration and competitive advantage have a positive relationship (R = .626, R^2 = .392) and F (1,137) = 71.665, p = .000, according to the findings in the table below (Table 4). Functional integration can account for 26.5 percent of the variability in the competitive advantage of food and beverage manufacturing firms in Kenya, according to an R^2 change of .265.

Table 4: Model summary for functional integration (FI)

					Change Statistics				
Model	**R**	**R2**	**Adjusted R Square**	**Std. Error of the Estimate**	**R2 Change**	**F Change**	**Df1**	**Df2**	**Sig. F Change**
1	.626a	.392	.379	.394	.265	71.665	1a	137	.000

a. Predictor (Constant), FI

4.5. ANOVA

The results showed here that F-ratio was 71.665, 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 5: ANOVA for Functional Integration (FI)

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	16.988	1	16.988	71.665	.000a
	Residual	67.304	137	.476		
	Total	84.292	138			

a. Predictors: (Constant), FI
b. Dependent Variable: CA

Table 6 shows the significance of test results for functional integration and competitive advantage. The results of model 1 revealed a positive and significant relationship between functional integration and competitive advantage (b1 = .617, p = .003, β = .626). Competitive advantage is anticipated to grow by .617 for every unit increase in functional integration. The study's OLS regression model was: $Y = \alpha + \beta_1 X_1 + \varepsilon$.

OLS Model: Competitive Advantage = 2.234 + 0.617 Functional Integration.

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

$$Y = 2.234 + 0.617X_1 + \varepsilon \quad (1)$$

According to the regression findings, the predictor (functional integration) has a positive and significant relationship with competitive advantage of Kenyan food and beverage manufacturing enterprises, with β_1 =.626, P-Value = .003, and t = 8.411. This showed that increasing functional integration will result in a .626 increase in competitive advantage for Kenyan food and beverage manufacturers. Generally, this indicates that when there is improved functional integration, food and beverage production companies gain a competitive advantage. At the 95 percent significance level, the null hypothesis that functional integration had no significant effect on competitive advantage of Kenyan food and beverage manufacturing firms was rejected.

Table 6: Significance of test results for functional integration

Model		**Unstandardized Coefficients**		**Standardized Coefficients**		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	2.234	.250		8.809	.000
	Functional Integration	.617	.071	.626	8.411	.003

a. Dependent Variable: Competitive Advantage

5. Conclusions

The study concluded that there is a positive significant relationship between functional integration and competitive advantage of food and beverages manufacturing firms in Kenya. Additionally, the competitive advantage is anticipated to grow for every unit increase in functional integration. This indicated that when there is improved functional integration, food and beverage production companies gain a competitive advantage. Further, the study concluded that food and beverages manufacturing firms have integrated internally through procurement integration, production integration, distribution and warehousing integration, and marketing integration to improve their competitiveness. Moreover, the study concluded that food and beverages manufacturers in Kenya had already adopted functional integration for achieving improved organizational performance and enhanced competitiveness.

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Conflicts of interest/Competing interests

Not applicable

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References

Avelar-Sosa, L., García-Alcaraz, J. L., & Cedillo-Campos, M. G. (2014). Techniques and attributes used in the supply chain performance measurement: tendencies. In *Lean Manufacturing in the Developing World* (517- Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017) (541). Springer, Cham.

Bauer, F., Rothermel, M., Tarba, S. Y., Arslan, A., & Uzelac, B. (2020). Marketing integration decisions, intermediate goals and market expansion in horizontal acquisitions: how marketing fit moderates the relationships on intermediate goals. *British Journal of Management*, *31*(4), 896-917.

Boström, M., & Karlsson, M. (2013). Responsible procurement, complex product chains and the integration of vertical and horizontal governance. *Environmental Policy and Governance*, *23*(6), 381-394.

Chen, C. J. (2019). Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage. *Management Decision*. 57(7), 1511-1534.

Cheruiyot, F. C. (2018). *The Effect of supply chain integration on operational performance of manufacturing organizations in Kenya* (Doctoral dissertation, Strathmore University).

Cheruiyot, K. P. (2013). Impact of integrated supply chain on performance at Kenya Tea Development Agency. *International Journal of Social Sciences and Entrepreneurship*, *1*(5), 194-203.

Curzi, D., & Olper, A. (2012). Export behavior of Italian food firms: Does product quality matter? *Food Policy*, *37*(5), 493-503.

Da Silva Poberschnigg, T. F., Pimenta, M. L., & Hilletofth, P. (2020). How can cross-functional integration support the development of resilience capabilities? The case of collaboration in the automotive industry. *Supply Chain Management: An International Journal*. *25(6),* 789-801.

De Abreu, A., & Alcântara, R. L. C. (2015). Supply chain managers: Professional profile and the role in the cross-functional integration of supply chain management. *Independent journal of management & production*, *6*(1), 44-63.

De Leeuw, S., Schippers, M. C., & Hoogervorst, S. J. (2015). The fresh connection: Cross-functional integration in supply chain management. In *The handbook of behavioral operations management: Social and psychological dynamics in production and service settings*. Oxford University Press.

Foerstl, K., Schleper, M. C., & Henke, M. (2017). Purchasing and supply management: From efficiency to effectiveness in an integrated supply chain. *Journal of Purchasing and Supply Management*, *23*(4).

Georgise, F. B., Thoben, K. D., & Seifert, M. (2014). Supply chain integration in the manufacturing firms in developing country: An Ethiopian case study. *Journal of Industrial Engineering*, *2014*.

Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017). Information technology for competitive advantage within logistics and supply chains: A review. *Transportation Research Part E: Logistics and Transportation Review*, *99*, 14-33.

Hossain, T. M. T., Akter, S., Kattiyapornpong, U., & Dwivedi, Y. (2020). Reconceptualizing integration quality dynamics for omnichannel marketing. *Industrial Marketing Management*, *87*, 225-241.

Jemaiyo, B. (2013). An assessment of the effectiveness of marketing strategies adopted by sugar manufacturing companies in Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, *4*(3), 350-357.

Jha, K. K., Thakkar, J. J., & Thanki, S. J. (2020). Cycle time reduction in outsourcing process: case of an Indian aerospace industry. *The International Journal of Advanced Manufacturing Technology*, *106*(9), 4355-4373.

Kagira, E. K., Kimani, S. W., & Githii, K. S. (2012). Sustainable methods of addressing challenges facing small holder tea sector in Kenya: A supply chain management approach. *J. Mgmt. & Sustainability*, *2*, 75.

Kalaitzidou, M. A., Longinidis, P., Tsiakis, P., & Georgiadis, M. C. (2014). Optimal design of multiechelon supply chain networks with generalized production and warehousing nodes. *Industrial & Engineering Chemistry Research*, *53*(33), 13125-13138.

Kenya National Bureau of Statistics (2018). *Economic Survey.* Nairobi. Kenya. Government Printer

Kibera, L. W., & Orwa, B. (2015). Implementation of Integrated Supply Chain in Manufacturing Companies Kenya: A Case of Bidco Oil Refineries. *International Journal of Education and research*, *4*(3), 11-32.

Kothari, C. (2017). research methodology methods and techniques by CR Kothari. *Published by New Age International (P) Ltd., Publishers*, *91*.

Leuschner, R., Rogers, D. S., & Charvet, F. F. (2013). A meta-analysis of supply chain integration and firm performance. *Journal of Supply Chain Management*, *49*(2), 34-57.

Liu, L., & Luo, D. (2012). Effects of logistics capabilities on performance in manufacturing firms. *Contemporary Logistics*, (9), 8.

Mackelprang, A. W., Robinson, J. L., Bernardes, E., & Webb, G. S. (2014). The relationship between strategic supply chain integration and performance: a meta-analytic evaluation and implications for supply chain management research. *Journal of Business Logistics*, *35*(1), 71-96.

Mackelprang, A. W., Robinson, J. L., Bernardes, E., & Webb, G. S. (2014). The relationship between strategic supply chain integration and performance: a meta-analytic evaluation and implications for supply chain management research. *Journal of Business Logistics*, *35*(1), 71-96.

Mellat-Parast, M., & Spillan, J. E. (2014). Logistics and supply chain process integration as a source of competitive advantage. *The International Journal of Logistics Management*. *25*(2), 289-314.

Mishra, A. N., Devaraj, S., & Vaidyanathan, G. (2013). Capability hierarchy in electronic procurement and procurement process performance: An empirical analysis. *Journal of Operations Management*, *31*(6), 376-390.

Munizu, M., Pono, M., & Alam, S. (2019). The Impact of Information Technology Application on Supply Chain Integration and Competitive Advantage: Indonesian Fishery Industry Context. *Quality-Access to Success*, *20*(169).

Murillo-Oviedo, A. B., Pimenta, M. L., Hilletofth, P., & Reitsma, E. (2019). Achieving Market Orientation Through Cross-Functional Integration. *Operations and Supply Chain Management*, *12*(3), 175-185.

Mutunga, S. L., & Minja, D. (2014). Generic strategies employed by food and beverage firms in Kenya and their effects on sustainable competitive advantage. *International Journal of Business and Management Review*, *2*(6), 1-15.

Njagi, J. M., & Muli, S. M. (2020). Influence of Supply Chain Integration Practices on the Performance of Manufacturing Firms in Kenya a Case of Kenya Breweries Limited. *International Journal of Business and Social Research*, *10*(1), 35-57.

Oliva, R., & Watson, N. (2011). Cross-functional alignment in supply chain planning: A case study of sales and operations planning. *Journal of Operations Management*, *29*(5), 434-448.

Otchere, A. F., Annan, J., & Anin, E. K. (2013). Achieving competitive advantage through supply chain integration in the cocoa industry: A case study of Olam Ghana limited and produce buying company limited. *International Journal of Business and Social Research (IJBSR)*, *3*(2), 131-145.

Otchere, A. F., Annan, J., & Quansah, E. (2013). Assessing the challenges and implementation of supply chain integration in the cocoa industry: A factor of cocoa farmers in Ashanti region of Ghana. *International Journal of Business and Social Science*, *4*(5).

Peters, N. J., Hofstetter, J. S., & Hoffmann, V. H. (2011). Institutional entrepreneurship capabilities for interorganizational sustainable supply chain strategies. *The International Journal of Logistics Management*. 22(1), 52-86.

Ratanya, E. K. (2013). *E-procurement implementation and supply chain integration among large scale manufacturing firms in Nairobi, Kenya* (Doctoral dissertation, University of Nairobi).

Richey, R. G., Chen, H., Upreti, R., Fawcett, S. E., & Adams, F. G. (2009). The moderating role of barriers on the relationship between drivers to supply chain integration and firm performance. *International Journal of Physical Distribution & Logistics Management*. 39(10), 826-840.

Sakchutchawan, S., Hong, P. C., Callaway, S. K., & Kunnathur, A. (2011). Innovation and competitive advantage: model and implementation for global logistics. *International Business Research*, *4*(3), 10.

Sandberg, E., & Abrahamsson, M. (2011). Logistics capabilities for sustainable competitive advantage. *International Journal of Logistics Research and Applications*, *14*(1), 61-75.

Singh, R. K. (2015). Modelling of critical factors for responsiveness in supply chain. *Journal of Manufacturing Technology Management*. 26(6), 868-888.

Stolze, H. J., Mollenkopf, D. A., Thornton, L., Brusco, M. J., & Flint, D. J. (2018). Supply chain and marketing integration: tension in frontline social networks. *Journal of Supply Chain Management*, *54*(3), 3-21.

Stolze, H. J., Mollenkopf, D. A., Thornton, L., Brusco, M. J., & Flint, D. J. (2018). Supply chain and marketing integration: tension in frontline social networks. *Journal of Supply Chain Management*, *54*(3), 3-21.

Sukati, I., Hamid, A. B. A., Baharun, R., Alifiah, M. N., & Anuar, M. A. (2012). Competitive advantage through supply chain responsiveness and supply chain integration. *International Journal of Business and Commerce*, *1*(7), 1-11.

Swink, M., & Schoenherr, T. (2015). The effects of cross-functional integration on profitability, process efficiency, and asset productivity. *Journal of Business Logistics*, *36*(1), 69-87.

Swink, M., & Schoenherr, T. (2015). The effects of cross-functional integration on profitability, process efficiency, and asset productivity. *Journal of Business Logistics*, *36*(1), 69-87.

Thornton, L. M., Esper, T. L., & Autry, C. W. (2016). Leader or lobbyist? How organizational politics and top supply chain manager political skill impacts supply chain orientation and internal integration. *Journal of Supply Chain Management*, *52*(4), 42-62.

Turkulainen, V., & Ketokivi, M. (2012). Cross-functional integration and performance: what are the real benefits? *International Journal of Operations & Production Management*. 32(4), 447-467.

Vanathi, R., & Swamynathan, R. (2014). Competitive advantage through supply chain collaboration–an empirical study of the Indian textile industry. *Fibres & Textiles in Eastern Europe*. 4(106), 8-13.

Vanpoucke, E., Vereecke, A., & Wetzels, M. (2014). Developing supplier integration capabilities for sustainable competitive advantage: A dynamic capabilities approach. *Journal of operations management*, *32*(7-8), 446-461.

Wamalwa, B. P. (2014). Sustainable supply chain management as a strategic tool for competitive advantage in tea industry in Kenya. *J. Mgmt. & Sustainability*, *4*, 157.

Wanjari, S. S. (2020). Investigating warehousing operations from an integrated supply-chain and transportation approach. *European Journal of Business and Management Research*, *5*(5).

Wolf, J. (2011). Sustainable supply chain management integration: a qualitative analysis of the German manufacturing industry. *Journal of Business Ethics*, *102*(2), 221-235.

Yi, G. (2013). Research on warehousing and distribution integration of electronic commerce network platform. In *2013 6th International Conference on Information Management, Innovation Management and Industrial Engineering* (Vol. 1, pp. 185-188). IEEE.

Zhu, Q., Sarkis, J., & Lai, K. H. (2012). Examining the effects of green supply chain management practices and their mediations on performance improvements. *International journal of production research*, 50(5), 1377-1394.

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