Abstract: This paper explored the role played by supply chain configuration on the performance of manufacturing sector in Kenya. Kenya’s manufacturing sector has come a long way in contributing to the country’s economic growth and development. However, the past decade has not been favourable for the sector, as it has recorded a significant decline in performance and growth characterized by loss-making, and declining production. With supply chain taking a huge portion of the industry’s operations, it raises the question on the extent to which supply chain of the manufacturing firms in Kenya has been aligned to suit the interests of suppliers, service providers, and customers as the key stakeholders in the supply chain process. The paper was anchored on the Supply Chain Operations Reference (SCOR) model which describes the essence of organizations to map, measure, and optimize their supply chain processes. Informed by a descriptive research design, primary data was collected from 160 manufacturing firms in Kenya using a questionnaire. Descriptive and inferential statistics were used to analyse the data. The findings revealed that supply chain configuration was significant in determining the performance of the manufacturing industry in Kenya. The findings revealed that configuring supply chain through promoting relationship with customers and suppliers played a significant role in reducing the costs of operations, enhancing quality and productivity thus enhancing profitability of manufacturing firms. A recommendation is therefore drawn that for the Kenya’s manufacturing sector to regain its strength and performance, there is need for the management to put more emphasis on supply chain processes by instigating strategies that enhance configuration of the supply chain network.

Keywords: supply chain configuration; manufacturing sector; firm performance

I. Introduction

The modern industry characterised by a surge in the fourth industrial revolution (industry 4.0) where technology and information are essential drivers of efficiency and effectiveness, companies are finding it more demanding to be competitive (van der Westhuizen & Niemann, 2022). Ordinary organizational processes that previously would require ordinary solutions and capabilities, are now more complex and drive the centre of competition (Tenorio et al., 2021). One of these processes is the supply chain process. While in yesteryears supply chain comprised of ordinary movement of goods and services, currently supply chain has taken the best part of the organizational processes and drives the nerve-centre for competition in most organizations (Bolton & Dwyer, 2017; Aslam et al., 2023).

As defined by Zimon et al. (2020), supply chain is a network comprising of interconnected entities, organizations, activities, resources, and technologies. These components are involved in the production, distribution, and delivery of goods or services to the end consumer. It encompasses the entire process from raw material acquisition to the final product reaching the customer’s hands, and most importantly, exchange and flow of information across the entire network (Srivastava et al., 2017). As a network, it implies that the effectiveness of supply chain depends upon the ability of the key players to work together and
have a common goal. Achieving this unified approach of operation, it will require configuration of goals and procedures. This is what is referred to as supply chain configuration (Norrman & Naslund, 2019; Salam & Bajaba, 2022).

Wilujeng et al. (2022) define Supply Chain Configuration as the systematic development of a cohesive framework that integrates and harmonizes a company's supply chain operations and key players in the supply chain network. The aim is to unite key stakeholders, including customers, employees, and suppliers, to foster an effective and efficient supply chain. According to Narayanan and Ishfaq (2022), supply chain configuration involves ensuring that all stages of the supply chain, from suppliers to end customers, are coordinated and synchronized to optimize overall performance and achieve mutual benefits for all stakeholders involved. This ensures that there is a more strategic collaboration with the supply chain stakeholders including suppliers, manufacturers, distributors, and retailers, to share information and coordinate activities effectively. According to Mahapatra et al. (2019), configuring supply chain incorporates putting in place key measures that ensure the synchronization of demand of the final products and the supply of the raw materials thus initiating and maintaining a seamless supply chain process that is customer-oriented.

Performance of the manufacturing sector in Kenya has been recognized as the main route towards a self-sustaining economy that is not over-reliant of the external market to thrive (Lukhoba & Muturi, 2015). With the benefit of essential minerals and raw materials as well as a technically vibrant human capital, Kenya's manufacturing sector has a huge potential in being the country’s economic backbone (Cheptum, 2019). The key indicators of the performance of the sector such as production capacity, ratio of imports to exports volume, quality of the products and lead time among others have been marginally met in the sector (Gachanja et al., 2020). According to Gligor et al. (2020), the modern manufacturing industry (industry 4.0) has shifted from the sole focus on production processes, and now it is bringing other key approaches that make the sector more competitive. These approaches include customer-centred focus and supplier-based strength, and at the centre of these approaches is information and technology (Kitainge et al., 2019). To steer the sectors’ performance, therefore, aligning these approaches is paramount. Bolton and Dwyer (2017) allude that supply chain configuration in the context of manufacturing sector entails building a flexible, adaptable and seamless supply chain network where the key players in the network have access and share the same information for the purpose of planning ahead and developing a more collaborative operating approach.

1.2 Statement of the Problem

Based on the Kenya’s economic survey by the Kenya National Bureau of Statistics, it is evident that the manufacturing sector in Kenya has not been vibrant in terms of performance and expansion for the past decade. Under Kenya’s vision 2030, the manufacturing sector is expected to contribute to over 20% of the country’s Gross Domestic Product (GDP). Six years now to 2030, the sector only contributes to 11% of the GDP, which raises the doubt on whether the sector will achieve the vision. Moreover, the past 10 years have seen an increase in the number of manufacturing companies falling from grace, despite the increase in the demand for the products they manufacture. Taking sugar for instance, its consumption increased from 772,731 metric tonnes in 2010 to 1,831,055 metric tonnes in 2022, while at the same period, the country’s largest sugar millers (Mumias Sugar Company and Nzoia Sugar) were in the verge of collapsing. Similarly, cement consumption grew from 1.6 metric tonnes in 2005 to 9.2 million metric tonnes in 2021, while in the same period, Athi River Mining and East Africa Portland- country’s largest cement manufacturing companies were steadily declining in terms of production and profitability (KNBS, 2022). This raises the question on what could be ailing the Kenya’s manufacturing sector. A report by the OECD (2019) revealed that supply chain processes accounted to over 60% of the costs
incurred by the manufacturing sector. On the other hand, Brockhaus et al. (2016) noted that the efficiency and effectiveness of the supply chain processes had more than 54% probability of enhancing the performance of manufacturing industry. Empirically, van der Westhuizen and Niemann (2022); Wilujeng et al. (2022); Selviaridis and Spring (2018); Mikalef et al. (2022) have established that supply chain configuration is a significant driver of organizational performance through enhancing the seamless supply chain process by integrating the customers, suppliers and service providers in a synchronized supply chain framework.

However, it remains unclear on whether the Kenya’s manufacturing companies have embraced supply chain alignment and how this could affect their performance, hence this study sought to examine the role played by supply chain alignment on the performance of manufacturing sector in Kenya.

II. Review of Literature

2.1 Theoretical Review

The paper is anchored on the Supply Chain Operations Reference (SCOR) mode. The model was put forward by the Supply Chain Council, and it is one of the comprehensive frameworks for managing and improving processes performance in supply chains. The SCOR model integrates strategic concepts such as business process re-engineering, operations, and process measurement into a cross-functional framework of modern businesses’ supply chain network (Quang & Castro, 2017). This framework comprises standardized process descriptions, a network of relationships among these standardized processes, metrics for measuring process performance, best-in-class practices for managing loading and routing, and configuration with skill and knowledge requirements. The SCOR model defines four main processes in the supply chain network which include the source, production, distribution, and the planning.

The processes determine the effectiveness of the supply chain and how instrumental it becomes in enhancing firm performance (Osterlund & Loven, 2015). The SCOR model upholds the need for integrating these four components of the supply chain process in order to streamline the flow of goods and services and ensure superior firm performance (Clark et al., 2011). According to Gattorna (2016), to have supply chain processes that are attributable to the organizational performance, there is need for a deliberate and strategic integration through enhanced communication and information flow. The model supports the essence of integrating the supply chain network towards having a seamless, flexible and adaptable supply chain process that significantly contribute to firm performance. The model is therefore utilized in this paper to expound on the need for supply chain configuration in enhancing the performance of the manufacturing sector in Kenya.

2.2 Conceptual Framework

The following was the conceptual model for the study. It is hypothesized that embracing supply chain configuration through managing relationships with customers and suppliers and integrated operations and processes, the manufacturing firms will record superior performance where lead time will be reduced, production, quality efficiency and effectiveness enhanced, and these will lead to enhanced profitability and customer satisfaction.
2.3 Supply Chain Configuration and Performance of the Manufacturing Sector

Empirical literature has established that supply chain configuration helps in synchronizing the objectives, structures and processes within and between different functions and members in a supply chain, leading to better business performance (Iranmanesh et al., 2023). According to Lee (2014), supply chain configuration is one of three strategic business imperatives, alongside agility and adaptability. Supply chain misconfigurations, stemming from the lack of proper coordination mechanisms between supply chain partners, create inefficiencies that not only prevent the supply chain from realizing its capabilities, but also critically impede its ability to compete and survive (Huge-Brodin et al., 2020). Supply chain configuration requires consistency of strategies, objectives and processes among different supply chain members to improve business competitiveness (Skipworth & Julien, 2015). Thompson and Coe (2012) identified that a well aligned supply chain lead to revenue growth, working capital efficiency, operating cost reduction, better perceived customer value, etc. across the whole supply chain.

According to Gölgeci and Kuivalainen (2020), supply chain configuration has had considerable influence on cost, delivery, quality, flexibility, inventory, process improvement, innovation and sales and financial in most multinationals. It enables companies to integrate their information systems successfully, and ultimately their operational performance increase (Buhner, 2012). High-level supply chain integration as elaborated byGattorna (2017), which includes exchange between companies of relevant real-time information about processes, planning and expectations from stake-holders, offers the biggest benefits from supply chain configuration. This notion of usefulness of supply chain configuration is also consistent with theories behind SCM, because even the definition of the concept SCM includes configuration and integration of the key business processes (Gölgeci & Kuivalainen, 2020), and the theory behind integration states that increased integration leads to higher performance (Pagell, 2014) due to increased visibility and higher predictability.

In Africa, companies are expanding and requiring additional resources, but they may not be willing to invest extensively in acquiring them. Instead, they opt for this model to meet their needs more economically (Von Maltitz, 2014). Moreover, the pursuit of new talent, reduction of operating costs, and the increasing focus on environmental concerns such as carbon footprint reduction are pushing businesses towards supply chain configuration. The adoption of this model has proven to be beneficial with minimal capital investments required. According to Dubey et al. (2021), companies in Sub-Saharan Africa are now recognizing that by embracing this approach, they can source while maintaining quality and enjoying...
financial benefits. The continent is experiencing significant disparities and inconsistencies in accounting for commodity demand, arising from the continuous growth of the population, infrastructural demands, and the regulatory authorities within various value chains (dos Santos et al., 2021). These complexities emphasize the importance of effective supply chain configuration to address these challenges successfully.

Sanders and Premus (2015) suggested that closer collaboration with stakeholders increases supply chain integration and performance. Brockhaus et al. (2016) describe the use of a “stakeholder association” for joint problem-solving. The association extends from the focal purchasing organization, and jointly determined supply chain improvements can be shared between the focal customer organization and the group of stakeholders (Rogers, 2015; Barratt & Oliveira, 2011).

In Kenya, private sector supply chains mainly focus on several areas. This differs from sector to sector and also industry sector to sector, but they are standardized and regulated by one body. According to Wanyama (2013), in the last decade there has been a dramatic shift from one dimensional supply chain to integrated network of partners in the supply chains in both private and public sector. Private sector supply chain consists of different parties that are either directly or indirectly interrelated with the aim of satisfying the needs of customers.

These reforms have ensured supply chain configuration and consequently fairness and competition among suppliers of goods, works and services, thereby restoring the confidence of investors in the procurement process while at the same time ensuring that the manufacturers gets the best value for its money (Amayi, 2011). Supply chain configuration is an integral driver for long-term relationships with the suppliers, which enables the supplier to learn about the real needs and requirements of the buyer through strategic collaborations (El Mokadem, 2016). This can result in optimization and rationalization of its own operations. The evaluation and measurement of these sorts of activities is hard which makes it a gain for the supplier since it can hide from the buyer and use it as an advantage for its own good (Gabbard, 2014). Supply chain configuration is increasingly being recognized as the integration of key business processes, avid scheduling and routing across the supply chain (Storey et al., 2015). For example, Chi, Huang, and George (2020) argue that now that companies have implemented processes within the firm, they need to integrate them between functions: Streamlining the organization’s operations and processes is the next great frontier for reducing costs, enhancing quality, and speeding operations (Vonderembse & Dismukes, 2015). Supply chain configuration seeks to have a more organized supply chain process, where the activities and operations of supply chain are well-articulated and carried out in a sequence manner. Operations and processes, therefore, play an integral role in determining how effective the supply chain process would be in enhancing the organizational performance (Salam & Bajaba, 2022).

III. Research Methods

3.1 Research Design

A descriptive design was adopted in this paper. The design is used because it sets out to describe whether supply chain configuration is related to performance of manufacturing firms in Kenya. The study adopted the design as it helps describe the situation as it exists.

3.2 Population of the Study

The study targeted the manufacturing firms in Nairobi Kenya. The KAM directory has listing of members (firms) by sectors which contains a register of 12 sectors of those in manufacturing firms spread all over the country (KAM, 2017). The population of the large sized registered members as per the directory is 461.
3.3 Sampling

A sampling formula by Cochran (1977) was used to establish the appropriate sample size for the study. The formula was used to calculate the sample size as advanced.

\[ n_1 = \frac{z^2 \cdot p(1-p)}{e^2} \]

\[ n_1 = \frac{246}{1 + \frac{246}{461}} = 160 \]

Where; \( n_1 \) is the corrected sample size and \( n_0 \) the >5% sample calculated above. This gave a sample of 160.

3.4 Data Collection and Analysis

The research utilized a structured questionnaire to collect data. A drop and pick method was used to administer the questionnaire using two trained research assistants. The data was analysed using descriptive and inferential statistics. Descriptive statistics including mean and standard deviation were used to summarize the responses and report what the respondents had indicated on the questionnaire. Inferential statistics were on the other used to make deductions where they helped in establishing the relationship between the independent and dependent variables. In this case, a multiple regression model was used. The findings were presented in tables.

IV. Results and Discussion

4.1 Response Rate

The number of questionnaires that were administered to all the respondents was 160. A total of 127 questionnaires were properly filled and returned from the manufacturing firm’s employees. This represented an overall successful response rate of 79.4%. According to Creswell (2014), a response rate of 50% or more is adequate. Babbie (2011) also asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good.

4.2 Performance of Manufacturing Firms

The study sought to establish the performance of the manufacturing firms in Kenya. The respondents were asked to indicate their level of agreement on specific statements regarding the performance of their respective firms. This was based on a five-point Likert’s scale. The findings as shown in Table 1 revealed that majority of the respondents disagreed that their company had been recording increased net profits in the past five years (Mean = 2.61; Standard deviation = 1.35). Majority of the respondents disagreed that the lead time for their customers had been reduced continuously over the years in their respective firms (Mean = 2.46; Standard deviation = 1.35). It was further established that most of the organizations recorded high returns from their customers, as a result of not meeting the needs and specifications of the customers (Mean = 2.39; Standard deviation = 1.47). The respondents further disagreed that that there their respective companies had been meeting the quantity of productions needed in the market for the past five years.

<table>
<thead>
<tr>
<th>Table 1. Descriptive Results on Organizational Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
</tr>
<tr>
<td>a) Our company has been recording increased net profits in the past five years</td>
</tr>
<tr>
<td>b) The lead time for the customers has been reducing continuously over the years in our firm</td>
</tr>
<tr>
<td>c) There are fewer returns/rejections by our customers than it was in the past</td>
</tr>
</tbody>
</table>
There has been an increase in the volume of units produced by the company for the past five years.

4.3 Supply Chain Configuration

The findings were analysed using descriptive statistics which comprised of mean and standard deviation. As the findings Table 1 portray, majority of the respondents disagreed that there were frequent stakeholder analysis to identify key stakeholders in the supply chain network in their respective companies (Mean = 2.84; Standard deviation = 1.34). The respondents further disagreed that the stakeholders identified in their respective organizations were effectively involved in making key decisions regarding the supply chain process (Mean = 2.92; Standard deviation = 1.28). The findings compare with those by Christiaanse (2015) who established that through identifying the key stakeholders in the supply chain network, it becomes easier to create a good relationship with the key stakeholders for a seamless supply chain network.

On enhancing the supplier relationship through supplier relationship management, majority of the respondents disagreed that suppliers in their respective organizations were adequately involved in designing and enhancing effectiveness of key supply chain process (Mean = 2.79). They further disagreed that there was adequate and appropriate information shared with the suppliers to enhance continued collaboration as shown by a mean of 2.82. The findings imply that supplier relationship was not effectively embraced as a way of promoting supplier collaboration. According to Chi et al. (2020), failure to include suppliers in key decision-making processes reduces the collaboration capacity of the two parties, thus exposing the organization to the risk of failing to have reliable suppliers and the required market intelligence.

The results further revealed that majority of the respondents disagreed that their respective organizations upheld prior planning of its operations and processes to ensure effectiveness and efficiency (Mean = 2.84). The respondents further disagreed that the process and operations in the organization are organized with consideration of the suppliers and the customers as shown by a mean of 2.71. From the findings, it is therefore evident that most of the manufacturing entities are yet to align their operations and processes to integrate with the customers and suppliers, and this could affect the effectiveness of the entire supply chain process (Chhetri et al., 2022).

Table 2. Descriptive analysis of the Findings

<table>
<thead>
<tr>
<th>Measurement Aspect</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Relationship Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) There are frequent stakeholder analysis to identify key</td>
<td>127</td>
<td>2.81</td>
<td>1.34</td>
</tr>
<tr>
<td>stakeholders in the supply chain network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) The stakeholders identified are effectively involved in making key</td>
<td>127</td>
<td>2.92</td>
<td>1.28</td>
</tr>
<tr>
<td>decisions regarding the supply chain process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Integrated Operations and Processes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Suppliers are adequately involved in designing and enhancing</td>
<td>127</td>
<td>2.79</td>
<td>1.15</td>
</tr>
<tr>
<td>effectiveness of key supply chain process in the organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Adequate and appropriate information is shared with the</td>
<td>127</td>
<td>2.82</td>
<td>1.13</td>
</tr>
<tr>
<td>suppliers to enhance continued collaboration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supplier Relationship Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) The organization upholds prior planning of its operations and processes to</td>
<td>127</td>
<td>2.84</td>
<td>1.11</td>
</tr>
<tr>
<td>ensure effectiveness and efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) The process and operations in the organization are organized with consideration</td>
<td>127</td>
<td>2.71</td>
<td>1.19</td>
</tr>
<tr>
<td>of the suppliers and the customers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4 Relationship Between Supply Chain Configuration and Performance of the Manufacturing Sector

The relationship between supply chain configuration and performance of the manufacturing sector was assessed using a multiple regression model. The model was of the form:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \]

The multiple regression model results as shown below covers the model summary, the ANOVA test results and the regression coefficients for the four independent variables. The model summary is as shown in Table 3. As the results portray, the R-square for the model was 0.615. This implies that 61.5% of the variation in performance of the manufacturing companies is as a result of the supply chain configuration.

The ANOVA results revealed that the F-statistics was 48.760 at a significance level of 0.000. This implies that the model was statistically significant to predict the relationship between supply chain configuration and the performance of manufacturing firms in Kenya.

The regression coefficients revealed that customer relationship management had a regression coefficient of 0.263 an indication that a unit change in customer relationship management would influence performance of the manufacturing firms in Kenya by up to 26.3%. On supplier relationship management, it was established that the Beta coefficient was 0.212 which implies that a unit change in supplier relationship management would influence performance by up to 21.2%. Integrated operations and processes had a Beta coefficient of 0.210 which implies that a unit change in integrated operations and processes would influence performance of the manufacturing firms in Kenya by up to 21.0%. The findings further revealed that all variables had P-values less than 0.05 an indication that they significantly influenced the performance of manufacturing firms in Kenya. Aligning supply chain processes is a critical process that manufacturing firms enhances their ability to compete and gain more performance (Baier et al., 2012).

Table 3. Regression Model Results on the Relationship between Supply Chain Configuration and Performance of the Manufacturing Sector

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.609</td>
<td>.300</td>
<td>2.033</td>
<td>.044</td>
</tr>
<tr>
<td>Customer Relationship Management</td>
<td>.263</td>
<td>.070</td>
<td>.223</td>
<td>3.753</td>
</tr>
<tr>
<td>Supplier Relationship Management</td>
<td>.212</td>
<td>.052</td>
<td>.247</td>
<td>4.051</td>
</tr>
<tr>
<td>Inventory visibility</td>
<td>.491</td>
<td>.064</td>
<td>.480</td>
<td>7.625</td>
</tr>
<tr>
<td>Operations and Processes</td>
<td>.210</td>
<td>.070</td>
<td>.201</td>
<td>2.996</td>
</tr>
<tr>
<td>R-Square</td>
<td>.615</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>48.760</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000&lt;0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance of Manufacturing Firms

V. Conclusion

Supply chain configuration is integral in enhancing the effectiveness of supply chain network and enhancing collaboration within the network for enhanced performance. Through supply chain configuration, the suppliers become more aware on the best approaches they can enhance their services to the manufacturer, the manufacturer becomes more aware of the best approach to meet the customer needs using the available service providers in the network.
From the findings, it can be concluded that the supply chain configuration in the manufacturing sector in Kenya has not been effectively aligned, and this is a major setback to the industry’s continued performance. It is therefore recommended that the supply chain managers in the manufacturing sector should be the champions of supply chain configuration owing to its role in enhancing the seamless operation of the supply chain network.

The supply chain managers should uphold best practices that can streamline the ability of the manufacturing entities to align their supply chain networks for a more visible, traceable and organized supply chain process. Through an aligned supply chain network, the manufacturing sector stands a chance to enhance customer satisfaction, save on costs and strengthen their revenue streams thus being more competitive. Through managing the relationship with the customers and the suppliers as well as integrating the operations and processes, the manufacturing firms gain more control of their supply chain processes, and this would result to effectiveness in internal and external operations thus enhancing their performance.

References


