




ROLE OF SUPPLY CHAIN MAPPING IN SUSTAINABLE PROCUREMENT AMONG MANUFACTURING FIRMS IN KENYA

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Abstract

Supply chain mapping and sustainable procurement is important aspects of supply chain management. Relationship between the two variables is unclear in available literature yet it can be used to unravel the performance challenges of manufacturing firms especially in Kenya. Manufacturing is important to Kenya's economy contributing for example, 7.2% to GDP in 2021. Moreover, growth in manufacturing from 2017 to 2021 is reported as unstable. The change was -1.7 in 2017, 6.7 in 2018, 3.0 in 2019, 0.2 in 2020 and 6.0 in 2021. Scholarly attention bearing in mind Covid -19 effect is necessary. Performance challenges in this sector can be attributed to the SC of these firms. An important performance area of the firms is procurement sustainability. This seminar paper investigated role of SC mapping to sustainable procurement among manufacturing firms in Kenya using qualitative and exploratory approach. Social Action Theory

guided the study. Past literature was reviewed systematically, thematically and content-wise. The results show that supply chain mapping has significant role on sustainable procurement and supply chain management. It can be concluded from the results that there is a significant role supply chain mapping plays in sustainable procurement among manufacturing firms in Kenya. The paper recommends that firms engage more on activities of supply chain mapping and that scholars give more attention to supply chain mapping as a driver to various supply chain performance outcomes.

Keywords: Supply Chain Management, Supply Chain Mapping, Sustainable Procurement, Supply Chain Management, Supply Chain Performance

INTRODUCTION

Supply chain mapping (SCM) refers to the process of obtaining and documenting information from and across entities who are involved in the firm's supply chain. This process aims at creating a global map their network for supply. The process could map the source of materials and all shipments used.. Kumara, Chibuzob, Garza-Reyesc, Kumaria, Rocha-Lonad and Lopez-Torrese (2017) contends that the supply chain map is for identifying opportunities and mitigating risk in the firm's supply chain. Supply chain mapping enables organization to put strategies that support responses when there are supply chain problems. Such problems may include supplier facing a shortage, an order gets lost in the system or there's a surge in demand. Organization also develops a deeper understanding of the surrounding costs, timeframes, and risks, and thereby gain an advantage over competitors who lack this important knowledge.

A supply chain comprises two main components. These are entities and functions. Entities are supply chain partners an organization relies on for sourcing materials, processing them, packing and shipping finished goods. They include wholesalers and vendors, warehouses, transporters, distribution centres, retailers, and customers (Som, Cobblah and Anyigba, 2019). Functions refer to processes that connect the entities in the chain. For example, an organization is connected to the supplier through sales and finance channels via email and phone calls; and to customers through online store and retailers; and the organization's product is connected to wholesalers, warehouse, and buyers through physical transportation.

Mapping the supply chain is a five-step process in which you create a visual representation of all the entities and functions that exist within and around the business. At each stage, the organization can ask questions to work out if the process could be more efficient, or less risky, expensive or time-consuming. The first step is identifying stakeholders. Here the firm

identifies everyone who contributes to the production, storage and distribution of the product. The organization can document the name of the business and the points of contact either on paper or using supply chain planning software. The organization may have different supply chains for different products. A number of questions are asked here for example if the organization is using the most efficient communication channel for the key businesses (Mubarik, Naghavi, Mubarik, Kusi-Sarpong, Khan, Zaman and Kazmi, 2021). Perhaps the organization could suggest creating a dedicated space for consistent, real-time communication with the contractor who handles the returns such as a shared channel on slack.

The next step is understand supplier relationships. The firm must endeavour to understand the relationships between all parties. Here the firm will establish if they are each other's sole supplier or one of many. The first-tier suppliers are expected to join the mapping process. They can then send the same invitation to second-tier suppliers, and so on. Each entity details what they sell, to whom, and what they buy next in the chain. As the map expands, the organization and the suppliers get a better view of potential risks, bottlenecks, and the dangers of relying on single suppliers and businesses with long lead-times.

The third step is establishing costs and timings. The organization should work out the costs and time frames involved in each part of the chain and find out which functions offer the most and least value to the business. At this stage it is helpful to think of the supply chain as a "value chain" by considering how costs and time frames either produce or prohibit value. Further, the organization can determine how long each element takes on average, including small things, for example receiving an email reply from the supplier and bigger things for example transportation of goods to the customer. Acknowledge risks is the next step. The organization acknowledges the risks associated with each entity, including political, legal, economic, and environmental threats(Som, Cobblah and Anyigba, 2019). It interrogates if unseen silos are increasing the risk of disruptions for example between procurement, marketing, sales, and fulfillment, or between the business and the suppliers and customers. The organization should then find out if it can remove these silos by improving knowledge sharing. Data tracking is the last step in supply chain mapping. The organization tracks the flow of information and data through the supply chain. Transferring information efficiently, including orders, shipments, and returns, can be as important in controlling costs as the movement of physical goods. If supply chain mapping is emphasized, it can contribute to sustainable procurement among manufacturing firms in Kenya.

Sustainable procurement is the integration of Corporate Social Responsibility (CSR) principles into your company's procurement processes and decisions while ensuring they still meet the requirements of your stakeholders. It is a process whereby organizations meet

their needs for goods, services, works and utilities in a way that achieves value for money on a life-cycle basis while addressing equity principles for sustainable development, therefore benefiting societies and the environment across time and geographies (Ataseven and Nair, 2017). Sustainable procurement integrates specifications, requirements and criteria that are compatible with the protection of the environment and society as a whole. It encompasses many issues beyond, for example, child labor or the use of harmful chemicals that can affect people or the environment. Commitment to sustainable procurement ensures that a company's core sustainability values are throughout the life cycle of their products and services. Best practice would be to future-proof your company's sustainable procurement and investments by implementing sustainable policies that increase their long-term viability.

According to Yang, Han, Zhou, and Yuan (2015), policies and strategies for sustainable procurement are based on the need to future-proof themselves primarily around scarcity in supply, the ability to cope with the demand of emerging markets, pressures brought upon by cost and the ability to reduce cost through reductions in energy consumption and waste. Sustainable procurement can help companies protect their brand reputation as it requires them to develop robust risk management. This enables them to better identify problem suppliers and address weak areas in their supply chain that have the potential to generate scandals and bad publicity. Lastly, sustainable procurement provides opportunities for brand differentiation as it encourages companies to develop more innovative and sustainable products.

In Kenya Manufacturing firms are important and contribute immensely to the economic well being of the country. According to Kenya National Bureau of Statistics (2022), in 2021, real value added in the manufacturing sector grew by 6.9 per cent compared to a growth of negative 0.4 per cent recorded in 2020. The share of the manufacturing sector to GDP was 7.2 per cent while the volume of output expanded by 6.0 per cent in the same period. The growth was mainly due to increased production of Other Non-metallic Mineral Products like cement, Leather and Related Products and Dairy Products sub sectors among others. However, in the review period decline in production was recorded in Prepared and Preserved Fruits and Vegetables, Animal and Vegetable Fats and Oils, Furniture and Pharmaceutical Products sub sectors. However, percentage change in manufacturing from 2017 to 2021 is reported as unstable with a decline from 2017 to 2020 and a small sudden rise in 2021. The change was -1.7 in 2017, 6.7 in 2018, 3.0 in 2019, 0.2 in 2020 and 6.0 in 2021. This indicates unstable performance in the sector and requires scholarly attention.

Studies in the area of supply chain mapping are limited. Moreover, studies around supply chain mapping does not present clear information on how supply chain mapping relates with sustainable procurement. For example Vargasa, Mantillab and Jabbour (2018) did an

article aimed at evaluating whether the enablers top and middle management support and strategic purchasing facilitate the development of sustainable supply chain practices, as well as the effect of the latter on competitive advantage (CA). Partial least squares structural equation modelling (PLS-SEM) was applied to test the proposed model based on a sample from companies operating in Colombia. The main hypotheses of the research were supported, implying that a suitable combination between internal enablers and the adoption of sustainable supply chain practices is important to pursue competitive advantage. However, the hypothesis for the expected effect of environmental practices wasn't supported, suggesting that there is a win-win perspective between social practices in supply chains and competitive advantage in the context of emerging economies.

Negri, Cagno, Colicchia, and Sarkis (2021) argued that research on the supply chain sustainability and its relationship with resilience is in its initial stages and is derives from observed mutual influences between the two. According to them, confusion on concepts, how to implement and measure sustainable and resilient supply chains persists. Following this, they carried out a systematic literature review on these issues. Findings revealed sustainable supply chain concepts established, with existence of theoretical foundations. Resilience of supply chains hasn't matured much. There are inconsistencies on establishment of sustainable and resilient supply chains. There exists lack of clarity on what can jointly advance the areas. Since sustainability focuses on efficiency with resilience focusing on effectiveness, the subject continues to attract debate. The study recommended that future research concentrates on analysis of implementation and impact relationships.

Mann and Kaur (2020) studied sustainable supply chain management and its impact on financial performance among Indian firms.. Data was obtained from top 100 listed companies on BSE Content analysis was performed to analyse life cycle sustainability of goods and services.. Hypotheses were tested using hierarchical linear regression. Findings showed that resource utilization and sustainable sourcing have a significant positive impact on the financial performance among the firms. The initial study that has focused on the sustainable supply chain activities at the micro level as mandated by the regulators of sustainability reporting and studies the impact of such activities on the financial performance of the Indian firms

Bastas and Liyanage (2018) studied literature on two management methodologies and sustainability management. They focused on integration of quality management with related intra-organizational focus and supply chain management with related interorganizational view. Descriptive analysis and thematic synthesis of literature on quality management, sustainability and supply chain management integration was conducted on management methodologies as well as on sustainability management. It was identified that incorporation of sustainability into

quality and supply chain management is highly emerging. Research area revealed was sustainable supply chain quality management. Despite the fact that several reviews had been conducted on sustainability management practices and quality, this is one study undertaken from the perspective of cumulative integration and the three approaches.

Yang, Movahedipour, Zeng, Xiaoguang and Wang (2017) investigated factors that are critical to success of assessment, evaluation, and attainment of sustainable supply chain management. The approach that the study used was critical-success identification and qualitative data analysis. The articles, published between January 1994 and November 2016, were used to determine the key success factors. Qualitative data analysis was conducted on fifteen such successes which had been identified in the literature review. Other factors were also determined through researcher collaborations and from industry expertise. Results from qualitative data analysis and interpretive structural modeling revealed joint impact of most key success factors. Most significant success factors indicated were economic benefits and environmental awareness of suppliers.

Mubarik, Naghavi, Mubarik, Kusi-Sarpong, Khan, Zaman and Kazmi (2021) set out to test what impact supply chain mapping had on visibility and resilience of a firm's supply chain. A close-ended questionnaire was used to collect data from 154 Electrical & Electronics sector firms in Malaysia. Structural equation modeling was used to analyze the relationships in the hypotheses. Supply chain mapping revealed significant effect on supply chain visibility and resilience. Mediating of supply chain visibility in the association between SC mapping and its resilience was established.

Omai, Ngugi and Mburu (2018) did a paper that investigated the effect of supply chain practices on sustainable supply chain performance in textile and apparel industry in Kenya. The major practices evaluated in the study were modularity based manufacturing, supply chain relationship, supply chain integration and supply chain responsiveness. For this, a cross-sectional study design was used. Census sampling was used to select participants and the firms to participate due to the small number of textile firms in Kenya. Therefore, 59 key informants were selected from 59 textile firms in Kenya. The findings revealed that modularity based manufacturing, supply chain relationship management, supply chain integration and supply chain responsiveness had a positive effect on supply chain performance in the textile and apparel industry in Kenya with modularity and supply chain integration being the strongest. Conclusions were that supply chain practices are important factors to achieve improvement in the performance of supply chains.

Jayarathne, Istyger and Perera (2012) studied the role of supply chain mapping in sustainable supply chain management. Role of supply chain mapping in relation to establishing

a framework for sustainability was the critical focus. Results indicated that complexity and hidden details of a supply network can be unravelled by supply chain mapping. The research further reveal that network of Sri-Lankan Tea firms is non-rational, non linear and is intertwined with stakeholder interactions outside of typical value creation perspectives.

Research works above concentrate on sustainable supply chain management. There is hardly any study on supply chain mapping. The study by Mubarik, Naghavi, Mubarik , Kusi-Sarpong, Khan, Zaman and Kazmi (2021) merely touched on supply chain mapping. Further, they argued that supply chain mapping may be, at it's adoption, a steppingstone. Its profound significance that it has, has hardly been discussed in the research literature. There is hardly any knowledge on contribution of supply chain mapping to sustainable procurement.

Objective of the study

Investigate role of supply chain mapping to sustainable procurement in Kenya.

Research Question

What is the role of supply chain mapping to sustainable procurement in Kenya?

Justification of the study

This paper provides opportunity for Manufacturing firms in Kenya to review their policy with regard to supply chain Mapping and sustainable procurement. The paper provides insights into how the government of Kenya at the two levels can improve the framework on manufacturing. Moreover policy makers within and outside the firms across other sectors can draw from findings from the study. Researchers may further their efforts from the study as a basis.

METHODOLOGY

Methodology refers to the steps and processes that are applied to actualize results in relation to a set objective. In research, the methodology follows laid down scientific principles and procedures. The methodology for this paper followed is explained below.

Philosophy

Research paradigm also referred to as research philosophy is a belief about the way in which data about a phenomenon is to be gathered, analyzed and used. It refers to a framework guides how research is to be conducted based on ideas about reality and the nature of knowledge. The philosophy that guided this seminar paper is intepretivism or anti-positivism.

This is the philosophy that involves researchers interpreting elements of the study thereby integrating human interest in the study (Saunders, Lewis and Thornhill, 2012). It is a philosophy incorporating a research approach where there is personal involvement in interpretations and where meanings emerge towards the end of the research process from analysis of data (Collins, 2010). It is based on social action theory. The paper involved interpretation and understanding of reviewed published articles about the subject of inquiry.

Study design

The study applied qualitative research design, a design which concerns itself with the extent to themes can be generated from a set of data with presentation being in form of narrations or explanations. Systematic review of literature was conducted. The procedure for systematic review involves formulating research question, developing protocol, conducting search and selecting studies along inclusion criteria. Further, extraction and analysis of data from relevant studies will be conducted. Literature review can address research questions with power that no single study has by integrating findings and perspectives from many empirical findings (Hiebl, 2021).

Study population

Frankfort and Nachmias (2008) explain that target population is the entire collection of elements with shared characteristics from which a sample can be chosen. It should be noted that systematic review has taken root in management research. Despite this, advice on how to organize the sample selection process as part of such reviews is hardly available (Hiebl, 2021). In this study, articles around supply chain mapping and or sustainable procurement across the globe in the last five years. Within this approach, theoretical saturation was used to arrive at adequate sample. Theoretical saturation refers to “the point at which gathering more data about a theoretical construct reveals no new properties, nor yields any further theoretical insights about the emerging grounded theory (Bryant and Charmaz, 2007). This was used to build knowledge on the contribution of supply chain mapping to sustainable procurement among manufacturing firms in Kenya. .

The Data and Data Collection Instrument

The process of scientifically gathering, selecting, and computing data to aid in the achievement of research objectives is described as data collection. Secondary data will apply in this study. The data was collected using literature review guide focusing efforts systematically to capture the subject. Data was analyzed thematically and content-wise.

RESULTS

In order to realize the objective in the seminar paper which was to investigate role of supply chain mapping to sustainable procurement in Kenya, a systematic review of literature was conducted. The review was followed by an analysis that led to conclusions arrived at.

Results: Review and Analysis of Literature

Table 1. Review and Analysis of Literature

Author	Year	Title	Objective	Results
Mann and Kaur	(2020)	Impact of sustainable supply chain management on financial performance among Indian firms.	To analyze impact of sustainable supply chain management on the financial performance among firms in India.	Sustainable sourcing and resource utilization positively and significantly impact on the financial performance of the Indian firms.
Bastas and Liyanage	(2018)	Management methodologies and sustainability management from an integration perspective: Intraorganizational focus of Quality management and interorganizational view of supply chain management.	To explore from an integration perspective, literature on management methodologies and sustainability management	Sustainability intergrated into quality and supply chain management is highly emerging with multi-dimensional approaches still requiring sustainable supply chains.
Yang, Movahedipour, Zeng, Xiaoguang and Wang	(2017)	Factors critical to assessment, evaluation, and attainment of a sustainable supply chain management	To determine success factors for assessment, evaluation, and attainment of sustainable supply chain management	Most significant success factors found to be economic benefits and environmental awareness of suppliers
Mubarik, Naghavi, Mubarik , Kusi-Sarpong, Khan, Zaman and Kazmi	(2021)	Impact of supply chain mapping on supply chain visibility and resilience of a firm.	To test impact of supply chain mapping on supply chain visibility and resilience among electronic and electrical firms in Malayasia	Supply chain mapping has effect on supply chain visibility and resilience. Supply chain visibility significantly mediates the association supply chain mapping with resilience of supply chain.
Omai, Ngugi and Mburu	(2018)	effect of supply chain practices on sustainable supply	Investigate effect of modularity based manufacturing,	modularity based manufacturing, supply chain relationship

		chain performance in textile and apparel industry in Kenya.	supply chain relationship, supply chain integration and supply chain responsiveness	management, supply chain integration and supply chain responsiveness had a positive effect on supply chain performance
Khan, Mubarik, Kusi-Sarpong, Gupta, Zaman, & Mubarik	(2022)	Blockchain technologies as enablers of supply chain mapping for sustainable supply chains	To examine the instrumentality of blockchain technologies in supply chain mapping and integration.	Blockchain technologies indirect effect through supply chain integration and mapping, on the supply chain sustainability. Supply chain mapping enhances sustainability in supply chain
Jayaratne, Istyger and Perera	(2021)	Role of supply chain mapping in sustainable supply chain management of tea firms in Sri - Lanka	To ascertain role of supply chain mapping in sustainable supply chain management of tea firms in Sri - Lanka.	Supply chain mapping provides insight into complexity of a supply network. Network is non-rational and non -linear but is intertwined with many stakeholder interactions
Pokuaa-Duah & Nadarajah	(2021)	Improving of Organizational Performance Using Lean Supply Chain Management Practices: The Mediating Role of Supply Chain Collaboration	To ascertain effect of lean supply chain management through supply chain collaboration on performance improvement among firms	Significant effect of lean supply chain management through supply chain collaboration on performance improvement among firms exist.
Ingutia	(2020)	Supply chain strategy and organizational performance of Kenya Power	Establish supply chain strategy adopted by Kenya Power, Evaluate effect of supply chain strategy on performance of Kenya Power	Lean strategy most adopted, others are agile and hybrid. The strategies predict performance at Kenya Power
Islam & Nurul	(2021)	Effect of Supply Chain Management on Competitive Advantage and Organizational Performance. Studies on the Batik Industry in Yogyakarta City	Investigate effect of supply chain management on competitive advantage and organizational performance. Analyze mediation of competitive	

			advantage in relationship above	
Ahmed	(2023)	Effect of Sustainable Supply Chain Management and Customer Relationship Management on Organizational Performance in the Context of the Egyptian Textile Industry	To examine effect of sustainable supply chain management on customer relationship management, competitive advantage, and organizational performance	sustainable supply chain management improves customer relationship management, competitive advantage, and organizational performance.
Karani	(2022)	Effect of supply chain strategies on the performance of manufacturing firms in Kenya	establish the effect of supply chain strategies on the performance of manufacturing firms in Kenya.	The findings indicated that agile supply chain strategy, risk hedging supply chain strategy, postponement supply chain strategy, and lean supply chain strategy had a strong positive and significant effect on performance
Mohammed Taj Hejazia*	(2022)	The association between organizational performance and supply chain management practices	Explore association between organizational performance and supply chain management practices.	Strategic supplier partnerships, information sharing and customer relationships highly impact performance of organization. Postponement doesn't impact performance of organization.
Zia, Bond, Green, Jr. & Zhao	(2021)	Supply Chain Finance: Impact on Supply Chain Competency and Organizational Performance	To assess role supply chain finance and competency on performance of organizations	Supply chain finance and competency account 51% of positive variations in performance of organizations.
Jiangtao, Yibin, & Mingxia	(2018)	Impact of supply chain quality management practices and knowledge transfer on performance organisations from China	To map relationship between supply chain quality management practices and knowledge transfer	Internal quality management practices positively and significantly affect knowledge transfer across organizations. Quality management practices have high positive effect on

knowledge transfer across organisations.
Internal and cross-organisational knowledge transfer promotes operations and innovation.

DISCUSSION

Results above compare and contrast with previous results of other works which involved systematic review of literature. The results here show inadequate scholarly attention has been given to supply chain mapping. In the limited works, Khan, Mubarik, Kusi-Sarpong, Gupta, Zaman, & Mubarik (2022) have revealed that when a supply chain is well mapped, supply chain sustainability improves. On the other hand Mubarik, Naghavi, Mubarik , Kusi-Sarpong, Khan, Zaman and Kazmi (2021) found that mapping of supply chain significantly affected visibility and resilience of the chain of supply. Jayaratne, Istyger and Perera (2021) also found that mapping of supply chain gives insight into hidden details and complexity of a supply network. The studies here agree that mapping of supply chain contributes to organization performance through sustainable procurement or other aspects.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

From the study objective which sought to investigate SC mapping and its role in sustainable procurement among manufacturing firms in Kenya. It can be concluded from the results that there is a significant role supply chain mapping plays in sustainable procurement among manufacturing firms in Kenya.

Recommendations for Practice

From the conclusion above, it is recommended that practitioners in supply chain management among manufacturing firms emphasize supply chain mapping as its potential to drive supply chain sustainability and other performance outcomes is evidenced.

Recommendations for Further Studies

It is also recommended that scholars give more attention to supply chain mapping among manufacturing firms. This will increase empirical evidence and accord clarity on its interplay with other variables in manufacturing and other sectors. The scope for further studies should entail further interrogation of process of obtaining and documenting information from and

across entities who are involved in the firm's supply chain. Further, the scope should investigate how this process interrelates with supply chain outcome such as sustainable procurement. It is recommended that the ensuing studies cover manufacturing firms and other sectors in order to build knowledge around these concepts. The present studies are limited in geographical coverage in that they are dotted across the world. The studies can cover more areas across the world.

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