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## Integration of Green Supply Chain Management on Operational Performance of Small and Medium-Sized Manufacturing Firms in Nairobi, Kenya

**Nadhifo Ibrahim Haro**

M.Sc. Student, Department of Procurement and Logistics, School of Business and Entrepreneurship, Jomo Kenyatta University of Agriculture and Technology, Kenya

**Dr. Arani Wycliffe**

Lecturer, Department of Business and Economics,  
Multimedia University of Kenya, Kenya

### **Abstract:**

*Integrated GSCM can help SMsMFs to improve socially, natural and monetarily their exhibition. The essence of examination was to explore the influence of integrated green supply chain management practices on the performance of SMsMFs in Nairobi.*

*The examination was guided by the accompanying destinations: to determine the influence of internal integration of green supply chain management, to establish influence of customer integration of green supply chain management and to examine influence of supplier integration of green supply chain management and operational performance of SMsMFs in Nairobi, Kenya. The examination utilized an illustrative exploration plan. The investigation focusses on a populace of 478 SMsMFs and a straightforward arbitrary method was utilized to pick 96 respondents from firms. The polls were utilized to gather information and the information gathered was investigated utilizing unmistakable and inferential measurements. In light of the examination discoveries, it was set up that numerous SMsMFs have embraced cross-utilitarian groups as a method of improving ecological exercises. It was additionally uncovered that lion's share of SMsMFs do cooperate with customers for green packaging, use of product with less energy consumption in transportation, reduction on environmental impact activities and items disposal. From the study finding it was observed that majority SMsMFs provide design specification to suppliers, draft environmental objective together with suppliers, conduct regular environmental audit with suppliers and conduct joint product development. In view of the inner reconciliation of GSCM objective, it was set up that numerous SMsMFs have embraced cross-useful groups as a method of improving ecological activities. Also, the examination set up that there are numerous SMsMFs have not set up natural administration systems. Lastly, the investigation suggests that small and medium-sized assembling firms should rehearse providers' mix of GSCM since it was found to increment operational execution of SMsMFs.*

**Keywords:** *Green supply chain management, operational performance, small and medium-sized manufacturing firms*

## **1. Introduction**

### *1.1. Background of the Study*

Green supply chain management concept nowadays has gained momentum in organizations. For example, organizations are keen managing their overall supply right from the upstream all the way to the downstream and organizations that are cable in managing their supply chains are able to limit the by and large ecological effect for both forward and turn around streams (Green et al., 2012). Researchers' notions have been that the productive coordination of whole inventory network process cannot be achieved independently but rather seamlessly (Kim, 2006). Therefore, suppliers, manufacturers, distributors, transporters, customers and disposal firms must be integrated in implementing GSCM practices (Thun & Müller, 2010). In spite of this fact, past studies have been exploring environmental initiatives by focusing on functional areas rather than cross-functional (Rao & Holt, 2005). It is therefore important to conceptualize GSCM and its effect on performance by integrating all functional departments (Vachon & Klassen, 2008). By focusing on upstream and downstream sides and internal processes are crucial in enhancing GSCM in organization (Yu et al., 2014).

Cross-functional integration within the organization also, mix with the clients and providers on implementing environmental management practices is required to attain sustainability of manufacturing firms (Green et al., 2012). In this manner, incorporated green store network the executives are characterized as inner ecological administration practice inside the firm and outer green joining of the organizations' manageable inventory network activities along with the clients and providers (Vachon & Klassen, 2008). Subsequently, inward, client and provider mix exercises are needed to be coordinated with store network accomplices, either upstream with the providers or downstream with clients

(Vachon&Klassen, 2008). The coordinated GSCM connecting inner GSCM activities and outside GSCM with the providers and clients will give unrivaled execution in overseeing chains of firms (Yu et al., 2014). Over the previous decade, the unpracticed green store network (GSC) has arisen as a critical part of the ecological and inventory network procedures of some of businesses.

The GSC encompasses a large range of practices from inexperienced shopping to integrated supply chains moving from providers, to producers, to clients, and to the reverse supply chain, that's 'closing the loop' (Zhu &Sarkis, 2006; Rao & Holt, 2005). Seen from a lifestyles-cycle perspective, tasks striving to achieve the aim of the GSC, awesome environmental and economic gain of the complete production network, are difficult to place into impact accurately without the profound inclusion of the production network buddies. In various words, it is fundamental to include SME providers inside the inventory network broad ecological improvement framework.

'Incorporated green production network the board is characterized as interior natural administration practice inside the firm and external green integration of the firms' sustainable supply chain initiatives together with the customers and suppliers' (Vachon&Klassen, 2008). Among these researches, some check out the motivations of companies to move green and the practices companies observe to be green (Wuet al., 2012). According to these authors, 'corporations put into effect inexperienced-related practices for numerous motives, inclusive of complying with outside guidelines or market call for, whilst others may additionally regard going inexperienced as one effective method to build competitive gain and consequently are prompted by using internal higher managerial level'.GSCMis typically understood as a fixed of managerial practices that combine environmental troubles into deliver chain control to make sure environmental compliance and to foster environmental capability of the complete supply chain (Caniatoet al., 2012).

Researchers have tested GSCM by characterizing it as green shopping (Min & Galle, 2001) and GSC practices (Green et al., 2012; Lee &Klassen, 2008). Zhu &Sarkis (2004) proposed a broader attitude of practices, along with inner environmental management, green buying, funding healing, eco-layout practices and cooperation with supply chain companions. Many organizations across the world are striving in adopting green supply chain management practices. Despite the existing complexity regarding sustainability concept whether or not synergies between the different sustainability dimensions, the point is that companies supply chains should use the triple bottom line to quantify progress towards getting manageable (Pagell& Wu, 2009). Incorporated green inventory network the executives is the coordination of upstream and downstream of production network, which has capacity to lower the overall environmental impact both the forward and reverse flow (Green et al., 2012). According to Handfield et al. (1997) established that 'environmental sustainability efforts should be integrated throughout the value chain'.

Organizations that seek to get benefits from environmental management process are required to integrate cross-functional and other store network individuals like providers and clients into this interaction (Rao &Holt, 2005). Likewise, this was affirmed by Walton et al. (1998) noticed that 'associations will possibly succeed if the natural administration work overall framework which incorporates clients, providers and different parts in store network'. An examination fronted by Rao and Holt, (2005); Zhu and Sarkis, (2004) and Vachon and Klassen, (2006) saw that the three principal dimensions of coordinated green store network the board are inner GSCM, GSCM with clients and GSCM with suppliers. Thus, this study will adopt these dimensions fronted in the above literature.

According to NEMA, 'large industrial establishments are subjected by Law to do assessments (EIAs) and Annual Environmental audits (IAs)'. EMCA does not extend to SMsMF despite their role in the supply chain network and the fact that they accounted for 43 percent of Kenya's export according to baseline survey report 1999 (www.nema.go.ke). According to the Kenya bureau of standards, there are only four firms that are ISO 14000 certified including Pan African paper mills and Central glass industries while a few others like Kenya breweries are ISO 22000 certified (Mwirigi, 2007). Green store network the executives assists associations with looking fundamentally into the pretended by each direct part in the work to address client issues and at the equivalent time meet desired environmental standards. Thus, it is not enough for a firm to be ISO14000 certified or to have NEMA certificate for the Kenyan situations, but there should be another practice for environmental sustainability. Some of the manufacturing firms in Kenya are multinationals and hence their response to green issues could be different from the local ones.

In Kenya it is only the large enterprises that are subjected to environmental audits, but the cause of pollution ranges from domestic, small enterprises and industrial with the latter carrying the biggest if not all the blame (Mwirigi, 2007). For example, Nairobi River presents an example of the main environmental challenge with level of pollution ranging from agricultural nutrients and raw domestic sewage to the highly toxic industrial waste. According to Kenya National Cleaner Production Centre (KNPC), one way of curbing pollution in rivers is through adoption of contemporary environmental measures such as recycling of wastes, reverse logistics, eco-design clean production and many others.

SMsMF play crucial roles inside the method of industrialization and monetary boom. The growth in step with capital earnings and output, create employment possibilities, enhance regional monetary balance thru industrial dispersal and generally sell powerful resource utilization considered important to engineering monetary improvement and boom of a rustic (Ogujiuba et al, 2004; Ong'olo&Odhiambo, 2013). The Kenya Vision 2030 (Government of Kenya, 2007) underscores the significance of SMsMF because the blueprint thru which Kenya seeks to grow to a 'middle earnings offering excessive pleasant lifestyles to all its citizens, job introduction, elevating productivity and public revenues through the year 2030.

According to the economic survey (KNBS, 2015), the SMsMF sector created 713,600 new jobs in 2015. The sector in terms of GDP contribution provided a total output to the economy of Kshs. 3,371.7 billion compared to a national output of Kshs. 9,971.4 representing a contribution of 33.8 per cent in 2015. The sector contributed a total of Kshs.1, 780 billion compared to Kshs. 5,668.2 billion for the whole economy in terms of value addition as per MSME report 2016(KNBS, 2016). 'However, current studies on GSCM look only in large manufacturing corporations despite the fact that SMsMFplay

an important role in the supply chain network and the fact that they accounted for 43 percent of Kenya's export according to baseline survey report' (Mwirigi, 2007).

### 1.2 Statement of the Problem

'Small and medium-sized manufacturing firms sector constitute to 70 per cent of manufacturing firms in Kenya and accounts over 40 percent of the total employment' (Kenya National Bureau of Statistics, 2017; Ongo'olo&Odhiambo, 2013). Despite their significance, past studies indicate that manufacturing firms in Kenya has been causing environmental deterioration. Kenya National Bureau of Statistics (2018) indicated that even though Kenya contribution to the causes of weather change is low at zero.31 metric tons of carbon dioxide as compared with 7.1 metric tons for Malaysia, 45 for Nigeria, 10.12 for South Africa and 77 metric tons for China. But that is expected to increase with high Gross Domestic Product (GDP) growth fee as aspired in Vision 2030. World Bank (2012) diagnosed commercial techniques and shipping as one of the sources of Green House Gases (GHG) and is likewise important in countrywide financial system within the attainment of Vision 2030.

Likewise, Ouru (2015) stated that 'manufacturing enterprise is one of the predominant members to the deterioration of environmental sustainability'. Nonetheless, different examinations have been led in GSCM executives such Korir (2014), Ouru (2015), Aleri (2018) every one of these investigations zeroed in on green store network the board practices like green plan, green coordination, green buying, reverberation configuration, switch coordination, green assembling in different assembling area. Albeit these investigations neglected to address green store network the executives in little and medium-sized assembling firms however rather they have been zeroing in on enormous assembling firms. Additionally, this investigation strayed from the standard by zeroing in on incorporated green production network executives. This is because organizations that seek to get benefits from environmental management process are required to integrate cross-functional and other supply chain members such as suppliers and customers into this process.

### 1.3. Objectives of the Study

The general objective of the study was to investigate the influence of integrating green supply chain management and the operational performance of small and medium-sized production firms in Nairobi, Kenya. The Specific Objectives included: -

- To determine the influence of internal integration of GSCM and the operational performance of small and medium-sized manufacturing firms on Nairobi, Kenya.
- To examine the influence of customers integration of GSCM and the operational performance of small and medium-sized manufacturing firms on Nairobi, Kenya.
- To establish the influence of suppliers' integration of GSCM and the operational performance of small and medium-sized manufacturing firms on Nairobi, Kenya.

### 1.4. Research Questions

- What is the influence of internal integration of GSCM and the operational performance of small and medium-sized manufacturing firms in Nairobi, Kenya?
- What is the influence of customers' integration of GSCM and the operational performance of small and medium-sized manufacturing firms in Nairobi, Kenya?
- What is the influence of supplier's integration of GSCM and the operational performance of small and medium-sized manufacturing firms in Nairobi, Kenya?

### 1.5. Significance of the Study

This study will assist SMsMF emerge as extra aware about integrating GSCM idea with their enterprise techniques. The management might be in a function to pick out the GSCM practices so that it will improve the corporation's commercial enterprise overall performance and even mobilize their R&D department to research on manufacturing of environmentally sustainable products. It may also, assist the authorities to perceive the loopholes in the present environmental laws and rules subsequently making better regulations on environmental concern. The authorities can even give you infrastructure to deal with the disposal of wastes. The project will assist the different communities with the aid of sensitizing them at the significance of holding the surroundings for destiny. This will enable them to have greater challenge on buying products which might be environmentally friendly

### 1.6. Scope of the Study

The examination focused on coordinating GSCM and execution of SMsMF situated in Nairobi. The investigation was conveyed in Nairobi has over 80% of assembling firms. The examination explicitly tended to incorporating of SCM through inner GSCM, GSCM with the clients and GSCM with the providers. This tended to the whole complete inventory network directly from the upstream (providers), through the association (inward) and downstream (clients) connecting natural administration and execution of firms. 'Small and medium-sized manufacturing firms was focused because it one the sectors which contribute close to 70% of the gross domestic product but however this sector has been ignored and yet its activities cause environmental degradation' (Kenya National Bureau of Statistics, 2018).

## 2. Literature Review

### 2.1 Theoretical Framework

'A theory is a set of interrelated constructs (concepts), definitions and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting phenomena' (Camp, 2010). In this section, theories of GSCM are discussed and how they interact with organizational performance.

#### 2.1.1. Resource-based View

It's based at the idea that the organization is a constituent of a collection of abilities. Lean supply chain control practice, total quality management and just-in-time practice plays a pivotal function in driving the firm in the direction of improved overall performance. These competencies permit the company to make maximum use of its available assets via minimization of waste and fee reduction. 'Organizational performance varies because of particular sources and abilities exhibited through firms in an enterprise' (Hoopes, Madsen, Walker, 2003). Barney (2001) explains that resources are inputs into company's production process, these consist of; ready personnel and use of current technologies.

The RBV Theory examines the influence of organization abilities on competitive advantage that results in usual organizational overall performance. Based on Ray et al.'s (2004) examines, the assets and capabilities that aren't conditioned into sustaining activities and enterprise procedures will not have superb effect on an organizational overall performance. Capacity and resource control are one of the SCM practices size studied on this framework. Capacity and aid management is defined as control ability and assets of provider which might be prepared successfully and operated correctly at most desirable degree (Baltacioglu, Ada, Kaplan, Yurt, & Kaplan, 2007). The predominant contribution of the RBV as a principle that evolved inside the method field is that it considers the involvement of different disciplines, which include economics, commercial enterprise, and business enterprise technology.

Zott (2003) contends that 'RBV puts extra emphasis on performance implications of the organization's utilization of internal sources'. Lean supply chain management is a resource to the organization since it enables the organization to utilize its core competence to produce superior products and services. This theory is relevant in this study if organizational resources are well utilized in production to minimize wastage, reducing inventory costs by embracing just-in-time approach, proper coordination of activities within the manufacturing firms through total quality management and be versatile to customers' requirement through agile. Thus, GSCM practices if well-coordinated will increase firm's productivity.

#### 2.1.2. Strategic Choice Theory

Strategic choice principle (SCT) changed into evolved and superior by Child in 1972. According to this idea, 'the aim of the businesses is to acquire high performance standards and increase the efficiency to the bounds of economic constraints. Manufacturing companies need not forget contextual factors as very crucial if firms are to carry out operations properly'. For example, managers that make sound selections for their businesses and undertake contemporary control practices inclusive of overall satisfactory control, just-in-time, agility and lean supply chain practices are likely to enhance productivity of businesses.

Strategic decisions in organizations have significant effects on organizational outcomes. Child (1972), states that 'the theory is less concerned with the functional operation of the organization and has more to do with the governance structure in organizations. Therefore, managers should establish structural reforms, manipulate environmental features, and choose relevant performance standards in achieving organizational goals'. According to the SCT, 'managers play an important role in achieving organizational outcomes through their decision making or leading the changes in organizations' (Child, 1972; Ketchen&Hult, 2007). This strategic decision-making functions at three levels: Top tier or long-term planning, middle tier or functional level, and bottom tier at the individual level (Kochan, Katz &McKersie, 1986). Strategic choice theory views managers as proactive agents who are down-stream decision-makers and mainly focus on directing major decisions and change processes in organizations. Change, or what Child (1972) calls 'variation in organizational structure,' is caused by three contextual factors: environmental conditions, technology, and size. This idea is beneficial due to the fact managers play critical position in achieving organizational outcomes through their selections making. For example, managers within the manufacturing firms must foster non-stop commitment to communication and collaboration at one-of-a-kind degrees throughout, inside, and between groups, related to team of workers from distinctive departments, supply chain contributors and organizational stages in strategic planning. These would be possible by coordinating cross-functional within the organization.

#### 2.1.3. Social Network Theory

A social network is a set of organizations interlinked by a series of relationships which can be graphically illustrated by a set of nodes and lines (Chabowski et al., 2011). Social network theory has two key elements which include density of the completeness of the ties between the actors in a network and centrality that is the position of a company in a network and its ability to control the information flow (Sarkiset al., 2011). Thus, organizations should make cross-enterprise decision-making approach in supply chain management. Manufacturing firms should make use of social network theory as instruments of examining the structure of inter organizational relations (Carter et al., 2007).

In addition, social network theory can assist manufacturing firms in Kenya to analyses and explore relationships between supply chain members at both levels, i.e., upstream and downstream (Sarkiset al., 2011). The social network theory can also be used to validate the necessity of supplier relationship practices in supply chains and further describe the need for undertaking proactive measures in acquisition of goods and services in organizations (Lee, 2005; Sarkiset al.,

2011). Use of social networks will make well execution of GSCM rehearses in the organization that will benefit from its central position to champion and monitor proactive initiatives (Vurroet al., 2009) through both material/money flow alliances and sharing-of-information types of ties (Borgatti& Li, 2009). 'Therefore, manufacturing firms in Kenya should focus on their supply chain configuration design through the use of advanced information sharing mechanisms that can increase supply chain density and, in turn, its ability to relate with suppliers' (Neville &Menguc, 2006; Vurroet al., 2009).

## 2.2. Conceptual Framework

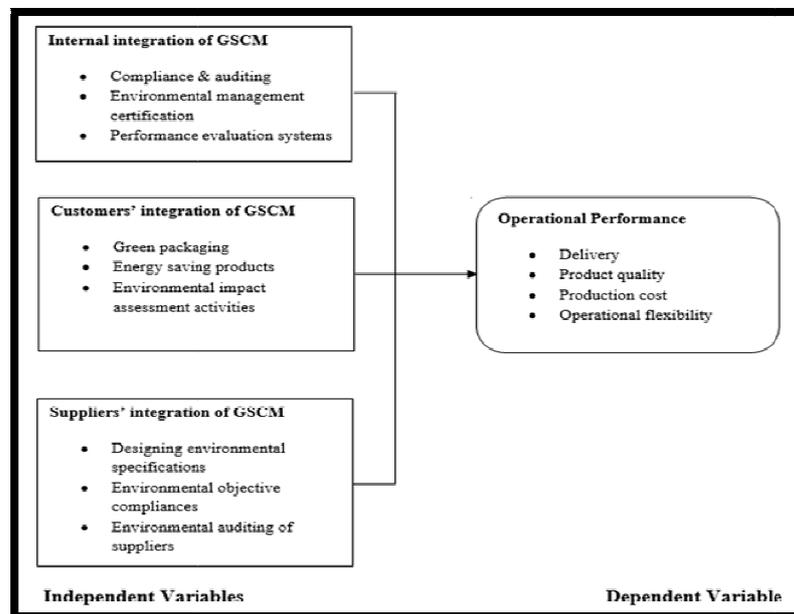


Figure 1: Conceptual Framework

## 2.3. Review of Literature on Variables

### 2.3.1. Internal Integration of GSCM

According to Vachon and Klassen (2006) 'internal green supply chain management as the environmental management practices carried across all functions within the organization through cooperation and sharing of crucial information for successful environmental management'. Equally, implementing internal GSCM practices in organization require close partnership relationships (Zhu et al., 2008).

Internal environment management is crucial for GSCM practices to succeed in organizations (Green et al., 2012). Internal mechanism for coordinating internal GSCM is required to be done systematically (Zhu et al., 2010). Environmental management practices should be entrenched in business operations in order organization can gain benefits such as cost saving, improvements of firm's efficiency and product quality improvement (Alvarez-Gil et al., 2001). Equally, some studies in the literature such as Chen, (2001) and Sroufe (2003) observed that environmental management system positively affects performance of organizations such as cost, quality, waste reduction, delivery and enhanced reputation.

Yang et al. (2010) found proactive environmental management programs such as well written and defined environmental objectives, policies save costs and deliver organization competitiveness. Further, a study by Lai and Wong (2012) noted that implementing green logistics can improve manufacturers' performance such as product quality and shorter lead time.

### 2.3.2. Customers Integration of GSCM

Green supply chain management with customers is the environmental collaboration between a firm and its customers that aims to fulfil customer environmental requirements by focusing downstream of the supply chain (Vachon&Klassen, 2008). Associations should direct natural coordinated efforts with clients through building close and long haul connections for effective usage of GSCM rehearses (Green et al., 2008).

Previous studies have shown that customer pressure is a primary driver to improve organization environmental image (Christman& Taylor, 2001). Thus, understanding the needs of end customer is a component of GSCM and it creates value. Due to environmental pressures from customers, it is important to conduct jointly environmental issues such as green packaging, crafting environmental goals and environmental planning (Zhu et al., 2010). For example, in Chinese automotive industry supply chain, due to motivational drivers such exports and sales to foreign customers, automobile firms have put their efforts towards building strategic environmental collaborations with their end customers (Zhu et al., 2010).

Environment collaboration with customers has become important as organizations tries to integrate ecological aspects of the product and process design to meet the customers' requirements (Thun& Muller, 2010). GSCM with customers can assist firms to integrate technological innovations, hence increasing organizational performance. Regarding to cost, customers support for product acquisition and facilitates product return for recycling processes, therefore

improving the success of environmental initiatives in material disposal (Lai & Wong, 2012). Also, GSCM with customers lead to joint product specifications that are durable.

An investigation directed by Zhu et al. (2007) in auto industry showed that there was no huge connection between ecological participation with clients and execution of firms regarding cost, conveyance and quality. In any case, an examination by Vachon and Klassen (2008) demonstrated opposite.

### 2.3.3. Suppliers Integration of GSCM

Green supply chain management is an environmental collaboration between firm and its suppliers in implementing environmental matters. It focuses on upstream of a product's organization supply (Vachon&Klassen, 2008; Zhu & Cote, 2004). It is necessary for organizations to include their suppliers' views in implementing environmentally friendly practices in form of purchasing and material management procedures (Rao & Holy, 2005). For example, in Chinese automotive industry have made it mandatory for suppliers to obtain ISO 14001 certification. This is because suppliers are considered as crucial partners in supply chains as they are in position to support environmental initiatives (Seuring& Muller, 2008).

Environmental collaborations with suppliers can make organization to gain competitive advantage. 'Greening the supply chain can benefit and organization through cost reduction to integrating in participative decision-making process that promotes environmental innovation' (Bowen et al., 2001). GSCM with providers can lessen wastage, material replacement through natural sourcing of crude materials and waste decrease of unsafe materials and consequently improve execution of firms (Vachon&Klassen, 2008). Equally, buying firm can assist its suppliers in adopting an environmental management system by assuring good environmental sources of materials.

From the empirical studies, it showed that suppliers are very instrumental in implementing environmental issues through sourcing friendly raw materials and which in turn reduce emissions (Corbett &Klassen, 2006). Also, Vacho and Klassen (2008) found out that a well linked collaboration with suppliers on environmental issues can improve the performance of the organization in terms of quality, delivery, flexibility, reduction in manufacturing costs, quick responding to market changes and fulfilling perfect orders.

### 2.3.4. Operational Execution of SMSMF

Operational performance it is a strategic dimension by which organizations choose to compete (Narasimhan& Das, 2001). Thus, manufacturing firms' resources should be geared towards developing competitive priorities to achieve a competitive advantage (Ho et al., 2002). From the existing literature, it shows that quality, delivery, flexibility and cost are fronted out as most competitive (Pagell& Krause, 2002).

Integrating environmental concerns into SCM has become important to the firm competitive advantage and hence increasing firm performance (Zhu et al., 2008). Yang et al. (2010) a decent ecological administration is a compelling instrument in supporting assembling seriousness as far as cost, conveyance and quality for overseeing supply chains. The examination had embraced adaptability, cost, quality as build instrument used to quantify operational adaptability.

## *2.4. Empirical Review and Critique*

Mukiri (2007) studied GSCM firms and found that 'reverse logistics obtained the least attention in manufacturing firms and local companies are not aware about the exercise than the locals. The relevance of GSCM in overcoming environmental challenges changed into extraordinarily favored. Factors appearing as obstacles to adoption had been exemplified. Hence the concluded that environmental demanding situations in Kenya are complicated and the GSCM exercise is yet to be followed'. The authorities have been regarded as the only accountable for gradual tempo towards implementation. Thus, they should take a look at proposed for similarly studies inside the same place which include the carrier quarter.

Korir (2014) noted that, 'green supply chain control has received interest among researchers and practitioners of operations and deliver chain control because of escalating deterioration of surroundings which includes diminishing sources, overflowing waste sites and growing tiers of pollution'. He additionally, asserted that GSCM have to be embraced not simply for environmentally friendly aspects, but for corporations to gain precise business feel and high income. But his examine targeting contextual method along with green procurement, inexperienced production, inexperienced distribution and reverse logistics. This research takes a look at unnoticed different important program constructs consisting of lean and just in time.

Ouru (2015) tested the GSCM performance management practices in huge manufacturing corporations in Nairobi, Kenya and he found out that benchmarking and use of cleaner production philosophy attributed to performance of large manufacturing firms. But this study did not focus on the specific improvement programs of production philosophies. Also, the study concentrated only on large manufacturing firms. Thus, the motive of this has a look at is to choose the effect of green convey chain control rehearses on the general execution of little and medium estimated creation organizations in Kenya by using improvement programs constructs such as lean manufacturing, total quality management, just in time and agile manufacturing.

Zhu et al. (2005) found that increasing pressures have caused the Chinese vehicle deliver managers don't forget implementation of numerous GSCM practices. Zhu et al. (2004) recommended that each environmental and Economic Performances are the basis for organizational performance. Lee et al. (2012) found out that, there can be a right away hyperlink between GSCM exercise implementation and commercial enterprise standard overall performance. The results indicated that corporation performance can be improved whilst GSCM complements operational overall performance, does this additionally observe in Kenya in that GSCM Practices are accomplished with the resource of agencies.

Mohamed (2012) found out that GSCM has a notable impact on manufacturing businesses in Mombasa. She recommended further studies to be completed in manufacturing corporations in different parts of the United States further to issuer area. Obiso (2011) determined that the uptake of GSCM rehearses had enormous ecological impact on execution of oil companies in Kenya. Omenge (2012) asserted that GSCM practices had extra satisfactory performance with the environmental overall performance of banks. All these researches focused on identical inexperienced deliver chain practices and non-of them centered at the unique improvement programs of production philosophies.

### 2.5. Research Gaps

From literature it indicates confined utility of theory in inexperienced SCM studies. The loss of concept utility can also have confined our capability to apprehend GSCM and its related variables in addition to the relationships between them. It also makes the generalization of study's findings from one context to another tough. It is therefore crucial that the green store network control research literature makes extra use of concept to improve our expertise of the phenomenon. Moreover, the few literatures reviewed incorporate theories. Further, the findings of majority reviewed literature had been based on qualitative and consequently lack quantitative strategies to validate and show theoretical concepts.

In Kenyan context, the literature reviewed on large manufacturing firms and automobile industries. 'There are limited studies available on green supply chain management focusing SMsMF and yet SMsMF represent to 70 in step with cent of manufacturing companies in Kenya and money owed over 40 percentage of the overall employment' (Kenya National Bureau of Statistics, 2015). 'There is also, the limited research on reverse logistics, green distribution, inexperienced manufacturing and green procurement. Therefore, the cause of this examine is to determine the influence of integrating of green supply chain management and the operational performance of small and medium sized manufacturing firms in Kenya'.

### 2.6. Summary

The concept of GSCM is limited in Kenya. However, the available literature focuses on majorly in large manufacturing firms and automobile industries. This work focuses on GSCM practices looking specific improvement programs of production philosophies. Also, theories have been reviewed to support the study and finally literature has been critiqued to establish research gaps.

## 3. Research Methodology

### 3.1. Research Design

Research design is a well thought out plan on how the study is conducted (Mugenda & Mugenda, 2003). In this investigation, an elucidating research configuration was received in light of the fact that expressive examination configuration would give clear depiction highlights on how coordinated green production network the board is carried on SMsMF in Kenya. Further, the investigation tried to comprehend and find out highlights that SMsMF have been utilizing to incorporate green inventory network the executives. The exploration configuration empowered the specialist to find the association among factors of interest.

### 3.2. Target Population

The objective populace in this investigation was all little and medium-sized assembling enrolled with Association of Manufacturers and are fundamentally based business place in Nairobi. As per the Kenya Association of Manufacturers (2019) there are an aggregate of 475 little and medium-sized assembling organizations working in Nairobi and they are classified in different areas under which they perform. There are different areas under which those organizations perform.

### 3.3. Sample and Sampling Technique

Stratified random sampling strategy was completed to bring the example size, for the explanation that populace of little and medium-sized assembling firms was taken into consideration to be heterogeneous, implying that a simple random pattern could be unrepresentative. It makes certain that every manufacturing area is represented. According to Cooper and Schindler (2006) every sample has non-zero possibility of selection. Taking a non-zero chance of selection of 0.10, then the sample size will be given as  $0.101 = \frac{\text{Sample size}}{475}$ .

This implied that a sample size of 48 manufacturing firms was incorporated. In addition, two respondents (procurement/supply chain department) were drawn from each firm using simple random technique. Hence, a total of 96 respondents were used in this study. The investigation picked production network administrators/acquirement managers of every one of the assembling firms to take part in the study because they were deemed to have good knowledge in procurement. The study calculated the percentage each sector represented among the total number of firms as shown

Sector	No. of firms	Firm sample size	No of respondents
Building	6	6/475x48=1	2
Food, Beverages	104	104/475x48=10	20
Chemical	64	64/475x48=6	12
Energy	44	44/475x48=4	8
Plastics	56	56/475x48=6	12
Textiles	40	40/475x48=4	8
Wood Products	23	23/475x48=2	4
Pharmaceutical	21	21/475x48=2	4
Metal and Allied	40	40/475x48=4	8
Leather	8	8/475x48=1	2
Motor	18	18/475x48=2	4
Paper	50	50/475x48=5	10
<b>Total</b>	<b>475</b>	<b>100</b>	<b>96</b>

Table 1

The examination utilized open and close finished questionnaire for all the respondents. Open ended questionnaires were deemed to be right because they provided an opportunity for respondents' freedom of expression while closed questionnaire (use of Likert scale) reduced biasness because of the provision of uniform questions and respondent were not influenced in answering questions. The response choices were nominal while the closed questions were on interval scale. The nominal questionnaire that required the respondents answer either Yes or No have no preferential. The stretch scale was estimated on a 5-point Likert size of unequivocally dissent, deviate, nonpartisan, concur and emphatically concur.

### 3.4. Data Collection Procedures

The specialist looked for consent letter from JKUAT to direct research from to assembling firms. From there on the analyst met the human asset officials of the assembling firms and educated them the expectation of conveying research. The human asset administrators of assembling firms allowed the researcher to collect the data from procurement/supply managers after liaising them. Thereafter, the researcher dropped the questionnaire to the procurement/supply chain managers and after one week the researcher picked the questionnaire as this was deemed to be appropriate time.

### 3.5. Data Analysis and Presentation

Homer and Stanley, (2002) opines that 'data analysis involves reducing accumulated data to manageable size, developing summaries, looking for patterns and applying statistical techniques while else data preparations include editing, coding, and data entry and is activity that ensures the accuracy of the data and their conversion from raw form to reduced and classified form that are more appropriate for analysis'. (Cooper &Schindler, 2011) states that 'editing detects errors and omission, corrects them where possible and satisfies that maximum data quality standards are achieved. Coding involves assigning numbers or other symbols to answer so that the responses can be grouped into limited number categories'. The data collected was presented in form of tables, graphs and charts. The multiple regression model used was ashow below: -

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + e_i$$

Where:  $y$  = Operational performance,  $\alpha$ ,  $\beta_1$  &  $\beta_2$ =Constants,  $x_1$ = Internal integration of GSCM,  $x_2$ = Customer's integration of GSCM,  $x_3$  = Supplier's integration of GSCM,  $e_i$ = Error term.

## 4. Research Findings and Discussion

### 4.1. Response Rate

The study administered a total of 96 questionnaires to the procurement/ supply chain managers of 48 manufacturing firms who were among the member of sample size. Two respondents were picked from 48 manufacturing firms sampled. All 96 questionnaires were filled and returned hence accounting 100 percent. This excellent response rate was attributed due to good data collection procedure technique where the surveys were self-controlled; clear clarification was provided and constant follow-up of the respondents.

### 4.2. Pilot Study Findings

Pilot study was conducted on 9 manufacturing firms who were not involved in the sample size but were among the objective populace. The 9% of respondents was 10% of the example size. One respondent was picked from 9 manufacturing firms. In this study validity of study instruments were carried out by subjecting the study instrument to the subject experts and supervisors and their opinions were incorporated in the study instrument.

Likewise, the investigation tried the dependability of the examination instruments by use of Cronbach alpha value coefficients. The purpose of conducting reliability is to measure the consistence of study instrument if it was subjected under similar conditions. From the pilot study, it was found out that all the study variables were reliable with the Cronbach value above 0.7. According to George and Malley (2011) noted that study instrument with the Cronbach value above 0.7 is a good measure.

Variable	No. of items	Alpha ( $\alpha$ )	Comment
Internal integration of GSCM	5	0.896	Reliable
Customer integration of GSCM	5	0.821	Reliable
Supplier integration of GSCM	5	0.762	Reliable
Operational performance	6	0.815	Reliable
Overall	21	0.807	Reliable

Table 2: Reliability Statistics

#### 4.3. Demographic Attributes of Respondents

The investigation looked to discover the segment attributes of the respondents and the outcomes are as per the following:

##### 4.3.1. Company Claimed

The examination looked to discover the assembling firm's possession. From the outcome, it was set up that most of the assembling firms were locally owned with the percentage rate of 56.3%, 22.9 percent were both locally and globally owned and 20.8 percent were globally claimed as shown in Table 3. The responsibility for firms were significant in this examination on the grounds that the investigation showed that dominant part of assembling firms is locally owned and the responses showed a true feeling of what is happening in the Kenyan manufacturing firms and it is valid to be generalized. Equally, it shows that Kenya has great potential towards industrializations.

Variables	Response	Frequency	Percent
Company ownership	Locally	54	56.3
	Global	20	20.8
	Global and local	22	22.9
	Total	96	100.0

Table 3: Company Ownership

##### 4.3.2. Market Served

The respondents were asked to indicate the market their manufacturing firms serve and the study findings it showed that 68 percent of manufacturing firms serve the local market, 15.6 percent served the global market and 15.6 percent served both local and global markets. The results are presented in Table 4. From these findings it is clearly shown that manufacturing firms have big local market to serve and which they are yet to satisfy.

Variables	Response	Frequency	Percent
Markets served	Global markets only	15	15.6
	Local markets only	66	68.8
	Local and global	15	15.6
	Total	96	100.0

Table 4: Markets Served

##### 4.3.3. Number of Years of Operation

The respondents were approached to demonstrate the quantity of years they have been in activity and greater part of assembling firms 56% have been activity under five years, 30.2 percent showed that they have been in activity somewhere in the range of 3 and 6 years, 3.1 percent have been in activity for around 7 to 10 years, 6.3 percent demonstrated they have been in activity for around 11 and 15 years and 4.2 percent showed that they have been in activity for over 15 years. The outcomes are given in Table 4.4. From the outcomes it tends to be presumed that greater part of assembling firms is at newborn child stage and they don't have insight in assembling firms. The examination finding might be at times one-sided and consequently might be incompletely summed up.

Variables		Frequency	Percent
Number of years the organization has been in operation in Kenya	Less than 2	54	56.3
	3 to 6	29	30.2
	7 to 10	3	3.1
	11to 15	6	6.3
	More than 15	4	4.2
	Total	96	100.0

Table 5: Number of Years in Operation

#### 4.4. Influence of Internal Integration of GSCM

##### 4.4.1. Internal Integration Descriptive Statistics Findings

The examination looked to discover the assessment of the respondents concerning interior coordination green production network the board and the presentation of little and medium-sized assembling firms on the Likert size of 1-5. From the examination discoveries it was discovered that 47.9 percent of respondents with a mean rate of 3.05 embraced cross-functional teams to improve environmental activities. Likewise, on environmental compliant, 53.1 percent of the respondents with a mean rate of 3.01 agreed that their manufacturing firms are environmental complacent through auditing their programs. Further, the study showed that 55.2 percent of the respondents with a mean rate of 2.98 adhere to environmental management certification such as ISO 14001. Equally, 52.1 percent of respondents with a mean rate of 2.97 indicated that their manufacturing firms have set up ecological administration frameworks and 60.4 percent of the respondents with a mean of 3.22 indicated that their manufacturing firms use less intensive capital machines.

Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Embrace cross-functional teams to improve environmental activities	20.8	20.8	10.4	28.1	19.8	3.05	1.461
Environmental compliant through auditing of our programs	30.2	13.5	3.1	31.3	21.9	3.01	1.599
Adhere to environmental management certification such as ISO 14001	35.4	8.3	1.0	33.3	21.9	2.98	1.654
Environmental management systems	29.2	14.6	4.2	34.4	17.7	2.97	1.545
Uses less intensive capital machines	26.0	12.5	1.0	34.4	26.0	3.22	1.591

Table 6: Internal Integration Descriptive Statistics  
SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

From the study findings it clearly shows that many manufacturing firms have embrace cross-functional teams as a way of improving environmental activities. However, there is quite big number of manufacturing firm who have embraced cross-functional teams. Therefore, it is important for those manufacturing firms to embrace cross-functional teams because implementing internal GSCM practices through close relationship will improve environmental activities and thus productivity (Zhu et al., 2008).

Further, it was observed that majority of manufacturing firms have not adhered to environmental management certification such as ISO 14001 when engaging with the suppliers. Also, many manufacturing firms have not put in place environmental management systems. These study findings disagree with the reviewed literature that for the organizations to improve productivity, they should observe environmental management system. This because according to Chen (2001) and Sroufe (2003) found out that environmental management system positively affects performance of organizations such cost, quality, waste reduction, delivery and improve reputation. Equally, Yang et al. (2010) noted that proactive environmental management programs such as well written environmental objectives, policies will enhance organizational competitiveness.

##### 4.4.2. Simple Linear Regression Findings on Internal Integration

Simple linear regression was led to decide the impact of interior mix of GSCM and operational execution of SMsMFs. The model used was  $Y = \beta_0 + \beta_1 X_1 + \epsilon$ . Where:

Y= Operational performance of SMsMF,  $\beta_0$ =Constant of the Model,  $\beta_1$  is the coefficient for  $X_1$ ,  $X_1$ =Internal integration,  $\epsilon$  = error term

The linear regression model showed that adjusted R=0.687 which implied that 68.7 change of operational performance of SMsMF can be explained by unit change of internal integration of GSCM as shown in Table 7.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780 <sup>a</sup>	.709	.687	.597

a. Predictors: (Constant), Internal integration of GSCM

Table 7: Model Summary of Internal Integration of GSCM

From Table 7, it shows that a change of one unit of internal integration of GSCM leads to 68.7 percent increment of operational execution of SMsMFs. Hence, inner joining has effect on operational execution of SMsMF. Further, test on ANOVA showed the significance F-statistics (99.837) less than 0.05 since p value,  $p=0.00$ , as shown in Table 4.7. This implies that there is a positive huge connection between interior reconciliation of GSCM and operational execution of SMsMFs

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.212	1	42.212	99.836	.000 <sup>b</sup>
	Residual	39.744	94	.423		
	Total	81.957	95			
a. Dependent Variable: Operational Performance of SMsMFs						
b. Predictors: (Constant), Internal integration of GSCM						

Table 8: ANOVA of Internal Integration of GSCM

Additional test on beta coefficients of the resulting model, showed that the constant  $\beta = 0.979$ , if the independent variable of internal integration of GSCM was held constant then there would be a positive operational execution of SMsMFs by 0.979. The regression coefficient for internal integration of GSCM was positive and significant ( $\beta = 0.718$ ) with a t-value=9.992 (p-value<0.001). As shown in Table 9.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.979	.275		3.561	.001
	Internal integration GSCM	.655	.066	.718	9.992	.000
a. Dependent Variable: Operational Performance of SMsMFs						

Table 9: Coefficients of Internal Integration of GSCM

This implied that for every one unit increase in internal integration of GSCM, operational performance of SMsMF was predicted to increase by 71.8 percent units. Thus, internal integration of GSCM positively builds the operational exhibition of SMsMF. These study findings agreed with the study of Sroufe (2003) who noted that internal integration of environmental management system positively affects performance of organizations such as cost, quality, waste reduction, delivery and enhanced reputation.

#### 4.5. Influence of Customer Integration of Green Supply Chain Management

##### 4.5.1. Customer Integration Descriptive Statistics Findings

The investigation looked to discover the assessment of the respondents concerning client coordination green production network the board and the presentation of SMsMFs on the Likert size of 1-5. From the examination discoveries it was discovered that 48.9 percent of the respondents with a mean pace of 3.04 of SMsMFs concurred that they cooperate with clients for green bundling, 58.7 percent of the respondents with a mean pace of 3.24 of SMsMFs concurred that they help out clients for utilizing items which less energy in transportation. Additionally, 45.2 percent of respondents with a mean pace of 3.04 of SMsMFs concurred that they cooperate with clients to decrease ecological effect exercises and 45.9 percent of the respondents with a mean pace of 4.09 of SMsMFs concurred that they work together with clients in things removal. Nonetheless, 31.2 of the respondents with a mean pace of 2.66 of SMsMFs concurred that they do direct customary preparing with their clients on item utilization as demonstrated in Table 10.

From the outcomes in Table 10, dominant part of SMsMFs they do help out clients for green bundling, utilization of item with less energy utilization in transportation, decrease on natural effect exercises and things removal. These examination discoveries are in agreement the investigation of Zhu et al. (2010) who saw that as a result of ecological pressing factors from clients, it is imperative to direct together natural issues like green bundling, creating natural objectives and ecological arranging. Similarly, associations should direct ecological joint efforts with clients through building close and long-haul connections for effective usage of GSCM rehearses (Green et al., 2008). In this way, those couple of little and medium-sized assembling firms who do not cooperate with their customers on matters to do with green packaging, use of product which consume less energy, reduce environmental impact activities and items disposal, should cooperate with customers to improve their productivity. GSCM with customers can assist firms to integrate technological innovations, hence increasing organizational performance. Regarding to cost, customers support for product acquisition and facilitates product return for recycling processes, therefore improving the success of environmental initiatives in material disposal (Lai & Wong, 2012).

Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Cooperate with customers for green packaging	23.0	11.0	11.0	28.4	17.5	3.04	1.471
Cooperate with customers for using products which consume less energy in transportation	19.6	17.4	4.3	37.0	21.7	3.24	1.470
Work together with customers to reduce environmental impact activities	20.0	24.4	10.0	22.2	23.3	3.04	1.491
collaborate with customers in items disposals	6.3	36.5	11.5	2.1	43.8	4.09	1.096
Regular training our customers in product usage	29.2	17.7	21.9	20.8	10.4	2.66	1.368

Table 10: Customer Integration of GSCM Descriptive Statistics  
SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

#### 4.5.2. Simple Linear Regression Findings on Customer Integration

Simple linear regression was conducted to analyze the impact of client joining of GSCM and operational execution of SMsMFs. The model used was  $Y = \beta_0 + \beta_2 X_2 + \epsilon$ . Where:

Y= Operational performance of SMsMF,  $\beta_0$ =Constant of the Model,  $\beta_2$  is the coefficient for  $X_2$ ,  $X_2$ =Customer integration,  $\epsilon$  = error term

The linear regression model showed that adjusted R=0.619 which implied that 61.9 change of operational performance of SMsMF can be explained by unit change of customer integration of GSCM as shown in Table 11.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.782 <sup>a</sup>	.720	.619	.931

a. Predictors: (Constant), Customer integration of GSCM

Table 11: Model Summary of Customer Integration

From Table 11, it shows that a change of one unit of customer integration of GSCM leads to 61.9 percent increment of operational execution of little SMsMFs. Thus, customer integration has influence on operational performance of SMsMF. Further, test on ANOVA showed the significance F-statistics (7.277) less than 0.05 since p value, p=0.00, as shown in Table 12. This implies that there is a positive critical connection between client joining of GSCM and operational execution of little and medium-sized assembling firms.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.840	1	5.840	7.278	.025 <sup>b</sup>
	Residual	75.448	94	0.803		
	Total	81.291	95			

a. Dependent Variable: Operational Performance of SMsMFs

b. Predictors: (Constant), Customer integration of GSCM

Table 12: ANOVA of Customer Integration OfGSCM

Additional test on beta coefficients of the resulting model, showed that the constant  $\beta = 3.304$ , if the independent variable of internal integration of GSCM was held constant then there would be a positive operational performance of small and medium-sized manufacturing firms by 3.304. The regression coefficient for internal integration of GSCM was positive and significant ( $\beta = 0.259$ ) with a t-value=2.281 (p-value<0.001). As shown in Table 13.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.304	.562		5.879	.000
	Customer integration of GSCM	.188	.082	.259	2.281	.025

a. Dependent Variable: Operational Performance of SMsMFs

Table 13: Coefficients of Customer Integration of GSCM

This implies that for each one-unit increment in client incorporation of GSCM, operational execution of operational execution of little and medium-sized assembling firms was anticipated to increment by 25.9 percent units. These study findings concur with the study conducted by Vachon and Klassen (2008) in automotive industry showed 'that

there was a significant relationship between environmental cooperation with customers and performance of firms in terms of cost, delivery and quality’.

#### 4.6. Influence of Supplier Integration GSCM

##### 4.6.1. Supplier Integration Descriptive Statistics Findings

The investigation looked to discover the assessment of the respondents concerning provider incorporation green production network the executives and the presentation SMsMFs on the Likert size of 1-5. From the investigation discoveries it was discovered that 54.6 percent of the respondents with a mean pace of 4.32 of SMsMFs agreed that they provide designing specifications to suppliers that meet environmental requirements for the items to be purchased, 47.9 percent of the respondents with a mean rate of 3.95 of SMsMFs agreed that they do cooperate with suppliers on matters of environmental objectives and 48/4 percent of the respondents with a mean rate of 4.05 of small and SMsMFs agreed that they regularly conduct environmental audit for supplier internal management. However, 26.9 percent of the respondents with a mean rate of 3.71 SMsMFs agreed that they select suppliers using environmental criteria. Likewise, 39.1 percent of the respondents with a mean rate of 3.66 of SMsMFs agreed that do conduct joint product development with suppliers as indicated in Table 14.

From the study findings, it was observed that majority small and medium-sized manufacturing firms provide design specification to suppliers, draft environmental objective together with suppliers, conduct regular environmental audit with suppliers and conduct joint product development. These study findings agree with studies reviewed in the literature, that a well linked collaboration with suppliers on environmental issues can improve the performance of the organization in terms of quality, delivery, flexibility, reduction in manufacturing costs, quick responding to market changes and fulfilling perfect orders (Vacho&Klassen, 2008). However, it was not that majority of SMsMFs do not select supplier using environmental criteria. Environmental collaborations with suppliers can make organization to gain competitive advantage. It is necessary for organizations to include their suppliers’ views in implementing environmentally friendly practices in form of purchasing and material management procedures (Rao & Holy, 2005).

	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Provide designing specifications to suppliers that meet environmental requirements for the items to be purchased	20.2	18.1	5.3	28.7	27.7	4.32	.888
Cooperate with suppliers for environmental objectives	22.3	19.1	10.6	30.9	17.0	3.95	.944
Regularly conduct environmental audit for suppliers’ internal management	24.2	17.9	9.5	24.2	24.2	4.05	.933
Select suppliers using environmental criteria	10.8	22.6	39.8	18.3	8.6	3.71	.861
Joint product development with suppliers	33.7	19.6	7.6	22.8	16.3	3.66	1.293

Table 14: Suppliers Integration Descriptive Statistics

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

##### 4.6.2. Simple Linear Regression Findings on Supplier Integration

Simple linear regression was conducted to examine the impact of provider combination of GSCM and operational execution of SMsMFs. The model used was  $Y = \beta_0 + \beta_3 X_3 + \epsilon$ . Where:

Y= Operational performance of SMsMF

$\beta_0$ =Constant of the Model

$\beta_3$  is the coefficient for  $X_3$

$X_2$ =supplier integration

$\epsilon$  = error term

The straight relapse model showed that changed  $R=0.746$  which inferred that 74.6 difference in operational execution of SMsMF can be clarified by unit change of provider reconciliation of GSCM as shown in Table 4.14.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.873 <sup>a</sup>	.813	.746	.892

a. Predictors: (Constant), Supplier’s integration of GSCM

Table 15: Model Summary of Supplier Integration of GSCM

From Table 15, it shows that a change of one unit of supplier integration of GSCM leads to 74.6 percent increment of operational execution of little and medium-sized assembling firms. In this way, provider coordination has effect on operational execution of SMsMF. Further, test on ANOVA showed the significance F-statistics (13.834) less than 0.05 since p value,  $p=0.00$ , as shown in Table 4.15. This means that there is a positive significant relationship between supplier integration of GSCM and operational execution of little and medium-sized assembling firms.

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.011	1	11.011	13.833	.023 <sup>b</sup>
	Residual	70.811	89	.796		
	Total	81.833	94			
a. Dependent Variable: Operational Performance of SMsMFs						
b. Predictors: (Constant), Supplier's integration GSCM						

Table 16: ANOVA of Supplier Integration of GSCM

Additional test on beta coefficients of the resulting model, showed that the constant  $\beta = 3.259$ , if the independent variable of internal integration of GSCM was held constant then there would be a positive operational execution of SMsMFs by 3.259. The regression coefficient for internal integration of GSCM was positive and significant ( $\beta = 0.076$ ) with a t-value=2.367 ( $p$ -value<0.001). As shown in Table 17.

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.258	.528		6.162	.000
	Suppliers GSCM with suppliers	.097	.131	.075	2.368	.020
a. Dependent Variable: Operational Performance of SMsMFs						

Table 17: Coefficients of Supplier Integration of GSCM

This implies that for each one-unit increment in provider coordination of GSCM, operational execution of operational execution of little and medium-sized assembling firms was anticipated to increment by 7.6 percent units. These study findings concur with the study Vacho and Klassen (2008) who found out that 'a well linked collaboration with suppliers on environmental issues can improve the performance of the organization in terms of quality, delivery, flexibility, reduction in manufacturing costs, quick responding to market changes and fulfilling perfect orders'.

#### 4.7. Operational Performance of Smsmfs

The investigation looked to discover the assessment of the respondents concerning the estimation of the operational presentation of SMsMFs on the Likert size of 1-5. From the investigation discoveries it was discovered that 44.6 percent of the respondents differ that operational exhibition of SMsMFs has been improved in terms of time delivery record to customers, provision of reliable services, providing high performing products and affordable products, customer needs have been fully modified to meet their needs and quick to respond to market. All these findings showed they are below the average as the mean rate is less than three as shown in Table 18.

Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Outstanding on time delivery record to customers'	29.3	13.0	13.0	41.3	3.3	2.76	1.345
Provide liable delivery to our customers	21.1	22.2	6.7	40.0	10.0	2.96	1.373
High performance of products that meet customer needs	31.2	16.1	10.8	32.3	9.7	2.73	1.438
Produce products with low costs	30.4	14.1	4.3	29.3	21.7	2.98	1.597
Quickly modify products or services to meet customers' requirements	24.7	22.6	10.8	29.0	12.9	2.83	1.419
Quickly respond to changes in market demand	56.7	28.9	3.3	6.7	4.4	1.73	1.100

Table 18: Operational Performance Smsmfs

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

#### 4.8. Multiple Regression Model Findings

The following model was used to estimate performance

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

Y= Operational Performance of SMsMF,  $\beta_0$ =constant,  $X_1$ =Internal integration,  $X_2$ =Customer integration,  $X_3$ =Supplier integration,  $\beta_i$  is the coefficient for  $X_i$  ( $i=1, 2, 3$ )

The regression analysis shows that the adjusted  $R^2=0.813$  which shows that 81.3 percent of change in operational execution of little and medium-sized assembling firms can be explained by a change of one unit of all the predictor variables jointly as shown on Table 19

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.927 <sup>a</sup>	.878	.813	.648
a. Predictors: (Constant), Suppliers GSCM with suppliers, Internal integration of GSCM, Customer integration of GSCM				

Table 19: Model Summary of Overall Regression Model

Further test on ANOVA shows that the significance of the F-statistic (34.349) is less than 0.05 since p value,  $p=0.00$ , as indicated in Table 20

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	43.300	3	14.433	34.349	.000 <sup>b</sup>
	Residual	38.658	92	.420		
	Total	81.958	95			
a. Dependent Variable: operational execution of SMsMFs						
b. Predictors: (Constant), Suppliers GSCM with suppliers, Internal integration of GSCM, Customer integration of GSCM						

Table 20: ANOVA of Overall Regression Model

This suggested that there was a positive huge connection between free factors and operational execution of little and medium estimated producing firms. In this manner, interior reconciliation, client incorporation and provider combination of GSCM builds the operational presentation of little and medium estimated producing firms. The following model was used to determine the overall regression coefficient

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Y= Operational performance of SMsMF

2.289=constant

0.662=Internal integration

0.032=Customer integration

0.156=Supplier integration

All variables are statistically significant with p values 0.000, and are less than  $p=0.05$  as summarized in Table 30.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	.460	.529		.868	.388
	Internal integration of GSCM	.662	.066	.725	10.080	.000
	Customer integration of GSCM	.032	.107	-.023	-.298	.003
	Suppliers GSCM with suppliers	.156	.099	.121	1.582	.017
a. Dependent Variable: Operational Performance of SMsMFs						

Table 21: Coefficients of Overall Regression Model

## 5. Summary Conclusions and Recommendations

### 5.1. Summary

The primary motivation behind the examination was to build up the impact of coordinating green inventory network the board and the operational exhibition of little and medium-sized assembling firms in Kenya. The examination was guided by the particular target of the investigation as summed up beneath:

#### 5.1.1. Influence of Internal Integration of GSCM and Operational Performance of Smsmf

Internal GSCM is the environmental management practices carried across all functions within the organization through cooperation and sharing of crucial information for successful environmental management. Studies reviewed in the literatures showed that internal integrating of GSCM practices such as EMS, proactive environmental programs and well-defined environmental objectives, policies can delivery organization competitiveness hence increasing productivity. Based

on the study findings, it was established that many small and medium-sized manufacturing firms have embrace cross-functional teams as a way of improving environmental activities.

However, study noted that there are large numbers of SMsMFs who have embraced cross-functional teams. Further, the study observed that majority of manufacturing firms have not adhered to environmental management certification such as ISO 14001 when engaging with the suppliers. Also, the study established that there are many SMsMFs have not put in place environmental management systems. Additional test on simple regression, it was found out that a change of one unit of internal integration of GSCM leads to 68.7 percent increase of operational performance of SMsMFs. Thus, internal integration has influence on operational performance of SMsMFs.

#### 5.1.2. Influence of Customers Integration of GSCM and Operational Performance of Smsmf

Clients' coordination of GSCM t is alluded regarding the working collaboration between the association and the clients that are equipped towards to satisfy client natural prerequisites. For instance, existing writings have shown that association should cooperate with clients on issue concerning natural issues such green bundling, ecological arranging and creating ecological target. Associations which are considered to work intimately with clients they are probably going to expand their operational exhibitions. From the examination discoveries, it was uncovered that greater part of little and medium-sized assembling firms they do help out clients for green bundling, utilization of item with less energy utilization in transportation, decrease on ecological effect exercises and things removal.

Notwithstanding, it was noticed that numerous little and medium-sized assembling firms who don't lead ordinary client preparing on item utilization. Similarly, it was seen that some little and medium-sized assembling firms don't help out their clients on issue to do with green bundling, utilization of item which devours less energy, diminish ecological effect exercises and things disposal. Further, test on basic relapse, it showed that a difference in one unit of client mix of GSCM prompts 61.9 percent expansion of operational execution of little and medium-sized assembling firms. In this way, client joining has impact on operational execution of SMsMF.

#### 5.1.3. Influence of Suppliers' Integration of GSCM and Operational Performance of Smsmf

Supplier integration of GSCM is the process of integrating suppliers and organization in matters concerning environmental issues. It focuses on upstream of products organization supply. From the reviewed existing literature, it was observed that environmental collaborations with suppliers can make organization to be competitive through wastage reduction of hazardous materials and hence improve performance. Also, by sourcing friendly raw materials can reduce emissions.

From the study finding it was observed that majority SMsMFs provide design specification to suppliers, draft environmental objective together with suppliers, conduct regular environmental audit with suppliers and conduct joint product development. However, it was not that majority of SMsMFs do not select supplier using environmental criteria. Environmental collaborations with suppliers can make organization to gain competitive advantage. Further test on simple regression, it was revealed that there was a positive significant relationship between supplier integration of GSCM and operational performance of SMsMFs

### *5.2. Conclusions*

Based on the internal integration of green supply chain management objective, it was established that many small and medium-sized manufacturing firms have embrace cross-functional teams as a way of improving environmental activities. However, study noted that there are large numbers of small and medium-sized manufacturing firm who have embraced cross-functional teams. Further, the study observed that majority of manufacturing firms have not adhered to environmental management certification such as ISO 14001 when engaging with the suppliers. Also, it was noted that majority of SMsMF have not set up environmental management systems. Additional test on simple regression, it was found out that internal integration of GSCM had a positive significant relationship with operational performance of small and medium-sized manufacturing firms.

Concerning customers' integration of GSCM objective, it was revealed that majority SMsMFs they do cooperate with customers for green packaging, use of product with less energy consumption in transportation, reduction on environmental impact activities and items disposal. However, it was noted that many small SMsMFs who do not conduct regular customer training on product usage. Equally, it was observed that some SMsMFs do not cooperate with their customers on matters to do with green packaging, use of product which consumes less energy, reduce environmental impact activities and items disposal. Further, test on simple regression, it was found out that customers integration of GSCM had a positive significant relationship with operational performance of SMsMFs.

Lastly, on supplier's integration of GSCM objective, it was observed that majority small and medium-sized manufacturing firms provide design specification to suppliers, draft environmental objective together with suppliers, conduct regular environmental audit with suppliers and conduct joint product development. Nonetheless, it was not that dominant part of little and medium measured assembling firms don't choose provider utilizing ecological models. Ecological coordinated efforts with providers can make association to acquire upper hand. Further test on straightforward relapse, it was uncovered that there was a positive huge connection between provider incorporation of GSCM and operational execution of little and medium-sized assembling firms.

### *5.3. Recommendations*

In light of the interior combination of GSCM objective, it was set up that numerous little and medium-sized assembling firms have not clung to ecological administration confirmation, for example, ISO 14001 while drawing in with

the providers. Thusly, the investigation prescribes to the administration of little and medium-sized assembling firms ought to hold fast to ecological administration certificate, for example, ISO 14001 while sourcing providers to advance natural mix between the organizations and providers. Likewise, the examination set up that there are numerous little and medium-sized assembling firms that have not set up natural administration frameworks. In this way, the investigation prescribes to the administration of little and medium-sized assembling firms should set up natural administration frameworks as ecological administration frameworks emphatically influence execution of associations in zones like expense, quality, squander decrease, conveyance and improve notoriety.

Also, the investigation suggests that small and medium-sized assembling firms should accept interior combination of green production network the executives since it was discovered to be positive huge relationship with operational execution of little and medium-sized assembling firms. Concerning clients' coordination of green store network, the executive's objective, it was noticed that numerous SMsFM who don't lead customary client preparing on item use. Accordingly, the investigation suggests that administration of little and medium-sized assembling firms should lead routinely client preparing on item use to furnish clients with abilities and information on the item use and better methods of discarding items to moderate ecological hazardless. Similarly, it was seen that some little and medium-sized assembling firms don't help out their clients on issue to do with green bundling, utilization of item which devours less energy, decrease ecological effect exercises and things disposal.

Therefore, the examination prescribes to the board of little and medium-sized assembling firms to team up with clients on issue to do with green bundling and natural decrease sway exercises and things removal. Finally, on providers joining of green store network the board objective, it was not that larger part of little and medium estimated producing firms don't choose provider utilizing ecological measures. In this manner, the investigation prescribes to the administration of little and medium-evaluated producing firms to accompany natural standards to choose providers. It is urgent for assembling firms to incorporate their providers sees in executing natural amicable practices consequently acquire upper hand. Similarly, the examination suggests that small and medium-sized assembling firms should accept providers' joining of green store network the executives since it was discovered to be positive critical relationship with operational execution of little and medium-sized assembling firms.

#### 5.4. Areas for Further Research

The examination was kept to a writing audit that just proposes interior incorporation of GSCM, client coordination of GSCM and providers' mix of GSCM. The hypotheses that clarify and uphold study have fronted. Nonetheless, the experimental writing that exist shows that there is more on coordinating green inventory network the board rehearses past what is talked about in this investigation. Along these lines study proposes further investigation can be led in a similar area yet utilize diverse incorporating rehearses. In this investigation, two respondents were picked from every little and medium-sized assembling firm's which may one-sided and consequently the examination prescribes comparative examination to be led utilizing numerous sources bunches from various areas.

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