Original Article

Green Supply Chain Management Methods To Enhance Sustainable Supply Chain - A Literature Review

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Abstract

The article seeks to grasp the elements of sustainable supply chain management, which includes green manufacturing, and it seeks to pinpoint the key contributions to the field. Green Supply Chain Management methods can significantly improve sustainability. This study focuses on the body of literature and conceptual models that are now accessible regarding how GSCM improves the environment to reduce environmental impacts through Green manufacturing, Green logistics, Reverse logistics, and Green purchasing. This article also sheds light on how businesses are adapting changing consumer demands by using sustainable supply chain management in order to not only maintain market share but also to keep costs under control, boost productivity, and gain an advantage over competitors.

Keywords: Green Supply Chain Management, Environmental performance, Operational Performance, sustainable supply chain

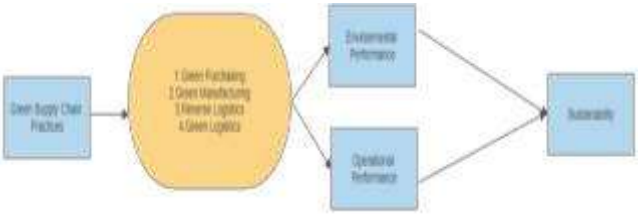
INTRODUCTION

Due to the acceleration of global warming and the changing biodiversity, the sustainability of the planet is now extremely at risk (Tseng et al., 2019). Over the past ten years, the concept of Green Supply Chain Management (GSCM) has full-fledged and gained significance in the context of business management around the world (Lopes & Pires, 2020). GSCM is defined as "the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and re-used at the end of their life cycle thus, creating a sustainable supply chain" (Dube et al., 2011).A crucial strategy for firms seeking to become ecologically responsible is Green Supply chain management and environmental sustainability decisions must increasingly be included into procurement theory and practice. Supply chain managers have begun to consider and adopt (GSCM) strategies to enhance both their financial and environmental efficiency as a result of increasing pressures from a diverse range of sources. Organizations are now making an effort to reduce their harmful environmental impact by integrating eco-friendly considerations into their supply chain activities.

According to Tseng et al.(2019) GSCM is the process of integrating environmental concerns into supply chain management. Many organisations now have sustainability goals at their heart, and enterprises have concluded that the optimum results come from integrating sustainability management methods across all organizational units (Srivastava, 2007).This study highlights the literature on GSCM and the green supply management process.

(Fig 1: Source Ala Telagha,2020)

(Fig 2: (Khan & Dong, 2017)



This model was adapted from (Abu Seman et al., 2019) ." GSCM practices encompass a set of green activities in procurement, manufacturing, distribution and reverse logistics" (Chin et al., 2015).In future this model may be modified with variables that are relatable to that particular period of time.

Objectives

1. To understand the concept of Green Supply chain Practices (GSCP) towards Environmental and Operational Performance which leads to sustainability
2. To study the benefits of green supply chain practices
3. To discuss the review of literature on GSCP, Environmental and Operational Performance from the period (2011-2022)

Literature Review

Green Supply Chain Management (GSCM)

Traditional logistic network operations involves transforming crude materials into finished goods and then disseminating them to consumers.(Prajapathi 2014) Unlike the typical supply chain, the green supply chain takes environmental aspects into account while making important decisions(Rupa & Saif, 2022) Therefore, one of the key objectives of modern businesses is to create sustainable businesses. Firms need to make a significant contribution and need to be concerned about the environment in order to accomplish more sustainable goals, which is generally alluded to as the "going green" (Tseng et al., 2019a) Societies all throughout the world are grappling with scenarios that have never happened before as a direct result of environmental degradation, resource exhaustion, and environmental issues. Concerns about the need for significant change in how individuals and corporations interact with the environment are growing. (Badi & Murtagh, 2019).Even though there is adequate of research on supply chain management that addresses environmental concerns to the newly developed idea of green practices in manufacturing.(Tseng, 2011) . Going green and reverse logistics are forms of innovative SCM. Sustainable manufacturing, eco-friendly distribution, and reverse procurement are all part of GSCM initiatives. The performance of sustainability is evaluated from the commercial, environmental, and social aspects. As far as the Sustainable Development Goal (SDG) No.9 is concerned it focuses on Infrastructure development, profitable business, and developmental activities. Technology and innovation, along

with equitable and sustainable industrialization, may generate dynamic and challenging economic structures that create employment and wealth. In a nutshell, the necessity of GSCM in assessing the organization's SC activities' environmental impact is crucial. The performance of sustainability can be enhanced more substantially by using GSCM techniques.

Sustainable Supply & Purchasing

Yu et al. (2017) investigated and empirically tested a conceptual framework linking green supply management and performance from a resource-based perspective. The findings imply that developing green supplier cooperation is

considerably and favourably related to both environmental and operational performance, and that both green purchasing and green supplier selection have a significant beneficial effect on green supplier collaboration. As a result, improving the purchasing function's knowledge and skills can be seen as a valuable resource for enhancing green supply capabilities and performance. (Yu et al., 2017).Green procurement process is usually thought to boost environmental performance, reduce waste, and generate cost savings. It also fosters efficiency and integration among business partners and their lead firms. This convergence should improve the company's reputation, ability to compete, and marketing exposure (Rao & Holt, 2005). Many of the literature reviewed also predicts a strong relationship between GSCM and Sustainability. A business strategy must be put forth in the circular economy to maximise resource efficiency, reduce negative environmental effects, and gain economic benefit. GSCM originated as a strategic planning for organizations to fulfil these goals(Kazancoglu et al., 2018). The minimization, repurposing, and the reuse of materials is a component of the eco-friendly procurement approach to sustainable procurement. An international analysis identified key elements for environmentally sustainable procurement, such as conveying design specifications to vendors that take into account environmental needs for goods required, collaborating with suppliers to achieve sustainability requirements, and selecting goods and services with low environmental impact. Green procurement is the idea of buying a variety of goods and services that minimises environmental damage, serving as a solution for firms that are both environmentally conscious and cost-conscious.(Chen, 2005)

Green Manufacturing

This is a key sector in green operations. Optimisation, commercial power, and fuel and resource efficiency analysis are the components which the methods for flow systems with the minimal resource and energy utilisation are based. The best course of action is to steer clear of designs that are either overly complex or have an excessive number of defects. Obviously, conserving energy is important for the environment. Additionally, it is obviously beneficial for business because it lowers expenses for businesses and eventually prevents possible environmental risks. The discovery of areas where large quantities of energy are consumed may then inspire a product's or its uses modification in order to achieve significant energy savings. Even with significant gain, focused measures can frequently be used to make enormous improvements in energy efficiency for minimal to no expense. However, sustainability entails much more than just examining and improving the environmental performance of production systems and processes.(Singh & Thakar, 2018) When society uses resources and generates debris at a rate that outpaces nature's capacity to turn waste from industry and

society into environmental nutrients and resources, a system may be considered to be unsustainable. (Paul et al., 2014).Growing industrialization has resulted in an increase in trash and e-waste production, pollution from inefficient waste disposal, GHG emissions, and incorrect disposal of industrial effluents to fulfil economic growth demands. This sustainability challenge can be met by converting to green manufacturing and moving toward environmentally friendly energy sources, materials, and procedures.(Kothawade 2015).

Green & Reverse Logistics

Reverse logistics is a procedure that makes sure products and unused materials are sent from the consumer to the manufacturer so it is salvaged, repurposed, or renovated. RL involves covering the SC from the other side. In order to reuse and repurpose those commodities, reverse logistics refers to a set of plan, implementation, and process control procedures for materials as well as finished goods. Uniform reusable packaging, efficient warehousing designs, and simple information access reduce storage and retrieval delays, which lower operating costs while being environmentally responsible. A wide range of tasks are included in logistics, such as gathering, classifying, handling, and repairing.(Singh & Thakar, 2018) Reverse Logistics programmes focusses on competitive advantage which can be gained through better profitability, efficiency gains, and more client contentment . Instead of buying new supplies and investing time and skills, RL provides both measurable and subjective advantages by recuperating, obtaining value from worn or rejected goods and extending product life. Additionally, by devoting significant priority to mending or restoring defective items, RL may drastically boost customer experience and thereby prolong

their loyalty. RL can also result in revisions to upcoming items or new product concepts by fusing user input and understanding the reasons for product returns. .(Banihashemi et al., 2019) RL has not received much attention from researchers working on sustainable supply chains. Even if there are still problems with how to define the roles that RL, sustainability, It is possible to assess various components using a thorough set of social sustainability parameters. (Sarkis et al., 2010)

GSCM & Operational Performance

To analyze how GSCM practise affects organisational, environmental, and operational Reverse Logistics programmes performance. A GSCM model that focuses on the performance effects of GSCM methods used by manufacturing businesses to integrate and coordinate environmental sustainability activities with their supply chain participants. According to the study's findings, GSCM techniques help manufacturing companies operate better economically and environmentally, both of which have a beneficial effect on operational performance. Productivity is

improved through optimal utilization of resources(Green et al., 2012) Dilhani and Chathurani in 2019 determined the effects of GSCM practices on various operations such as flexibility, delivery, quality, and cost impacting customer satisfaction. Customized manufacturing and delivery significantly increase market share, according to the study, even though GSCM practises improve all other operational achievement metrics mentioned above. Additionally, they discovered a study on indirect effect of GSCM practises on satisfying consumers are impacted by cost minimization and quality (Mallikarathna & Silva, 2019). From a resource-based viewpoint, Yu et al 2017 researched, created, and empirically tested a framework connecting GSCM and sustainability. The results recommend that increasing sustainable supplier coordination has a significant and beneficial association with both organizational and environmental performance and also improving purchasing function's knowledge and skills can be seen as a valuable resource for enhancing green supply functionality.(Yu et al., 2017).After all the literature reviews it has been analysed that GSCM and operational performance is correlated up to an extent.

Manufacturing organisations use GSCM methodologies to investigate the effects of GSCM practise on operational, environmental, and organisational performance in order to integrate and coordinate environmental sustainability operations with their supply chain partners. Green et al. established a GSCM model that focuses on the performance consequences of GSCM methods. The outcomes of the study show that GSCM procedures assist manufacturing organisations in operating more efficiently on an economic and environmental level, both of which are good for operational performance (Green et al., 2012) In 2019, Despite the fact that GSCM practises boost all other operations performance indicators, based on the study (flexibility, delivery, quality, and cost). Additionally, they found that GSCM practises had an indirect impact of customer satisfaction through manufacturing cost and quality, which has not previously reported in the research of Mallikarathna & Silva 2019. After a thorough analysis of the literature, it has been determined that there is nearly connection between GSCM and operational performance.

Green Supply Chain Practices (GSCM) and Environment

Huiying Zhang and Fan Yang's study looked into the connection between monetary, functional, and environmental concerns. By actually analysing data gathered from Chinese manufacturing companies, this study also looked into the motivations behind green practises and their effects on performance. The conclusion was that implementing green practises helped improve an organization's operational performance, which in turn helped indirectly enhance business performance. According to the findings, experts should adopt a new perspective and

acknowledge that adopting environmental strategies leads to opportunities in the economy and in the marketplace.(Zhang & Yang, 2016) The goal of the study conducted by Louis and Epoh s was to examine how GSCM practises, sustainability practice among SMEs relate to one another. The study comes to the conclusion that even if the literature supports the relationship of GSCM on environmental sustainability, it is crucial to understand how certain GSCM sub-dimensions relate to the desired performance outcome in SME supply chains.(Epoh & Mafini, 2018). In order to persuade businesses to adopt these practises, the study by Seman et al was to provide objective support for the substantial enhancement in sustainable performance that GSCM and green innovation strategies bring about. We can draw a connection between environmental performance and sustainable supply chain methods.(Hooker et al., 2020). Green innovation initiatives (GII) are positively impacted by environmental rules, market demand, and internal company actions, but GIIs are positively impacted by ecologic, societal, and financial sustainability, which are the three categories of sustainability predicted in the study by Zailani and colleagues on the factors that influence the acceptance of green technology and its impact on business performance in Malaysia's automotive sector (Zailani et al., 2015) Sustainability is strongly predicted by green products this indicates that using green products will greatly improve an organization's environmental performance. In reality, a company's purchasing organisation demands

suppliers to obtain environmentally friendly raw materials in order to decrease the toxic materials used in the product's production. This outcome is in line with research showing how green product practises significantly affect environmental performance.(Chin & Choon, 2020). Green process includes green purchasing, manufacturing and logistics. Rao et al. (2002) examined the extent of GSCM practice adoption using only two supply chain stages, namely, environmental initiatives within organisations and supplier greening, and how it affects performance in the manufacturing industry in South East Asia. They found a strong correlation between GSCM practises and environmental performance but not between environmental performance and economic performance. Consequently, an organization's environmental performance may not result in financial gains(Rao & Holt, 2005). Chin et al in from their study concluded that choosing environmentally friendly suppliers could improve business performance by minimising the number of suppliers and controlling purchasing expenses. Additionally, using green processes significantly improves environmental performance.(Chin & Choon, 2020). Chiou et al. developed and validated a relationship model for promoting green supply chains, green innovation, sustainability practises, and competitive edge in Taiwanese industry. They discovered that enhancing the competition and sustainability practises of the company by developing green logistics through green innovation. (Chiou et al.,2011)

Fig 3 source: https://www.visualcapitalist.com/most-sustainable-companies

Green Practices and sustainability

In the twenty-first century, enterprises must prioritise sustainability Robins categorized divided sustainability into three main categories: socioeconomic, social, and ecologic. Beneficiaries put pressure on businesses to deliver sustainable performance. Businesses are becoming more and more conscious of how decisions about products and procedures impact environmental and social performance. Therefore, a myriad of issues and pressure from environmental agencies, and an increase in social awareness among workers, purchasers, and societies overwhelm organisational decision-makers; these circumstances should strike a balance in order to guarantee internal and external stakeholders a reasonable ROI and firm survival.(Zailani et al., 2015) Efficient and sustainable business practises are two crucial foundations of sustainability of the company. An increased ecological, biological, and economical efficiency is made possible by the implementation of these policies along the list. The advantages of integrating minimalist and environmental concepts, including reduced expenses and production schedules, improved process flow, customer needs and expectations fulfilment, environment quality enhancement, as well as workforce commitment and satisfaction. Implementing green SC practises can have an impact on sustainability. (Govindan et al., 2014) This model was adapted from (Abu Seman et al., 2019) .“ GSCM practices encompass a set of green activities in procurement, manufacturing, distribution and reverse logistics” (Chin et al., 2015).In forthcoming this model may be modified with variables that are relatable to that particular period of time.

Conclusion

The supply chain has historically been defined as an interconnected process of production wherein raw materials are converted into finished goods and then supplied to customers. Environmental policymakers and experts have expressed alarm in recent years about the linkage between manufacturing firms and environmental concerns in developing economies. For numerous operational synergies, manufacturing organizations frequently upgrade their supply chain activities to green supply chain systems, but they frequently fail to deploy such advanced systems due to internal and external barriers. An effort to implement sustainable production is very limited in the Asian continent as proven through research. These researches made to analyse pertinent literature that is currently available, and it has been demonstrated that the GSCM procedures impacts performance crucially in the manufacturing sector. The study also identified a number of GSCM techniques and performance measurement factors for more empirical research. Customers' environmental concerns are on the rise, according to several research on the automotive sector. These studies also highlight the advent of "green customers." As a result, a green market compels automakers

to develop and implement cutting-edge goods and procedures need for green goods

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