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# A LITERATURE REVIEW ON GREEN SUPPLY CHAIN MANAGEMENT

## With focus on green operation, reverse logistics, green design, and waste management

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**Abstract:**

Green supply chain management (GSCM) is an emerging concept of combining sustainable environmental processes into the existing traditional supply chain management GSCM has gained popularity with both academic and practitioners. The purpose of this paper is to understand what green supply chain management with more focus on green operation, reverse logistics, green design, and waste management. This paper also discusses briefly on green manufacturing, remanufacturing and network design can create a positive change in the industry. This is an emperical research and will capture secondary data to come up with a conclusion. This research paper will shed some light on green practices and how it can radically improve our existing supply chain system.

**Key words:**

Green Supply chain management, GSCM, Green design, waste management, green logistics, green operation.

**Introduction:**

Supply chain management is the handling of the entire production flow of goods and services. Right from the procuring raw materials to delivering the final product or service and adding value to the customer, effective supply chain management will help to minimize cost, waste, and time in production cycle. Nowadays, as world became conscious about the environment in their supply chain management, the green supply chain concept is used to reduce environmental degradation and air water and waste pollution by implementing green practises in business. This framework includes quality management, green manufacturing, green production, sustainable packaging, green design, and waste management. With an efficient supply chain, one can outperform their competitors on retail prices and increase their profitability; also, it will help them to meet or exceed customer expectation for product delivery.

**Literature review**

The Green Supply Chain Management (GSCM) idea is expansive and there is no reasonable comprehensive definition to depict it. Since the idea is characterized diversely by specialists, it is challenging to depict GSC by a solitary definition. According to Circular Economic Wiki, "The term 'Green supply chain management' (GSCM) refers to the concept of integrating sustainable environmental processes into the traditional supply chain. This can include processes such as product design, material sourcing and selection, manufacturing and production, operation, and end-of-life management."

Scholars and researchers have examined Green Supply Chain practices in various perspectives.

Srivastava in 2007 and Rao & Holt in 2005 in their research have pinpointed that GSCM practices that consist of reverse logistics, product recovery and reuse of used products, green design, green purchasing, and collaboration with suppliers and customers.

Zhu et al. (2008b) maintain that the network of GSCM encompassing suppliers through manufacturers, and then to customers, would finally closing the loop (reverse logistics) by the logistics service provider with the help of a customer. In the supply chain network, GSCM suppliers are one of the influential players in the upstream integration of the supply chain and play a vital role.

Walker et al. (2008) discovered several internal and external drivers including organizational factors, suppliers' environmental compliance requirements, regulation, customers, competitors, and society that drives SME in the adoption of GSCM.

In another study, Govindan et al. (2014) identify 47 barriers in the Indian context, and among them are technological, outsourcing, financial, knowledge, and support from the stakeholders, which found to be the most influential barriers. In short, successful implementation of GSCM, is motivated, as well as hindered, by several internal and external drivers and barriers.

Tseng and others. in 2015 have researched about Sustainable supply chain management: A closed-loop network hierarchical approach, where he evaluated the sustainable supply chain management on 4 aspects i.e. internal operations, sustainability, learning and growth, and stakeholder. The result of this indagation is that the top aspect to consider is stakeholder and top 5 criteria are corporate sustainability, green design, strategic planning for environmental management, supplier cost-saving initiatives and market share.

Rajabian Tabesh et al. (2016) then develops a framework to show how innovations affect GSCM performance.

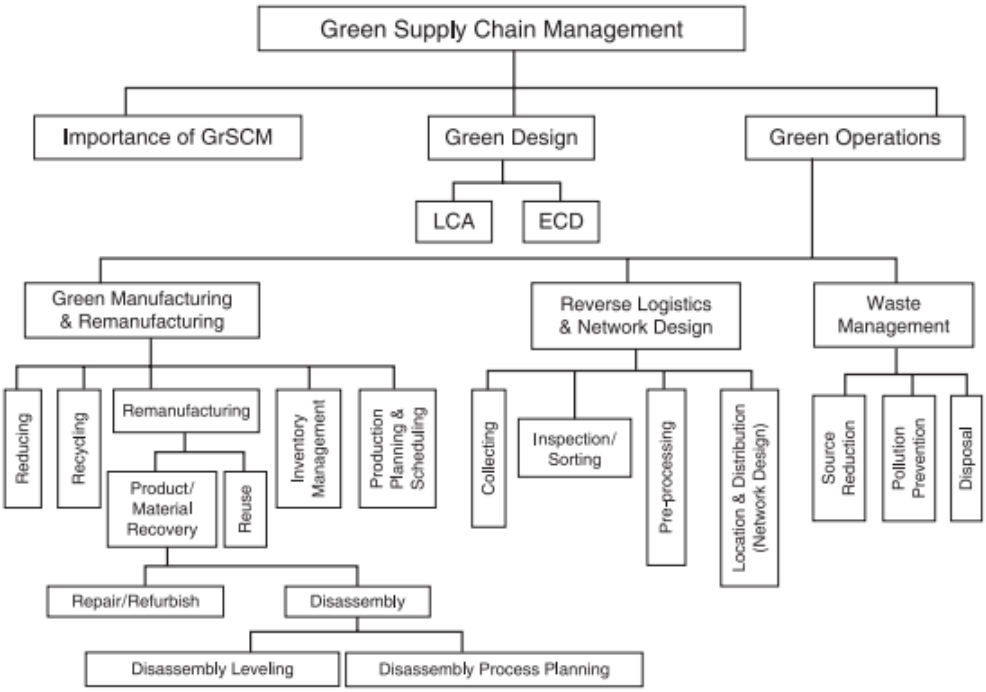
Chavez et al. (2016) emphasize on the cooperation with customers to enhance environmental performance.

Roehrich et al. (2017) contribute to the GSCM literature to consider the importance of the first-tier-second-tier relationship which is different from the traditional concept of buyer-supplier relationships.

Moreover, Huang et al. (2017) study define the internal and external factors stimulating firms to adopt GSCM in Taiwan and found that institutional pressures including regulatory, customer awareness and competitive pressure (GSCM adoption by competitors) drive firms adopting GSCM.

Lu Liu in 2019 researched about green manufacturing from 251 manufacturing firms across China, United states and Vietnam based on high-order theory and GrSCM theory studied the impact of corporate top management characteristics on GrSCM and enterprise. He also analysed the intensity of competition to explore whether it effects the relationship between GrSCM and firm performance.

Ming-Lang Tsenga,Md Shamimul Islamb, Noorliza Kariab, Firdaus Ahmad Fauzib, Samina Afrin 2019- The paper begins with the notion of GSCM and then moves on to the approach for reviewing the existing research. This research does a comprehensive review of the GSCM literature and provides descriptive analyses based on metadata research, as well as content-based insights analysis. The study also demonstrates that the importance of collaborating with supply chain partners to boost environmental performance has piqued the interest of modern scholars. According to studies, coordination among suppliers, customers, and logistics service providers is required to share environmental information, reduce pollution, and cooperatively achieve environmental goals. According to the study, research on drivers or barriers analysis of green supply chain management reveals a dropping trend, while there is an increasing trend of using mathematical optimization models to improve decision making in pursuit of environmental performance.




**Importance of Green Supply Chain Management**

As in any arising research region, the early writing centres around the need and significance of GrSCM, characterizes the importance and extent of different terms and recommends ways to deal with investigate the region further. Basics of greening as a cutthroat drive are made sense of by Porter and van der Linde(1995a,b). Their essential thinking is that interests in greening can asset save, squander disposing of and efficiency moving along. Three methodologies in GrSCM, responsive, proactive and esteem chasing, are recommended (Kopicki et al. 1993; van Hoek 1999). In the receptive methodology, organizations submit negligible assets to natural administration, begin naming items that are recyclable and use 'end of pipeline' drives to bring down the natural effect of creation. In the proactive methodology, they start to pre-empt new natural regulations by understanding a humble asset obligation to start the reusing of items and planning green items. In the worth looking for approach, organizations coordinate natural exercises like green buying and ISO execution as vital drives into their business system.

**Green Design**

The writing underscores both environmentally conscious design (ECD) and life-cycle assessment/analysis (LCA) of the product. The point is to foster a comprehension of what plan choices mean for an item's ecological similarity (Glantschnig 1994; Navin-Chandra 1991). Madu et al. (2002) present an extremely

helpful hierarchic system for ecologically cognizant plan. Adequate writing exists on plan for material and item recuperation (Barros et al. 1998; Ferrer 1997a,b, 2001; Gatenby and Foo 1990; Guide and van Wassenhove 2001; Krikke et al. 1999a,b; Louwers et al. 1999; Melissen what's more, de Ron 1999; Seliger et al. 1994). Boothroyd and Alting (1992), Krikke et al. (1999a,b, 2003), Kroll et al. (1996), Laperiere and ElMaraghy (1992), Lee et al. (1995), Moore et al. (1998, 2001), Scheuring et al. (1994), Seliger et al. (1994) and Taleb and Gupta (1997) examine plan for dismantling, though Gupta and Sharma (1995), He et al. (2004), Jahre (1995), Jayaraman et al. (1999), Johnson (1998) and Sarkis and Cordeiro (2001) bargain with plan for squander minimization. Green Design The writing underscores both environmentally conscious design (ECD) and life-cycle assessment/analysis (LCA) of the product.

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**Green Operations**

A portion of the critical difficulties of GrSCM such as incorporating remanufacturing with interior tasks (Ferrer and Whybark 2001), understanding the impacts of contest among remanufacturers (Majumder and Groenevelt 2001), coordinating item plan, item reclaim and production network impetuses (Guide what's more, van Wassenhove 2001, 2002), coordinating remanufacturing and RL with production network plan (Chouinard et al. 2005; Fleischmann et al. 2001; Goggin and Browne 2000; Savaskan et al. 2004) are posed in this area.

**Green manufacturing and remanufacturing**

This is a vital region inside green activity. The methods for least energy and asset utilization for stream frameworks to decrease the utilization of virgin materials depend on three fields of study: squeeze examination (Linnhoff 1993), modern energy (Boustead 1979) and energy and lifecycle examination (Lee et al. 1995). Reusing, principally determined by monetary and administrative variables, is performed to recover the material substance of utilized and non-working items. Coordinated factors address up to 95% of aggregate

costs (Stock 1998) in reusing. Monetarily driven reusing tracks down its application in vehicles (Bellmann and Khare 1999) and the customer hardware industry (de Fazio et al. 1997; Johnson 1998). Administrative hardware reusing is additionally drilled (Krikke et al).

Hoshino et al. (1995) characterize remanufacturing as reusing incorporated assembling. Businesses that apply remanufacturing regularly incorporate cars, gadgets and tires. Item recuperation alludes to the wide arrangement of exercises intended to recover esteem from an item toward the finish of its valuable life. Pugh (1993) involves numerical models in assessing asset recuperation choices. Different creators arrange and characterize the recuperation interaction in an unexpected way. Johnson and Wang (1995) characterize it as a mix of remanufacture, re-use and reuse, though Thierry et al. (1995) partition recuperation into fix, revamp, remanufacture, rip apart and reuse. Melissen and de Ron (1999) characterize recuperation rehearses and give applicable definitions and wording. A model for assessing recuperation systems for the item without abusing the physical and efficient possibility requirements is proposed by Krikke et al. (1998), which has been additionally changed and refreshed (Fleischmann et al. 2001, 2002; Goldsby and Closs 2000; Inderfurth et al. 2001; Krikke et al. 2003). Vehicle, electronic and paper reusing are the most widely recognized instances of item recuperation (Ashayeri et al. 1996; Barthorpe 1995; Ferrer 1997a; Fleischmann et al. 1997; Isaacs also, Gupta 1997; Jayaraman et al. 1999; Krikke et al. 1998, 1999 a, b; Lenox et al. 2000; Linton and Johnson 2000; Nasr 1997; Shrivastava 1995; Tan et al. 2002).

**Reverse Logistic and Network design**

Reverse logistic activities contrast from those of conventional logisctic (Carter and Ellram 1998). Reverse logistic networks have some nonexclusive qualities connected with the coordination prerequisite of two business sectors, supply uncertainity, returns demeanor choices, deferment, and hypothesis (Blumberg 1999; Fleischmann et al. 2000; Hess and Meyhew 1997; Jahre 1995; Krikke et al. 1999a, 1999b; Lambert and Stock 1993; Yalabik et al. 2005). Subsequently, they influence network plan to a considerable extent. Collection is the main stage in the recuperation process in which item types are chosen, gathered and moved to offices for remanufacturing. Utilize product originated from different sources are brought to the product recuperation office in a converging process. (Krikke et al. 1998).

Organizations should really try to understand the hidden value in Reverse logistic and start to concentrate in this area (Mollenkopf, Closs 2005). They need to comprehend the monetary effect of RL methodologies. Srivastava (2005) create a progressive dynamic system to find the possibility of benefit driven RL

organizations. They find RL exercises beneficial for their selected category of the product. Nowadays, data and correspondence innovations (ICT) are possible to assume a vital part in the co-appointment and joining of GrSCM exercises (Dekker et al. 2004). Issues connected with the joining of RL exercises inside an association have been managed by Chouinard et al. (2005), while Daugherty et al. (2005) track down that asset obligation to data innovation leads to predominant RL execution.

**Waste management**

Caruso et al. (1993) model a strong waste administration framework (including assortment, transportation, inineration, composting, recycling and disposal) utilizing a multiobjective area distribution model upheld by arranging heuristics. A choice help framework, for metropolitan waste administration in a territorial region, for assessing general approaches for assortment and for recognizing regions reasonable for finding waste treatment and removal plants is introduced by Haastrup et al. (1998). Giannikos (1998) utilizes a multi-objective model for finding removal or treatment offices also, shipping waste along the connections of a transportation organization. Bloemhof-Ruwaard et al. (1996a,b), Richter (1996) and Richter also, Dobos (1999) utilize other numerical demonstrating procedures for squander the executives. Mourao and Amado (2005) portray a heuristics for a reject assortment application.

Disposal has been a compelling issue all of the time and has prompted green cognizance. Because of GrSCM, endeavors to limit removal have been the concentration. Bellman and Khare (1999) recommend decreasing the monetary and climate related expenses of auto destroying buildup (ASR). Different waste administration and stock models take disposal costs into account. Richter and Dobos (1999) investigate monetary request amount (EOQ) fix alongside garbage removal with number set-up numbers. Louwers et al. (1999) incorporates vehicle expenses and garbage removal in their model. Richter and Weber (2001) broaden the converse, Wagner/Whitin model to the case with extra factor producing and remanufacturing cost. Teunter and Vlachos (2002) zero in on the need of a removal choice for remanufacturable things.

**Conclusion**

Green Supply Chain Management can decrease the environmental effect of modern action without forfeiting quality, cost, dependability, execution, or energy use productivity. While the specific goal of GSCM is often the reduction of CO2 emissions, other unmistakable advantages for an organization are more prominent productivity of resources, less waste creation, more noteworthy development, decrease of creation costs, reuse of unrefined components, expanded benefit, view of enhanced the client base, and so on.