



## **Green Supply Chain Management: Opportunities, Challenges and Changing Strategies: A literature Review**

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### **ABSTRACT**

Greening for sustainable development is an important area for researchers as well as practitioners. Sustainability issues have now become a challenge and these result from unethical and irresponsible business operations. Three thousand of the world's largest corporations are contributing to almost \$2 trillion in terms of negative social and environmental externalities a year (Foo, Lee, Tan, & Ooi, 2018) Organizations are focusing on green practices in order to become sustainable. . The main objective of this study is to analyze the opportunities, challenges and changing nature of strategies in implementing green supply chain management. The research adopts a systematic literature review procedure to explore the existing literature. The current study is a unique contribution for researchers as well as practitioners as it explains the challenges, opportunities and strategies for implementing green supply chain management.

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## **1. Introduction**

Supply Chain Management (SCM) which has evolved from logistics, operations and purchasing became a strategically important discipline (Troth, Jordan, Lawrence, & Tse, 2012). SCM is a concept that integrates different functional areas and this integration involves all the firms which are included in the supply chain in order to enhance its competitiveness (Erba et al., 2011). The discipline got its root in the area of logistics, moreover its history dates back to early nineties'. Following business processes are parts of supply chain management: managing relationship with customer, customer services, managing demand, fulfilling orders, managing manufacturing flow, procurement, product development and commercialization. A more holistic definition of supply chain management is the coordinated set of activities among vertically associated firms with the aim of serving customers and gaining profit for the organizations (Larson & Rogers, 1998), so supply chain management is about managing flow of goods and services and involves activities which convert raw material in final products. It is about streamlining all the supply side processes to enhance customer value for gaining competitive advantage. It includes all the processes such as production, product development and management of information systems required for these activities(Kenton, 2018).

Green supply chain management (GSCM) is based on environment and supply chain management. Addition of green with the supply chain management and environment analyzes the relation between the two and also discusses that how these impact each other. GSCM is Incorporation of environmental thinking in supply-chain. Environmental issues such

as environmental pollution, depleting resources and global warming are damaging ecological balance. All stakeholder including government, communities, organizations as well as individuals are taking care of these environmental problems. Companies are now reviewing their production process as a result of pressure from government and communities (Cankaya & Sezen, 2018)

GSCM involves designing of products, selection and sourcing of materials, processes of manufacturing, delivery of the final product to the consumers and end-of life management after useful life of the product in an environment friendly manner.. These practices can be seen at both intrinsic as well as extrinsic level.. Intrinsic practices include internal environmental management and eco design. Extrinsic GSCM practices are environmental cooperation, green purchasing and reverse logistics (Zaid, Jaaron, & Bon, 2018). Extent of implementation of green practices varies. There are several barriers or challenges in implementation process which organizations need to overcome (Majumdar & Sinha, 2018). The aim of the current study is to identify those challenges and driving forces so that effective strategies can be developed.

The study consists of 7 sections. Section 2 discusses the problem statement and objectives of the study. In section 3 research methodology is explained. Section 4 summarizes the results of systematic literature review. In this, researcher identified the major drivers and barriers and strategies from literature. In section 5, discussion is mentioned. Section 6 discusses current issues and future directions and section 7 discusses the conclusion.

## **1. Problem Statement and Objective of Study**

Sustainability is considered as voluntary business activity in the developed world but in developing countries, this concept is lacking because of several reasons such as less consumer power, lack of public awareness, less regulatory frameworks, governance issues and other enforcement issues. As suggested by Silva et al. (2018), green supply chain management needs to be examined in relation to other concepts. (Geng, Mansouri, & Aktas, 2017) also discussed that the concept of green is a relatively new. The frameworks for GSCM have been proposed in the developed economies and there is lack of research on these agendas in developing world. It is important to enhance research in these regions so that contextual differences can be explored (C. J. C. Jabbour & de Sousa Jabbour, 2016). With differences in the extent of implementation of green practices, it is important to identify the challenges that organizations face while going green. Green supply chain is an inter-departmental activity; it focuses on both upstream and downstream of supply chain (Majumdar & Sinha, 2018). The driving forces of green supply chain management range from external to internal ones such as regulations and suppliers to inner motivations and managerial commitment (Agarwal, Giraud-Carrier, & Li, 2018). According to Menon and Ravi (2021), developing sustainable supply chain involves barriers which should be removed. For eliminating these barriers, it is important to study these challenges. The implementation process of green supply chain management is slow, it is important to identify the barriers in this process (Lamba & Thareja, 2021). In the same way (Ali & Aboelmaged, 2021) identified that in order to make informed decisions about green supply chains, it is important to analyze the driving forces as well as barriers in its implementation process.

Researchers as well as practitioners around the world are interested in developing strategies for effectively implementing supply chain. It is important to analyze the opportunities and challenges in implementing supply chain practices so that strategies can be devised. So the current study intends to answer the following research questions.

### **1.2. Research Questions**

- What are the driving forces/opportunities in the implementation of green supply chain management?
- What are the potential challenges in the implementation of green supply chain management?
- What are the possible strategies for effective implementation of green supply chain management?

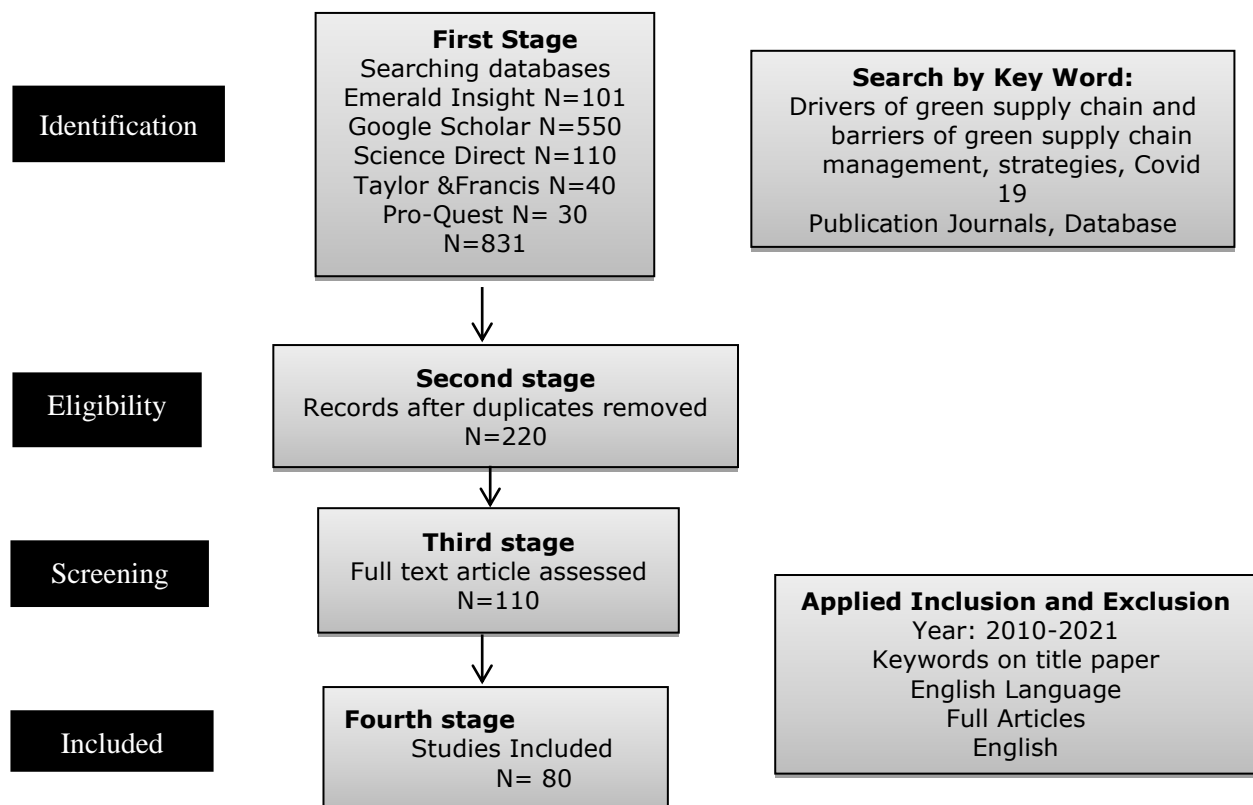
### 1.2.1 Rationale of the Study

- To find the driving forces in the implementation of green supply chain management.
- To analyze the potential challenges in the implementation of green supply chain management.
- To propose the strategies for implementation of green supply chain management.

### 1.3. Research Method

A systematic process of getting data is followed in this study. As the systematic literature review is a process to review literature of the relevant field in a rigorous and 'systematic' way. According to Sandhu, Smallman, Ozanne, and Cullen (2012a), a systematic literature review starts by defining keywords which will be used for searching the literature. In the same way (Tranfield, Denyer, & Smart, 2003) maintains that literature reviews are aimed at identifying gaps and knowledge limitations. With the literature review, drivers and barriers in implementation of green supply chain management were identified. Similarly strategies for effective implementation of green practices are also explored. The current study focuses on four steps which are identification of data, screening the data, checking for the eligibility and ultimately inclusion of the data. The main purpose of this data was to present current trends and providing recommendations for future research. The data was collected from reliable databases which include Science direct, emerald, Willey, jstor, Springer and Google scholar.

### 1.4. Prisma Flow Chart



The data search covers papers which are published between 2010 and 2021. Initially the study used keywords such as drivers of green supply chain and barriers of green supply chain management and strategies for supply chains. Later on some synonyms were also used such as driving factors of green supply chain. Around 1200 papers were initially derived including all the sources. Later on we limit this search to title and keywords and around 250 papers were screened out. For presenting the insights, the study selected 80 papers. The keywords were limited to article title only. It used only published data.

The research on the driving forces and barriers of green supply chain is majorly present in the *Journal of Cleaner Production*, *Supply Chain Management: An International Journal*, *International Journal of operations and production management*, *Management of Environmental Quality: An International Journal*, *Journal of Manufacturing Technology Management*, *Benchmarking: An International Journal* and others which include *Industrial Marketing Management*, *Resources Conservation and Recycling*, *Journal of Global Responsibility*, *Competitive Review*.

## 2. Analysis and Synthesis

The results are organized into tabular form and contribution of each author is mentioned. The data is then synthesized and important drivers, barriers and strategies are discussed. Based on the literature strategies are discussed for effective implementation of green supply chain management.

The major dimension which is considered with the driving forces of green supply chain management is green purchasing. Most of the articles reviewed, focused on green purchasing in their studies while the reverse logistics considered as second important dimension of green supply chain management. Internal environmental management, green culture and environmentally conscious operations are also studied in the literature. The focus on these dimensions represents that focus on the green in emerging economies is majorly being studied with the internal drivers. Or alternatively we can say that green starts with the commitment of the organization to go green. Reverse logistics or remanufacturing practices can help a lot in the context of emerging economies. The following dimensions are most frequently studied in the literature:

- Green procurement
- Reverse logistics
- Cleaner production
- Customer cooperation
- Green logistics
- Product design
- Lean and green implementation
- Strategic green marketing

## 3. Drivers of GSCM

Going green is a major requirement by the government and companies in certain countries but this trend varies. Major drivers identified are listed in the table 1. These drivers are then divided in to two categories i.e. internal and external. Internal drivers include environmental policy, strategic orientation, strategic culture and internal environmental orientation. External drivers include customers, competitors, government rules and regulations, socio-cultural responsibility and eco-reputation.

The driving forces discussed in the table can be clustered in two sets i.e. internal and external drivers as shown in exhibit 1.

Internal Drivers	External Drivers
<ul style="list-style-type: none"> <li>• Internal environmental orientation</li> <li>• Organizational culture</li> <li>• Expected benefits</li> <li>• Strategic orientation</li> <li>• Green strategy and firm’s view of green</li> <li>• Environmental policy</li> </ul>	<ul style="list-style-type: none"> <li>• Customers</li> <li>• Competitor’s initiatives</li> <li>• Government rules and regulations</li> <li>• Socio-cultural responsibility</li> <li>• Eco-reputation</li> <li>• Supplier commitment towards green</li> </ul>

**Figure 1: Internal and External Drivers**

Implementing green supply chain practices and assessing its performance is very important for competing in competitive environment. As in the context of circular economy, green supply chain management can be improved by constantly monitoring performance (Kazancoglu, Kazancoglu, & Sagnak, 2018). Understanding the factors which are driving

the adoption of green in supply chain is important. Some of these factors are governmental regulations, market drivers (customers, competitors, public pressures and investors), suppliers, and some internal drivers. Recent research also shows that internal drivers are more powerful in comparison to external drivers. Institutional theory and self-determination theory can explain these concepts. External institutions have pressure on internal drivers for the adoption and implementation of GSCM and internal drivers' impact directly (Agarwal et al., 2018). Literature suggests that green supply chain can be implemented effectively through enterprise resource planning (ERP). ERP is complete information system that covers the entire process of manufacturing from raw materials to the end products. There are a lot of studies conducted on the implementation of green supply chain and how different organizational factors impact its implementation.

Studies on the antecedents of green supply chain management explain the role of top management in taking initiatives for greening. According to (Khan, Bano, & Zandi, 2018), the main role of ethical leadership is implementing green practices at all levels of organizational operations. Firms need to introduce new method of production, management and other processes for surviving in the highly competitive environment.

#### 4. Barriers

Potential barriers identified in the literature are identified in table 2. These barriers are also categorized as internal and external barriers. Internal barriers include less commitment from top management, management problems, lack of awareness and lack of ethical and moral values. Similarly external barriers include insufficient governmental controls; customer's unwilling to pay extra cost, limited suppliers of sustainable products and diverse stakeholders.

**Table 1**  
**Major drivers of green supply chain management**

	<b>Author (Year)</b>	<b>Contributions</b>
1	(S.-Y. Lee, 2008)	Buyer environmental requirements, Suppliers' willingness to participate, Government rules and regulations
2	(Sandhu, Smallman, Ozanne, & Cullen, 2012b)	Customers, Institutional pressures, Internationalization
3	(Chan, He, Chan, & Wang, 2012)	Organizational identities, Culture Internal environmental orientation, External environmental orientation
4	(Agan, Acar, & Borodin, 2013)	Regulations, Customers, Expected benefits
5	(C. C. Hsu, Tan, Zailani, & Jayaraman, 2013)	Customer pressure, Competitor pressure, Regulatory measure and Socio-cultural responsibility
6	(Diabat, Kannan, & Mathiyazhagan, 2014)	Community economic welfare , Health and safety issues, Adoption of safety standards
7	(Khalili, Duecker, Ashton, & Chavez, 2014)	Academia for developing human resource
8	(Moini, Sorensen, & Kristiansen, 2014)	Systematic planning to develop green strategy, Firm's view of green
9	(Chahal, Dangwal, & Raina, 2014)	Green in social marketing and relationship marketing
10	(Gualandris & Kalchschmidt, 2014)	Customer pressure and innovativeness
11	(A. B. Jabbour, Jabbour, Govindan, Kannan, & Arantes, 2014)	Maturity of environmental management
12	(Hartmann, Germain, & Grobecker, 2015)	Interacting with international customers, Innovative culture of firms
13	(Esfahbodi, Zhang, Watson, & Zhang, 2016)	Coercive pressures
14	(Bhardwaj, 2016a)	Environmental policy
15	(C.-C. Hsu, Tan, & Zailani, 2016)	Eco-innovation , Strategic orientation , Eco-reputation strategic orientation
16	(Bossle, De Barcellos, & Vieira, 2016)	Internal (firm's capability, Quality of personnel environmental leadership
17	(Chileshe, Rameezdeen, & Hosseini, 2016)	Social drivers, Green image , Sustainability concerns, Economic drivers, Environmental drivers

18	(Singh, Rastogi, & Aggarwal, 2016)	Top management commitment, Integrating with supply chain members, Eco-friendly packaging and reverse logistics
19	(S. Li, Jayaraman, Paulraj, & Shang, 2016)	Environmental orientation
20	(Teixeira, Jabbour, Jabbour, & Latan, 2016)	Green training
21	(Miras-Rodríguez, Machuca, & Pérez, 2017)	Top management support, Cost saving, Employee commitment, Regulations and customer pressures
22	(Huang, Huang, & Yang, 2017)	Normative pressures, Coercive pressures, Mimetic pressures
23	(Miroshnychenko, Barontini, & Testa, 2017)	Pollution prevention, Green product development, The adoption of ISO 14001
24	(Balasubramanian & Shukla, 2017)	External (Government green related regulations, Pressure from stakeholder's and competitors, Internal environmental commitment, reputation / brand image, reduce cost, entry in foreign markets)
25	(Ghadge, Kaklamanou, Choudhary, & Bourlakis, 2017)	Internal drivers (employee involvement, suppliers, investors) External drivers (Government, consumers, competitors)
26	(Chu, Yang, Lee, & Park, 2017)	Institutional pressures, Top management support
27	(C, Patil, T, & Prakash, 2018)	Institutional effectiveness, Policy, Technology, Public participation, Recycling, Financial stability
28	(Gómez-Luciano, Domínguez, Andrés, & De Meneses, 2018)	Glocalization, Supplies markets
29	(W. Ahmed & Najmi, 2018)	Leadership pressures and institutional pressures
30	(Petljak, Zulauf, Štulec, Seuring, & Wagner, 2018)	Water and energy management and waste management
31	(Kim & Stepchenkova, 2018)	Environmental transformational leadership
32	(Kumari & Patil, 2018)	Institutional pressures, Technology adoption and top management commitment
33	(Sureeyatanapas, Poophiukhok, & Pathumnakul, 2018)	Size of company, 'financial status, customer's pressure and organizational support
34	(Chaowanapong, Jongwanich, & Ijomah, 2018)	Firm strategic factors, business feasibility, policy factors
35	(Held et al., 2018)	Law / politics, customers, cost and competition
36	(Johannsdottir & McInerney, 2018)	Five C framework that includes commitment, configuration, core business, communication, continuous improvement (Insurance companies)
37	(Thanki & Thakkar, 2018)	Effective leadership, focus on customers, focus on customers, Employee involvement and training, Communicating goals, Financial capabilities, Skills and abilities, commitment of top management, Change of mindsets, Employee motivation and rewarding system, Green disposal initiatives, innovation, support of government, adopting Green standards
38	(Ghosh, 2018)	Internal environmental concern, collaboration with suppliers, pressure from customers, competitive pressure and management support
39	(Choi, Min, & Joo, 2018)	Competitive market environment
40	(Chakraborty, Mondal, & Mukherjee, 2019)	Cost, price sensitive market, cheap labor cost, and fast turnaround
41	(Gong, Gao, Koh, Sutcliffe, & Cullen, 2019)	Customer awareness
42	(Y. Li, Ye, Dai, Zhao, & Sheu, 2019)	External pressures ( government pressures and customers pressure), Internal pressures (resources pressure and organizational inertia)
43	(Zhang, Wang, & Zhao, 2019)	Green human resource management and environmental legitimacy
44	(Micheli, Cagno, Mustillo, & Trianni, 2020)	Green image, Competitors, Internal pressures, Product and internal process

From literature, barriers and challenges are categorized as internal and external barriers as shown in exhibit 2:

Internal barriers	External barriers
<ul style="list-style-type: none"> <li>•Management problems</li> <li>•Lack of employee involvement</li> <li>•Lack of commitment from top management</li> <li>•Cost</li> <li>•Lack of awareness</li> <li>•Complexity</li> <li>•Lack of knowledge and expertise</li> <li>•Risk of return on investment</li> <li>•Lack of training</li> <li>•Lack of ethical and moral values</li> </ul>	<ul style="list-style-type: none"> <li>•Insufficient governmental controls</li> <li>•Customer’s insufficient willingness to pay extra cost</li> <li>•Lack of bank loans</li> <li>•Market structure</li> <li>•Limited suppliers of sustainable products</li> <li>•Diverse stakeholders</li> <li>•Social and cultural barriers</li> </ul>

**Figure 2: Internal and external barriers**

Lack of awareness and cost are ranked as the most significant barriers in implementing green supply chain. Green practices can increase cost and customers may not be willing to pay extra cost for going green. In the same way less commitment from top management and ultimately less no. of training programs for organizational members make it difficult to effectively implement green supply chain management. Lack of knowledge and expertise is ranked as the third barrier.

Green practices can become difficult to implement as the cost of implementing may get high and there can be shortage of resources to bear such cost. Others reasons can be environmentally arrogant suppliers and less corporate social responsibility (A. D. Mathiyazhagan & Anilkumar, 2019). Top management’s attitude is very crucial as this can play a supportive or hindering role in implementation of green supply chain management. Ethical values need to be inculcated at all levels, lack of ethical values and commitment from leadership can become a major challenge. In the same way awareness is key, if organizational members or customers are unaware of green practices and its importance, it becomes very difficult to implement such practices (Movahedipour, Zeng, Yang, & Wu, 2017)

Attention towards environmental concern and increasing awareness attracts the attention of researchers and organizations to think about green supply chains. The members of supply chain face several issues related to green supply chain. These are majorly due inefficient tracking, substandard products, poor inventory management etc. (Jæger, Menebo, & Upadhyay, 2021)

## 5. Strategies for implementation of green supply chain

Table 2 outlines the strategies that are being used by the organizations. Generally organizations develop framework for implementing green practices in supply chain. Green human resource management is also used to implement green supply chain management (Bhardwaj, 2016b). Top management develops policies such as green procurement, designing green and innovative products, green packaging and distribution (M. Ahmed, Thaheem, & Maqsoom, 2020).

**Table 2**  
**Major Barriers of Green Supply Chain Management**

Author (Year)	Contributions
1 (Singh et al., 2016)	Management problems, technical problems, less awareness about environment, lack of employee involvement, inefficient government controls
2 (Chakraborty et al., 2019)	Design of product, trade policy, lack of proper marketing strategies, lack of reverse network design, lack of data base of customers, seller reputation as well as identity
3 (Held et al., 2018)	Cost, complexity, Risk of uncertain return on investment, customer’s insufficient willingness to pay extra cost, insufficient personal resources, expenditure of time
4 (Filho et al., 2019)	Perceived cost and budget restrictions, Leadership, less knowledge and experience, limited suppliers of green products, evaluating

		procurement, different stakeholders
5	(A. Muktadir, Ali, Rajesh, & Paul, 2017)	Lack of awareness of local customers in green products, lack of commitment from top management, lack of reverse logistics practices. Lack of training and outdated machineries
6	(Ghadge et al., 2017)	Market structure, logistics network, distribution processes
7	(Balasubramanian & Shukla, 2017)	External ( lack of green professionals, shortage of green suppliers, stakeholder collaboration is missing) Internal (cost of implementation is high, lack of knowledge and awareness)
8	(Movahedipour et al., 2017)	High cost of environmentally friendly packaging, poor CEO commitment, investment on green product design, lack of moral and ethical values, lack of sustainability models, poor human skills, inadequate technology, lack of sustainable practices in vision and mission
9	(C et al., 2018)	Barriers in sustainable solid waste management (poor social values and ethics, lack of expertise, poor environmental commitment, illiteracy, unscientific planning)
10	(Raut, Narkhede, Gardas, & Luong, 2018)	Competition, uncertainty, shortage of resources, governmental rules and regulations, training , financial restrictions, management commitment and leadership
11	(K. Mathiyazhagan, Sengupta, & Mathivathanan, 2019)	Implementation difficulty, lack of bank loans, cost implication, deficit of trainings, environmentally ignorant suppliers, lack of corporate social responsibility, inadequacy in top level management, lack of technological expertise, high initial buyer and supplier investment
12	(Gupta , Kusi-Sarpong, & Rezaei, 2020)	Technological, Economic, financial, Regulatory, institutional, Social barriers cultural barriers, Organizational barriers, Market barriers
13	(Jæger, Menebo , & Upadhyay, 2021)	Poor inventory management (IN), ineffective tracking (TR) and sub-standard products
14	(Mishra , Singh , & Subramanian, 2021)	Lack of commitment and top management support

## 6. Changing Nature of Strategies

As the situation changed after Covid 19 pandemic, companies faced number of challenges in implementing their strategies. Developing resilience and sustainable practices for countering the effects of future large-scale issues is the most important aspect to consider in the current situation (Paul, Muktadir, & Ahsan, 2021). In the same way supply chain agility, collaboration efficiency, artificial intelligence and big data analytics are the areas which need attention in current era. Strategies for current situation discussed in the literature are listed in table 3.

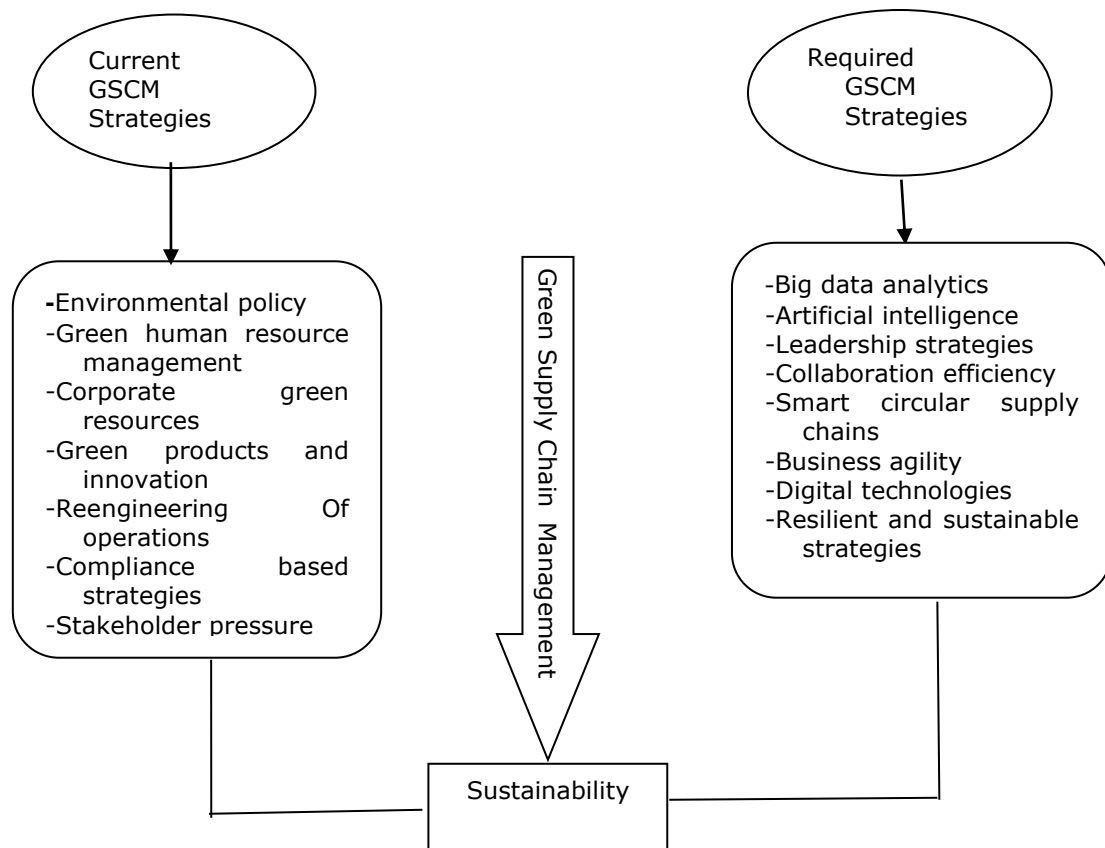
**Table 3**  
**Current strategies**

	Author (Year)	Contributions
1	(Hassan Younis & Sundarakani 2019)	Environmental management system certification, Compliance based strategies or reengineering of operations
2	(Lo, 2014)	Practices of green design, purchase, and internal environmental management, green manufacturing and logistics
3	(Jæger, Menebo , et al., 2021)	Inventory management (IN), inefficient tracking (TR) and sub-standard products
4	(Huang, Borazon, & Liu, 2021)	Corporate green resources and stakeholder pressure
5	(Bhardwaj, 2016b)	Environmental policy and green human resource management
6	(Kumar, Agarwal , & Sha, 2016)	Develop framework for green supply chain management
7	(Sellitto 2018)	Green products and innovation
8	(Ahmed , Thaheem , & Maqsoom, 2020)	Policies developed by top management such as green design, green packaging and green distribution
9	(S. M. Lee, RhA, Choi, & Noh, 2013)	Supply chain practices involving environment to sustain competitive advantage
10	(Susanty , Sari, Rina, & Setiawan, 2018)	Involvement, technology, financial and regulation



**Table 4**  
**Changing Strategies**

	<b>Author (Year)</b>	<b>Contributions</b>
1	(Paul, Abdul Moktadir, & Ahsa, 2021)	Developing resilience and sustainable practices
2	(Do, Mishra, Wu, et al., 2021)	Supply chain agility
3	(Sharma, Luthra, Joshi, & K, 2021)	Collaboration Efficiency
4	(Abdolazimi, Esfandarani, Salehi, Shishebori, & Shakhshi-Niaei, 2021)	Decreasing lead time and disease infection rate
5	(Bag, Dhamija, Luthra, & Husingh, 2021)	Big data analytics
6	(Arkajyoti De & Singh 2021)	Leadership strategies
7	(Nayal et al., 2021)	Artificial intelligence
8	(Kayikci, Kazancoglu, Lafci, Gozacan-Chase, & Mangla, 2021)	Smart circular supply chains, government support, top management support
9	(Butt 2021)	Modification in inventory policies
10	(Mishra et al., 2021)	Coordination, cooperation, flexibility
11	(Manyati & Mutsau 2021)	Business agility through green skills
12	(Paul & Chowdhury, 2020)	Digital Technologies



**Figure 3: Comparison of strategies**

## 7. Discussion

The objective of our study was to analyze the driving forces and challenges in implementation of green supply chain management as well as to highlight the current and required strategies for its effective implementation. While developing the strategies for implementing green practices, it is important for firms to see that how this impacts corporate performance. Environmental management system certification, firm age and firm size can affect corporate performance. Hassan Younis and Sundarakani (2019) investigated the effect of all these control variables on corporate performance. According to the research, there is a positive relation between business size and all the dimensions of sustainable performance but there is no relation with operational performance. The research also revealed that having a qualified EMS in a UAE business had a favorable influence on all dimensions of performance, but firm age has no bearing on any of the four outcomes of performance. There are a variety of tactics that may be used to persuade companies to green their supply chains. For example, pressure on companies to clean up

their operations and lower their carbon footprints may cause them to behave differently. Some companies may use compliance-based tactics like pollution reduction and short-term end-of-life solutions, while others may proactively react and redesign their processes to minimize consumption of materials and pollution. Firms are more likely to gain a competitive advantage and profit from the deployment of GSCM processes if they pursue the latter method. More recently, (Primrose et al., 2019) used the resource-based view theory to study the elements that drive environmental performance in businesses using a belief-action-outcome framework, and found a substantial association between information technology and environmental performance (Hassan Younis & Sundarakani, 2019).

Similarly stakeholder pressure has a substantial beneficial influence on green resources and green supply chain practices, and these practices have a considerable and favorable impact on organizational performance. Furthermore, corporate green resources serve as a buffer between stakeholder demand and green supply chain management (Huang et al., 2021).

It can be seen that green supply chain management has emerged as a key component of sustainable strategy. This concept has been gaining attention in academics and industry as a means of making industries more competitive. With the growing desire to reduce carbon footprints and greenhouse gas emissions, it's more important than ever to investigate the many characteristics and drivers of sustainable development, particularly in supply chain management. The key drivers of GSCM are environmental legislation and green human resource management, which involves offering training to employees on how to adopt sustainable practices. Another important driver is the use of sustainable criteria in supplier selection, which has been demonstrated to improve sustainability results (Bhardwaj, 2016b). Top management policies to include practices such as creative green design, procurement, packaging and distribution which all play a critical role in reducing emission, are among the ways to implement GSCM (M. Ahmed et al., 2020)

Internal and external forces like as engagement, technology, financial, regulatory, and consumer pressure all have a direct impact on early GSCM implementation. Technology has the greatest impact of all of these factors. Only the financial component has a direct impact on full implementation of GSCM practices, although legislation and consumer pressure have a beneficial impact on full implementation of GSCM methods through early adoption (Susanty, Sari, Rinawati, & Setiawan, 2018)

The extensive shocks imposed by the Covid 19 outbreak affected all stages of supply chains. The food supply chains responded with speed in order to sustain operations and mitigate the disruptive consequences. Operationalizing supply chain agility practices can help in responding to this crisis. The agile practices are "through sensing" and "seizing capabilities". Sensing involves identification and assessment of the related opportunities as well as threats which are related with the specific supply chain. At the company and supply chain levels, seizing entails acquiring, merging, and changing tangible and intangible resources. Similarly, supply chain transformation is likely if enterprises and their supply chains build the sustaining power to guarantee that desired improvements continue beyond the crisis (Do, Mishra, Wulandhari, et al., 2021).

The disruptive global supply chains revealed gaps and exposed vulnerabilities. It is important to develop strategies in order to move forward in post covid19 era. Supply chain resilience and sustainability practices could play a prominent role in this period (Paul & Chowdhury, 2020).

In case of retail supply chains, retailers tried to organize themselves in order to fit the new scenario. Collaboration Efficiency can serve as the main criteria for enhancing the performance of the retail supply chain. In the same way order fulfillment and digital retail supply chains can serve as the resilient strategies in order to mitigate the long term consequences of the pandemic (Sharma, Luthra, Joshi, & Kumar, 2021). Big data analytics can also serve as tool to enhance resilience and to restore supply chains (Bag, Dhamija, Luthra, & Husingh, 2021). In the same way leadership strategies can also play a crucial role for developing resilience in agri-supply chains (Arkajyoti De & Singh, 2021). (Kazancoglu, Ekinci, Mangla, Sezer, & Kayikci, 2021) identified the role of top management and government support in order to develop smart circular supply chains.

Our analysis explains all the major drivers and barriers in implementation of green supply chain management since 2010. It also highlighted the major strategies being implemented and the required strategies. This analysis can be used by the academicians and practitioners for developing effective strategies for the future by overcoming barriers and supporting the driving forces.

## **8. Current Issues and Future Directions**

Within the organization, management at every level needs to be committed to green otherwise it becomes difficult to implement the policies in an appropriate manner. In the same way it is important to ensure employee involvement. Above all these, top management commitment and support is crucial without which it is impossible to inculcate the concept of green at any level. The values and culture of organization is reflection of top management. So if top management is not committed, it become challenging for organization to go green (M. A. Moktadir, Ali, Rajesh, & Paul, 2018). Lack of awareness about green practices and their impact on sustainability is another barrier that needs to be considered in organizations. This can be catered through training programs that can help employees in understanding the importance of green practices. Literature also highlights that high investment cost is a significant barrier in green supply chain management (A. D. Mathiyazhagan & Anilkumar, 2019). In this context lack of bank loans for such initiatives is also a challenge. From supplier perspective, environmentally ignorant suppliers can affect the supply chain activities in a negative manner. There can be limited suppliers of sustainable products and firms have to purchase from them anyway (Diniz-Filho & Bini, 2019).

As far as external factors are concerned, government rules and regulations are most significant factors. These external pressures lead towards the adoption of green practices by organizations. In certain economies, adoption of green and sustainable practices is a compulsion from regulatory bodies and organization adopt these practices in compliance with regulatory bodies. In the same way customers can also influence organizations to adopt sustainable practices.

The strategic programs and initiatives of the company are driven by top management (Mintzberg, 1979). Commitment, leadership, and support from top management are critical prerequisites for adopting supply chain management activities and initiatives (Lambert, Cooper, & Pagh, 1998). Top management provides appropriate management styles and organizational ideals in order to lead organization choice and increase firm performance, according to human resource management (Hambrick & Mason, 1984). The culture and values of organization are reflection of top management. The boundary spanning role of top management affects environmental projects through employee commitment (Gattiker & Carter, 2010). Top management set examples and this impact employee's action in ethically uncertain and unclear areas which may not be clearly stated in company's policy (Carter & Jennings, 2004). So lack of top management support can be a major reason for the failure of environmental management practices. In the same way employee's involvement and trainings for implementing green practices also serves an important role. The culture and values of an organization reflect the commitment of top management towards green (Thanki & Thakkar, 2018). Top management support can serve as an important driving force for going green.

During the last two decades, different environmental rules and regulations have been published by private and public organizations in order to enhance green practices. ISO 14000, for example, is an environmental management standard developed by the International Organization for Standardization (ISO). It provides standards for environmental management, labeling, performance evaluation, and lifecycle assessment (Karimi & Rahim, 2015). According to Porter and Van der Linde (1995), one of the most important drivers for supply chain management is strict environmental rules, which enable organizations become more efficient. Similarly, businesses develop environmental rules in order to limit political risks.(Haufler, 2001). Environmental management was strengthened after 1970, as rules grew more financially relevant, and it became the primary focus of businesses.

Actors in the supply chain work in a way that satisfies both customer and regulatory criteria in the context of GSCM. As a result, government agencies and national/international authorities will exert pressure on businesses to adopt ecologically responsible practices. Similarly, studies show that environmental demands from competitors and stakeholders aid in the implementation of green supply chain management, and that top management support acts as a buffer for environmental activities (Dai, Montabon, & Cantor, 2014). Stakeholder theory also implies that putting pressure on corporations to follow environmental and green supply chain management practices may assist motivate them (Sarkis, Zhu, & Lai, 2011). So government needs to introduce strict rules and regulations for effective implementation of green practices.

Customers play an important role in green supply chain initiatives. The preference of customers for green products motivates companies to develop green products. Environmental requirements as well as support from buyers are positively associated with willingness of suppliers to engage in green initiatives. Government plays a positive role and motivate these suppliers. (Lok et al., 2020) found that government regulations, customer demands and supplier performance are three high priority drivers for green supply chain management. The concept of green needs to be introduced at all levels, there must be policies from regulatory bodies and compliance of these policies must be compulsory. Within the organization, it must start from the top and cascade at all levels of management. There must be programs for employee's awareness. Commitment of management at all levels is necessary for implementing green supply chain management.

With changing nature of barriers and challenges after Covid pandemic, the disruptions in the supply chains needs to be handled with other strategies. These may include advance technology, artificial intelligence, top management support, collaboration efficiency, smart circular supply chains, business agility and developing other such resilience and sustainability strategies.

Our study focused on the challenges, opportunities and strategies of green supply chain management. Future researches can be done for comparing different countries and economies. The extent of implementation and nature of challenges vary greatly in different economies so the comparison will give a clearer picture of such differences.

## **6. Conclusion**

The study of drivers and barriers of green supply chain management reflects that most important drivers are expected benefits, green orientation and organization strategy. As far as barriers are concerned, investment cost, limited suppliers, management problems and employee involvement are potential barriers in implementation of green supply chain management. For implementing green supply chain management organizations develop variety of strategies. The study indicates that top management support, green human resource management, advanced technology, reengineering of operations, corporate green resources and developing business agility can help in greening of supply chains. The nature of these strategies is changing especially after Covid 19 outbreak. The study can help practitioners in developing appropriate strategies according to the current situation. The research contributes in understanding the nature of issues encountered for implementing green practices. As greening is important for sustainable development and organizations need to develop strategies for going green so the study will help researchers in identifying major challenges and driving forces so that effective strategies can be developed.

### **Authors Contribution**

Samina Khan: conceived of the presented ide, complete the literature review, worked on data analysis and interpretation and drafted the manuscript.

Urooj Pasha: Critical revision of the article and final approval of the version to be published.

### **Conflict of Interests/Disclosures**

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