

Analysis of Dimension of Green Maritime Supply Chain Management “The Bangladesh Perspective

Mohammad Abdullah Abu Sayed

Research Scholar

Maasayed74@gmail.com

Co-Author

MD NasirUddin

captnasiruddin@gmail.com

DECLARATION:: I AS AN AUTHOR OF THIS PAPER / ARTICLE, HEREBY DECLARE THAT THE PAPER SUBMITTED BY ME FOR PUBLICATION IN THIS JOURNAL IS COMPLETELY MY OWN PREPARED PAPER.. I HAVE CHECKED MY PAPER THROUGH MY GUIDE/SUPERVISOR/EXPERT AND IF ANY ISSUE REGARDING COPYRIGHT/PATENT/ PLAGIARISM/ OTHER REAL AUTHOR ARISE, THE PUBLISHER WILL NOT BE LEGALLY RESPONSIBLE. . IF ANY OF SUCH MATTERS OCCUR PUBLISHER MAY REMOVE MY CONTENT FROM THE JOURNAL.

Abstract

People are speaking out about the importance of implementing environmentally responsible measures worldwide. Everyone is now concerned about the negative impacts of industrialization on the environment and the excessive carbon emissions produced by huge enterprises in manufacturing things and providing services. Business leaders are attempting to find a solution to eliminating it shortly. Green supply chain management (GSCM) can play a critical role by preventing environmental waste from being generated across the supply chain and ensuring the most efficient use of resources, ultimately financially beneficial for the companies involved. This study aims to provide a conceptual framework for green supply chain management and identify the elements that influence the implementation of GSCM in manufacturing companies in Bangladesh.

Keywords: Green Maritime Supply Chain Management, SSCM, GSCM.

greener,

which includes marine areas, water ecosystem services, greenhouse gas pollution, and conservation deterioration in the transportation domain before the manifestation of

1. Introduction

For Davarzani et al., it is not necessary to be concerned about the impact of the mass

environmental difficulties (2016). This ranged from oil rig disasters involving leaks caused by oil exploration and transportation to coastal floods and rising sea levels, which threatened to overwhelm densely populated coastal cities, to various other incidents. According to Liu et al. (2018), marine distribution networks are large and complicated systems that necessitate the conduct of sensitivity studies. In the complex web of relationships, it was difficult to distinguish between sustainability efforts, changes in maritime hydrology, and greenhouse gas emissions. Green supply chain management (GSCM) has been implemented in several industries with varying degrees of effectiveness. We do this since each firm has its characteristics and distinct national setting. In an article by Fernando et al., GSCM was found to have assisted corporations in avoiding financial penalties for environmental violations and ethical and regulatory challenges (2018a). Even though various industries widely adopted global supply chain management (GSCM) throughout the world, there was little information on the amount of GSCM implementation and its impact on business efficiency in the marine industry.

➤ **Concept and Characteristics of GSCM**

To be broadly adopted, the GSCM principle and actions must be tailored to the specific characteristics of the maritime industry. The current GSCM concept was more appropriate for usage in the industrial sector, at least now. To overcome those research gaps, the study broadens the scope of GSCM practises by adapting the existing model to meet the needs of the marine industry while maintaining the established restrictions. The marine green supply chain management concept developed due to the Green innovation concept and practices.

This definition characterizes the acquisition of coastal green space as an embedded transportation

operation and control. In addition to shipping layout and adherence, green financial flow (GFF) and green procurement (G.P.) are important considerations.

Economic advantage, information dissemination systems, and freight transportation firms are provided from the point of origin to the destination. Companies involved in the maritime manufacturing process must manage everything from the store to the customer, expense coordination and monitoring, tailored responsibilities, and other channel partners from origin to consumption. Lee and Song worked with the majority of the

supply chain's three aspects of marine systems,

handled by Lee and Song (2010).



Figure-1 Green Maritime Supply Chain Management:

1. Transportation
2. Activities at the port/terminal
3. Dispatch of cargo (Table 1).

	<i>Shipping</i>	<i>Port Operations</i>	<i>Freight Forwarding</i>
<i>Main Function</i>	<i>Moving Cargoes between ports</i>	<i>Shipping reception; Loading/discharging cargoes; Stevedoring; And Connecting to inland transportation</i>	<i>Booking vessels; and Preparing for requisite documents for ocean carriage and trade, on behalf of shippers</i>
<i>Supportive Logistics Activities</i>	<i>Documentation relating sea trades; Container tracing and information service.</i>	<i>Warehousing, Offering distribution centers, Repairing and Inland connection</i>	<i>Inventory management; Packing; and Warehousing</i>

Table: 1. Main function and supportive activities of maritime supply chain system
Participants in the marine distribution network

collaborate with a diverse range of partners, including cross-border trading partners, to improve transit success and achieve commercial success. Furthermore, a marine

distribution network interacts with many shore amenities, such as harbours and distribution centres and the labour force for cargo handling and land transportation services. Compared to similar industries, the engagement of many marine operators in container taken-based supply chain networks results in more complex supply chain networks. Therefore, in the marine logistic chain network, connectivity between corporate players and consumers has become a significant source of worry for many participants and consumers.

Marine supply chain activities are critical to the success of a wide range of sectors, including food, manufactured equipment, autos, and energy supplies. The relatively safe processing of international cargoes is made possible by the activities of the marine supply chain. Because it is a component of social business in numerous industry fields, a marine manufacturing process has the potential to be extremely important for continuing financial progress and the distribution of wealth throughout the world. Unfortunately, the issues surrounding the international logistics ecosystem continue to escalate, and marine enterprises have been presented with new and significant long-term challenges due to Lam's leadership (2011). Because of the rapid rate of environmental damage and the difficulties associated with

climate change during the past century, more people have become concerned about the systemic ecological issue (Lirn et al., 2014). If the International Maritime Organization (IMO), as the industry's sole lawmaker, is serious about resolving these concerns, it must have officially begun to close its restrictions placed on naval operations by implementing innovative sustainable supply chain restrictions such as the energy efficiency design index (EEDI) and the ship energy efficiency management plan (SEEMP). In the marine business, numerous companies are under pressure from government agencies to adopt green technologies and reduce the carbon footprint of their supply chains.

Green supply chain flexibility helps increase the sustainability performance of the delivery chain (Fernando and Sathasivam, 2017). To better understand the whole concept of GSCM, organizations, organizations and the general public were all interested in learning more (Zhu et al., 2012). Employing GSCM provides tremendous economic benefits for a company, but it also improves its considerations for long-term sustainability. Therefore, the study hypothesizes that GSCM extended into the marine setting and evolved into MGSCM, but that MGSCM must provide answers for marine enterprises to strengthen their distribution

network. Using actual original findings and document analysis, this study determines how MGSCM was implemented among Bangladeshi marine participants in this study. To tie everything together, we'll look at four crucial components of long-term firm success: 1. economics and finance; 2. ecology 3. excellence in terms of function and 4. excellence in terms of society.

Despite the ongoing debate over implementing an environmentally friendly approach in the transportation domain, only a few studies have looked at the practical application of GSCM features in the maritime supply network setting. Although only a few research studies have evaluated the sustainable development element from a corporate managerial viewpoint, they have adopted green and sustainable cargo vessel layouts, such as improving energy performance to reduce time spent in port (Johnson and Styhre, 2015), decreasing boat velocity (Lindstad and colleagues, 2011), and utilizing combination propulsion systems (Dedes et al., 2012), as well as green and sustainable cargo vessel layouts (Lai et al., 2013).

Problem Statement

Development management and control challenges have been thoroughly investigated across various industries. According to the

survey findings, the sector has recently shifted its attention to developing green initiatives to achieve environmental, economic, and social well-being objectives. It's possible that green project planning (GPP) was not well researched. Wong et al. (2012) investigated the green procurement design process to lower total costs while lowering greenhouse gas emissions. The GPP challenge was to determine the sequence in which green projects would be constructed and the percentage of green projects constructed each year during the scheduled period. To achieve the targets for sustainable growth, it was necessary to assess the total cost of construction projects and the overall reductions in CO2 emissions. The authors proposed a multi-objective optimal approach to organizing planned green initiatives' construction sequence while considering various critical constraints such as money, greenhouse gas reduction objectives, project length, and sequencing. A value training set consisting of a multi-objective evolved optimization method was utilized to address the challenge. Each balanced aggregate independent issue was resolved to utilize a crucial feature optimization strategy, which the researchers developed. This numerical experiment used data from a representative coastal port in China's western regions as input.

Compared to conventional techniques such as the rapid aristocratic non-dominated sortedii) simulated annealing, the new technique is more efficient. The proposed solution entailsiii) minimizing computing time while retaining high-performance operations, according to the investigations.

Motivation forresearch

That primary topic aimed to examine the many areas of contemporary sustainable research, particularly those about transportation, ports, and maritime operations, and gather and assess the important concerns in the industry's efficiency. It helped the participants in the industry gain a better understanding of the current ecological situation and develop important management insights and construct acceptable green plans for their respective organizations.

Objectives

- i) Intended outcome: To establish whether the maritime industry will implement green supply chain management.To determine the scope and extent of Green supply chain management in the maritime industry.With the help of SEM, we were able to determine the dimensions of green supply chain management in the maritime industry.

Research Questions

- i) How do you go about incorporating the GSCM

into your maritime operations?

What are some of the good indicators that can be derived from the dimensions in the GSCM?

How do you do a dimension analysis to achieve proper supply chain management?

Research Gap

On the other hand, most of these features may be referred to as research gaps.

S.No	Research Gap	Author Name
1.	<p>The connectivity and communication flow were commonly studied in the research, and there is a startling vacuum in the marine and GSCM research when it comes to the economic aspect. There are just a few research studies on economic flow for developing the distribution network. Thus, defining an individual assessment of GFF as part of the components of MGSCM from a sustainable accountancy viewpoint was essential. This is because financial competence is frequently mentioned as a crucial factor in the application of sustainable initiatives.</p>	Lau and Wang (2009)
2.	<p>According to a literature study, numerous researchers have noted exporter collaborative efforts as a crucial feature towards developing green the production process. Within that market with various levels of participants, incorporating all marine performers is a criterion for attaining a sustainable supply chain. As a result of such a discovery, research learning happens green supply chain integration practices (GSIP) as a crucial factor that was included among MGSCM aspects to ensure long company success.</p>	Lun(2011); Lun et al., (2014); Yang et al., (2013)
3.	<p>Many researchers have explored incorporating Green. Supply chain processes with procurement work systems directly evaluate target customers and green the distribution network. Supply management involves</p>	Yang et al. (2013) Lirn et al. (2014) Lun et al., (2014)

	<p>employing sustainable promotion, green vessels, better shipping technology (green motors and efficient energy thrusters and ships), and greener transportation goods (carrying reused and recyclable technology). These operations are targeted at increasing client service value, operational excellence, and the smooth flow of the marine supply chain. All of these elements are conceptualized in this study as the MGSCM element of green additional value logistics operations (GVALS).</p>	
4.	<p>Since 2013, IMO requirements such as SEEMP and EEDI enabled companies should have to adhere to environmental standards. These laws encourage maritime improvements such as ecological shipbuilding and power systems to conform. Many studies in the marine literature imply stated ship design and compliance (SDC) is a sustainable competence that boosts energy efficiency and minimizes environmental effects.</p>	<p>Rehmatulla et al., (2017) Lai et al., (2013); Lun et al., (2014); Lun, (2011)</p>

General Study

Because of the sea environment, many GSCM investigations concentrate on environmental, economic, and project activities, whereas social intelligence was typically disregarded in these investigations. To close the gap, this research incorporates the social component as a significant concept in developing a comprehensive, long-term performance assessment system for the transportation

industry. In terms of demography, MGSCM studies in developing countries performed less successfully than those in prosperous countries (Jabbour et al., 2015). Even though modern industrial states may reap greater benefits in technological advancements and widespread access to wealth, emerging nations (such as Bangladesh) may produce distinct and exciting outcomes.

2. Literature Review

In the words of Srivastava, global supply chain management (GSCM) is the understanding of sustainability thought in supply chain management (SCM), which includes product creation, input material acquisition and selection, manufacturing methods, finished product delivery to consumers, and item end of life management, among other.

Things. Global supply chain management (GSCM) is defined as the understanding of sustainability thought in supply chain management (SCM) (2007). GSCM represents the junction of a company's sustainability management's organizational elements with the basic notion of SCM, which is a relatively new field of research because both are relatively new fields of research (Yang et al., 2013; Zhu and Sarkis, 2004). Different experts have

proposed several different interpretations depending on the circumstances of their research (Table 2).

Conceptualizing of MGSCM

Because of this, most of the analyses conducted for the MGSCM research incorporated the responsible growth of measurements into their conceptual model for GSCM, following the industrial viewpoint that they were using. This was done to accommodate the unique characteristics of the company. For example, the concept of ecologically sustainable management has been intensively researched in various fields, including production (Zhu and Sarkis, 2004).2004; Fernando and Hor, 2017), strategic development (Marcus and Fremeth, 2009), and the automobile industry are examples of topics that have been studied (Fernando et al., 2018a).

Authors	Definitions
Narasimhan and Carter (1998)	Green supply chain management is the effort of purchasing departments on activities such as reducing pollutants, recycling and materials substitution
Dan and Liu (2000)	GSCM is a management mode which considers the environmental effects and the efficiency of resource utilization in the whole supply chain. It is based on the green manufacturing theory and supply chain management techniques, involving suppliers, manufacturers, retailers and consumers. It aims to minimize the negative effects on the environment and to maximize the efficiency of resource utilization in the whole production process.
Zsidisin and Siferd (2001)	GSCM is a supply chain management technique used to solve the environmental problems within a company's production and service departments.
US-Asia Environmental Partnership (2003)	Activities in which an organization imposes its environmental requirements to its suppliers' productions and processes should be named "Green supply chain management".
United Nations Environment Programme (2003)	The main activities of GSCM include evaluating the suppliers' environmental performance, developing eco-design with suppliers, providing training and information for suppliers in order to improve suppliers' environmental management capabilities
Zhu (2004)	GSCM enterprises cooperate with their downstream and upstream, optimizing the environmental benefits from product design, material selection and retailing to recycling, improving both economic and environmental performances to achieve the sustainable development of supply chain.

Table: 2. Definitions of green supply chain management

Because the MGSCM concept has been linked to inter-organizational ecological topics such as manufacturing environment, factory ecosystem modules, product life cycle inquiry, comprehensive creator accountability, and brand governance (Zhu et al., 2005), it can be applied to nearly any organization's environment within the managerial framed structure (Zhu et al., 2005). A direct effect of this was that the GSCM was included in the fast-expanding field of study on marine morality and sustainability. In addition, sociological, technological, ecological, and economic concerns were considered. This study applied the global supply chain management approach to the marine environment. The findings define MGSCM as incorporating sustainability considerations into inter-organizational supply chain management techniques within the marine environment to facilitate the movement of activities through the distribution network.

Dimensions Of MGSCM

Businesses must implement green procedures and preservation measures to retain lower costs while reducing greenhouse gas emissions to create a better environment (Fernando,

2009). The goal of Sustainable was to raise awareness among company executives, investors, and customers about the need to strike a balance between financial, social, and environmental outcomes. To achieve the triple bottom line by implementing sustainable principles in the maritime domain, the notion of sustainable development has been extended to include the perspective of the marine supply chain. Psaraftis defined a responsible marine distribution system as combining strong financial, ecological, and societal functioning, and he used this definition frequently (2016). Those are to be expected due to the incredibly difficult task of comprehending the sociological factor resulting from the ambiguity (Clarkson, 1995; Wood and Jones, 1995). The ethical component of green procurement must be identified, which is a huge difficulty. This research aimed to fill in the gaps in the research on marine management and highlight the crucial role in the environment. The analysis, as mentioned earlier, which was based on the effectiveness of the idea from the aspect of public and organizational structures, was a Sustainability approach by Lam, who developed it (2014).

Sustainability of MGSCM

According to Asgari et al. (2015), sustainable

development is a broad phrase that incorporates three important aspects: ecological, financial, and sociological, and it is used in a variety of industries, including marine logistics services, to describe a broad range of activities. In particular, academics (e.g., [2–10]) have paid close attention to the impact assessment process, particularly relevant in ports and harbour infrastructure. The former emits greenhouse gases at sea, notably in emission control zones (ECZs) and within harbours, whilst the latter does so in conjunction with the former and cargo vehicles at port facilities. Unfortunately, the greenhouse gases emitted by container vehicles on the roadways leading from the point of origin to the destination are not included in this Special Issue by Corbett et al. (2009).

In their paper, Huang et al. (2016) explained that ships emit greenhouse gases (GHGs) such as nitrogen oxides (NO_x), sulphur dioxide (SO₂), carbon dioxide (CO₂), and fine particles while arriving at ports and loading and unloading cargo (PM). The number of greenhouse gases that have been released. The impact of port proximity on the health of those who live near portsRecent study has calculated the following: However, when compared to the infrastructure areas of aircraft and road freight, humanitarian organizations, as well as partners,

are far less involved in resolving these issues in the maritime shipping industry than they are in the aerospace and road freight areas of infrastructure. This is the case because the industry has less interaction with cities and must thus be geographically segregated from those who live in cities. International organizations, such as the International Maritime Organization (IMO), have been leading the charge in developing and putting some measures to reduce greenhouse gas emissions from ships in collaboration with shipping firms and shipyards. Chatzinikolaou and colleagues (2015).

Statistical evaluation and legal considerations were two areas in which Cullinane and Bergqvist (2014) contributed to the growing body of knowledge about ECA. A study conducted by Cheng et al. (2015) examined the viability of transportation systems, ports, and supply chains. Lee et al. (2018) aimed to reduce and quantify greenhouse gas emissions to achieve sustainable transport business harbours and build a methodology incorporating essential success indicators that evaluate green cargo with port facilities. Because the three special problems on marine transportation and supply had a limited scope and many long-term difficulties, this Special Issue seeks to deepen and expand the

present knowledge on the subject.

Sustainability challenges in Shipping, Port,

Mostert et al. (2018) developed a detailed guide for constructing a maritime supply chain within the Yangtze River Economic Belt, executed in 2018. (YREB). In addition to highway, high-speed train, and sea transportation, they also include a three-mode hybrid terminal intermodal supply chain. It considers both the evaluation of trade-offs and the assessment of

and Maritime Logistics

the international environmental intervention. The author devised a bi-objective approach, which included taking the steps necessary to deal with formal regulatory situations while taking into account emissions regulation measures, taxation, and emissions exchange systems and reducing operational costs and carbon dioxide emissions production, among other things.

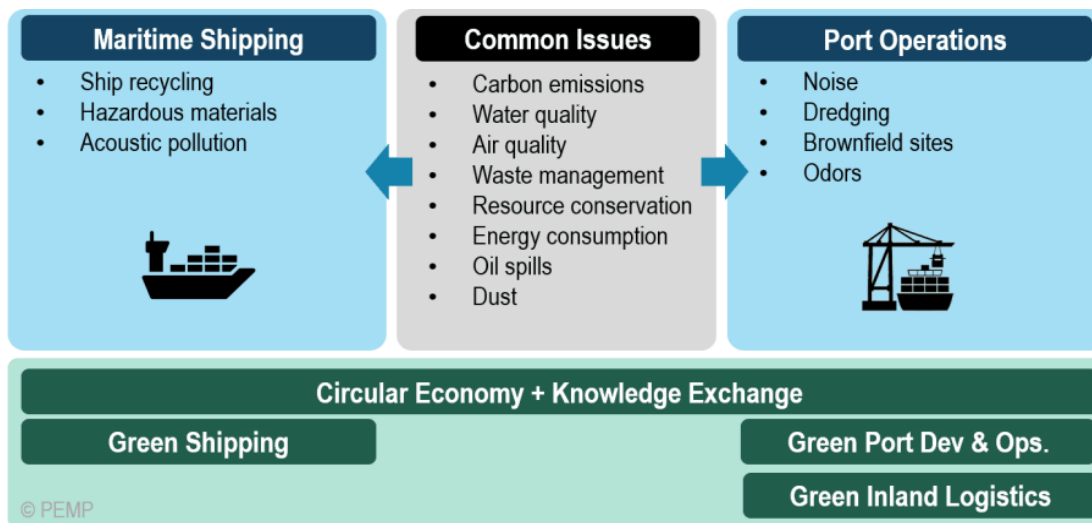


Figure:2 Green Shipping

3. Environmental Issues ofSSCM

According to Lee et al. (2016), the harbour operation has been modified. Disagreements between the container terminal and the municipal government and ecological difficulties caused by port users' events and

facilities are just a few extrinsic pressures driving the harbour interaction here. According to their investigation into present ecological frameworks, these two authors defined coastal city participants and their distinct objectives to analyze the environmental sustainability of seaport states. In contrast, in the coastal cities

of Shenzhen and Guangzhou, the three major features of resilience, namely financial, ecological, and sociological, were applied to the cities. They begin by reaching the following conclusions: (1) Economically, China's Belt and Road Initiative (BRI) has created tremendous possibilities for bilateral commerce since its inception. In addition, these harbour cities face a sociological challenge due to the limited area of coastline available for seaport facilities and urban shoreline developments; and (3) they are faced with the same environmental dilemma as the rest of the world in terms of water contamination. They recommend that seaport towns adopt innovative initiatives to investigate new techniques to improve efficiency and quality while minimizing adverse environmental consequences. Chen et al. recommend that seaport towns adopt innovative initiatives to investigate new techniques to improve efficiency and quality while minimizing adverse environmental consequences (2019).

4. Impact ofSSCM

Given the increased interest in offshore ocean waves as a source of renewable energy and as a port, Lee et al. (2016) conducted a study. They developed a mechanism for evaluating ocean energy investment strategies, which they called a selection method. The authors presented a

model in which wave energy-generated electricity is treated as a commodity similar to a newsvendor. It was typical to practise in industrial supply chains to use models like this for standard stock management under ambiguity to explain the behaviour of optimum feature behaviours. The technique creates a newsvendor framework to improve wind energy refurbishment and manufacture whenever the wave supply is uncertain. The technique assumes a fixed electrical power supply chain to a specific port, a distinct energy client, a separate energy supplier shareholder in wave energy, and a single power plant owner. Several scenarios with varying degrees of electricity demand, supply uncertainty of wave energy, ocean energy transformer building costs, manufacturing costs of both pulse and traditional utilities, and cost and residual values in the power industry were hurriedly simulated and then presented.

The writers received a variety of management insights and policy recommendations from the simulation. Following the research, it was discovered that the residual value of tidal power is a significant consideration when port expenditures in energy conversion systems are made. In their recommendation, the government should encourage the harbour to invest more in water waves by offering

incentives such as reduced construction costs or increased value of recovered wave power.

5. Difference between the components of MGSCM &SSCM

According to the definition, maritime green supply chain management incorporates environmental considerations into supply-chain management, including specific creation, order fulfilment and selection, manufacturing methods, finished products distribution, and item end of life administration and management.

Sustainability was improved at every level of the supply chain, beginning with idea concept innovation and continuing through all stages of manufacture to the final delivery to the end-user. The articles in this section are concerned with efforts to enhance sustainability through material procurement, product manufacturing, and consumer behaviour. The goal of these increased sustainability activities is to lessen the impact of the supply chain on the next generation of consumers.

6.Green Supply chain management in Bangladesh

The manufacturing industry plays a significant influence in developing Bangladesh's economy. During the fiscal year 2019-2020, the manufacturing industry will generate 20.4 per

cent of the total employment opportunities in the country. Bangladesh's manufacturing industry is considered the fastest-growing sector in the country. Bangladesh's estimated GDP in the most recent year of 2019 was 286.00 USD Billion, with projections indicating that it would reach roughly 305.00 USD Billion by the end of 2020. [26] The manufacturing industry contributed an all-time high of 25730.30 BDT million in 2019, and a record low of 7383.40 BDT million was predicted in 2006, both records. Bangladesh's manufacturing industry accounts for the lion's share of the country's gross domestic product.

On the other hand, the manufacturing industry has a negative side effect on industrial waste. It has been estimated that the volume of solid waste generated by municipal and manufacturing industries in Dhaka, Bangladesh, is 3000 tonnes per day [28], [19]. It is estimated that there are 1081 construction enterprises in Bangladesh [27], according to the REHAB (2014) report.

Compared to European countries, Bangladesh's green supply chain is not as well developed as possible. The Bangladesh national building code (BNBC) must be amended to ensure the effective usage of environmentally friendly materials. A significant amount of garbage is generated in Bangladesh due to unplanned

industry, rapid urbanization, and an unthinking way of living. Inadequate public knowledge and failure to fulfil industrial duties are causing the environment to suffer from potentially fatal repercussions.

The primary goal of manufacturing companies in Bangladesh is to maximize profit or minimize cost while also providing the highest possible level of customer satisfaction, depending on the target market. On the other hand, consumers are extremely sensitive to changes in the price and cost of products. Consumers are not particularly concerned about environmental issues, which better waste management, resource usage, and green management practices can be addressed. Because consumers are not particularly concerned about environmental issues, manufacturing companies are concentrating on the various tools of supply chain management that ensure that the product is delivered at the appropriate time, at the appropriate location, in the appropriate form, to the appropriate customer, and that it meets the needs of the customer, while ignoring the environmental

impact of supply chain management [29].

According to the findings of Aziz and Hafez (2003), the worldwide result rate and productivity of the manufacturing industry have been declining over the past 40 years; lean manufacturing processes can be a more effective strategy to address the situation [30]. The environment agency of the United Kingdom government, BREEAM (Building Research Establishment Environmental Assessment Methodology), the construction industry board (CIB), Building Research Establishment (BRE) Waste Concerns, the Bangladesh Association of Construction Industry (BACI), the Construction Products Association (CPA), the United States Environmental Protection Agency (EPA), and others have begun to express their concerns about making the construction and manufacturing industries more environmentally friendly and environmentally friendly. Green supply chain management is a relatively new topic in Bangladesh, yet it is an extremely important component of achieving sustainability.

	Organizational Objectives	Relationship in Supply Chain	Evaluation Standards
Traditional Suppliers	Maximum benefit of economy	Short-term and rival strategy	Price, quality and delivery
Green Suppliers	Maximum benefits of economy and environment	Green cooperation and competition	Economy and environment
Sustainable Suppliers	Maximum benefits of economy, society and environment	Partner for creating new value through SSCM	Considering the TBL factors

Table: 3. The distinction between traditional suppliers, green suppliers, and sustainable suppliers

7. Factors of GSCM in Bangladesh

According to empirical classification, the factor analysis of GSCM is divided into six categories. Internal environmental management, green purchasing, cleaner production, recovery, eco-design, and pollution are some of the topics covered. Sub-factors directly impact the practice of global supply chain management and the performance of supply chain management. Introduced by Hamideh Shekari, Skandar Shirazi, Mohamad Ali Afshari, and Said Mehdi Veyseh in 2011, the responsiveness factor is composed of 34 subfactors that operate together to measure the factor's responsiveness.

The major six factors are dominated by the 34 sub-factors described. These considerations have an impact on the overall GSCM

manufacturing prospect in general. GSCM, on the other hand, is not widely used in Bangladesh as a management technique. GSCM is still active in Bangladesh, although only at the primary school level. More elements can be considered when examining the possibility of manufacturing companies in Bangladesh. The manufacturing company in Bangladesh is working as a newcomer to global supply chain management. When it comes to manufacturing companies in Bangladesh, green production and recovery factors are frequently employed. Environmental design factors in the manufacturing business are extremely limited [25].

On the other hand, firms are beginning to acquire the expertise of GSCM. Some firms in the RMG sector are expected to make limited progress, but the number of firms in this sector is quite small. Improved performance can be achieved through green supply chain management practices.

8. Conclusion

The primary purpose of the Green Supply Chain Management programme is to ensure that the maximum amount of environmental and economic value is realized via the correct implementation of green supply chain operations. Bangladesh is a developing country with a burgeoning economy. Bangladesh's manufacturing industries include various products such as rice mills, medicine, paper yarn, jute items, and leather. Even though only a few companies have adopted and implemented GSCM, Bangladesh has a significant potential to be a leader in the implementation of GSCM. Bangladesh is a labour-intensive country that creates an absolute advantage in a small number of industries, such as textiles. The world's economy is growing increasingly sensitive to environmental challenges as time goes on. As a result, there is tremendous potential for the manufacturing industry to gain a competitive advantage through the application of GSCM.

9. References

1. Asgari, N.; Hassani, A.; Jones, D.; Nguyen, H.H. Sustainability ranking of the U.K. major ports: Methodology and case study. *Transp. Res. Part E Logist. Transp. Rev.* 2015, 78, 19–39.[CrossRef]
2. Chatzinikolaou, S.D.; Oikonomou, S.D.; Ventikos, N.P. Health externalities of ship air pollution at port—Piraeus port case study. *Transp. Res. Part D Transp. Environ.* 2015, 40, 155–165.[CrossRef]
3. Clarkson, M.E. (1995) 'A stakeholder framework for analyzing and evaluating corporate social performance', *Academy of Management Review*, Vol. 20, No. 1, pp.92–117.
4. Chen, J.; Fei, Y.; Lee, P.T.-W.; Tao, X. Overseas Port Investment Policy for China's Central and Local Governments in the Belt and Road Initiative. *J. Contemp. China* 2019, 28, 196–215.[CrossRef]
5. Cheng, T.C.E.; Farahani, R.Z.; Lai, K.H.; Sarkis, J. Sustainability in maritime supply chains: Challenges and opportunities for theory and practice. *Transp. Res. Part E Logist. Transp. Rev.* 2015, 78, 1–2.[CrossRef]
6. Corbett, J.J.; Wang, H.; Winebrake, J.J. The effectiveness and costs of speed reductions on emissions from international shipping. *Transp. Res. Part D Transp. Environ.* 2009, 14, 593–598.[CrossRef]
7. Cullinane, K.; Bergqvist, R. Emission control areas and their impact on maritime transport. *Transp. Res. Part D Transp. Environ.* 2014, 28, 1–5.[CrossRef]
8. Davarzani, H., Fahimnia, B., Bell, M. and Sarkis, J. (2016) 'Greening ports and maritime logistics: a review', *Transportation Research Part D: Transport and Environment*, Vol. 48, No. 1, pp.473–487.
9. Fernando, Y. and Hor, W.L. (2017) 'Impacts of energy management practices on energy efficiency and carbon emissions reduction: a survey of Malaysian manufacturing firms', *Resources, Conservation and Recycling*, Vol. 126, No. 1, pp.62–73.
10. Fernando, Y. and Saththasivam, G. (2017) 'Green supply chain agility in EMS ISO 14001 manufacturing firms: empirical justification of social and environmental performance as an organizational outcome', *International Journal of Procurement Management*, Vol. 10, No. 1, pp.51–69.
11. Fernando, Y., Sharon, S.S.T., Wahyuni-TD, I.S. and Tundys, B. (2017) 'The effects of reverse logistics on cost control abilities: an insight into manufacturing companies in Malaysia', *International Journal of Value Chain Management*, Vol. 8, No. 4, pp.285–306.
12. Fernando, Y., Walters, T., Ismail, M. N., Seo, Y. W. and Kaimasu, M. (2018a) 'Managing project success using project risk and green supply chain management: a survey of the automotive industry', *International Journal of Managing Projects in Business*, Vol. 11, No. 2, pp.332–365.

13. Huang, L.; Wen, Y.; Geng, X.; Zhou, C.; Xiao, C. Integrating multi-sourcemaritime information to estimate ship exhaust emissions under the wind, wave, and current conditions. *Transp. Res. Part D Transp. Environ.* 2018, 59, 148–159.[CrossRef]
14. Johnson, H., and Styhre, L. (2015) 'Increased energy efficiency in short sea shipping through decreased time in port', *Transportation Research Part A: Policy and Practice*, Vol. 71, No. 1, pp.167–178.
15. Lai, K.H., Wong, C.W.Y., Veus Lun, Y.H. and Cheng, T.C.E. (2013) 'Shipping design for compliance and the performance contingencies for shipping firms', *Transportation Research Part E: Logistics and Transportation Review*, Vol. 55, No. 1, pp.74–83.
16. Lee,P.;Chang,Y.-T.;Lai,K.; Lun,Y.H.;Cheng,T.C.E.Greenshippingand port operations. *Transp. Res. Part D Transp. Environ.* 2018, 61, 231–233.[CrossRef]
17. Lee, P.T.-W.; Chung, Y.-S.; Lam, J.S.L. *Transportation research trends in environmental issues: a literature review of methodology and key subjects. Int. J. Shipp. Transp. Logistics.* 2016, 8, 612–631.[CrossRef]
18. Lun, Y.H.V. (2011) 'Green management practices and firm performance: a case of container terminal operations', *Resources, Conservation and Recycling*, Vol. 55, No. 6, pp.559–566.
19. Mostert, M.; Caris, A.; Limbourg, S. *Intermodal network design: A three-mode bi-objectivemodelappliedtothecaseofBelgium. Flex.Serv.Manuf.J.*2018,30, 397– 420. [CrossRef]
20. Rehmatulla, N., Calleya, J. and Smith, T. (2017) 'The implementation of technical energy efficiency and CO2 emission reduction measures in shipping', *Ocean Engineering*, Vol. 139, No. 1,pp.184–197.