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IMPACT OF ENVIRONMENTAL COLLABORATION, ORGANIZATIONAL COLLABORATION AND GREEN SUPPLY CHAIN MANAGEMENT IN SUSTAINABILITY PERFORMANCE

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ABSTRACT

Nowadays the concept of green supply chain management is a receiving increased attention to the whole world and this concern make the ground of writing this paper. As Bangladesh is a developing country, many manufacturing industries are growing and also many multinationals are opening their manufacturing subsidiaries in our country. These factories wastage as harmful gases of carbon and sulfur, plastic wastes, black fumes from vehicles and from factories are causing pollution in the air, water as well as land. So green supply chain management is important to maintain the overall internal environment of an organization as well as how it impacts the mother nature. The purpose of this paper is to review various kinds of literature on the relationship between green supply chain management, inter-organizational collaboration pattern, environmental collaboration and sustainability performance in the context of Bangladeshi manufacturing companies. These research findings will be particularly important for manufacturing companies in developing a relation among organizational collaboration, environmental collaboration and sustainability performance.

Keywords: Green supply chain management, environmental collaboration, organizational collaboration.

1. INTRODUCTION

The environment is getting threatened due to industrial activities, burning fossil fuel and vehicles black fumes in terms of carbon monoxide, sulfur dioxide, methane emission, discarded plastic packaging materials and other toxic gases and materials. The concept of green supply chain management is to eliminate the harmful and hazardous emissions and other wastages as well as to revamp every steps of supply chain like resourcing, product design, manufacturing process, packaging materials, delivery system etc. Green supply chain management (GSCM) can play a vital role to redesign every part of supply chain , as such to reduce the adverse effect of supply chain activities to mother nature and thus develop organizational collaboration, environmental collaboration and sustainability performance of organizations.

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Green supply chain management is incorporating environmental consciousness into every single aspect of the supply chain as product or service design, material sourcing, procurement, supplier selection, production or manufacturing process, waste elimination, delivery to retailers, whole sellers and consumers. For ensuring GSCM, logistics design should be energy efficient, planning of warehouse should be such that can ensure optimize use of place should use environment- friendly vehicles for transportation and place right people in right place to reduce wastage and enhance efficiency using current resources. An organization can achieve financial, environmental and social benefits by following GSCM practices. Financial benefits include increased revenue, reduced costs etc. Environmental benefits include reduced waste, reduced air and water pollution, reduced fuel consumption reduced sound pollution. Social benefits include noise reduction, improved health, safety and security. GSCM can provide improved manufacturing process that is eco-friendly, reduce risk, enhance innovative ideas like recycling, reuse and reduce , increase awareness among stakeholders and also create a healthy relationship among the various stakeholders and consumers. This can also lead an organization to sustainability performance.

This paper basically focuses on the main activities of supply chain management and how these areas can function in the eco-friendly process. Moreover, by the various collaborative partnership among organizations as well as environmental collaboration, firms can also achieve short term and long-term sustainability. Manufacturing companies must adopt these eco-friendly techniques to enhance their long-term profitability along with minimizing the harmful impact of supply chain activities to nature. In developing countries like Bangladesh, maximum manufacturing companies don't use any eco-friendly technologies in factories. This research paper can help to understand the importance of GSCM and how it impacts their sustainability performance.

2. LITERATURE REVIEW

According to Bhagwata, Milind Kumar Sharma b (2007) for any business organization that has supply chain activities, must require measuring performance criteria to evaluate supply chain management. They propose a balanced performance measurement system to map and analyze supply chain. By the help of that tool, the relevant supply chain manager can measure performance from all perspective and in a more equitable way.

As mentioned by Christopher (1992) supply chain is a sequential network of organizations including the manufacturing one along with the suppliers and distributors wherein every stage value is created and send to the net one. So that at the end the consumers can get a quality output. In other words, a supply chain consists of multiple firms, both upward(i.e., supply) and downward (i.e., distribution), and the ultimate consumer. SCM requires the joint relationship with multiple responsible units for maintaining the entire process. SCM deals with the whole process of manufacturing along with the supplier with the end users of materials or services.

S. Seuring, M. Muller (2008) had taken a broad look at sustainable supply chain management and the issues emerging in this field. It offers a conceptualization based on a literature review. Frequently, the focal companies face hindrance due to some external factors as suppliers, customers, government laws and policies etc. Based on these triggers, two strategies are identified. The first one is labeled as ‘‘supplier management for risks and performance’’. This strategy also counts environmental and social criteria to evaluate suppliers as they a doubt about the loss of goodwill of the firm if such problems are raised. The second strategy is called ‘‘supply chain management for sustainable products’’. This can improve the overall supply chain performance by influencing the product’s performance on the basis of environmental and social factors.

According to Samir K. Srivastava(2007), GSCM can reduce the ecological impact of industrial activity without sacrificing quality, cost, reliability, performance or energy utilization efficiency as well as minimize ecological damage and enhance the profitability of a firm. GSCM primarily focus on quality, operations strategy, supply-chain management, and product and process technologies. It is reasonable to expect that these research areas will continue to hold the greatest promise for advancement in the short term with the collaborative effort of inter and intra firm by adopting green technologies in all areas of supply chain.

As mentioned by M. K. Chien; L. H. Shih (2007), corporations can benefit from an entirely green supply chain by cooperating with upstream suppliers on green production technology and exchanging green information with them, as well as taking the voices of downstream customers and green consumers into account in their production processes. The conventional end-of-pipe treatment can no longer meet the demands of international environmental protection. To meet the expectations of society, pollution preventive measures should be adopted as an environmental management strategy. However, firms are in general concerned about increased operation cost and descending market share value that is a consequence of following GSCM technology. Nevertheless, the present study found that the implementation of GSCM practices has a positive effect on environmental and financial performance; that is, an increase in environmental performance will be accompanied by increased corporation profit and market share.

The starting points are external pressure and incentives set by different groups. While stakeholders form the widest possible description, two groups are of particular relevance. On the one hand, customers are of great importance, as operating the supply chain is only justified if the products and services are finally ‘‘accepted’’ by customers. On the other hand, according to New SJ(1997), all modes of governmental control be it from local municipalities, national or multi-national governments, are of great relevance. He ‘‘advocates an expanded scope for supply chain management research which accounts for the social function and the political and economic implications of supply chain developments’’. Cramer (2000) proposes an approach which ‘‘monitors new developments and trends in the environmental debate and changes in pressure exerted by external stakeholders’’. Roberts S. (2003) ,emphasizes that action from

NGOs, which hold focal companies responsible for environmental and social problems at earlier stages of their supply chain, can lead to a reputation loss. The other macro environmental factors that can affect focal companies are legal regulation, response to stakeholders, competitive advantage, customer demands, reputation loss, and environmental and social pressure groups (Bowen FE et.al,2001;Handfield RB. Et.al,1997; Preuss L., 2001; Roberts S., 2003; Sarkis J.,2001;Rao P,2005;Welford et.al, 2006; Zhu Q et.al, 2005;Zhu Q et.al, 2007; Linton JD et.al, 2007). When the focal company is pressured, it usually passes this pressure on to suppliers. Looking at the overall supply chain (or life-cycle) of the product, the focal company quite often has to take a longer part of the supply chain into account than needed for ‘‘pure’’ economic reasons (Hanfield RB et.al, 1997; Kogg B., 2003; Preuss L., 2005; Seuring S., 2004). Related to this, barriers and supporting factors are mentioned, which support or hinder the cooperation with suppliers (Carter CR., 2001; Gunther E. et.al, 2005; Lamming RC et.al, 1996; Bowen FE., 2001; Carter CR., 2002). This holds true for having information on the environmental and social performance at the single production stages, as well as on improving the performance of main suppliers. Based on these factors, a range of strategies can be identified regarding how companies deal with such issues. To put it more simply, two different strategies can be used to summarize them. Bowen et.al (2001) and Hanfield RB et.al(1997), distinguish between ‘‘greening the supply process’’ and ‘‘product based green supply’’. Building on this, the two strategies are labeled as ‘‘supplier management for risks and performance’’ and ‘‘supply chain management for sustainable products’ ‘the barrier and incentive categories are listed according to the number of papers that refer to them, and where several or all categories could have been addressed.

Sharfman et.al, (2009), introduced the term “cooperative supply-chain environmental management”. By applying this collaboratively with the focal firm and suppliers, the firms can minimize the adverse effect on environment. Vachon and Klassen defined “environmental collaboration” as the direct involvement of an organization with its supply chain partners in developing environmental solutions. The GSCM collaboration focuses not only on reducing the environmental consequences of material flows but also on improving operational process and product quality (Simatupang et.al, 2005).Various collaboration measures can be applied for GSCM to deal with multiple diversity that causes difficulties in the understanding and systematic implementation of the collaborative measures. In the field of environmental management, several researchers took attempt to identify significant collaborative GSCM measures (Linton JD. Et.al, 2007; Preuss L., 2005; Seuring S., 2004; Lamming RC., 1996; Cooper et.al, 1997; Hanfield RB et.al, 1999; Hanfield RB et.al, 1997; Zhu Q. et.al, 2005; Elkington J., 1998; https://cleantechnica.com /2012/04/15/green-manufacturing/) and classify the measures to identify the relationships between the measures(Christopher et.al, 1992; Kleindorfer PR et.al, 2005). However, a holistic view in explaining how various collaborative measures influence each other and how the company-overlapping measures can be integrated for better GSCM remain lacking (Gunther E., 2005).

According to Moon Jung Kang and JongwoonHwang(2017), there are four collaborative measures for GSCM subdivided into twelve more subpatterns. The four broad areas are information and knowledge sharing, process integration, joint performance management, relationship management. As the model prescribed by the researcher, to facilitate GSCM, joint planning, as well as joint performance, is essential. By doing work collectively collaborative partners can reduce conflict and enhance knowledge, skill and competency sharing. Also if both partners have set the same goal, then they mutual discussion to have a clear notion about each other's strategies, techniques and process. Thus increase mutual trust among the collaborative partners. If both partners can maintain trust and work together to increase their competitiveness in the market, then they can also linger their partnership and hence gain sustainability.

According to Jao-hongCheng (2008), there is an effect of knowledge sharing in green supply chain among manufacturing organizations. But trust among all the partners plays a significant role in knowledge sharing among them. This research is based on Taiwan's manufacturing companies and the researchers come to a conclusion that if there is trust among the partners, then knowledge sharing get enhanced and vice versa. Another research (106) show that inter-organizational collaboration can help the companies to sustain competitive advantage. Moreover, this paper gives emphasis on corporate core competencies and collaborative strategic plan to sustain their inert organizational collaboration and gain competitive power in the market.

B.S. Sahay explained that trust among partners and alliances play a pivot role in long-term collaborative relationship. As well as the researcher develop a framework focusing on three factors of trust as the ways the term is used, factors leading to trusting behavior in the customer-supplier relationship, and the effect of trust on the behavior of a customer and a supplier.

The limited understanding of environmental management in the supply chain has hampered the development of a widely-accepted framework that characterizes and categorizes environmental activities. (Zhu and Sarkis, 2004; Zsidisin and Siferd, 2001). For example, Bowen et al. (2001) defined green supply as the buying organization's intent to improve the environmental performance of purchased input and/or of the suppliers that provide them. As such, green supply includes a wide variety of activities such as cooperation between organizations to minimize the logistical impact of the material flows and gathering environmentally related information about purchased materials and components. Others have proposed definitions more focused on the purchasing function, suggesting that green supply activities consist of the involvement of the purchasing function in facilitating internally driven environmental activities such as recycling reuse and source reduction (Carter and Carter, 1998; Min and Galle, 2001; Zsidisin and Siferd, 2001). Here, the focus is on collaboration between a focal plant and its suppliers and/or its customers. Environmental collaboration in the supply chain includes a direct involvement of an organization with its suppliers or customers to jointly develop environmental solutions (Florida, 1996; Geffen and Rothenberg, 2000; Rao, 2002).

According to Bowen et.al (2001), environmental collaboration focus on the supplier-customer relationship. It also puts emphasis on joint planning. (Frohilch and Westbrook,2001). As mentioned by Zhu and Sarkis (2004), GSCM combines two sets of activities and two directions in the supply chain as it separate control oriented activities as monitoring and put emphasis on relational activities as collaboration. Similarly, collaboration has both theoretical and managerial implication. First collaborative activities are difficult to replicate and so is expected to offer a competitive advantage. Second collaboration requires long-term commitment. GSCM promotes environmental collaboration by knowledge, skill and competency sharing by using 3Rs, in logistics. Global environmental management initiative (2004), Bowen et. al(2001). Hence environmental collaboration focuses more on the process of eco-friendly production. Reiskin et.al (2000), mentioned about several benefits and challenges of environmental collaboration as less chemical use in plants. Similar anecdotal evidence has been reported for the automotive industry (Geffen and Rothenberg, 2000; Global Environmental Management Initiative, 2001).

Environmental collaboration includes the exchange of technical information and require a mutual willingness to learn about each other's operations in order to improve environmental practices (Canning and Hanmer-Lloyd, 2001; Geffen and Rothenberg, 2000). The collaborative firms can also work together to minimize the hazardous impact on the environment due to supply chain activities (Bowen et al., 2001; Carter and Carter, 1998). As noted earlier, these practices take the form of joint planning and decision-making regarding environmental issues, which is consistent with examples and cases presented in the green supply chain literature (Geffen and Rothenberg, 2000; Hall, 2000; Handfield et.al, 1997; Walton et.al, 1998).Again several cases in the literature illustrate the linkage between environmental cooperation and operational performance. (Hart, 1997).As, Xerox negotiated with its key suppliers to design products that are easier to remanufacture by developing a technique that makes it difficult for their rivals to replicate and ultimately lead to improving environmental and operational performance (Reinhardt, 1999).The competitive advantages generated by environmental collaboration are twofold. First, the collaboration includes knowledge integration and cooperation between organizations, which are recognized as resources that might generate competitive advantage (Grant, 1996; Simonin, 1997). As such, manufacturing organizations adopting collaborative activities with their suppliers and customers can develop organizational capabilities (Lorenzoni and Lipparini, 1999), which can improve environmental performance as well as other dimensions such as cost and quality (Hart, 1997; Porter and van der Linde, 1995). Case evidence supports the linkage to improved productivity (Geffen and Rothenberg, 2000), while the limited survey has highlighted improved product quality (Gavaghan et.al, 1998) and financial performance (Carter et.al, 2000). Thus, collaboration is expected to positively influence operational performance (Aragon-Correa, 1998; Porter and van der Linde, 1995).According to Bonifant et al., 1995; Klassen and Whybark, 1999, Bowen et.al, 2001 environmental collaboration can reduce manufacturing costs, enhance quality and flexibility increases as well as improves a plant's environmental performance.

The findings highlighted in the previous section indicate that environmental collaboration with primary suppliers and major customers can have a significant positive impact on both manufacturing and environmental performance. The positive link between environmental collaboration and different areas of manufacturing performance adds further support to the natural resource-based view of the firm (Hart, 1995). The results obtained here complement those reported in previous research. For example, a strong linkage has been noted between external stakeholders, including customers and distributors, in the implementation of ISO-certified environmental management systems and the degree of competitive advantage derived from the ISO 14001 certification (Delmas, 2001). Rao (2002) found a linkage between environmental activities in supply chain and organizations' environmental performance. Another study found a positive link between green supply chain practices (including a mix of collaboration and monitoring activities) and both environmental and economic performance (Zhu and Sarkis, 2004). Green supply chain management affects operational performance (Carter et al., 2000; Christmann, 2000; Melnyk et al., 2003; Sarkis and Cordeiro, 2001). For example, environmental purchasing, defined as the involvement of the purchasing function in environment-related projects within the organization, was positively linked to net income and negatively linked to cost (Carter et al., 2000). Finally, an organization with proactive environmental management will develop innovative solutions to environmental improvement as well as organization's operations (Aragon-Correa, 1998; Porter and van der Linde, 1995; Russo and Fouts, 1997).

Sustainability is based on the simple fact that all activities for survival depend on the natural environment. The objective of sustainability is to preserve harmony in the environment, fulfilling the social, economic and economic requirements of the current generation and preserving for future generations. The Brundtland Report of 1987 popularized sustainability and described it to be any development meeting present needs without affecting future generation's capability to survive. This is an initiative taken in order to repair the damages from direct and indirect human actions on the environment. A sustainable business must fulfill some essential criteria as long- term sustainable decision-making process, produce eco-friendly products by eco-friendly supply chain, focus on GSCM and also focus on maintaining Mother Nature. The primary focus of the sustainable operation is to make optimum use of resources and produce maximum output with minimum wastage. Environmental sustainability maintains a balance between the environmental requirement for long-term and fulfilling a company's ultimate goal.

The Triple Bottom Line (TBL) model of Elkington (1998) collaborating economic, environmental and social dimensions of sustainability and their interdependency is another accepted study in research circles). This model focuses on holistic development considering the three spheres of social, economic and environmental impacts on society, business and environment. The environmental pillar includes activities like ecosystem services, green engineering, air quality, water quality, stressors, resource integrity, while social pillar includes environmental justice, human health, participation, education, resource security, sustainable communities. The economic pillar

consists of activities like incentives, jobs, supply and demand, natural resource accounting, costs and prices. Other researchers on sustainability also brought out these three pillars of sustainability. The Triple Top Line (TTL) value concentrates on the same three important requisites for a sustainable business namely financial benefits, work betterment, and social advantages for its stakeholders.

Many organizations take initiatives of sustainability as corporate social responsibility. This step can help them to enhance their brand image, increase profit margin as well as make them competitive with changing the environment. Though corporate environmental responsibility is sometimes expensive, it can help an organization to embark to a higher rank from the social perspective. The Supply chain consists of three or more entities starting from suppliers and end at ultimate consumers who are involved in manufacturing and all other supporting activities. (Mentzer, Dewitt, & Keebler, 2001)According to Carter & Rogers, 2008, companies which participate in social activities can gain long-term economic benefits and competitive advantages along with natural development. Organizational sustainability consists of three components: the natural environment, society, and economic performance and CER related activity in the supply chain.

There are various conceptual frameworks in SCM, but one of the conceptual frameworks most often referred to the triple bottom line (TBL), which is proposed by Elkington (1998). This framework divides sustainability into three dimensions, i.e. economic, environmental and societal. The other frameworks are derived from the TBL shows the six conceptual frameworks of sustainable development and SCM. The first three frameworks (Elkington, 1998; Gidding et al. (2002)) relate to three components (economic, environmental and social) with different perspectives among the components. The others three frameworks (Carter and Rogers, 2008; Mongsawad, 2009; Teuteberg and Wittstruch, 2010) are derived from the TBL model and add business functions or support contributions for SCM. For achieving sustainability along with the economic, societal and environmental issues, the impact of human actions into distinct compartments should be considered. The second group shows that for long-term sustainability organizations also should consider other support components as risk management, transparency, knowledge ethical issues etc. According to S Santiteerakul et.al, 2015 and Thoo Ai China, 2015 there are three main features to construct sustainability metrics: (1) supply chain needs identification must cover all of the three core dimensions; (2) metrics should reflect both the short-term and long-term perspective; and (3) engagement level of activities must cover the supply chain level. The literature review is summarized in the following two tables:

Table 1: Dimensions of sustainability development addressed in this paper

Dimension(s)	Sub dimensions	Sources
GSCM	Green procurement	Gilbert (2001), Bowen et.al.(2001), Carter et.al.(1998), Carter et.al.(2000), Min and Galle(2001), Zsidisin and Siferd (2001), Zhu Q et.al.(2005), Holt D.(2009), Green Jr et.al.(2012), Lee SM et.al.(2012).
	Product design	Simatupang et. al.(2005), Rein hardt(1999), Gavaghan et.al.(1998)
	Green manufacturing	Hsu and Hu (2008), Simatupang et. al.(2005), Carter et.al.(2000), Christman(2000), Melnyk et.al.(2003), Sarkis and Cordeiro(2001)
	Green packaging	https://www.plushbeds.com/blog/green/what-is-green-packaging/
	Green inventory management	https//:www.researchgate.net/publication/307586139_Green_Inventory_Management
	Green distribution	https://www.sustainablebusinesstoolkit.com/green-distribution/
	Green logistics	Gilbert (2001), Global environmental management initiative (2004), Bowen et. Al.(2001), Ninlawan C et.al (2010), Holt D.(2009), Laosirihongthong et.al(2013)
Organizational collaboration for GSCM	Information and knowledge sharing, process integration, joint performance agement, relationship management	Samir K. Srivastava(2007), Moon Jung Kang and Jongwoon Hwang(2017), Jao-Hong Cheng (2008), B.S. Sahay, Zhu and Sarkis(2004), Zsidisin and Siferd (2001), Florida(1996), Geffen and Rothenberg(2000), Rao(2002), Bowen et. Al.(2001), Carter et.al.(1998), Grant(1996), Simonin(1997), Lorenzoni and Lipparini(1999)
Environmental collaboration for GSCM	Cooperation with upstream suppliers and downstream customers, collaboration between focal firms and suppliers, Supplier and customer relationship, distributers and customers relationship	Gilbert (2001), M.K. Chien and L.H. Shih(2007), Sharfman et. al.(2009), Vachon and Klassen, Frohilch and Westbrook(2001), Zhu and Sarkis(2004), Reiskin et.al.(2000), Geffen and Rothenberg(2000), Hall(2000), Handfield et.al(1997), Walton et.al(1998), Hart(1995), Hart(1997), Porter and van der Linde(1995), Bonifant et.al.(1995), Klassen and whybark(1999), Bowen et.al.(2001), Delmas(2001), Rao(2002)

Table 2: Supporting factors for sustainable supply chain management

Sustainability performance factors		Sources
Economic performance	Financial	Samir K. Srivastava(2007), M.K. Chien and L.H. Shih(2007), Elkington(1998)
	Nonfinancial	M.K. Chien and L.H. Shih(2007)
	Overall	New SJ(1997), Hanfield RB et.al.(1997), Kogg B.(2003), Preuss L. (2005), Seuring S.(2004), Elkington (1998), Santiteerakul et.al.(2015), Thoo Ai China (2015)
Environmental performance	Raw materials	Elkington(1998)
	Energy	Elkington(1998)
	Natural resources	Preuss L. (2001), Elkington(1998)
	Overall	Hanfield et.al, Schary et.al. , Carter CR et.al.(2002), Kova's G(2004), M.K. Chien and L.H. Shih(2007), Roberts S.(2003), Bowen F. et.al(2001), Handfield RB. et.al(1997), Preuss L. (2001), Roberts S.(2003), Sarkis J.(2001), Rao P(2005), Welford et.al. (2006), Zhu Q et.al.(2005), Zhu Q et.al.(2007), Linton JD et.al.(2007) , Carter CR.(2001), Gunther E. et.al. (2005), Lamming RC et.al(1996), Bowen FE.(2001), Carter CR.(2002), Elkington (1998), Santiteerakul et.al.(2015), Thoo Ai China(2015)
Social performance	Health and safety	Graafland JJ(2002),S.Seuring, M. Muller(2008)
	Potential capabilities for human well being	New SJ(1997), Carter and Rogers(2008), Mongsawad (2009), Teutiberg and Wittstruch (2010)
	Ethics	Carter and Rogers (2008), Mongsawad (2009), Teutiberg and Wittstruch (2010)
	Overall	Hanfield et.al, Schary et. al,Carter CR et.al(2002), Kova's G(2004), S.Seuring, M. Muller(2008) , Robert S.(2003), Bowen FE et.al(2001),Handfield RB. et.al(1997), Preuss L.(2001), Roberts S.(2003), Sarkis J.(2001),Rao P(2005),Welford et.al(2006), Zhu Q et.al. (2005), Zhu Q et.al(2007), Linton JD et.al. (2007), Carter CR.(2001), Gunther E. et.al (2005), Lamming RC et.al(1996), Bowen FE. (2001), Carter CR.(2002), Elkington(1998), Carter and Rogers(2008), Santiteerakul et.al.(2015), Thoo Ai China(2015)

3. TOWARDS A CONCEPTUAL FRAMEWORK

The hypothesized model linking the relationship between GSCM practices , environmental collaboration, organizational collaboration or collaboration among organizational partners and sustainability performance has shown in the following figure:

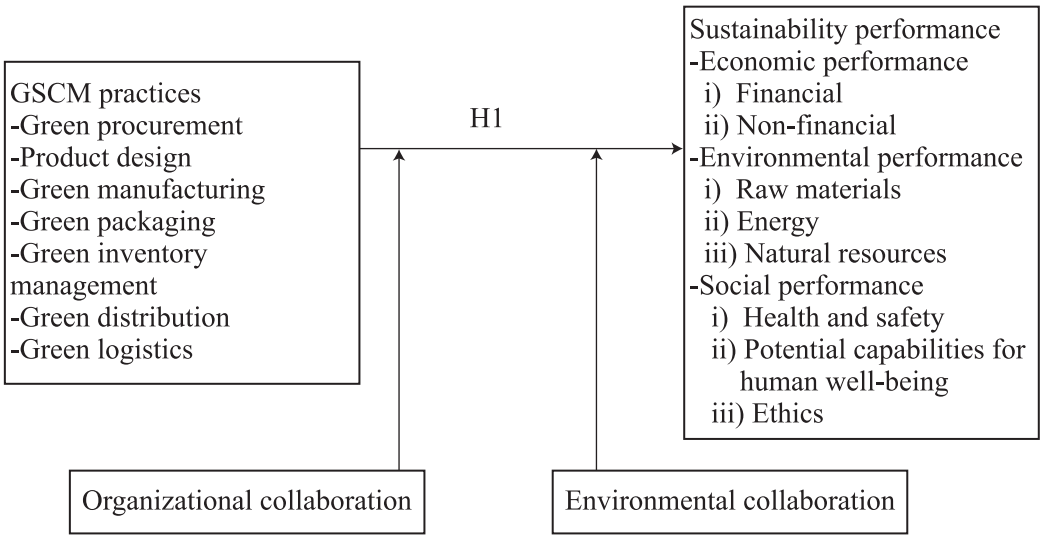

Figure1: Proposed conceptual model

Green procurement can be ensured by applying green procurement policies, provide training to suppliers to use less harmful materials, choose suppliers based on environmental competence, produce eco-friendly products, contribute and support parent company to be environment friendly. Moreover company should also draw attention in 3 R's: reuse, recycle and reduce and increase the use of paper, cloth, jute for packaging purposes. Also for organizational internal energy supply can be fulfilled by using solar panel and hence reduce fuel consumption.(Zhu Q et.al, 2005; Holt D., 2009; Green Jr et.al, 2012; Lee SM et.al, 2012).

Green manufacturing can be defined as the establishment of eco-friendly activities in manufacturing field and can be achieved by capturing economies of scale, reduce key resource costs, using less fuel consuming equipment and machineries, following lean manufacturing process, by sharing resources among internal organizational units. Green manufacturing is a productions process which converts inputs into outputs by using renewable energy system, by moderating harmful emissions, minimize waste by focusing on recycling and minimize the dependency on natural resources. Green manufacturers research, develop and use process and technologies that can lessen hazardous impact on environment.(Zhu Q et.al, 2005; Holt D., 2009; Green Jr et.al, 2012; Lee SM et.al, 2012;https://cleantechnica.com/2012/04/15/green-manufacturing).

Green packaging should allow such packaging materials those are eco-friendly, recyclable, non-toxic, plant-based plastics and biodegradable as paper bags, jute bags, glass bottles, cloth bags etc. The conventional packaging system that mostly depends on plastic and related materials that causes adverse effect on Mother Nature. So to lessen the adverse impact on nature, to reduce the carbon footprint on environment and reap other benefits as cost reduction industries are moving towards green manufacturing. Managing inventories, and thereby material flows, is of key importance for achieving efficient and sustainable supply chains. Green inventory management is characterized by minimizing costs as well as focusing on environmental issues. To achieve green inventory any organizations must manage the inventory level and reduce it by following Just-in-time approach, six sigma, focus on pull demand (http :www.researchgate.net/publication/307586139_Green_Inventory_Management).

Distributors must be well trained and properly knowledgeable about the green philosophy; so that they can focus on environment-friendly vehicles or other delivery processes .Such as for large lorry they can use the catalytic converter to reduce the harmful emission from black fumes.
Green logistics can be justified by following rules and regulation of load limit of vehicles, use direct to end user sales. As for green logistics transportation, it is about delivering goods directly to user site, using alternative grouping orders together, rather than in smaller batches investing in vehicles that are designed to reduce environmental impacts, and planning vehicle routes. Green logistics is about reverse logistics that includes collecting used products and packaging from customers for recycling, returning packaging and products to suppliers for reuse, and requiring suppliers to collect their packaging materials (Ninlawan C et.al, 2010; Holt D., 2009; Laosirihongthong et.al, 2013).

According to literature review of various authors, Sustainable performance depends of three major factors as economic, environmental and social. The GSCM interacts with each other and can hold an organization together for sustainability performance, where the interaction has found to lead significantly to firm performance(Zhu Q. et.al, 2005; Zhu Q., 2007).

According to S Santiteerakul et.al.(2015), in order to implement sustainable development in companies and their supply chains, a sustainable development within both short-term and long-term perspectives. Sustainability from a short-term perspective is the ability of activities to meet the needs of present and future generations. On the other hand, sustainability from a long-term perspective is the ability of activities to shift human activities to non-polluting products and non-polluting technologies; less material and energy usage; as well changed attitudes, lifestyle and behavior towards a sustainable path. An increase of sustainability performance must be considered both within short and long-term perspectives. Sustainable performance of a company can be developed based on economic performance by considering financial and non- financial activities for short and long-term. For financial short term benefit organization

should focus on benefits of supply chain operation and cost minimization. But for long-term financial benefit they should consider employees' long-term equitable income. For short-term non-financial benefit company can consider quality and reputation of supply chain .But for long-term nonfinancial benefit company increase trust, be flexible and responsive. To gain environmental short term benefit organization should use 3R's –reuse, reduce and recycling and for long-term benefit company should improve manufacturing process and technology. Organizations must focus on reducing the use of natural fuels as energy resources and in long-term they should use eco-friendly technologies. In short-term company should reduce energy consumption to save nonrenewable energy by efficient use and lessening wastage. But in long term they should mostly depends on natural sources like wind or solar power for energy. To enhance sustainability performance, company should also consider the social issues. As they can provide health care facilities, arrange awareness programs, provide training for human skill development and follow environmental laws and policies. Also for long-term positive impact on society, they should engage in social development activities voluntarily, use more environment-friendly technologies, and provide awareness program and promotional activities that can motivate people to change their life style positively towards sustainability development.

The above discussions develop the basis of the following hypothesis:

H1: GSCM practice is positively related to long-term sustainability performance.

The benefits that can be derived from environmental collaboration have been recognized in the GSCM literature (Paulraj A., 2011). Researchers have emphasized the direct relationship between GSCM practices and organizational performance. Holt and Ghobadian (2009) used external GSCM to see the impact of environmental collaboration on firm performance. Paulraj A. (2011) sought a relationship between sustainable supply management and sustainability performance. In contrast to these studies, environmental collaboration can enhance technological diversity, knowledge sharing, social development as well as develop a sustainable relationship with all stakeholders of a company. Also, environmental cooperation and organizational performance can be improved. Environmental collaboration can reduce manufacturing costs, enhance quality and flexibility increases as well as improves a plant's environmental performance. A sustainable business must fulfill some essential criteria as long-term sustainable decision making process, produce eco-friendly products by eco-friendly supply chain, focus on GSCM and also focus on maintaining Mother Nature. Therefore, the following hypothesis is proposed:

H2: Environmental collaboration has a significant positive role GSCM practice and sustainability performance.

According to Moon Jung Kang and Jongwoon Hwang (2017), to attain sustainable green supply chain management organizational collaboration beads on mutual trust is obligatory. The collaborative partners set a common target and accordingly they should share their skills, technologies and competencies. By doing so, a mutual trust grows among the collaborative partners and they can linger their partnership that is essential for sustainability. 105 also mentioned that knowledge sharing has the significant effect on sustainable GSCM. But for that purpose the collaborative planning as well as mutual trust among the collaborative partners is very important. B.S. Sahay explained that trust among partners and alliances, plays a pivot role in long-term collaborative relationship. All the supply chain members should reinforce their collaborative behavior that can help them to build and maintain a trust based long term relationship.

The above discussion develops the base of the following hypothesis:

H3: Mutual trust among the collaborative partners plays a positive role for sustainable GSCM.

4. DISCUSSION AND CONCLUSION

Based on various literature reviews, it's evident that GSCM and sustainability are inseparable concepts. To ensure GSCM, organizations must emphasize on all steps of supply chain management as procurement, Manufacturing process, logistics, inventory, supplier, distributer, packaging etc. All the mentioned areas' activities should be eco-friendly. Besides the importance of all steps related o supply chain, environmental collaboration is needed to ensure GSCM and long-term sustainability performance. Moreover, long term collaborative partnership grows from mutual trust must add more value and ensure sustainability. By having mutual trust the firms can easily share their knowledge and competency and reach their set target. The proposed conceptual model is fully based on the review of various literatures where it is clearly specified that there is a relation among GSCM, mutual trust among collaborative partners and environmental collaboration to sustainability performance. All these areas have a positive impact on long term sustainability performance. Improved network and collaboration among all these mentioned areas has both theoretical and managerial implication in organizations. First, the collaborative competencies, strategies and skills are difficult to replicate by the rival firms and thus it is expected to offer competitive advantage to the firms. Moreover, collaboration requires long-term commitment based on mutual trust and hence can enhance the scope of more knowledge and skill sharing that can lead to long term sustainability. So it needs to be more researched and then it can be applied usefully to the context of Bangladeshi manufacturing company.

5. RESEARCH LIMITATIONS AND FUTURE SCOPE

This study is conducted on green supply chain management based on various literatures. A model is developed by linking the green supply chain management, environmental collaboration, organizational collaboration and sustainability performance. The result would be more credible and effective to apply in the context of Bangladeshi manufacturing companies, based on some quantitative analysis. But no data was collected from relevant firms to support or verify the hypothesis quantitatively. Therefore there is a vast scope for future research to quantify the conceptual model and verify the hypothesis quantitatively.

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