

# A Study on Implementation of Green Supply Chain Management in RMG Sector of Bangladesh

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**Abstract** - In modern management, green supply chain management is a sort of mode which comprehensively considers both influence of environment and utilization of resource efficiently in the all activities of supply chain and how to implement green supply chain management is special industrial operation at present has become into of top priority problems. The core contents of RMG enterprises implemented green supply chain management to solve the problems challenges in implementing green supply chain management of RMG sector in Bangladesh and is the main study of this article.

**Index Terms** - Apparel Enterprises, Export Trade, Green Supply Chain, Implementation Principles, Performance based supply chain, RMG, Strategic Assets, Strategic Cooperation

## 1 Introduction

THE readymade garment (RMG) sector is a success story for Bangladesh. The industry started in the late 1970s, expanded heavily in the 1980s and boomed in the 1990s. The quick expansion of the industry was possible because of the use of less complicated technology, cheap and easy to operate sewing machines, and relatively cheap and abundant female workforce. RMG products are traditional products to earn foreign exchange through export in Bangladesh, and for a long term, Bangladesh has been the one of the biggest export trade country of RMG and Apparel in the world market. But since entering into the 21<sup>st</sup> Century, Bangladeshi RMG and Apparel industry begun to face increasingly serious problems with offering high-quality, low-cost products within a short lead time; and to meet health, social, and environmental compliances in the face of increasingly stiff completion. Under this domestic and foreign competitive environment, the future survival and development of Bangladeshi RMG industry face large challenge. Simple management mode of made of "import to export" or the production and management mode of "vertical integration" have made the Bangladeshi RMG industry lack in activity, innovational ability and insufficient international competition. Under this background, the idea of "horizontal integration" begins to rise, and as the representative of this idea, the supply chain management increasingly prevails, and the green supply chain management has gradually become into the new concept for the sustainable development of the enterprises. However, it is not the simple problem of concept to really implement the green supply chain management in enterprises, and there are large numbers of works to do. This article mainly studies the core approaches and principles that

RMG enterprises implement the green supply chain management to solve the problems faces by those enterprises.

## 2 Problems facing by RMG Sector of Bangladesh

The garment industry of Bangladesh has been the key export division and a main source of foreign exchange for the last 25 years. National labor laws do not apply in the EPZs, leaving BEPZA in full control over work conditions, wages and benefits. Garment factories in Bangladesh provide employment to 40 percent of industrial workers. But without the proper laws the worker are demanding their various wants and as a result conflict is began with the industry. Following are the some specific problems facing by the RMG sector of Bangladesh.

**a. Raw materials:** Bangladesh imports raw materials for garments like cotton, thread color etc. This dependence on raw materials hampers the development of garments industry. Moreover, foreign suppliers often supply low quality materials, which result in low quality products

**b. Unskilled workers:** Most of the illiterate women workers employed in garments are unskilled and so their products often become lower in quality.

**c. Improper working environment:** Taking the advantages of workers' poverty and ignorance the owners forced them to work in unsafe and unhealthy work place overcrowded with workers beyond capacity of the factory floor and improper ventilation.

Most of the garment factories in our country lack the basic amenities where our garment workers sweat their brows from morning to evening to earn our countries the major portion of our foreign exchange. Anybody visiting the factory the first impression he or she will have that these workers are in a roost.

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Improper ventilation, stuffy situation, filthy rooms are the characteristics of the majority of our factories. The owners profit are the first priority and this attitude has gone to such an extent that they do not care about their lives.

**d. Lack of managerial knowledge:** There are some other problems which are associated with this sector. Those are lack of marketing tactics, absence of easily on-hand middle management, a small number of manufacturing methods, lack of training organizations for industrial workers, supervisors and managers, autocratic approach of nearly all the investors, fewer process units for textiles and garments, sluggish backward or forward blending procedure, incompetent ports, entry/exit complicated and loading/unloading takes much time, time-consuming custom clearance etc.

**e. Gendered division of labor:** In the garment industry in Bangladesh, tasks are allocated largely on the basis of gender. This determines many of the working conditions of women workers. All the workers in the sewing section are women, while almost all those in the cutting, ironing and finishing sections are men. Women workers are absorbed in a variety of occupations from cutting, sewing, inserting buttons, making button holes, checking, cleaning the threads, ironing, folding, packing and training to supervising.

Women work mainly as helpers, machinists and less frequently, as line supervisors and quality controllers. There are no female cutting masters. Men dominate the administrative and management level jobs. Women are discriminated against in terms of access to higher-paid white collar and management positions.

When asked why they prefer to employ women for sewing, the owner and managers gave several reasons. Most felt that sewing is traditionally done by women and that women are more patient and more controllable than men.

**f. Wages:** The government of Bangladesh sets minimum wages for various categories of workers. According to Minimum Wage Ordinance 1994, apprentices' helpers are to receive Tk500 and Tk930 per month respectively. Apprentices are helpers who have been working in the garment industry for less than three months. After three months, Apprentices are appointed as helpers. Often female helpers are discriminated against in terms of wages levels, and these wages are also often fixed far below the minimum wage rate. A survey conducted in 1998 showed that 73% of female helpers, as opposed to 15% of their male counterparts, did not receive even the minimum wage.

**g. Insufficient of loan:** Insufficiency of loan in time, uncertainty of electricity, delay in getting materials, lack of

communication, problem in taxes etc. Often obstruct the industry. In the world market 115 to 120 items of dress are in demand where as Bangladesh supplies only ten to twelve items of garments. India, South Korea, Hong Kong, Singapore, Thailand, Taiwan etc, have made remarkable progress in garments industries. Bangladesh is going to challenge the garments of those countries in the world market.

**h. Unit labor cost:** Bangladesh has the cheapest unit labor cost in South Asia. It costs only 11 cents to produce a shirt in Bangladesh, whereas it costs 79 cents in Sri Lanka and 26 cents in India. Clearly, Bangladesh's comparative advantage lies in having the cheapest unit labor cost.

**i. Working hours:** Though the wages are low, the working hours are very long. The RMG factories claim to operate one eight-hour shift six days a week. The 1965 factory Act allows women to work delivery deadlines; however, women are virtually compelled to work after 8 o'clock. Sometimes they work until 3 o'clock in the morning and report back to start work again five hours later at 8 o'clock. They are asked to work whole months at a time the Factory Act, which stipulates that no employee should work more than ten days consecutively without a break.

**j. Poor accommodation facilities:** As most of the garment workers come from the poor family and come from the remote areas and they have to attend to the duties on time, these workers have to hire a room near the factory where four to five huddle in a room and spend life in sub human condition.

For four to five workers there is one common latrine and a kitchen for which they have to pay from Tk=2000 to Tk=2500/-. They share this amount among themselves to minimize the accommodation expense.

One cannot believe their eyes in what horrible condition they have to pass out their time after almost whole day of hard work in the factory. After laborious job they come into their roost, cook their food and have their dinner or lunch in unhygienic floor or bed and sleep where they take their food. They share the single bed or sleep on the floor.

The owners of these factories must not treat the workers as animals. The owners of these factories who drive the most luxurious car and live in most luxurious house do ever think that these are the workers who have made their living so juicy. Will these selfish owners ever think of these workers of their better living for the sake of humanity by providing better accommodation for these workers in addition to providing with the job?

**k. Safety Problems:** Because of the carelessness of the factory management and for their arrogance factory doors used to be kept locked for security reason defying act

Safety need for the worker is mandatory to maintain in all the organization. But without the facility of this necessary product a lot of accident is occur incurred every year in most of the company. Some important cause of the accident are given below-

- Routes are blocked by storage materials
- Machine layout is often staggered
- Lack of signage for escape route
- No provision for emergency lighting
- Doors, opening along escape routes, are not fire resistant
- Doors are not self-closing and often do not open along the direction of escape
- Adequate doors as well as adequate staircases are not provided to aid quick exit
- Fire exit or emergency staircase lacks proper maintenance
- Lack of proper exit route to reach the place of safety
- Parked vehicles, goods and rubbish on the outside of the building obstruct exits to the open air
- Fire in a Bangladesh factory is likely to spread quickly because the principle of compartmentalization is practiced

**l. Price competitiveness:** China and some other competitors of Bangladesh have implemented sharp price-cutting policies in exporting garment products over the last few years, but Bangladesh has failed to respond effectively to such policies. China was able to drop the export price of 29 garment categories by 46 per cent on average in the United States within a year, from \$6.23 per sq metre in December 2001 to \$3.37 per sq meter in December 2002. Bangladesh needs to respond to such price-cutting policies of its rivals in order to remain competitive in the quota-free global market.

**m. Lead time:** Lead time refers to the time required for supplying the ordered garment products after the export order has been received.

In the 1980s, the usual lead time in the garment industry was 120-150 days for the main garment supplier countries of the world; it has been reduced to 30-40 days in the current decade.

However, in this regard the Bangladesh RMG industry has improved little; for example, the average lead time is 90-120 days for woven garment firms and 60-80 days for knit garment firms. In China, the average lead time is 40-60 days and 50-60 days for woven and knit products respectively; in India, it is 50-70 days and 60-70 days for the same products respectively.

**n. Environmental Pollution:** There are 12 million people right now in Dhaka which is going to be 22 million by 2025. There are 7000+ industrial units in and around the Dhaka city. The RMG sector is the second major contributor of river pollution after tanneries. RMG sector are discharging 2 million m<sup>3</sup> effluents every day. Underground water level in Dhaka city is going down quickly. Wastage of water- as usage is 15 – 18% higher than is required (Green the Supply Chain of the Textile Industry in Bangladesh, Report on the World Bank initiatives shown in CP workshop, 08 – 09 May 2012, BTT Desk). Almost, the scenario is same in the port city, Chittagong, also.

### 3 Core Contents of Implementing Green Supply Management in RMG Sector

There are five contents of implementing green supply chain in RMG sector of Bangladesh, by which RMG sector of Bangladesh can solve the problems mentioned in previous section, are establishing the strategic assets, developing a flow system, designing an organization of performance based, establishing the strategic cooperation, and establishing a performance evaluation and management system.

#### 3.1 Establishing the strategic assets view of green RMG supply chain

US Michigan State University was, in 1996, first put forward the concept of green supply chain (Handfield, 1996, P. 1295 – 1297). After that commencement, domestic and foreign academe begun to study various aspects of the green supply chain management (Beaman, 1999, P.332-342, Joseph, 2003, P.397-409, Jiuh-Biing, 2005, P.287-313, Aref A, 2005, P.330-353, Samir K, 2007, P.53-80, Wu, 2003, P.86-88, Wu, 2004, P.1-3, Liu, 2006, P.27-30, Wang, 2003, P.11-16, 47). Some foreign famous multinational companies such as Ford Motor Company, Hewlett-Packard Company, Valuable Clean Group and General Electric Company regarded the supply chain management as the strategic assets and corporate cultures acquiring corporate competitive advantage to filter into various parts, various department and various employees. To rewrite the competitive law in the industry and impel competitors to have to develop themselves, the supply chain has been utilized as the strategic weapon. It is the challenge for Bangladeshi RMG enterprises and if Bangladeshi RMG enterprises want to change “Made by Bangladesh” to “Created in Bangladesh” and walk on the road of sustainable development, the enterprises should not only implement green production but also the green supply chain “from cradle to recurrence”, that is to say, the green supply chain should be regarded as the strategic asset of enterprises and the strategic supply chain management should be implemented.

**First**, the green supply chain strategy composed by five basic collocation factors including the followings should be established:

- Green Operation Strategy
- Green Outsourcing Strategy
- Green Channel Strategy
- Green Client Service Strategy and
- Green Asset Network

**Second**, the green supply strategic culture should be established, and the green supply chain management should be integrated into enterprise culture.

**Finally**, the green supply chain strategy which can be organically integrated with green product strategy and green market strategy should be developed.

Therefore, the green supply chain strategy which can accord with the competitive strategy, client demand strategy, strength status of textile and apparel enterprise and fit in with the environment should be developed.

### *3.2 Developing a flow system of green RMG supply chain*

Bangladeshi RMG enterprise should describe a blueprint about green supply chain to integrate the rules of the flow relationships among various operation units in the supply chain to ensure the harmony among various flows with the base establishments of the supply chain and achieve the aim of the green RMG supply chain after confirm the strategic status of green supply chain. But this blueprint should not only acquire the corporate competitive advantage and economic efficiently through implementing green supply chain management, as viewed from the management objective, also reduce the negative influences of management to the least extent and maximize the social efficiencies such as the utilization rates of resource and energy. As viewed from management objects, the blueprint should include five aspects (Jiuh-Biing, 2005, P.287-313, Aref A, 2005, P.330-353)..

The **first** one is the material suppliers which are middling enterprises such as fiber manufacturer, resin manufacturer, dye manufacturer, and accessories manufacturer.

The **second** one is the manufacturers which produce the middle products or final products such as yarn manufacturer, textile manufacturer, printing and dyeing manufacturer, apparel manufacturer and composite material manufacturer. The **third** one includes operators, distributors and shopkeepers.

The **fourth** one includes consumption units or consumers.

And the **final** one includes reclaim disposal manufacturers which compose an integrated positive supply chain and reverse supply chain with other suppliers, manufacturers, operators, distributors and consumers.

In the green RMG supply chain management, the management objects become into the strategic partners among enterprises through many basic flows such as green plan, green stock, green manufacturing, green distribution, green logistics, green consumption and green reclaim. To ensure the order of various flows and maximize the performance of the whole green supply chain, many technical support, information support and mechanism support such as decision-making support system, information management system, green evaluation system and support guarantee system should be established, as the same time. According to former research results (Jiuh-Biing, 2005, P.287-313, Wu, 2003, P.86-88, Wang, 2003, P.82-87), combining with the characters of RMG and apparel industry, we develop the green textile supply chain flow system which is seen Figure 1.

### *3.3 Designing an organization of performance based on green RMG supply chain*

Corresponding organization structure is needed for operation flow. The organization design of Bangladeshi RMG and apparel enterprises also need to add a green smartness integration supply chain organization (seen in Figure 2), as viewed from the strategic status and flow system of the green supply chain management. The organization should possess following characters (Shoshanah, 2006).

**First**, it can support the whole competitive strategy of the enterprise.

**Second**, it has the skills and the core ability to implement all supply chain flow among the interior of the enterprise with its strategic partners.

**Third**, it has established the effective green performance evaluation system.

**Fourth**, it should follow a series of feasible design principle including the principle that form obeys the function (the supply chain organization must really reflect the green supply chain flow) and the equal principle of flow and responsibility and ability (each flow should arrange corresponding function department or responsible personnel takes on corresponding function and possesses corresponding ability).

At the same time, the organization should possess following characteristics (Xu, 2004, P.80-82).

The **first** one is the whole cooperation, and in the process of cooperation and interaction, the decision-making, execution, cooperation, feedback, follow and emergency disposal should be developed.

The **second** one is the smart reaction, and aiming at complex and changeable market and competitive development, the organization should quickly make reasonable reactions and harmonize enterprise to implement new resource distribution and strategic and tactic adjustment.

The **third** one is the three-dimensional communication, and in different enterprises, various levels operation and decision-making layers, the organization can implement three-dimensional information transfer and communication.

The **fourth** one is the process drive, and the organization should drive the team through harmonizing the environment and process.

### ***3.4 Establishing the Strategic Cooperation mode of green RMG supply chain***

The supply chain of RMG is longer than other supply chains in other industries, and for the whole supply chain, the latter includes many suppliers. But in fact, more enterprises are gradually reducing the strategic range, and they more and more focus on few core abilities. So the effective cooperation among enterprises in the green RMG supply chain becomes into the base to acquire the best performance of the green RMG supply chain management, and it is the most important strategic activity for enterprises, that is to say, to establish the cooperation relationship is same important with technological innovation, and the enterprise which possess the ability of effective cooperation can acquire effective competitive advantage. However, few executive officers of green RMG supply chain can give a clear and specific definition of cooperation, because the cooperation comes down to many aspects which include not only many cooperation types, but extensive mutual activities, and information sharing among operation units and the R&D of long-term production and marketing items.

At present, according to the cooperation extent and profundity, the cooperation partnership can divided into four sorts such as trade type, cooperative type, harmony type and cooperation type.

The cooperation partners of trade type devote their minds to enhance the simplicity of trade execution and few of them are absorbed in reducing the cost of supply chain management and enhancing the income of supply chain. This sort of cooperation relationship needs few advanced information system, and it is the most basic cooperation relationship at present.

The cooperation of cooperative type possesses higher level of information sharing, and it generally implements information communication through special electric data exchange network and internet.

The cooperation of harmony type possesses more complex basic establishment and flow of information sharing than the cooperation of cooperative type, and both cooperation relationships are closer and they more depend on their ability each other. This sort of cooperation relationship needs the negotiation and compromise with higher level, and they all expect to benefit from long-term cooperation, and this cooperation is fitter for the key supply chain partners with strategic meaning.

The cooperation of cooperation type can mutually invest in R&D project and the development project of intellectual property rights, and the sharing degree covers from entity assets to knowledge assets even to the human resource. This sort of cooperation generally is called as "strategic alliance" which can not only share information but also develop information.

Though the strategic cooperation modes of the green RMG supply chain are different, but the RMG enterprise should establish "key" and "strategic" clients and suppliers accruing the rule that "20% of clients will bring 80% of profits for the enterprise". The concrete method is to establish a selectable evaluation standard to evaluate and select the cooperation relationships and cooperation partners according to many special demands such as green strategy, culture, organization and technology. At the same time, RMG enterprises also should follow following instructive principles to ensure the success of cooperation relationship.

**First**, simplify the interior cooperation before cooperation.

**Second**, customize the cooperation mode according to the importance degrees of cooperation partners.

**Third**, ensure to sharing knowledge and information and assume mutual risks and benefits among cooperation partners. **Fourth**, trust each other.

**Fifth**, confirm every cooperation partner's anticipation. **Sixth**, utilize the technology to support the cooperation relationship.

### ***3.5 Establishing a performance evaluation and management system of green RMG supply chain***

For the RMG enterprise which first introduces the green supply chain management, the establishment of the green RMG supply chain performance evaluation and management system is the effective tool, and the effective supply chain performance evaluation system can tell enterprise whether various parts in the positive supply chain and reverse supply chain are really exerting function, and help enterprise to diagnose problems and continually correct problems. First, we should add green indexes into the general supply chain

evaluation index system to establish effective green RMG supply chain evaluation index system which can exactly reflect the green health status of the RMG enterprise supply chain. Second, we should utilize the green RMG supply chain evaluation index to support the strategic aim for RMG enterprises and implement effective green RMG supply chain performance management. Effective supply chain performance evaluation system must include following three sustainable activities (Anne-Marie, 2006, p.1427-1432),

- (1) making quantitative aims to accord with plan and budget,
- (2) establishing individual objective and department objective to accord with the total objective of RMG enterprise,
- (3) establishing clear follow evaluation process and the mechanism and program of management performance.

At present, there are many articles to study the supply chain performance evaluation index system, and the structure research of the performance measurement system mainly includes two tendencies, and the first one is to establish a new system based on the advice model, and the second one is to adopt the performance measurement system with multiple advices. The performance evaluation and management system of the RMG supply chain should possess following characters (Anne-Marie, 2006, p.1427-1432).

**First**, the system has been implemented in other industries, and it is not only the concept theory.

**Second**, the system is designed based on the environment of the supply chain.

**Third**, the management system should be composed by the performance measurement which can be easily operated.

The supply chain operation reference model (SCOR) is the first supply chain reference model based on performance measurement, and it has been in the growth stage of lifecycle and become into the standard in the industry. It is the most popular supply chain reference model which is adopted and accepted in the world. Therefore, in the performance evaluation system of SCOR, we can add green indexes about RMG enterprises to establish the green RMG supply chain performance evaluation and management system.

#### 4 Challenges of Implementing Green Supply Management in RMG Sector of Bangladesh

In recent survey by Wipro and outsourcing center 65% of the respondents indicated that prioritization was an important barrier in implementation of green supply chain management. 62% of the respondents cited cost and budget constraints as challenge to green supply chain management.

Initials investment may look as a challenge but sustainability reports of many companies have proved that the financial gains are also significant and NPV is significantly positive (Navneet, 2011). Other challenges includes lack of appropriate technology and business processes, trade-off between green requirements and investment, and integration of general supply chain efforts and green supply chain efforts (Muchiri, 2010).

#### 5 Conclusion

It has important meaning to implement green RMG supply chain management for the sustainable development of Bangladeshi RMG enterprises and the whole industry by removing the challenges faces in RMG sector, and it offers an ideal management mode for the harmony development of economic benefits and social benefits in Bangladeshi RMG enterprises. But at the same time, to really implement green supply chain management, there are works to do, we should not only establish the strategic assets view of green RMG supply chain, but establish organization, cooperation mode and performance management system in the process of implementation. With green supply chain management a collection of many opportunities, it is difficult to decide which potential opportunities to consider and in what ordered. One way is to evaluate the ROI in each case of each activity. However, ROI in case of all activities may not appear positive but net results of all the activities put together are definitely significant both in terms of ROI and intangible benefits.

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#### REFERENCES

- [1] Anne-Marie & Jolly-Desodt. (2006). Benchmarking of the textile garment supply Chain using the SCOR model. 2006 international conference on service systems and service management. Troyes of France. V3. P.1427-1432.
- [2] Aref A. Hervani and Marilyn M. Helms. (2005). Performance measurement for green supply chain management Benchmarking: An International Journal. No.12(4). P.330-353.
- [3] Beaman, B. M. (1999). Designing the green supply chain. Logistic Information Management. No.12(4). P.332-342.
- [4] Handfield R B. (1996). Green Supply Chain: Best Practices From the Furniture Industry. Proceedings Annual Meeting of the Decision Science Institute. USA. No.3. P.1295-1297.
- [5] Jiuh-Biing, Sheu, Yi-Hwa, Chou & Chun-Chia Hu. (2005). An integrated logistics operational model for green-supply chain management. Transportation. Research Part E41. P.287-313.

- [6] Joseph Sarkis. (2003). A strategic decision framework for green supply chain management. *Journal of Cleaner Production*. No.11(4). P.397-409.
- [7] Liu, Qijun. (2006). Study on Supply Chain of Green Textile. *Journal of Zhejiang Provincial Party School*. No.6. P.27-30.
- [8] Samir K. Srivastava. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*. No.9(1). P.53-80.
- [9] Shoshanah Cohen & Joseph Roussel, interpreted by Wangrong et al. (2006). *Strategic Supply Chain Management*. Beijing: People's Post and Telecommunication Publishing House.
- [10] Wang, Nengmin, Yangtong & Qiao, Jianming. (2003). Study on Green Supply Chain Management. *Industrial Engineering Journal*. No.10(1). P.11-16, 47.
- [11] Wang, Yingluo, Wang, Nengmin & Sun, Linyan. (2003). The Basic Principles of Green Supply Chain Management. *Engineering Science*. No.5(11). P.82-87.
- [12] Wu, Dichong & Gu, Xinjian. (2003). Study of Green Textile Supply Chain and Its Organization. *Journal of Textile Research*. No.24(1). P.86-88.
- [13] Wu, Dichong. (2004). Study on Supply Chain of Green Textile. *Silk Monthly*. No.12. P.1-3.
- [14] Xu, Yimin. (2004). The Design of Order-oriented Agile Supply Chain Organization. *Logistics Sci-Tech*. No.8. P.80-82.
- [15] Yang, Hongjuan & Tian, Cungang. (2004). The Sustainable Development Mode of Yunnan Enterprises: Green Supply Chain Management. *Inquiry into Economic Problems*. No.11. P.73-75.

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