Green Supply Chain Management, Environmental Collaboration and Sustainability Performance: A Review

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Abstract: The focus of this paper is to understand the concepts of green supply chain management (GSCM) and its collaboration with the environment. The concept of GSCM is to integrate the environmental thinking into supply chain management (SCM). The GSCM can contribute to sustainability performance enhancement. In this paper, the focus is given on the environmental collaboration, which is a key indicator to GSCM strategic formulation and execution. The literature review shows the relationship between GSCM, environment collaboration and sustainability performance. In this paper, a conceptual model is discussed which explain the correlation between these indicators. The GSCM must involve collaboration with the suppliers in designing green products, organizing awareness seminars and helping suppliers to build their own environmental program.

IndexTerms **- Green supply chain management (GSCM), Environmental collaboration, Sustainability performance, corporate social responsibility (CSR), Manufacturing, Reversed logistics.**

I. INTRODUCTION

The supply chain management aims to provide right product to the right customer at right cost, right time, right quality and right quantity [1], whereas the term "green" makes it environmental friendly. At present, the environment is badly affected by the pollutants that are being produced by the business activities. These pollutants includes hazardous chemicals, discarded packaging materials, scrapped toxic materials, medical wastage and other form of industrial pollution[2]. The green supply chain management (GSCM) aims to consider environmental issues along with the supply chain management (SCM). GSCM aims to minimize or eliminate the wastage including solid and liquid waste, toxic and hazardous chemicals and materials, biomedical wastes along supply chain such as material resourcing and selection, manufacturing process, product design, delivery of final product and end of life management of the product [3][4].

The green supply chain management plays a vital role in enhancing the environment and thus contributing the sustainability performance enhancement.

II. Traditional Supply Chain Management

The firms are always bound to fulfill the customer demands due to competitive environment. A supply chain is a network consists of suppliers, manufacturer, distributors, wholesaler, retailer, customer etc. directly or indirectly they are involved in producing and delivery products or services to the ultimate customers- both in downstream and upstream sides through physical distribution, flow of information and finances [5].

The supply chain of any product or services can be better understood by the process as shown above. According to Chopra and Meindl [6], a typical supply chain includes the following five stages: components/ raw material suppliers, manufacturers, wholesalers/ distributors, retailers and customers.

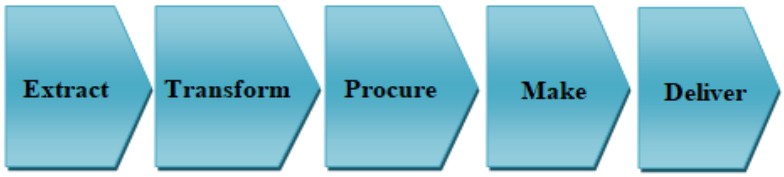

Figure 1: Supply chain management process flow

These five stages are dependently connected through flow of products, information and money. SCM practices include activities and approaches utilized by a firm to integrate the supply and demand effectively for improvement of SCM [7].

III. Green Supply Chain Management

The GSCM is a value addition process to the SCM, also it evolved from SCM. It is considered as an environmental innovation. As the SCM practices become mature, the government along with the firm are collaborating to reduce the environmental problems in order to reduce waste, energy and pollution, minimize environmental risks and improve community goodwill. The collaboration can promote mutual environmental learning [8]. GSCM aims to minimize or eliminate the wastage including solid and liquid waste, toxic and hazardous chemicals and materials, biomedical wastes. Firms that implements GSCM practices benefitted from cost

saving (conserving materials, reduced energy and natural resources), better impression to the public and government and decreased environmental liabilities [2].

The GSCM model can be better understood by the above figure. The aim of GSCM may be listed as:

- Reduction of energy use and focused on renewable alternatives.
- Reducing water wastages.
- Reducing natural resources.
- Packaging material reduction.
- Recover the target materials.
- Recycling/ renew of the used/ wastage materials.

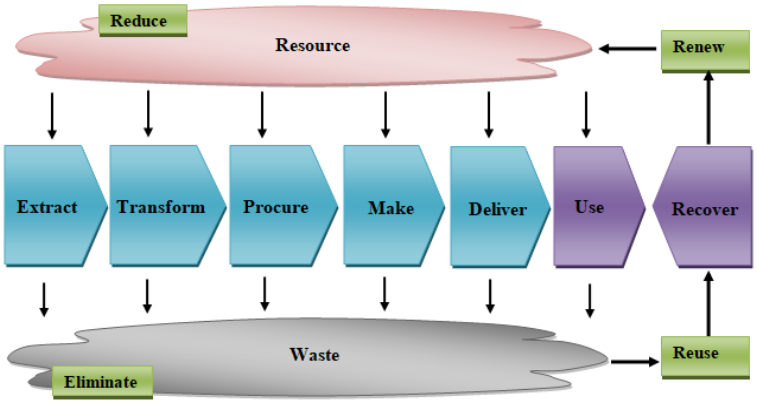

Figure 2: Green supply chain management

GSCM practices composing a set of green activities in procurement, manufacturing, distribution and reversed logistics [9]. Reversed logistics is an approach to reuse of products or materials. It is the process of moving goods from final destination for the proper use and disposal [10].

In today's global environment demands, the focus of companies has changed. Previously, it focused more on the wealth creation through well structured economic performance in terms of asset creation and overall market strength, but now focuses on environmental and social performance while achieving the high economic performance [11] in order to reach optimum sustainability performance. Sustainability is a business strategy that is very closely related with the corporate social responsibility (CSR). Specifically, the environment, firms and society are mutually dependent with each other. According to Paulraj [12] environment collaboration includes the cooperation with the suppliers to achieve environmental objectives and improve waste reduction initiatives, providing suppliers with eco-friendly design, working with suppliers for clean production and helping suppliers to provide materials, tools, parts and services that support organizational goals.

IV. Proposed Conceptual Model

A conceptual model linking the relationship between GSCM practices, environmental collaboration and sustainability performance [13] is given in the figure below.

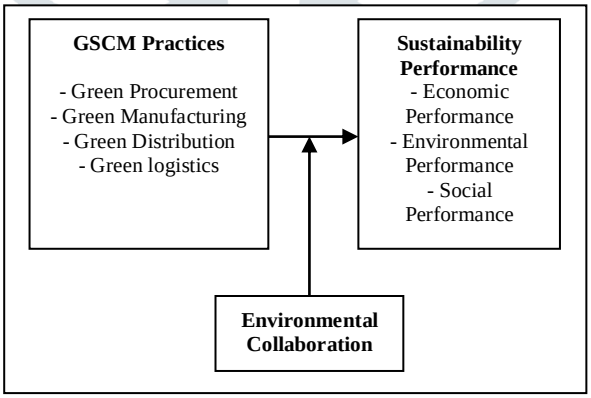

Figure 3: Conceptual Model

The green procurement, green manufacturing, green distribution and green logistics are included under GSCM practices; also the sustainability performance is investigated as economic, environmental and social perspective.

Based on the literature review of GSCM practices, there are four important perspectives upon GSCM rely: green procurement, green manufacturing, green distribution and green logistics [9] [14]. Green procurement is defined as the practices utilized by an organization to effective selection of suppliers based on their environmental competence, technical and eco design capability, environmental performance, ability to develop environmental friendly goods and the targeted environmental objectives [12]. Also, the 3Rs: Reuse, Recycle and Reduce in the process of green procurement in term of paper container, paperless transaction [9] [15] [16] [17], ensuring suppliers environmental compliance certification and conduct auditing for suppliers internal environmental management [17] are also emphasized in this study.

Green manufacturing is a production process which converts input into output by reducing hazardous substances, increasing energy efficiency, practicing 3Rs, minimizing waste [9], designing and redesigning green processes [18] [15] [16] [17].

Green distribution consists of green packaging with a aim to downsize packaging, use "green" packaging materials, promote recycle and reuse programs, standardize packaging, minimize material uses and unpacking time [9] and finally save energy usage [15].

Green logistics is more concern about the delivering goods using alternative fuel vehicles and grouping order together [9]. As per Laosirihongthong et al. [19], green logistics is about reverse logistic that includes collection of used products for recycling, returning this to suppliers for reuse.

The authors [12] [18] [15] [19] have recommended sustainability performance, such as economics performance, environmental performance and social performance as important performance indicators.

V. Conclusion

Based on the literature survey, undoubtedly, GSCM and sustainability performance are two inextricably related SCM concepts. Majority of research explain the significant relationship between these two. However, there are some issues such as involving collaboration with suppliers in designing green products and adopting environmental practices into processes have yet to be research completely [13].

The proposed conceptual model is mainly focused within relational view theory which was explained by Dyer and Singh in 1998 [20]**.** This theory specially provides insight into how firms can develop value addition linkages with the others to achieve their desired outcome.

REFERENCES

[1] Basher V. Vendor selection and quota allocation by using fuzzy topics and linear programming. Master of Engineering in Production Engineering. University of Delhi: India.

[2] Wisner JD, Tan K-C, Leong GK. Supply chain management: a balanced approach. 3rd ed. Canada: South- Western Cengage Learning; 2012.

[3] Rao P. Greening of suppliers/in-bound logistics – In the South East Asian Context. Greening the Supply Chain 2006; 189-204.

[4] Srivastava SK. Green supply-chain management: a state-of-the-art literature review. International Journal of Management Reviews 2007; 9(1): 53-80.

[5] Mentzer JT. Supply chain management. United States of America: Sage Publications, Inc; 2001.

[6] Chopra S, Meindl P. Supply chain management: strategy, planning, and operation. 4th ed. Upper Saddle River, New Jersey: Pearson Education,Inc; 2010.

[7] Li S, Subba Rao S, Ragu-Nathan TS, Ragu-Nathan B. Development and validation of a measurement instrument for studying supply chain management practices. Journal of Operations Management 2005; 23: 618-641.

[8] Darnall N, Edwards Jr D. Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. Strategic Management Journal 2006; 27(4): 301-320.

[9] Ninlawan C, Seksan P, Tossapol K, Pilada W. The implementation of green supply chain management practices in electronics industry. Proceedings of the International MultiConference of Engineers and Computer Scientists2010; March 17-19: Hong Kong.

[10] https://en.wikipedia.org/wiki/Reverse_logistics

[11] Carter CR, Rogers DS. A framework of sustainable supply chain management: moving toward new theory. International Journal of Physical Distribution and Logistics Management 2008; 39(5): 360-387.

[12] Paulraj A. Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. Journal of Supply Chain Management 2011; 47(1): 19-37.

[13] Thoo Ai Chin, Huam Hon Tat, Zuraidah Sulaiman. Green Supply Chain Management. CIRP 26 (2015): 695-699.

[14] Thoo AC, Abdul Hamid AB, Rasli A, Zhang D. The moderating effect of enviropreneurship on green supply chain management practices and sustainability performance. Advanced Materials Research, Sustainable Development of Industry and Economy 2014; 869-870.

[15] Holt D, Ghobadian A. An empirical study of green supply chain management practices amongst UK manufacturers. Journal of Manufacturing Technology Management 2009; 20(7): 933-956.

[16] Green Jr KW, Zelbst PJ, Meacham J, Bhadauria VS. Green supply chain management practices: impact on performance. Supply Chain Management: An International Journal 2012; 17/3: 290-305.

[17] Lee SM, Kim ST, Choi D. Green supply chain management and organizational performance. Industrial Management & Data Systems 2012; 112(8): 1148-1180.

[18] Zhu Q, Sarkis J, Geng Y. Green supply chain management in China: pressures, practices and performance. International Journal of Operations & Production Management 2005; 25(5): 449-468.

[19] Laosirihongthong T, Adebanjo D, Tan KC. Green supply chain management practices and performance. Industrial Managament & Data Systems 2013; 113(8): 1088-1109.

[20] Dyer JH, Singh H. The relational view: cooperative strategy and sources of interorganizational competitive advantage. Academy of Management Review 1998; 23: 660-679.