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Barriers for Green Supply Chain Management Implementation

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Abstract

Green Supply Chain Management is one of the recent innovations for the enhancement of capabilities of Supply Chain Management. GSCM enables organizations to comply with legislative requirements & maintain a competitive advantage. Green business practices are not easy to adopt and implement, due to the presence of many barriers. Identification of essential barriers for Green Supply Chain Management implementation is tricky due to its numerous characteristics. The purpose of this paper is to identify various factors that act as barriers for green supply chain implementation. Barriers are broadly grouped as a Financial Barrier, Knowledge barrier, and technology barrier. Barriers were identified, both through detailed literature and discussion with Academician and industrial experts. Barriers are negatively correlated with green performance parameters. During GSCM adoption, it is not possible to eradicate all these barriers initially and so industries must identify which barrier is a major obstacle for GSCM implementation. The levels of different barriers are important in better understanding of their implications in successful implementation of GSCM. By clear understanding of the barriers, organizations can identify the weaker areas and can formulate strategies to improve these areas that will ultimately improve the effectiveness of their GSCM implementation programs. Barriers are categorized on priority basis and industry should try to overcome these barriers, which in result improves economical, social and operational performance.

Keywords: Green SCM, Barriers for GSCM

1. Introduction

In 2010 the world's greenhouse gas emissions was the highest ever in history. The implications this will have is still unknown, but research done leaves no doubt that the climate changes we are facing today is a consequence of the increased amounts of gases that circulates in our atmosphere due to increased human activity following the industrialization. Global warming, an effect due to the increase in amounts of the greenhouse gases present in air is the most severe problem mankind is facing at the moment. Rapid worldwide industrialization requires an increase in supply chain activities. These activities are major factors in the depletion of natural resources, climatic problems, waste generation, harmful emission of gases, and disruptions in the ecosystem. To overcome environmental deterioration, green supply chain management integrates environmental management principles with supply chain activities in order to either improve the environment or to preserve it so no further depletion is allowed. Therefore, green supply chain management is an important and emerging 21st century trend among all industrial activities, facing competitive regulatory and community pressures address these serious environmental issues by greening their supply chains, eliminating or minimizing waste in all forms including energy emissions, chemical, hazardous, and solid waste along the supply chain (Hervani et al., 2005). Material movement goes through several phases in the life cycle of any product, and each phase such as the extraction of raw material, manufacturing, use and reuse, recycling and disposal contributes significantly to the supply chain's ecological burden.

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GSCM is one of the best strategies for meeting the challenge to reduce carbon emission and enhance sustainability because of its potential to improve the environmental performance of any organization (S. Balasubramaniam 2012). Along with the rapid change in global manufacturing scenario, environment and social issues are becoming more important and compulsory in managing any business (Sunil Luthra et al. 2010). GSCM is an approach to improve performance of the products and processes keeping in mind to the requirements of the environmental regulations predefined by government and aims at confining the wastes within the industrial system so that energy resources are conserved and prevent the dissipation of harmful materials into the environment, including all phases of product's life cycle which includes the design phase, production phase and the distribution phase to the end users of the product and also its disposal at the end of product's life cycle.

Patrick Penfield of the Whiteman School of Management defines Green Supply Chain Management (GSCM) as “the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and reuse at the end of their life cycles thus, creating a sustainable supply chain”.

The environmental impacts at each stage of the supply chain are minimized and focus on the utilization of energy and resource (of an organization) for making environmentally sound supply chain. GSCM integrates ecological factors with supply chain management principles to address how an organization's supply chain processes impact the environment. Organizations are increasingly becoming aware of the impact of tight integration of supply chain and environmental management systems in enabling a sustainable business strategy. Many are now seeking out solutions and guidance on how to implement a sustainable supply chain. A sustainable supply chain is not only optimal for the organization, but is optimal relative to its limited environmental impact. With Increasing customer awareness and regulatory norms, organizations with greener supply chain management practices will have a competitive advantage over companies that are reluctant to embrace GSCM.

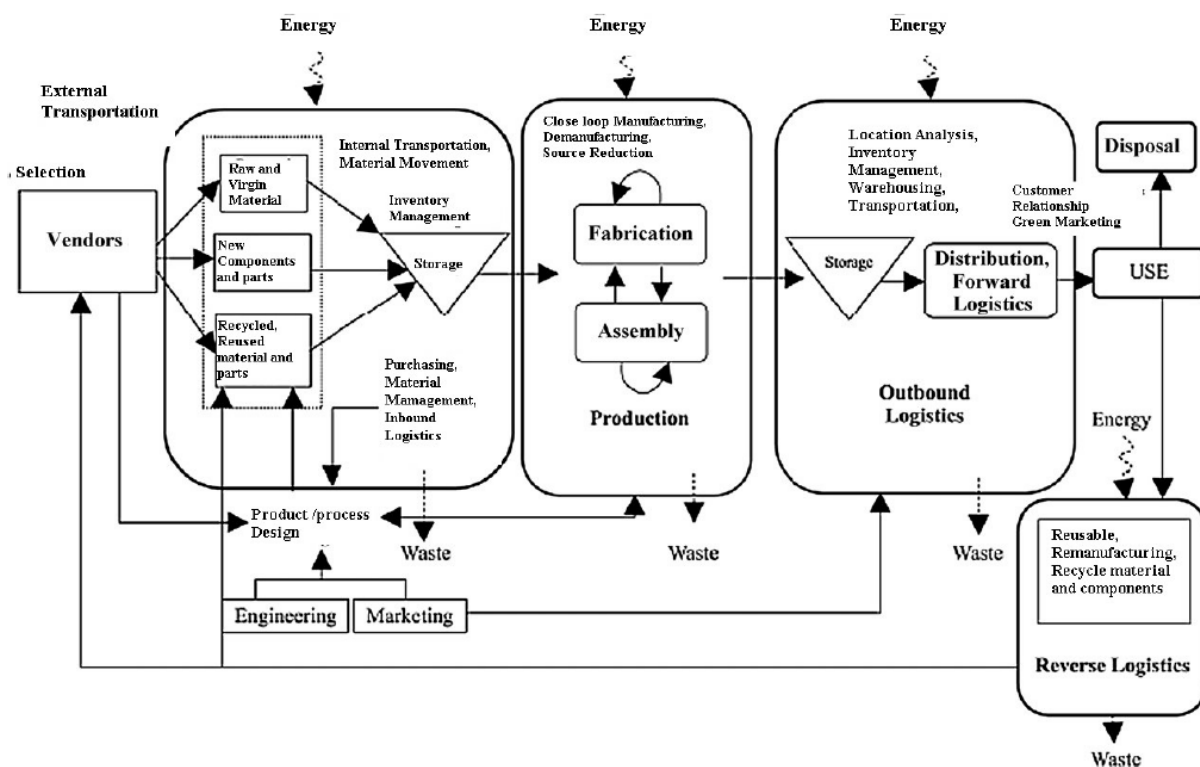


Fig.1. Process involved in Green Supply Chain Management

2. GSCM implementation: Barriers

Conventional SCM is focused on balancing benefits among multiple stakeholders, to improve the operating efficiency throughout the facilities, and to maximize the profitability of processes and activities. GSCM takes a somewhat narrower

approach by focusing on environmental concerns, social responsibilities, and economic gains as its top priorities. Integrating the sustainability approach with GSCM is a complicated process. As small to medium enterprises (SMEs) seek to become more environmentally sustainable, they encounter a variety of barriers that, when compared to the large corporate arena, are either insignificant or may be nonexistent. Seuring and Muller observed several barriers during maintaining the supplier relationship in the perspective of environmental consideration. Many of the researchers found that the role of the public is less in the development of sustainability. Similarly, few researchers found low “eco-literacy” and the lack of understanding or expertise about laws, environmental management, as barriers. Lack of knowledge and information regarding the issue of sustainability is an important barrier. Lack of sharing information creates more gaps to executing GSCM.

The incentives should be aimed at decreasing the barriers that industry face; such incentives can be split into three main categories: financial, ease of implementation, and recognition. Bohdanowicz et al. suggests a range of issues that limit the supplier's ability to respond to the buyer's requirements for sustainability. Lack of willingness or ability to engage means that the opportunity is not always demoralized. Secondly, human barriers which include resistance to change, lack of qualified staff and training programs, lack of understanding, and the inability to plan are also considered significant barriers for implementing SSCM. Seidel et al. Mentioned that IT companies often have a lack of support from middle management within the organization, and this lack of transparency creates a negative impact while seeking to implement the SSCM concept. The most understandable barrier to environmental sustainable development of industries is the fact that many. Common barriers are summarized as given below.

Barriers for GSCM: (Source: Kshitij Dashore and Nagendra Sohani, April 2013)

Sr. No.	Barrier to Implement GSCM	Description	Literature Support
1.	Lack of integration of IT system	It uses various computer based applications programs and various IT enabled procedures and software which may be zero utility during the various data and information exchange process.	Shreejith B. (2012); Gioconda Q. (2011); Xianbing Lui (2011); Daine Holt (2009); Abby Ghobadian (2009); Wu et al. (2009); AlKhidir et al. (2009); Ravi et al. (2005); McLaren et al. (2004); Rogers et al. (1998).
2.	Lack of acceptance of advancement in new technology	It emphasis on adoption of various advancement in technology to the older established technology in existing organization.	Shreejith B. (2012); Christian B. (2011); Jie Yang (2011); AlKhidir et al. (2009); Daine Holt (2009); Hsu et al. (2008); Hosseini (2007); Digalwar et al. (2004); TSai et al. (1999); Gant (1996); Cooper (1994).
3.	Poor organizational culture in GSCM	It directs towards the participation of top level management in motivating the employee.	Brooks W. (2011); Cunkuan Bao (2011); Abby Ghobadian (2009); Yu Lin et al. (2008); Yu Lin (2007); Hsu et al. (2008); Chien et al. (2007); Ravi et al. (2005).
4.	Lack of skilled human resource professionals in sustainability and GSCM	It reflects the lack of skills in human resource department of the organization with special context to their recruitment policies and trainings in GSCM.	Shreejith B. (2012); Xianbing Lui (2011); Gioconda Q. (2011); Yu Lin et al. (2008); Hsu et al. (2008); Chien et al. (2007); Yu Lin (2007).
5.	Uncertainty and competition in Market	Market competition and uncertainty is high due to global competitiveness and varying customer's requirements.	Jie Yang (2011); Mudgal et al. (2010); Daine Holt (2009); Hosseini (2007); Yu Lin (2007).
6.	Lack of government initiatives system for GSCM practitioners	It means government not making industry friendly policies toward GSCM and not giving special benefits to those organizations implementing GSCM.	Shreejith B. (2012); Gioconda Q. (2011); Xianbing Lui (2011); Sunil L. (2010); Daine Holt (2009); Abby Ghobadian (2009); Mudgal et al. (2010); Mudgal et al.

			(2009); Yu Lin et al. (2008); Hsu et al. (2008); Srivastva (2007); Hosseini (2007); Scupola (2003).
7.	Poor implementation of green practices within a supply chain	Lack of consideration of green practices like hazardous solid waste disposal, energy conservation, reusing and recycling materials etc.	Christian B. (2011); Jie Yang (2011); Daine Holt (2009); Abby Ghobadian (2009); Mudgal et al. (2009); Yu Lin et al. (2008); Hsu et al. (2008); Ravi et al. (2005).
8.	Lack of top level management Commitment	It means top level management resisting towards implementation of green practices.	M.D. singh (2012); Shreejith B. (2012); Gioconda Q. (2011); Xianbing Lui (2011); Sunil L. (2010); Daine Holt (2009); Abby Ghobadian (2009); Mudgal et al. (2010); Sarkis (2009); Mudgal et al. (2009); Zhu (2007); Ravi V. et al. (2005); Digalwar et al. (2004).
9.	Cost of implementation for GSCM	It reflects to the high initial cost investment required to implement various green methodologies such as green design, green manufacturing, green labeling of packing etc	Shreejith B. (2012); Gioconda Q. (2011); Xianbing Lui (2011); Sunil L. (2010); Daine Holt (2009); Abby Ghobadian (2009); Mudgal et al. (2009); AlKhidir et al. (2009); Hosseini (2007); Ravi et al. (2005).
10.	Supplier's flexibility to change towards GSCM	This means suppliers unwillingness to be involved in design process and technology, which affects overall performance of whole chain.	B.P. Sharma (2012); Shreejith B. (2012); Tomohiro Shishime (2011); Sanjay K. (2010); Lettice et al. (2010); Hsu et al. (2008); Kannan et al. (2008); Srivastva (2007); Sarkar et al. (2006); Ravi et al. (2005).
11.	Customer's unawareness towards GSCM products and services	This reflects customers do not know about green products and their benefits.	B.P. Sharma (2012); Shreejith B. (2012); Tomohiro Shishime (2011); Sanjay K. (2010); Mudgal et al. (2009); Zhu et al. (2008); Zhu et al. (2007); Ravi et al. (2005).
12.	Lack of knowledge and Experience	Lack of knowledge and experience among the supply chain stakeholders in executing GSCM.	Sixiao Qu. (2011); Daine H. (2009); Yu and Hui (2008); Tsai and Ghosal (1999).
13.	Lack of green architects, consultants, green developers, contractors in the region	Lack of green practitioners available in the region for an organization.	Sixiao Qu. (2011); Daine H. (2009); Yu and Hui (2008); Tsai and Ghosal (1999).
14.	Lack of training in GSCM	This reflects lack of training given to the employee of the organization, thus resisting enhancement of overall performance of supply chain and green practices in it.	B.P. Sharma (2012); Daine H. (2009); Yu and Hui (2008); Bowen et al. (2001); Cooper et al. (2000).
15.	Lack of internal sustainability audits within the organization	It reflects integration of all internal departmental issues related to the coordination for the supply chain.	Walker and Preuss (2008); Min and Galle (2001); Wycherley (1999).
16.	Lack of external sustainability	It reflects integration of all external	Walker and Preuss (2008);

	audits for suppliers and contactors	departmental issues related to the coordination for the supply chain	Sharfma et al. (2007); Min and Galle (2001); Wycherley (1999).
17.	Lack of sustainability certification like ISO 14001	It refers to authenticity of quality of products and services as per pre-established norms.	B.P. Sharma (2012); Shreejith B. (2012); Tomohiro Shishime (2011); Sanjay K. (2010); Yu (2007); Linton et al. (2007).
18.	Lack of professional treatment and long term contracts for adopting GSCM from government	It shows poor government regulations and support to the GSCM practitioners.	B.P. Sharma (2012); Shreejith B. (2012); Cunkuan Bao (2011); Sanjay K. (2010); Yu (2007); Linton et al. (2007); Carter and Ellram (1998).
19.	Lack of management initiatives for transport and logistics	It shows poor managerial management of logistics in the organization.	M.D. Singh (2012); Daine Holt (2009).
20.	Lack of energy management and waste management of the organization	It shows poor management of organization towards its resources.	M.D. Singh (2012); Daine Holt (2009); Alemayche (2008); Roger and R.S. (1998)

From the literature review and expert's opinion from academics professional's common barriers are identified and these barriers are group in three main categories viz: Technology barrier, Knowledge barrier and Financial Barrier. Industries need to develop and update themselves on new trends and technologies when implementing GSCM (Mudgal et al., 2010). In the technology barrier category, a lack of new technology, materials and processes barrier ranks first.

In GSCM implementation, the lack of financial support is usually considered as the most important constraint to environmental actions (Zhang et al, 2009). In this barrier category, financial constraints are a dominant barrier. It reveals that Indian industries are unable to fulfil their economic needs and hence do not spend much for GSCM implementation.

The Knowledge barrier category is comprised of five barriers. Lack of green system exposure professionals barrier i.e. professionals in industries are less exposed to green systems. Industries are reluctant to take responsibility to adopt and update environmental issues (Shen and Tam, 2002). Lack of Environmental Knowledge barrier (Mudgal et al. - 2010) show that there is "lack of preparedness owing to the low level of uptake of environmental management systems due to ignorance and lack of awareness of benefits which in turn becomes a significant barrier." Low priority is obtained for Lack of awareness about reverse logistics barrier. It proved to be a big obstacle to minimize waste and improve profits. A chief barrier of reverse logistics, seen in the Indian automobile industry supply chain, is the lack of awareness about the benefits of reverse logistics (Ravi and Shankar, 2005; Mudgal et al., 2010)

3. Conclusion

Due to the complexity of GSCM practices, customer and cost pressures and regulation uncertainty, implementing GSCM is considered as a thankless task that increases overall product cost (Hsu and Hu, 2008, A. Diabat and Govindan 2011). Uncertainty and competition in market and Poor organizational culture in GSCM are significant barriers to achieve the Supplier's flexibility to change towards GSCM. Industries start implementing GSCM practices, many barriers will still occur. It is necessary to investigate the impact of these barriers and the relationship between the barriers during the implementation of GSCM. Another useful approach would be to find the dominant barriers in the adoption of GSCM. Generally, the eradication of barriers is not easy and it needs further analysis. It is not possible to eradicate all kinds of barriers simultaneously. Hence, industries need to determine the most influential barrier.

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