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Identification of Barriers of Green Supply Chain Management (GSCM): A Study in the Indian Context

Mohd. Azmi Khan¹ and Salma Ahmed²

Abstract

Sustainability and green practices has emerged as an innovative environmental strategy to minimize impacts of supply chain activities on environment in last few years. There are many barriers which directly and indirectly affect the implementation of GSCM and therefore organizations are struggling to implement GSCM in their operations. Through a systematic literature review, the researcher identified ten (10) barriers from various research studies that were published between 1994 and 2016. The research methodology was perusing literature in GSCM and validating by experts opinion from academics. Ten barriers have been put forward through the process of literature review and opinion of academicians. By removing the barriers, Indian industries can focus on cleaner production by adopting GSCM in their operations. Identification of these barriers will help organizations to get deeper insight. This paper investigates GSCM barriers and highlights common barriers that act as restriction force for implementing GSCM in Indian context. This study is based on analysis of literature available on secondary sources and gives an overview of barriers of GSCM only in the Indian context.

Keywords: Barriers, GSCM, Indian context, Literature Review, Secondary data.

1. Introduction

Environmental awareness has become a key area for every business and mainly for the manufacturing industries all around the world. In the prevailing globalization era, organizations are now thinking in an environmentally conscious manner and trying to inculcate sustainability into their operations. In today's developing economies, environmental and social issues need to be addressed to operate globally in an effective manner. Increasing societal pressure, regulatory norms, eco friendly practices, end life use of product and consumer awareness have increased consciousness towards natural environment. Gilbert (2000) defines GSCM as an integrating environmental philosophy into the traditional supply chain. Environmental consciousness in business has given rise to adoption of green practices into a supply chain to emerge as a unique discipline by combining environmental issues along with supply chain (Srivastava, 2007). It emerged as process of considering environmental issues in the business operations and performing in an eco-friendly manner. GSCM is a process to improvised product and process keeping in mind environmental regulations (Hsu and Hu, 2008). GSCM has evolved recently and consider whole life cycle of product from conception, manufacturing and transportation till

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1. Dept. of Business Administration, Aligarh Muslim University, AMU Aligarh, India
E-mail: azmikhan2011@gmail.com
 2. Dept. of Business Administration, Aligarh Muslim University, AMU Aligarh, India
E-mail: salmaahmed6@rediffmail.com

the end life of the product (Borade and Bansod, 2007). In present competitive situation, organizations are becoming more sensitive to environmental and social concern related to their business (Luthra *et al.*, 2011). Green supply chain management has come forward as an innovative strategy to meet the challenges of reducing environmental impacts and enhance sustainability (S. Balasubramaniam 2012).

Green Supply Chain Management (GSCM) as defined by the Patrick Penfield *"the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and reused at the end of their life cycles thus, creating a sustainable supply chain"*.

Srivastava (2007) defines Green Supply Chain Management as, *"integrating environmental thinking into SCM, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life"*.

In India, awareness level of customers and society related to Green practices opted by organizations has increased. So, organizations need to consider green initiatives in their product and processes for making supply chain environment friendly.

2. Literature Review

A literature has been reviewed to identify various barriers that restrict an organization from adopting GSCM and going green. The era of GSCM in India started from 2005 and took a leap in last few years where frequency of papers on GSCM has reached to its maximum. Many researches in the area of GSCM have been initiated over the past decade because of increased environmental awareness. Though the first paper in the Indian context related to barriers of GSCM was written more than a decade ago, in the year 2005, yet it remains a scantily researched topic. Scarcity of literature on GSCM highlights the need of research in the field of sustainable/green supply chain management. It further throws light on the fact that GSCM is still at its infancy stage in India and require further comprehensive exploration.

Table 1 presents the barriers that are unanimously quoted by the researchers in their respective studies, along with the studies, the number of barriers identified in each study, and the tools which have been used to analyze them.

Table 1: Paper Reviewed in Indian Context Related to GSCM Barriers.

S. No	Researcher	Year	Title	No. of Barriers	Tools used
1.	Dube, A., and Gawande, R.	2016	Analysis of green supply chain management barriers using ISM-fuzzy MICMAC approach	14 Barriers	Interpretive Structural Modeling and Fuzzy MICMAC
2.	Jayant, A., and Azhar, M.	2014	Analysis of the barriers for implementing green supply chain management practices: An interpretive structural modeling approach	20 Barriers	Interpretive Structural Modeling
3.	Deepak, M., NoorulHaq, A., and Mathiyazhagan, K.	2014	Identification of pressures, barriers and drivers for the implementation of green supply chain management	26 Barriers	Analytical Hierarchical Process
4.	Lalit, Dr., Narwal, M. S., and Kumar, A.	2014	Barriers and their relative importance to the adoption of green supply chain management in Indian context	11 Barriers	Quantitative tools include descriptive statistic, reliability analysis and correlation Analysis
5.	Dashore, K., and Sohani, N.	2013	Green supply chain management: A hierarchical framework for barriers	14 Barriers	Interpretive Structural Modeling
6.	Dashore, K., and Sohani, N.	2013	Green supply chain management- Barriers and drivers: A review	20 Barriers	Literature Review
7.	Mathiyazhagan, K., Govindan, K., and Geng, Y.	2013	An ISM approach for the barrier analysis in implementing green supply chain management	26 Barriers	Interpretive Structural Modeling
8.	Muduli, K., Govindan, K., Barve, A., and Geng, Y.	2012	Barriers to green supply chain management in Indian mining industries: a graph theoretic approach	4 Barriers	Graph theoretic and matrix approach
9.	Luthra, S., Kunmar, V., Kumar, S., and Haleem A.	2011	Barriers to implement green supply chain management in Indian automobile industry using interpretive structural modeling	11 barriers	Interpretive Structural Modeling
10.	Mudgal, R. K., Shankar, R., Talib, P., and Raj, T.	2010	Modeling the barriers of green supply chain practices: An Indian perspective	15 Barriers	Interpretive Structural Modeling
11.	Ravi, V and Shankar, R	2005	Analysis of interactions among the barriers of reverse logistics	11 Barriers	Interpretive Structural Modeling

(Source: Created by Author)

3. Research Design

The aim of the study was to highlight the barriers of Green Supply Chain Management in the Indian context. The study is based on secondary as well as primary sources. The research was undertaken in two stages. Initially, the secondary sources were used by perusing existing literature on GSCM to identify the various barriers to GSCM. The study covered all literature available in GSCM in the Indian as well as global context irrespective of industry domain. The studies pertain to a period of more than two decades beginning from the year 1994 to 2016. In the second stage, opinion of expert academicians was sought to point out the barriers that hinder the organization to implement Sustainable/ Green Supply Chain Management in India.

Ten (10) barriers of Green Supply Chain Management have been identified in the Indian context. The scope of the study is therefore limited to

- (i) Identification of barriers
- (ii) Identification of barriers in the Indian context
- (iii) Barriers pertaining to any business.

4. Barriers of Green Supply Chain Management (GSCM)

According to various researchers, GSCM have drawn an increased attention of researchers and organizations at both micro and macro level. The various barriers hinder organization from adopting Green supply chain management and restrict enterprises in implementing GSCM mainly in manufacturing industries. Globally, all organizations are moving from traditional supply chain management to sustainable / green management due to increased pressure from the customers and society. Therefore organizations should identify barriers that are needed to be removed in the adoption of GSCM. Even GSCM comprises of many benefits, still organizations are dubious for adoption green and sustainable practices because of these barriers which actually discourage organizations from adopting GSCM. This paper identifies the barriers of GSCM through reviewing the literature and with a purpose of delivering a deeper insight into them. The described GSCM barriers can help organizations to identify the areas in their organization which need improvement for successful implementation of green practices in their supply chain management.

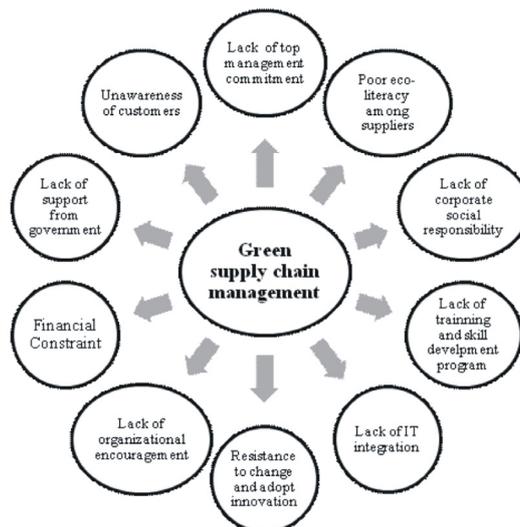


Figure 1: Barriers of Green Supply Chain Management

Table 2, that follows, presents an overview of Green Supply Chain Management (GSCM) barriers long with the names of the authors who have identified these barriers.

Table 2: Barriers of GSCM and their Respective Sources

S.no	GSCM Barriers	References
1.	Lack of top management commitment	Mintzberg (1973); Hamel <i>et al.</i> , (1989); Rogers and Tibben (1998); Sharma (2000); Ravi and Shankar (2005); Zhu and Sarkis (2006); Sarkis (2009); Mudgal <i>et al.</i> , (2009); Mudgal <i>et al.</i> , (2010); Sarkis (2001); Luthra <i>et al.</i> , (2011); Giunipero <i>et al.</i> , (2012); Zaabi <i>et al.</i> , (2013); Jabbour (2013); Anil Dube and Rupesh Gawande (2016)
2.	Poor e co literacy among suppliers	Gilbert (2001); Bowen <i>et al.</i> , (2001); Shen and Tam (2002); Mudgal <i>et al.</i> , (2009); Mudgal <i>et al.</i> , (2010); Wang and Chan (2013)
3.	Lack of Corporate Social Responsibility (CSR)	Sharma (2000); Seuring (2004); Faisal (2010); Mudgal <i>et al.</i> , (2010); Anil Dube and Rupesh Gawande (2016)
4.	Lack t raining and skill development program	Min and Zhou (2002); Walker <i>et al.</i> , (2008); Wang <i>et al.</i> , (2008); Mudgal <i>et al.</i> , (2009); Mudgal <i>et al.</i> , (2010); Olugu <i>et al.</i> , (2011); Schoenherr <i>et al.</i> , (2012); Muduli <i>et al.</i> , (2013); Zaabi <i>et al.</i> , (2013); Anil Dube and Rupesh Gawande (2016)
5.	Lack of i ntegrating information system	Rogers and Tibben (1998); Ravi and Shankar (2005); Wang <i>et al.</i> , (2008); AlKhidir <i>et al.</i> , (2009); Wu <i>et al.</i> , (2009); Luthra <i>et al.</i> , (2011); Zaabi <i>et al.</i> , (2013); Anil Dube and Rupesh Gawande (2016)
6.	Resistance to change and adopt innovation	Cooper (1994); Gant (1996); Rogers and Tibben (1998); Ravi and Shankar (2005); Hsu <i>et al.</i> , (2008); Digalwar <i>et al.</i> , (2004); AlKhidir <i>et al.</i> , (2009) Li an d Olorunniwo (2008); Wang <i>et al.</i> , (2008); Mudgal <i>et al.</i> , (2010); Luthra <i>et al.</i> , (2011); Anil Dube and Rupesh Gawande (2016)
7.	Financial constraints	Mandal and Deshm ukh (1994); AlKhidir <i>et al.</i> , (2009); Lee (2008); W ang et al. (2008); Mudgal <i>et al.</i> , (2009); Chandramowli <i>et al.</i> , (2011); Luthra <i>et al.</i> , (2011) Wu <i>et al.</i> , (2012); Mehrabi <i>et al.</i> , (2012); Luthra <i>et al.</i> , (2013); Anil Dube and Rupesh Gawande (2016)
8.	Lack of organizational encouragement	Ravi <i>et al.</i> , (2005); Chien <i>et al.</i> , (2007); Yu Lin (2007); Hsu <i>et al.</i> , (2008); Yu Lin <i>et al.</i> , (2008); Luthra <i>et al.</i> , (2011); Anil Dube and Rupesh Gawande (2016)
9.	Lack of support from government	Scupola (2003); Srivastva (2007); Hosseini (2007); Hsu <i>et al.</i> , (2008); Mudgal <i>et al.</i> , (2009); Mudgal <i>et al.</i> , (2010); Luthra <i>et al.</i> , (2011); Anil Dube and Rupesh Gawande (2016)
10.	Unawareness of customers	Mudgal <i>et al.</i> , (2009), Mudgal <i>et al.</i> , (2010); Ravi et al. (2005); Zhu et al. (2004); Zhu et al. (2007); Zhu et al. (2008) ; Luthra et al. (2011); Anil Dube and Rupesh Gawande (2016)

(Source: Created by researcher)

5. Discussion

Many researchers in the developed countries, for instance in US, Japan and Taiwan, have studied the role of GSCM but very few studies have been done in the Indian context covering GSCM. Many developed economies have stringent environmental laws that initiate organizations to adopt green practices thereby minimize environmental impact of their operations. The response of organization in developed countries is better because of strict government regulations which organizations have necessarily to conform to. The government in India through review of organizations operations, recognition of their effort, and a penalty for non adherence should attempt to mobilize organizations to adopt green practices.

6. Conclusion

This paper seeks to understand the present challenges and barriers faced by Indian organization in the adoption of GSCM. The research paper deals with the twenty barriers, which were identified through review of literature and in consultation with academicians. In the present business environment, industry and researchers has shown increased attention in GSCM practices for minimizing environmental impact and achieving organizational objectives. Despite of many benefits, going for green supply chain management in organizations is still a challenge and organizations are struggling to implement GSCM. Organizations need to take thorough study of these barriers in order to remove them from the path for successful implementation of GSCM practices.

7. Implications of the Study

This work is meaningful for organizations interested in going green by adopting GSCM. The degree of successful implementation of GSCM is influenced by these barriers. This research endeavor has explored 10 barriers that will help managers to take precaution in formulating strategies to implement GSCM. The GSCM barriers that restrict organizations from adopting GSCM has become a major concern for organizations in India. Therefore, efficient policies need to be framed to remove these barriers.

References

- AlKhidir, T., and Zailani, S. (2009) Going Green in Supply Chain Towards Environmental Sustainability, *Global Journal of Environmental Research*, 3 (3), 246-251.
- Balasubramanian, S. (2012) A Hierarchical Framework of Barriers to Green Supply Chain Management in the Construction Sector, *Journal of Sustainable Development*, 5, 15-27.
- Borade, A.B., and Bansod, S.V. (2007) Domain of Supply Chain Management –A State of Art, *Journal of Technology Management and Innovation*, 2(4), 109-121.
- Dashore, K., and Sohani, N. (2013) Green Supply Chain Management - Barriers & Drivers: A Review, *International Journal of Engineering Research & Technology (IJERT)*, 2 (4), 2021-2030. ISSN: 2278-0181
- Dashore, K., and Sohani, N. (2013) Green Supply Chain Management: A Hierarchical Framework for Barriers, *International Journal of Engineering Trends and Technology (IJETT)*, 4 (5), 2171-2182.
- Deepak, M., Noorul Haq, A., and Mathiyazhagan, K. (2014) Identification of Pressures, Barriers and Drivers for the Implementation of Green Supply Chain Management, *5th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014)* December 12th–14th, 2014, IIT Guwahati, Assam, India.
- Dube, A., and Gawande, R. (2016) Analysis of Green Supply Chain Barriers using Integrated ISM-Fuzzy MICMAC Approach, *Benchmarking: An International Journal*, 23 (6), <http://dx.doi.org/10.1108/BIJ-06-2015-0057>

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- Faisal, N. (2010) Analysing the Barriers to Corporate Social Responsibility in Supply Chains: An Interpretive Structural Modelling Approach, *International Journal of Logistics Research and Applications*, 13(3), 37-41.
- Gilbert, S. (2000) Greening Supply Chain: Enhancing Competitiveness through Green Productivity, *Report of the Top Forum on Enhancing Competitiveness through Green Productivity held in the Republic of China*, 25-27 May, 2000. ISBN: 92-833-2290-8.
- Giunipero, L. C., Hooker, R. E., and Denslow, D. (2012) Purchasing and Supply Management Sustainability: Drivers and Barriers, *Journal of Purchasing and Supply Management*, 18(4), 258-269.
- Hsu, C.W., and Hu, A.H. (2008) Green Supply Chain Management in the Electronic Industry, *International Journal of Science and Technology*, 5(2), 205-216, ISSN: 1735-1472.
- Jayanta, A., and Azhar, M. (2014) Analysis of the Barriers for Implementing Green Supply Chain Management (GSCM) Practices: An Interpretive Structural Modeling (ISM) Approach, *Procedia Engineering*, 97, 2157 – 2166.
- Lalit, Narwal, M.S., and Kumar, A. (2014) Barriers and Their Relative Importance to the Adoption of Green Supply Chain Management in Indian Context, *International Journal of Engineering Research & Technology (IJERT)*, 3 (1), 2260-2269.
- Luthra, S., Kumar, V., Kumar, S., and Haleem, A. (2011) Barriers to Implement Green Supply Chain Management in Automobile Industry using Interpretive Structural Modeling Technique-An Indian Perspective, *Journal of Industrial Engineering and Management*, 4(2), 231-257.
- Mathiyazhagan, K., Govindan, K., Noorul H. A., and Geng, Y. (2013) An ISM Approach for the Barrier Analysis in Implementing Green Supply Chain Management, *Journal of Cleaner Production*, 47, 283-297.
- Mehrabi, J., Gharakhani, D., Jalalifar, S., and Hossein Rahmati H. (2012) Barriers to Green Supply Chain Management in the Petrochemical Sector, *Life Science Journal*, 9(4), 3438-3442.
- Mudgal, R. K., Shankar, R., Talib, P., and Raj, T. (2010) Modelling the Barriers of Green Supply Chain Practices: An Indian Perspective, *International Journal of Logistics Systems and Management*, 7(1), 81-107.
- Muduli, K., and Barve, A. (2013) Empirical Investigation of the Barriers of Green Supply Chain Management (GSCM) Implementation in Indian Mining Industries, *3rd International Conference on Business, Economics, Management and Behavioral Sciences*, 12, 205-224.
- Muduli, K., Govindan, K., Barve, A., and Geng, Y. (2013) Barriers to Green Supply Chain Management in Indian Mining Industries: A Graph Theoretic Approach, *Journal of Cleaner Production*, 47, 335-344.
- Min, H., and Zhou, G. (2002) Supply Chain Modeling: Past, Present and Future, *Computers & Industrial Engineering*, 43(1-2): 231-249.
- Patrick Penfield (2007) Sustainability can be Competitive Advantage- Whitman School of Management <http://www.mhia.org/news/industry/7056/thegreen-supply-chain> - Aug 7, 2007
- Ravi, V., and Shankar, R. (2005) Analysis of Interactions among the Barriers of Reverse Logistics, *Technological Forecasting and Social Change*, 72(8), 1011-1029.
- Srivastva, S. (2007) Green Supply State of the Art Literature Review, *International Journal of Management Review*, 9(1), 53-80.
- Walker, H., Di Sisto, L., and McBain, D., (2008) Drivers and Barriers to Environmental Supply Chain Management Practices: Lessons from the Public and Private Sectors, *Journal of Purchasing and Supply Management*, 14 (1), 69-85.
- Wooi, G.C., and Zailani, S., (2010) Green Supply Chain Initiatives: Investigation on the Barriers in the Context of SMEs in Malaysia, *International Business Management*, 4 (1), 20-27.
- Zaabi, S., Dhaheri, N., and Diabat, A. (2013) Analysis of Interaction between the Barriers for the Implementation of Sustainable Supply Chain Management, *The International Journal of Advanced Manufacturing Technology*, 68(1-4), 8