

# A Literature Overview on Green Supply Chain Management and Critical Factors

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**Abstract:** To differentiate from competitors and for setting sustainable development every organization supports new activity. India ranks at 141/178 Environmental Performance Index, which is the worst rank. Green Supply Chain Management (GSCM) is one of those most efficient ways. A supply chain includes product design, material procurement and selection, manufacturing operation, logistics till end consumer with support of top management and under burden of government legalization to make green environmental process. GSCM is for improving environmental performance of product and process at its each stage of organization i.e. Purchase, manufacture, marketing and logistics. For validity of GSCM approach towards the organization we found majorly 15 most dominating Critical Factors (CFs) in electronic, manufacturing and textile industry. By perusal of various literature we tabulated citation of critical factors in each literature. This study examines a detailed analysis of CFs in GSCM by which we found of most dominating CFs and Sub-CFs in GSCM.

**Keywords:** Green Supply Chain Management; Critical Factor; Critical Success Factor; sustainable supply chain, Environmental Performance Index

## I. Introduction

As a result of worldwide economic development and high levels of industrialization, reduction of natural resources and its influence on environment have attracted attention of government and business communities across the globe. All stages of a product's life cycle will influence a supply chain's environment burden, from resource extraction, to manufacturing, use and reuse, final recycling, or disposal. Environmental management has thus become a topic of mutual concern of businesses, government and consumers.

Green Supply Chain Management (GSCM) is a combination of, supply chain management (SCM) and environmental thinking (Green Thinking), surrounding product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumer and end-of-life management of the product [1]. GSCM may be a

practically good to stabilize the financial, ecological and social gains and has emerged as an important management strategy for business organizations to become more cost effective, environmental friendly and competitive [2].

The industries believe that the implementation of GSCM would be expensive, but it is the matter of knowledge on the concept and the management view point and involvement towards making the industries' supply chain more cost effective and environment friendly. Therefore, it calls for the need to identify various critical factors to implement GSCM [3] Critical Factor is term for an element that is necessary for an organization or project to achieve its mission, it is a brief statement created in an organization that explains a specific element that must be achieved. To be effective critical factors must be necessary to the organization's success, identical with a high-level goal, Connection with the organizational strategy.

## Objectives of the research

- To identify various critical factors to implement GSCM
- To find the citations of critical factors in literature.

Previous literature review papers in sustainable and green supply chain have put more importance on the integrated view of GSCM and limited attempts all factors in one literature. In this paper, literatures in the area of operations, supply chain include government involvement and company management is considered in which we discussed fifteen most dominating critical factors towards GSCM; this paper focuses on study conducted to improve the greenness of different SC processes and to identify the barriers in adopting these green practices.

In this paper, perusal of past Literature is done to identify CFs and its effect towards the sustainability when we implemented GSCM. Solution methodology describes the solution methodology for the research.

## II. Literature review

A number of authors have referred to the GSC over the past decade due to developing environmental management topics. In this section, the relevant literature on GSCM in organizational context and identification of CFs to implement GSCM towards sustain ability in industries are summarized.

The strategy used for literature review is to find keyword relevant to literature by defining project, key concept of project and generating keywords by using synonyms. By this process we found fifty two papers. By detailed examination of papers, we selected twenty seven most relevant papers for further study purpose. The four step approach was adopted for review of last studies

- i. Delimitation of Research
- ii. Categorizing Research paper
- iii. Collection of Critical Factors
- iv. Reviewing the progress of work for future work

### ***Environmental Performance Index***

Yale Center for Environmental Law & Policy and Columbia University Center for International Earth Science Information Network in collaboration with the World Economic Forum developed method of quantifying and numerically marking the environmental performance of a state's policies was introduced by Environmental Performance Index (EPI).

It measures the effectiveness of national Environmental protection efforts by past iterations and strategies applied by that nation. Ranking given to only those countries of which Environmental performance are measured. EPI was started with the measure of twenty three countries in 2002 now in the year of 2012 it reached to 132 countries and now in 2014 and 2016 EPI measure for 178 countries. The main objectives of EPI measure is Environmental Health and Ecosystem Vitality.

Developing economies, including China, India and Russia have had modest development over the past decade, but they have also paid an environmental price for their rapid growth. India is the fastest growing economy that ranks at in 2012 it is 125/132, in 2014 it is 155/178 now it's in 2016 it is 141/178 EPI, which is worst rank. It is mainly due to Air Quality, Biodiversity and habitat protection. This literature is summarized into mainly two parts,

- Green supply chain management context
- Identification of CFs to implement towards sustainability

### ***Green Supply Chain Management Context***

For “Sustainable Development” concept discussed in Earth Summit in Rio, GSCM is very important to take useful measure to protect environment for long term economic and environmental growth [4]. GSCM involves finance

flow, information flow, logistics flow, environmental management and relationships is an important source of the firm's advantage. To achieve organizational objectives like enhance brand image, optimum resource utilization, social and environmental friendly image GSCM is logically good because it emerged as important strategy [3]. Meanwhile most Far-reaching approach of environmental management is to create value through greening the supply chain [5].

GSCM is a powerful way to take competitors advantage with increased awareness to corporate responsibility to meet the terms with environmental policy [4]. The aim of organization implementing GSCM is to enhance environmental and financial performance [6]. GSCM should be proactive approach started by every organization. Srivastava suggests mainly three approaches i.e. Reactive, Proactive and Value Seeking. Perusal of the literature frame of integrated GSCM is not developed hence researcher need to explain integrated supply chain [7].

In last thirty years of highlighted mass production, the Toyota production system, lean production, just-in-time, and modular consortium as important innovations for organization point for cost reduction but it's time to take Green Innovation Initiatives (GII) [8].

The definition of GSCM in the past studies has ranged from green procuring to integrated green supply chains flowing from supplier to manufacturer to customer, and even reverse logistics [9]. Some of the literature explains that government legalizations and organization management involvement is important and includes part of GSCM [6] [7] [8]. For integrating environmental thinking, Srivastava defines GSCM as “A supply chain which include product design, material procuring and selection, manufacturing operation, logistics till end consumer with support of top management and under burden of government legalization to make green environmental process.”

### **Green Supply Chain Management =**

**Green Purchasing + Green Manufacturing+  
Green marketing + Reverse Logistics [4] [8]**

### ***Identification of CFs to Implement Towards Sustainability***

The critical factors of GSCM practices validated in this work can help enterprises identify those areas of GSCM where acceptance and improvements will be made, and in prioritizing GSCM efforts [5]. We have taken the literature available for developed/developing countries for identifying these CFs. Critical Factors are activities/key factors essential for ensuring the success of any phenomenon/business to happen and necessary for an organization to achieve

their goal mouth [3]. Each literature was discussed as a specific segment of supply chain but this study refer to mixture of all past literatures.

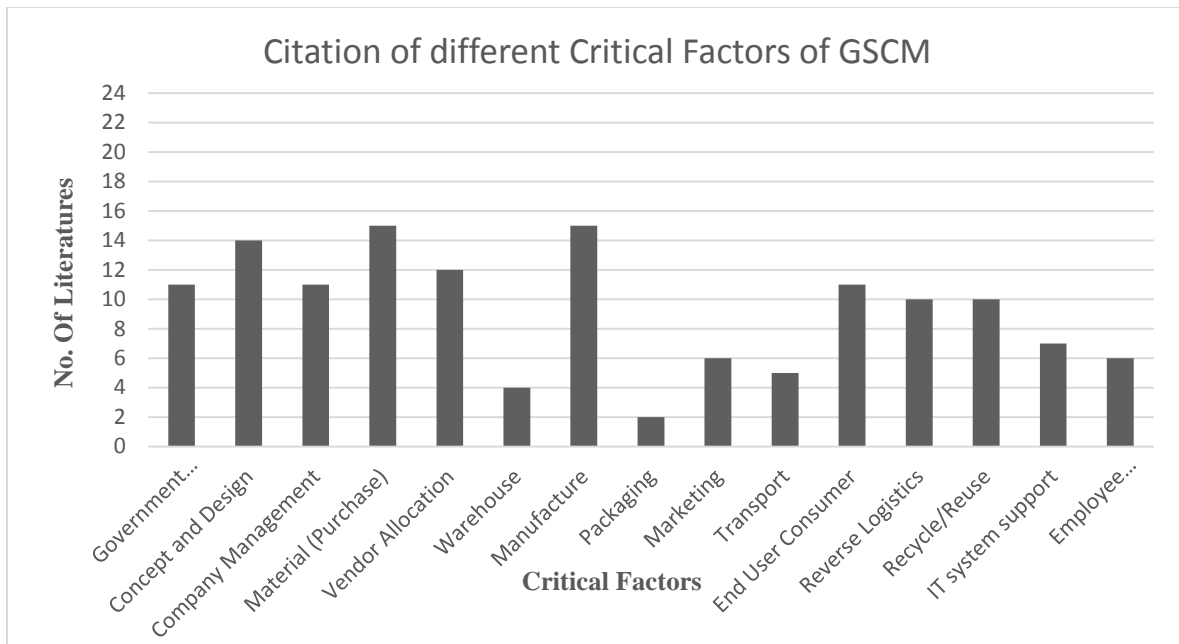
All phases of a Product’s Life Cycle (PLC) will influence supply chains so to make impactful GSCM, we need to consider all parameters [10]. Each parameter works as a CF by past literature we found forty seven CFs as different researcher offer different phase of PLC of GSCM. Mainly Fifteen CFs are considered which are implemented to GSCM towards sustainability stated in the literature have been explained.

III. Methodology

Perusal of past literature gives different CFs. We found forty seven Sub- CFs in different literatures. For further studies we classified these Sub-CFs into Fifteen main CFs which is mentioned in row in following table as per the authors mentioned in their paper [11] [12] [13]. In column of following table, we explained Author and publish year. This work uses the CFs present in past literature are examined, it helps to understand the importance of CFs to implement GSCM towards sustainability.

Ref. No.	Critical Factor Parameter  Author & Year	Government Involvement	Concept and Design	Company Management	Material (Purchase)	Vendor Allocation	Warehouse	Manufacture	Packaging	Marketing	Transport	End User Consumer	Reverse Logistics	Recycle/Reuse	IT system support	Employee management
[1]	Zailani et al. -2015	✓	✓	✓				✓				✓				✓
[2]	Mangla et al.-2014		✓					✓							✓	✓
[3]	Luthra et al. -2014	✓	✓	✓	✓	✓	✓			✓		✓	✓		✓	
[4]	Nimwat & Namdev -2012				✓			✓		✓		✓	✓			
[5]	Allen H. Hu & Chia-Wei hsu- 2006	✓	✓	✓	✓	✓						✓	✓		✓	
[6]	M.K. Chien & L.H. Shih-2007	✓	✓	✓	✓			✓		✓		✓	✓			
[14]	C. W. Hsu & A. H. Hu-2008		✓	✓	✓	✓								✓		✓
[7]	Samir K. Srivastava 2007			✓	✓			✓					✓	✓		
[8]	Kuo-Chung Shang et al. - 2014	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		
[9]	Jörg H. Grimm et al.- 2013			✓	✓											✓
[10]	Ninlawan C et al. - 2010				✓	✓	✓	✓	✓		✓		✓	✓	✓	
[12]	A.D. Sarode V.K.Sunnapwar P.M.Khodke		✓		✓			✓			✓		✓			
[15]	Kamalakanta Mudulia et al. -2013		✓			✓										✓
[16]	Ali Diabata, Kannan Govindanb- 2010	✓	✓			✓		✓				✓	✓	✓		
[17]	Devendra K. Yadav, Akhilesh Barve -2015	✓				✓		✓				✓				
[18]	Su-Yol Lee- 2015	✓				✓		✓				✓				
[19]	Allen H. Hu Chia-Wei Hsu- 2006	✓	✓	✓	✓	✓								✓	✓	✓
[20]	Fahimnia et al. - 2015			✓											✓	
[21]	Jiuh-Biing Sheu et al.- 2005				✓	✓		✓		✓		✓	✓	✓		
[22]	Aref Hervani Joseph Sarkis- 2005				✓	✓	✓	✓		✓	✓		✓	✓		
[23]	Jayanth Jayaram BalramAvittathur- 2014	✓	✓		✓							✓	✓			
[24]	Niraj Kumar et al. -2015		✓					✓			✓					
[25]	S. Maryam Masoumik et al. - 2015	✓	✓	✓	✓			✓				✓			✓	

Table 1 Citation of different Critical Factors of GSCM



#### IV. Conclusion

We have studied, past research work under domain of GSCM and major CFs. In the period of globalization feels pressure from domestic and international level for Environmental sustainability. We make attempt to recognize major critical factors of GSCM for sustainable growth. To obtain strategic importance of GSC initiatives, we have found in our literature review that out of Fifteen CFs Green Design, Material Purchase (Procurement), Vendor allocation, and Green manufacturing are the most important CFs. When we consider centric approach then we found forty seven CFs which we can say as Sub- critical factor. As per perusal of past literature we found that Environmental Policy for GSCM, Green Design, Initiation and top management support, Involvement of supplier and vendor in green practices, Green Manufacturing process, Reverse logistics, Recycling program are the major Sub-CFs. The future scope of this research is to study and analyze CFs for various types of industries.

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