

# Effective Implementation of Green Supply Chain Management (GSCM) Practices in Three Southern States Manufacturing Companies in India

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*Abstract- The green supply chain management consists of those activities associated with manufacturing from raw material acquisition to final product delivery. The recently changed environmental requirements that affect manufacturing operations selling and distribution and transportation systems, growing attention is given to the development of environment management strategies for supply chains. A green supply chain aims at confining the wastes within the industrial system so as to conserve energy and prevent the dissipation of harmful materials into the environment. The aim of this research paper is to examining the Green practices in the selected Three Southern States Indian Manufacturing Companies. The main objectives of this paper are to examine the impact of GSCM Practices in south Indian small medium and large scale manufacturing industry in southern industry in India. To find out the green factors influences the GSCM using in south Indian small medium and large scale manufacturing industry in southern industry in India and To identify the various indicators of GSCM Practices in south Indian small medium and large scale manufacturing industry in southern industry in India.*

**Keywords:** - GSCM, Industry, Management, Associated, Changed Environmental, Indian Manufacturing Companies,

## I. INTRODUCTION

Green Supply Chain Management (GSCM) is one of the recent innovations for the enrichment of capabilities of Supply Chain Management. In this study, the various activities of the Supply Chain processes of the various Southern Indian Manufacturing Industries i.e. Small, Medium and Large Scale Industries and finds how much eco-friendly they are i.e. how much percentage of the green factors are involved in their supply chain activities from the procurement of the raw material to the transportation of the final product for the purpose of metering the performance of the manufacturing sectors has been studied. The major six activities of the green supply chain management; namely Green Sourcing & Procurement, Green Manufacturing, Green Warehousing, Green Distribution, Green Packaging, Green Transportation are being covered throughout the research. From these above process activities are measured the performance of the various Southern Indian Manufacturing industries with the help of various crucial performance indicators & their sub-indicators. Green concept has been increasing in consciousness of the environmentalist in the last few decades.

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More people are aware of the world environmental problems such as global warming, evil substance usage, and decrease in non supply of resources. The Government has organised campaigns to make people aware of this concept. Several organizations responded to this by applying green principles, to their company, such as using environmental friendly raw material, reducing the usage of the recycle papers for wrapping. The green principles were expanded to many departments within organization. Green supply chain management (GSCM) is modern Buzz ward emerging in 21<sup>st</sup> century.

This idea covers every stage in manufacturing from the first to the last stage of product life cycle, i.e. from product design to recycle or retire. GSCM concept has ranged from green purchasing to integrated supply chains starting from supplier, to manufacturer, to customer and reverse logistics. Reverse logistics deals with the activities of the various processes which are necessary for returning waste material and used goods to their producer respectively resulting into the complete economic cycle compared to the traditional unidirectional flow economy. Closed loop economy implies savings of raw materials and energy of the input side and of landfill capacity on the output side, so that economic and ecological efficiency of the enterprises can be improved. This generates on one hand advances towards sustainable development on the other hand considerable cost reduction to some or even all of the enterprises involved.

## II. REVIEW OF LITERATURE

Literature review takes into consideration the broader concept of sustainable development and outlines how and why companies should be concerned with environmental and social issues in green supply chain management. The review suggests that this is mainly due to pressure from stakeholders and to enhance the company reputation as well as for competitive advantage reasons. Common benefits of GSCM in achieving sustainability are enhanced value for customers, cost reduction, increased operational efficiency and competitive advantage. The current trend in recent literature also indicates that a more cooperative model of GSCM favors the environmental and social dimensions.

**Qinghua Zhu in (2006)<sup>1</sup>** studied Green supply chain management: pressures, practices and performance within the Chinese automobile industry in which they observed that Increasing pressures from a variety of directions have caused the Chinese automobile supply chain managers to consider and initiate implementation of green supply chain management (GSCM) practices to improve both their economic and environmental performance. Expanding on some earlier work investigating general GSCM practices in

China, authors explores the GSCM pressures/drivers (motivators), initiatives and performance of the automotive supply chain using an empirical analysis of 89 automotive enterprises within China.

**Chung-Hsiao in (2008)<sup>2</sup>** studied the Green supply chain management in the electronic industry in which they mentioned that there are various approaches for implementing green supply chain management practices has been proposed and recognized in previous literatures, according to the author. But there is yet no investigation that identified the reliability and validity of such approaches particularly in electronic industry. Author used the fuzzy analytic hierarchy process method to prioritize the relative importance of four dimensions and twenty approaches among nine enterprises in electronic industry. The findings indicate that these enterprises would emphasize on supplier management performance in the crucial role of implementing green supply chain management.

**Fengfei Zhou in (2009)<sup>3</sup>** study on the Implementation of Green Supply Chain Management in Textile Enterprises in which according to the author, The green supply chain management is a sort of modern management mode which could comprehensively consider the environmental influence and resource utilization efficiency in the whole supply chain and how to implement the green supply chain management in special industrial operation at present has become into one of hotspot problems.

In another study, **Ninlawan & Tossapol in (2010)<sup>4</sup>** works on the Implementation of Green Supply Chain Management Practices in Electronics Industry in which they aims to survey current green activities in computer parts “manufacturers in Thailand to evaluate green supply chain management and they survey current green activities in computer parts” manufacturers in Thailand, 11 manufacturers are case studies who provide in-depth interview about green procurement, green manufacturing, green distribution, or reverse logistics. To evaluate green supply chain management, the questionnaire related to investigate GSCM practices, measure Green Supply Chain Management performance, and explore GSCM pressure/driver within Thai electronics industry is used to obtain survey results. Then suggestions to develop GSCM in electronics industry are presented in the end.

**Robert & Benjamin in (2010)<sup>5</sup>** Introducing Green Transportation Costs in Supply Chain Modeling in which they thinks that Escalating environmental concerns with prevalent transportation modes has led to an increased interest in the adoption of “green”, sustainable practices in the area of supply chain management. As a part of an overall green supply chain strategy, the amount of carbon emissions resulting from the transportation element of a supply chain is a growing concern for supply chain managers and corporate executives alike. In which, author tries to review methods for quantifying carbon emissions and estimating the cost of going green in a select set of supply chain optimization models. Although GSCM has been comprehensively reviewed. There are areas around Green supply chain management that still require further study. One is a gap in the literature in terms of the implementation of green supply chain management (GSCM) practices in three southern states manufacturing companies

in India and also definitely has different views about this and can sometimes be conflicting from the company’s point of view. Normally, when the word ‘natural environment’ and ‘sustainability’ comes into the picture, most operation managers. This study should focus more towards qualitative study such as interviews in understanding the different three southern states manufacturing companies in India towards green supply chain management to represent the different views about the concept and how this, in the end, implicates management decisions.

### III. STATEMENT OF THE PROBLEM

The Southern Indian Manufacturing industry rapid growth relates to two major dimensions affecting environmental sustainability, environmental burden and resource shortage. The rapid and continuous growth of Southern Indian Industry population has also brought great challenges to India energy resource security. The Southern Indian manufacturing companies have experienced increasing environmental pressure while simultaneously recognizing various benefits and incentives to green their supply chains. Internal awareness is a key-dimension for enterprises to implement environmental practices such as GSCM. Proactive companies usually have greater implementation of environmental practices beyond requirements of laws and regulations, while reactive companies only seek compliance with regulatory requirements. In India, the diversity in the adoption rates has seen some manufacturing supply chain companies proactively implementing environmental strategies such as green purchasing and eco-design. Many manufacturing supply chain enterprises considered or initiated some GSCM practices such as investment recovery, eco-design and internal environmental management. However, investment recovery and development of recycled material markets in India have not received much attention. That is to say the maturation of the manufacturing product market is still progressing and has yet to create a critical mass to be economically worthwhile for development of a used parts market. However, a regulated manufacturing product take-back system has been in operation in India.

These take-back system forces manufacturers to consider environmental effects in the whole life cycle and thus providing motivation for organizations to further pursue GSCM practices and closing the manufacturing supply chain loop. Thus, GSCM practices have emerged as a systematic approach within the manufacturing industry in India to balance the economic and environmental sustainability of firms.

1. How far supply chain practices implementation in southern manufacturing company green is followed?
2. Which factors is environment stability of GSGM?
3. How much utility of implementation of green supply chain practices in southern manufacturing industry?

#### IV. RESEARCH METHODOLOGY

##### Data source & Data Analysis

The study is analytical based on collection of data from both primary and secondary sources. Primary data is collected from well structured questionnaire, in South India representing various categories and size groups of manufacturing companies. Secondary data is obtained from various published and unpublished records, books, journals. Appropriate Statistical tools are to be used to draw inferences from the data collected.

##### Objectives of the study

The purpose of the present study is to identify major works on green supply-chain management research integrating environmental thinking. 'green purchasing', 'green design', 'industrial ecology', 'industrial ecosystems', 'remanufacturing' and 'waste management' were conducted

1. To examine the impact of GSCM Practices in south Indian small medium and large scale manufacturing industry in southern industry in India.
2. To find out the green factors influences the GSCM using in south Indian small medium and large scale manufacturing industry in southern industry in India.
3. To identify the various indicators of GSCM Practices in south Indian small medium and large scale manufacturing industry in southern industry in India.

4. To offer appropriate suggestions and conclusions to the policy makers.

##### Scope of the Study

The present study could be predictable to provide improved the green supply chain management practices using the southern manufacturing industry in India This idea covers every process in manufacturing from the first to the last stage of product life cycle, i.e. from product design to recycle or retire. GSCM concept has ranged from green purchasing to integrated supply chains starting from supplier, to manufacturer, to customer and reverse logistics. Reverse logistics deals with the activities of the various processes which are necessary for returning waste material and used goods to their producer respectively resulting into the complete economic cycle compared to the traditional unidirectional flow economy. Closed loop economy implies savings of raw materials and energy of the input side and of landfill capacity on the output side, so that economic and ecological efficiency of the enterprises can be improved. This generates on one hand advances towards sustainable development on the other hand considerable cost reduction to some or even all of the enterprises involved.

##### Lists of Important Drivers

These are various drivers for green supply chain management (GSCM) which are observed from the literature review and also important for Global and Indian manufacturing environment. The lists of overall list of drivers are given below.

**Table 1.1 Driving factors of Mean & standard deviation of GSCM for Overall Manufacturing Industries**

S. NO.	Driving Factors	Mean Score	STD. Deviation
1	Government Rules	4.1481(4)	.9074
2	Environmental concerns	4.0222(5)	.6711
3	Social & Environmental responsibility	3.0741(9)	.7531
4	Green image , Global marketing & Competitiveness	5.5687(1)	.3529
5	Society force	3.9259(6)	.6345
6	Health & Safety'	4.1963(3)	.7511
7	Economic benefits or cost reduction benefits to industry	3.4074(8)	.2345
8	Customers awareness, pressure & support	4.2963(2)	.4589
9	Employees Motivation , health & Safety	3.2963(10)	.9653
10	Scarcity of Resources, Higher waste generation & Waste disposal problem	3.7463(7)	.8659

##### Source:-Primary Data

Table 1.1 shows that drivers factors of GSCM overall manufacturing industries Green image, Global marketing & Competitiveness having the highest mean score value (5.5687(1), Customers awareness, pressure & support having mean score value (4.2963) and having health & safety' mean score value (4.1963) and Government Rules having mean score value (4.1481(4) This indicate that south Indian manufacturing companies giving more importance to

customers awareness, pressure and support, Environmental concerns. This driving factor is more helpful for maintaining the customer's awareness, pressure and support in companies. General manufacturing companies are also giving importance to employee's motivation, health and safety and environmental concerns and legislature of green supply chain management (GSCM).

**Table 2.1 Sector wise Overall Comparison of Mean Statistic**

Structural Modeling. Electronic copy of this paper is available at: <http://ssrn.com/abstract=956954>.doi: 10.1016/j.jclepro.2010.01.16

S.No	Type of Industry	Mean Score	Std. Deviation
1	Small	3.153	0.730
2	Medium	4.625	0.839
3	Large	4.942	0.963

**Source:-Primary Data**

From the table 2.1 it is observed that large scale industries are having higher sector statistics value (4.942) and followed by Medium scale industries are suitable for the adoption of GSCM. Small Scale is having the less sector statistics value, (3.153) those manufacturing companies are suitable for the adoption of GSCM.

### V. CONCLUSION

With increasing competition in today's comprehensive market, the organizations have to look to the modern strategic manners in order to gain sustainable organization and competitive advantage. Green Supply Chain Management (GSCM) as a new innovative managerial tool that can be used as a strategic stick to gain competitiveness and to promote the organizations environmental and economic performance at the same time. As the effect of this research paper it is observed that the driver of GSCM, Green image, Global marketing & Competitiveness, Customers awareness, pressure & support health & safety' is very important and crucial for adoption of Large and medium scale industry. All aspects create pressure on manufacturer which helps to implement the GSCM in Manufacturing Industries in three southern states manufacturing companies in India.

### REFERENCES

1. Qinghua Zhu, Joseph Sarkis & Kee-hung Lai, "Green Supply Chain Management: Pressures, Practices and Performance within the Chinese Automobile Industry," (2006).
2. Chung-Hsiao, "The Green supply Chain Management in the Electronic Industry" (2008).
3. Fengfei Zhou, "Study on the Implementation of Green Supply Chain Management in Textile Enterprises," (2009).
4. Ninlawan & Tossapol, "The Implementation of Green Supply Chain Management Practices in Electronics Industry" (2010).
5. Robert & Benjamin, "Introducing Green Transportation Costs in Supply Chain Modeling". (2010).
6. Scupola, A. (2003). The Adoption of Internet Commerce by SMEs in the South of Italy: An Environmental, Technological and Organizational Perspective. *Journal of Global Information Technology Management*, 6(1), 52-71.
7. Singh, M.D., and Kant, R. (2008). Knowledge management barriers: An Interpretive Structural Modeling Approach. *International Journal of Management Science and Engineering Management*, 3(2), 141-150. ISSN 1750-9653, available at: <http://www.jstor.org/stable/257085>.
8. Solvang, W.D, Deng, Z., and Solvang B. (2007). A Closed-loop Supply Chain model for managing overall optimization of Eco-efficiency. POMS 18th Annual Conference Dallas, Texas USA, May 4 to May7, 2007.
9. Srivastva, S. (2007). Green Supply State of the art Literature Review. *International Journal of Management Review*, 9(1), 53-80. Doi: 10.1111/j.1468-2370.2007.00202.x
10. Sarkis, J., Hasan, M.A., Shankar, R. (2007). Evaluating Environmentally Conscious Manufacturing barriers with Interpretive