An Investigation on Green Supply Chain Management and its Scope in Indian Construction Industries

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Abstract - Indian construction industry is one of the important sector in national economy. It is one of largest sector in India contributes to growth of 11.1% of India’s GDP. Due to such a vast industry it is well known that construction has significant and irreversible impact on environment because it largely deals with the consumption of natural resources. Hence green supply chain management (GSCM) can play vital role to solve this problem in eco-friendly manner. In developing country like India the awareness about green supply chain management is in early stage. The issue of GSCM has received attention past decade among researcher in different industries but it shows that lack of research on GSCM in construction sector within India. The purpose of this study is to find out current situation and scope of GSCM in construction industries in India.

Keywords - Green Supply Chain Management (GSCM), Indian Construction Industry, Environmental Management, ISO 14001, GDP

I. INTRODUCTION

At present, Indian construction industry holds a significant position in national economy. The sector provides direct employment to more than 18 million peoples directly and 14 millions peoples indirectly [9]. Green supply chain management as an environmental innovation which integrates into supply chain management. GSCM has gained popularity with both academic and practitioners in developed countries. Now day’s organizations are working on environmental management in their business as a concern to environmental sustainability. They have realized the greater benefit of the green technology adoption in their business operation. Green supply refers to the way in which innovations in supply chain management and industrial purchasing may be considered in the context of environment [1]. Green supply chain management consist activities that include the purchasing function’s involvement in reduction, recycling, reuse and the procurement of materials. Integrating environmental thinking into a supply chain management including product design, material acquisition and selection, manufacturing process, final delivery of the product to the customers as well as end life management of the product after its useful life. From these definitions we know that there is a range of researcher focus on Green supply chain management.[2]

GSCM= Green Procurement + materials management + Green Distribution + Reverse logistics. Supply chain management has the potential to make construction projects less fragmented, improve project quality, reduce project time, and hence reduce overall project cost, while creating more satisfied customers. The green supply chain management emerged as an effective management tool and philosophy for proactive and leading construction organization [3]. Certification of suppliers, Environmental management system, Government regulation and legislation, Green design, Reducing energy consumption, recycling materials and Packaging, Environmental collaboration with customers were the main drivers which affecting GSCM adoption and implementation in construction projects.[4]

The present study is to find out current situation and scope of GSCM in construction industries also drivers affects the Indian construction industry while implementing it.

II. LITERATURE REVIEW

The construction industry plays an important role in shaping society’s physical environment its output is used for providing vital utilities. However, construction usually has a significant and irreversible impact on the environment [5].

The Indian construction industry plays important role in building national economy. The construction sector in India contributes to a growth of 11.1% of its GDP. According to global insight, US$ 175 billion was spent on construction in India in 2007. It gives job opportunity around 18 million people directly and 14 million people indirectly on site [9].

Green supply chain management (GSCM) has been adopted as an antidote for best practice in the construction industry. Green supply chain management aims to maximize to overall environmental profit by adopting a life cycle approach through product design, material selection, manufacturing sales and recovery [5].

This part involves some information of the use of materials in the construction industry. It relates to the environmental impacts of construction materials to the total human activities. Aggregates are mineral materials, such as sand or gravel,
which are used in making concrete. Aggregates account for 66% of material in concrete and the production of aggregates in India was estimated to be 2.2 billion tones in 2010, the second largest in the world [14].

The causes of waste in construction are numerous, and are usually classified under two headings usually known as direct and indirect waste. The direct waste was generated in transport, delivery, storage, cutting, spillage, wrong use, wrong specification, production waste and poor workmanship [16].

An environmental management system (EMS) is required once the organizations decide to improve its environmental performance. EMS is set of tools, principles and procedures which an organization can use to help protect the environment from the potential irreversible impacts of its activities, products and services. By understanding the nature and impact of the environmental damage, the construction industry must take practical steps to overcome this problem. The trade-off between economic growth and the sustainability of the environment can be attained by the corporate environmental management with the company. The ISO 14000 series of standards was developed by the International Standardization Organization (ISO) in response to achieve sustainable development. The definition of EMS in ISO 14001 is the part of the overall management system which includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving reviewing and maintaining a company’s environmental policy [10].

Certification of suppliers’ environmental management system, Government regulations and legislation, Green design, Reducing energy consumption, Reusing and recycling materials and packaging and Environmental collaboration with customers are some important drivers that can affect GSCM [4],[11],[18].

Green image is driver of GSCM that provides a green image of company where a manufacturing products is to be used, more importantly, green image refers to the positive recognition by customers of organizations [12],[17].

From above analysis EMS is important tool for implementing GSCM and most critical drivers for implementing GSCM concluded as Government regulations and legislation, Green design, Reducing energy consumption, Reusing and recycling materials, companies green image and Environmental collaboration with customers.

III. OBJECTIVES

Studies shows that large number of the organizations understands the importance of green supply chain management (GSCM) but actual numbers of organizations that could actually deals with such practices is significantly low. The research is aimed to identify specific objectives as follows,

1) Examine the response to green supply chain management of the Indian construction industries.
2) Using the 'green purchasing strategy' to evaluate the situation of green supply chain management implementation in the construction industries.
3) Identification of main drivers that can affect the implementation of a green supply chain management in construction project.

IV. METHODOLOGY

1) Literature collection
2) Study of Literature
3) Data collection (Design of Questionnaire)
4) Analysis of Data
5) Recommendation for future work

V. GREEN SUPPLY CHAIN MANAGEMENT

Green supply chain management (GSCM) defines as “integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the customers as well as end-of-life management of the product after its life”.[15]

The scope of GSCM practices and implementation are ranges from green purchasing to integrated life-cycle management supply chains flowing from the supplier, through to the contractor, customer and closing loop with reverse logistics [3].

VI. DATA ANALYSIS

To evaluate green supply chain management, the questionnaire related to investigating current situation green practices, GSCM performance, and GSCM pressure are prepared. Important drivers that can affect GSCM implementation are selected through study of literature. The Questionnaire contained two section first section contains questionnaire related to general information about organization, current situation of GSCM in construction industries and second section contains question related to drivers affecting GSCM.

The data shows that most responses from construction companies thinks that implementation of EMSs is successful. For the construction companies, one third respondents will be added environmental issues into their policy and establish
proactive operation during the projects and establish proactive operation during the projects. Nearly half of the companies just fulfill legal requirements

![Environmental pressure for construction companies](image1)

The data shows that all responses from the construction companies feel the pressure from the local residents. Meanwhile the government, contractors and clients, and other stakeholders are supposed to be creators of environmental pressure by most of these companies. Less than one third of these responses think the media is creating pressure.

![The environmentally stakeholders for Indian construction companies.](image2)

**VII. CONCLUSION**

The above study shows brief importance of implementation of green supply chain management in construction industries. In terms of drivers affecting implementation of GSCM some important drivers are Government regulations and legislation, Green design, Reducing energy consumption, Reusing and recycling materials, companies green image and Environmental collaboration with customers. Most of responses from construction companies shows positive intentions and committed to purchase construction materials with environment friendly attributes, such as recycled materials. Waste management is the top priority for environment performance among the companies.

**VIII. RECOMMENDATIONS FOR FUTURE WORK**

Although, some studies in literature gives information about GSCM performance, practices and implementation over the world in different industries, but there has still research is to be carried out about GSCM implementation and adoption in developing countries like India. Since India is facing rapid development in past decade in every sector, for that there is urgent need to introduce GSCM in construction sector to overcome environment challenges. It would be helpful to further analyze supplier and contractor relationship in GSCM practices and drivers affecting implementation of GSCM through Interpretive structural modeling technique (ISM).

**ACKNOWLEDGEMENT**

I wish to express my sincere gratitude to project guide Dr.K.Ravi whose valuable guidance and useful suggestions in preparation of this paper.

I am thankful to Asst. Prof. S.B. Patil head of P.G. studies for his valuable advice. Finally I would like to thank to my family and friends to their support.

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