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Impact of Green Supply Chain Management Practices in India

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Abstract

Green supply chain management technique (GSCM) is a newer way to differentiate an organization from its competitor organizations because it can highly influence the planned success of an organization. With rapid increasing awareness of environmental protection globally, the green trend of conserving our planet's resources and protecting the environment is difficult to fight against, thereby putting more pressure on firms. With the rapid change in manufacturing scenario globally, environmental as well as social issues are becoming of great importance in running any business. Green supply Chain Management (GSCM) is a way to improve the performance of the process and the end products according to the requirements of environmental regulations agency. A green supply chain management aims to constrict the waste product within the industrial system in order to keep and protect energy as well as to prevent the dissipation of dangerous materials into the environment. In view of the growing global environmental awareness among organizations, green supply chain management (GSCM) has emerged as a newer solutions that considers sustainability elements with combination of environmental thinking along the intra- and inter-organizations management. Green Supply Chain Management (GSCM) has emerged as an important organizational philosophy to achieve the competitive environment by reducing environmental risks and improving ecological efficiency. Research on GSCM has grown substantially over the past two decades. Companies that have adopted GSCM practices with a focus on distribution activities have successfully improved their business and environmental performance on many levels. Today's also some of remaining companies have not adopted green supply chain management, due to this environmental performance index (EPI) of India is not good. This paper represents a brief report on various issues of GSCM on the basis of literature survey. This paper eventually contains two parts – literature survey and discussion of existing trends and stages representing the functioning of GSCM. To serve these purpose 356 articles published during 1996 through 2016 were reviewed. Knowledge extracted from the survey of the literature helped in knowing the existing trends and various concepts related to GSCM. The discussion of existing trends and various phases constitute a relevant knowledge base and will help manufacturing industry and academia in developing a better understanding about GSCM.

Keywords: *Green Supply Chain Management, green purchasing, green operation, performance measurement.*

INTRODUCTION

In the last few decades, there has been a worldwide awareness in controlling pollution to preserve the earth and its valuable resources. Given the centrality of this issue, one of the most significant current discussions in supply chain management among researchers and practitioners is green supply chain management (GSCM). For several years great effort has been devoted to the study of GSCM by a number of authors in order to consider environ-mental management issues. What is more, recently, researchers

have shown an increased interest in GSCM models to reduce serious environmental implications associated with differing supply chain activities (Green et al.1998). The GSCM practices concept is introduced for measurement of a firm's competence involving management on environmental performance which is based on combination of green thinking such as green procurement, green design, green manufacturing, green logistics, green consumption and green recycling . Result of performance evaluation from GSCM operations can be used to improve both economic and environmental performance of the organization.

Green supply chain management (GSCM) has unique issues related to competitive advantages, scarcity of resources, and environmental performance (Zhu *et al.* 2007). Zhu and Sarkis (2007) have addressed that organizations need to incorporate green supply chain practice in their supply chain activities to reduce environmental pollution. The benefit of GSCM includes all the stakeholders directly or indirectly. It helps in controlling pollution and wastages at each level of the supply chain (Vachon and Klassen 20060.

To Green the Supply Chain Globally:

In spite of pressure from consumers, government and the investment community, many organizations are not motivated to focus on approaches, such as cleaner production, eco-efficiency, and environmental management systems for greener management practices [sameer et al., 1996]. One question that needs to be asked, however, is whether considering green principles in decision-making processes may cause economic loss. There is increasing concern about determining the best solutions for balancing environmental and economic performance [Neto et.al., 2008]. Therefore, to avoid profit reduction, many organizations make little attempt to take green criteria into consideration and improve the environmental quality. Today's Globalization increases the opportunities for buyers. As buyers increase their focus on environment improvement, which increases the supplier environmental performance. It is true for all firms that regard environmental improvement as a task, not just for making an issue of cost, risk and for public image. To improve the supply chain management more effectively, it is required to evaluate the overall performance of GSCM measurement. As a result, the performance measurement at the supply chain level can be explained as the managerial process.

Research Background

The term "green" is now widely used interchangeably on the more established "sustainability" concept, which points to a more holistic view of environmental, social and economic impact (Dobers & Wolff, 2000; Rahimifard & Clegg, 2007; Saha & Darnton, 2005). Greening the supply chain management is a new field which is motivated by the need keeping in mind the environmental consciousness . The major objective, however, is not only about environmental friendliness, but also a good sense of green business and raising profits (Wilkerson, 2005). Many business firms are now realising the need to upgrade and modernize their supply chain management from an old functional role to a new strategic role to cope with running environmental legislations and to maintain a fighting competitive advantage, through science and technological innovation with improved eco-efficiency. Organizational managers of environmental management systems in earlier days were incorporated only at arm's length where individual organizational units alone managed the environmental performance in product design, process design, logistics, marketing, compliance regulations, and waste management. Though it was realised

long back that adopting green policy should meet the customers required order criteria in the market, the implementation of green idea needs to be extended to the whole firm. There is a fast growing need for integrating environmentally sound choices into supply chain management practice and research work for any organization.

Methodology

The methodology adopted for this study is shown in Figure 1. Structured keyword search technique was used while searching the related research papers. Papers were collected by using the keywords such as "Green supply chain management", "Green operation", "Green design", "Green procurement", "Drivers and barriers of GSCM", and "Performance measurement of GSCM". Papers were mainly found from major publications such as Science Direct, Emerald, Springer, Wiley, Francis & Taylor, online library and Google Scholar. Papers were either selected or rejected after analyzing the context of the paper. Only those papers were selected which fulfilled the following criteria.

- Papers published in peer reviewed journals;
- Papers related to GSCM and its operational issues;
- Papers for a period of 1996 to 2016.

In our survey, we have collected a total 743 articles out of which 356 were found relevant, fulfilling the stated conditions. Only these 356 papers were considered under study. These papers were studied to explore the existing trend of GSCM in terms of number of publication, country wise publication, method and area of study. Further important phases of GSCM are discussed to have a better understanding of it.

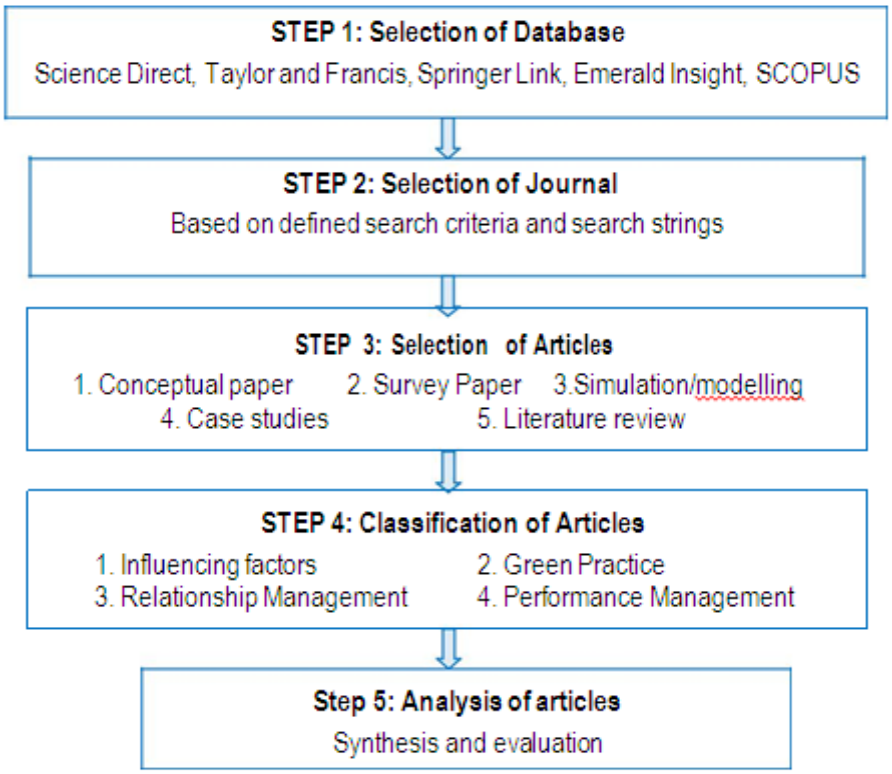

Fig 1 *- Flow diagram for literature survey*

Discussion

On the basis of the selected paper, present and past trends in GSCM is discussed in the first part and further important phases of GSCM are discussed in the second part.

Trends of green supply chain management

In this section the past and present trend of GSCM literature is discussed. For this purpose, materials are collected and further analysed to explore the trend of GSCM literature.

Year wise distribution of research papers

The basic body of literature identified comprises 356 papers. The allocation of the publications in the research period (1996-2016) is shown in Figure 2.

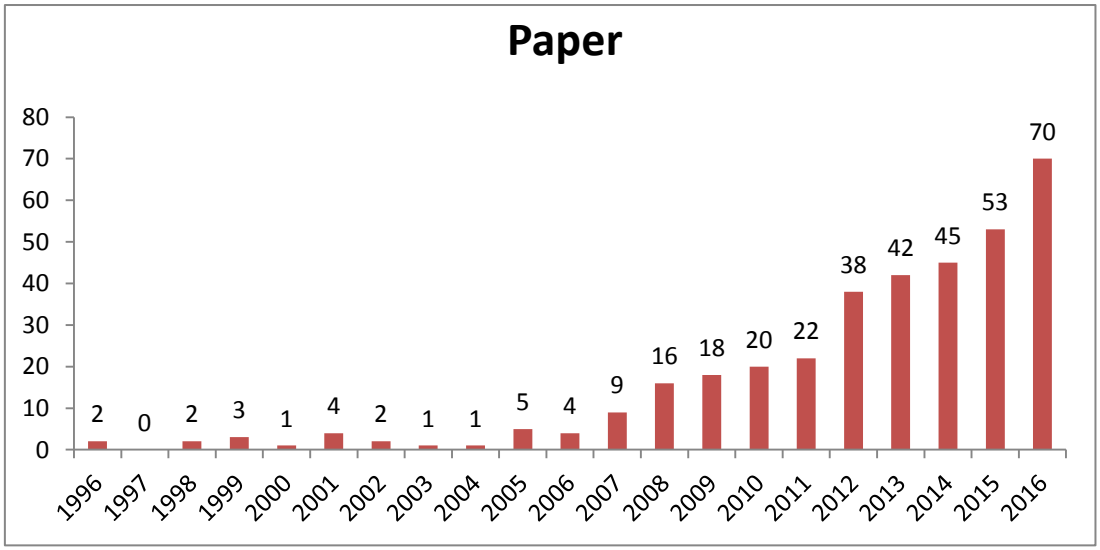

Fig 2- *Year wise distribution of research papers*

Figure 2 represents the number of papers and their year of publication. It can be observed that from 2007 onwards there is a remarkable increase in the number of publications related to GSCM. Perhaps, this is due to the impact of the Kyoto protocol, which came into force in 2007. Out of total 356 papers maximum publications have been made between the period 2012 and 2016 which consists approximately 90% of total publication. It is interesting to note that although environmental issues have been identified as a major concern years ago, it has gained the attention of researchers in recent years perhaps because of globalization. It is interesting to note that though environmental issues were always a major concern, but gained the attention of researchers in recent years with the increasing globalization.

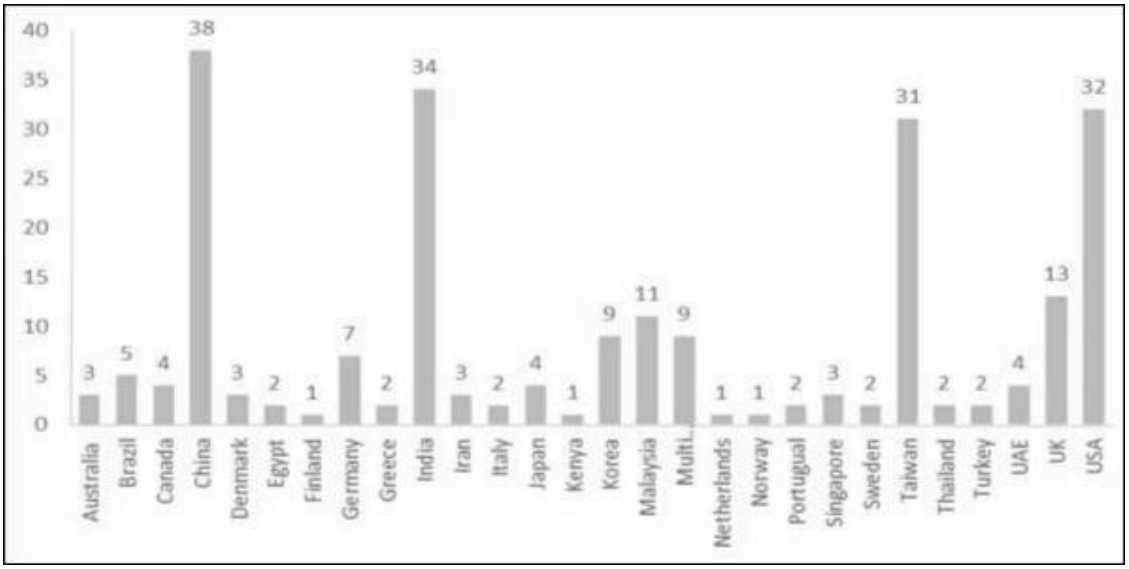

Fig 3- *Implementation of GSCM in different countries*

Papers have been classified on the basis of countries where the practice of GSCM has been implemented. Out of 356, 43 papers were found in which specific area of GSCM implementation was not mentioned. There were 5 papers which covered more than one countries to study the implementation of GSCM. It is clear from the above diagram that china recorded the maximum number of studies of implementation of GSCM followed by India and Taiwan. It might be possible that, because both are fast developing countries and are in the phase of rapid industrialization along with population growth and increasing environmental awareness, therefore they strive to attain development with ecological balance.

Table 1 *- The breakdown by the methodology and focused area*

Focused Area / Methodology	General Paper (GEN)	Performance Management (PM)	Green Practice (GP)	Influencing Factors (IF)	Relationship Management (RM)	TOTAL
Theory	16	4	11	3	11	45
Model	3	17	36	18	8	82
Case	7	8	8	11	12	46
Review	6	15	3	5	8	37
Survey	13	56	46	19	12	146
TOTAL	**45**	**100**	**104**	**56**	**51**	356

Table 1 represents the relationship of methodology to the focus area of study. On the basis of the methodology adopted by the published papers they are classified into five different areas i.e. theory based, case based, survey based, model based, and review based. Theory based includes all those published papers which are only theoretical and conceptual in nature, not presenting empirical study and showing less concern on

practical implication. Case based includes those published materials which are exclusively based on case methods, articles using case just as an example to support the findings of the study have not been considered under the head case study

methodology in this study. Survey oriented articles are the papers which primarily include empirical studies on the basis of questionnaire or interview based data. The outcome of these types of studies often helps in establishing theories on the basis of hypothesis testing.

Phases of green supply chain management

Unlike a traditional supply chain, where the flow of materials and information is lined from one end to other with limited collaboration and sharing of information among partners (Bhateja *et al.* 2011), green supply chain considers all process of the supply chain from extraction of raw materials to the final disposal of goods, wherein each player motivates other players to go green and provides the necessary information, support and guidance. According to Zhu and Sarkis (2004), green supply chain also includes the four areas of traditional supply chain, such as upper and lower flows and the activities occurring within the organization and logistics processes. The practice of GSCM eliminates or minimizes all sorts of waste occurred in supply chain, either at its source or during the process. The practice of green design and green operation which consists of green manufacturing, remanufacturing, reuse and recycle, make the internal supply chain green. While external supply chain which consists of upstream and downstream activities can be green through green distribution, reverse logistics, green procurement and green logistics. Organizations adopting green supply chain practice get benefitted as their overall (environmental, economic and social) performance improves. GSCM can be generally divided into different phases. In the line of GSCM are discussed in the following sub sections.

Green procurement

The term green procurement, first time appeared during 1980s (Dowlatashahi 2000), is integration of environmental management into the purchasing function of any firm (Igarashi *et al.* 2013). Martha and Houston (2010) emphasized the basic purpose of green procurement is to eliminate waste, and purchasing department should focus on value by comprehensively considering the total cost in the process of eliminating waste and waste disposal activities. It strives to ensure that purchased products or materials meet environmental objectives set by purchasing firm that minimizes environmental impact. Thus the ultimate goal of green purchasing is to reduce the source of wastage, promote recycling, reuse and reduce the uses of resources, and substitution of materials.

Preuss (2001) in his paper has introduced the notion of "green multiplier effect". He proclaims that purchasing can be a major agent for enabling environmental initiative in the supply chain. The availability, characteristics, knowledge, ambitions, equipment and actions of the suppliers can have an impact on green purchasing (Knudsen 2003). Many authors have developed different approach individual and integrated to evaluate suppliers and selection (Govindan *et al.* 2013). According to Igarashi *et al.* (2013), the most commonly used multi-criteria decision-making approach is analytical hierarchy process (AHP) and the most commonly considered criteria for green supplier evaluation and selection is environmental management system. Green procurement has a significant role in selecting suppliers. They have identified key dimensions of green supplier selection (GSS). (i) Aligning supplier selection with a firm's overall green strategy. (ii) The role of decision making tools and models in GSS. Researchers had identified major Barriers to the adoption of green procurement; they are inadequate

information between decision takers, lack of common implementation standards and follow ups, real and forecasted cost obstacles, market and technical uncertainties.

In the process of purchasing and procurement, suppliers, purchasing managers, upstream members of the supply chain should work with a common goal to reduce wastage and provide environmentally friendly products. Green procurement often highlights specific attributes such as recycled content, energy efficiency, and waste reduction. It can be treated as pre-steps taken to control the environmental impact. It is like precautionary action taken at the start of the supply chain to check waste rather than taking at the end of the supply chain.

Green design

Conventional design involves an ignorance of environmental effects of producing, inefficient use of energy and the generation of waste at each stage of designing process. Whereas, green design or design for the environment or life cycle design is about designing a product or service in a systematic and structured way that reduces its adverse impact on the environment. It is intended to develop more environmentally amiable products and process. The primary concern of green design is minimizing the damage in the whole designing process (Luthra 2011). It can be achieved by replacing hazardous material and process by one that appears less problematic, bringing ecological balance between man and nature, reducing or minimizing the consumption of material/ energy (Kumar *et al.* 2013). Scope of green design encompasses many different disciplines including environmental risk management, safety of the product, safety of employee health, pollution prevention, conservation of resource and waste management. (Amemba *et al.* 2013)

The central concept of green design is a Life Cycle Analysis (LCA). Life cycle analysis is defined as a process to estimate as well as to judge the environmental, and resource related results of the product through all phases of product life cycle (Gungor and Gupta, 1999). Environmentally related data are generally collected, analyzed, and presented through LCA. Steps involved in LCA are as follows 1) identification of the goals and boundaries of LCA, 2) analysis of inventory to achieve a balance between material and energy in the system, 3) evaluation of the system's impact on the environment, assessment of the most promising system improvements to reduce the negative environmental impact.

Green operations

Green operations incorporate practices that do prioritize health and comfort of the facility's occupants and the protection of the global environment. Green operations involve decisions and actions regarding the control and upkeep of product, environment and equipment Apart from the scope of green design, it is also important to discuss the environmental issues, which are addressed by green design solutions. Green design solution helps to address the following issues: (i) reduction in energy consumption (designing product which is human powered, *Jansen and Stevels*, 2006), (ii) increment in material reuse (leader-follower joint optimization to address green design with material efficiency, *Ji et al.*, 2013); design for reverse logistics to harvest disposable product (*Khor and Udin*, 2013), (iii) reduction in emission, (multi objective optimization to reduce emission of CO2, methanol production (*Taghdisian et al.* 2014).

Environmental management literature reflects that orientation of green operation is a product as well as process related environment practice (Ferguson and

Toktay 2006) with the purpose of reducing the environmental impact of product and supply chain processes on natural resources (Porter and Linde 1995). During the 1990s the green manufacturing relatively a new concept was emerged (Sezen and Cankaya 2013). It is a combination of multidisciplinary approach focused on reducing energy consumption and material used by using green energy, developing and selling green products and employing green process in the business operation (Ferguson and Toktay 2006). Positive correlation between GSCM practices and manufacturing sustainability has been detected in Malaysian firm [8]. Long-term benefit can be achieved after improving the GSCM performance (Xiaoyana 2012). According to Fleischman *et al.* (2000), any firm during its production, operational activities should encompass zero potential safety problems, zero health threats on the operators and product users, zero environmental pollution, waste recycling, and waste disposal to match the set standards of green manufacturing.

Remanufacturing is a process of returning a used product to like-new condition with a warranty to match. Remanufacturing system consists of three phases: collection, remanufacturing process and redistribution. In the collection phase the used products are collected from previous customers. After collecting the used product, it is sent for remanufacturing process with different remanufacturing operations like inspection, cleanin disassembly, component reprocessing, reassembly and testing (Sundin 2006). The remanufactured products are then distributed to reach the target customers (Fleischman *et al.* 2000).

Many of the authors have distinguished remanufacturing and manufacturing on the basis of activities involved in remanufacturing process, which is absent in case of manufacturing, activities are disassembly, cleaning, inspection and sorting. In remanufacturing the quality, quantity and timing of the used products cannot be controlled, whereas it can be controlled in the case of manufacturing (Fleischman and Krikke 2000). It can be inferred that production planning for remanufacturing is a complex task (Sundin 2006). In general remanufacturing is 3 to 5 times more labour intensive. Nevertheless, it has advantages over the manufacturing as the customer has to pay less, the remanufacturing companies earn more since fewer new components are required and the whole process is pro to the environment. That is why remanufacturing is sometimes being referred to as a "win-win-win" situation compared with manufacturing (Seitz and Peattie 2004). In-spite of having advantages, some challenges exist at each phase, i.e. collection, remanufacturing process and distribution of remanufacturing system. The main challenge in remanufacturing is to match the demand and supply of remanufactured goods, which is due to uncertainty in both demand for remanufactured products and supply of remanufacture-able product to the firm.

Performance Measurement of Green Supply Chain Management

Many firms are adopting GSCM policy due to pressure from public, government, competition, and numerous benefits such as cost reduction supplier integration environmental innovation (Rao 2002). Large firms are not only adopting GSCM but also putting pressure over their suppliers (small firms) to go green (Zhu *et al.* 2005). To improve environmental image and gain economic profit, GSCM has become emerging environment practice for manufacturer (Zhu *et al.* 2007). Seeing the importance, it has become obvious to measure the degree of GSCM practice and its contribution to the firm's performance (Zhu *et al.* 2007). The

relationship between environmental and economic performance is positive and significant (Zhu and Sarkis 2004), however direct impact of GSCM on economic performance probably takes longer time to realize (Bowen *et al.* 2001). Firms may have to bear short term economic losses when going for improving their environmental performance but in long term, there is possibility of environmental practices due to competitive pressure and other factors which can lead to fetch positive economic performance (Zhu and Sarkis 2007).

Performance of GSCM should be measured on the basis of some criteria. Zhu *et al.* (2007) in their paper has mentioned that the criteria should recapitulate the overall impact of GSCM. In general, criteria can be divided into following heads. 1) Generation of pollution and waste management, which may include emissions of hazardous gas, water consumption, reducing the volume of residues and lowering pollution levels. 2) Preservation of resources, it may include using fewer natural resources and less energy, decreasing the consumption of hazardous and toxic materials. 3) Economical benefits, it may include reduction in costs material purchasing, fees for water treatment and discharge, penalties for environmental accidents. On the basis of these criteria or such other criteria performance of can be measured for the long term benefit. The ISO 14031 further extension of ISO 14000, is designed for use in environmental performance evaluation with indicators in three key areas: (1) Environmental condition indicators; (2) Operational performance indicators; and (3) Management performance indicators (Zhu *et al.*, 2013).

Performance measurement tools for environmental operations are increasing, but they are not so adequate to entirely evaluate the impact of GSCM. Hervani *et al.* (2005) in their paper has mentioned the following common tools used for measuring the performance. They are Analytical Hierarchy Process (AHP), Activity-Based Costing (ABC), Balanced Scorecard (BSC), Life Cycle Analysis (LCA), Product Stewardship, Design for Environment (DEF), and Data Envelopment Analysis. Some of the tools can be directly applied to aspects of GSCM and performance, and others require adjustments and extensions (Hervani *et al.* 2005). Overall, there is none of the tools are perfect for performance measurement of GSCM. Any of the tools that are to be used for planning, estimation, and management, their practice is greatly rely on agreement across organizations and the ease and accessibility of data and knowledge to apply these tools.

Green Purchasing

Green Purchasing means procurement of raw/finished products and services that have less effect on human health and the environmental condition which when compared with same competeting products and services they fulfill the same purpose. This comparison may include raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and disposal of the product or service. Green purchasing is also defined as environmentally preferred purchasing (EPP), environmentally responsible purchasing, green procurement, affirmative procurement, eco-procurement, and environmentally responsible purchasing. A green product is one which satisfies and fulfills consumers' desire without damaging the environment and contributes towards a more sustainable world. Green purchasing allow a firm/industry to offset financial and environmental risk. Customer demand and pressure for suppliers to go green can

facilitate environmental purchasing activities such as evaluating environmentally friendly products and packaging, reducing packaging material, and performing product environmental design Alternatively, firms/industries now want to involve their suppliers at the basic design stage or to develop a network to pre-qualify suppliers that have responsible environmental management system. Continuous assessments and benchmarking can uplift an organization with their existing process. Green purchasing do bring important benefits as well as advantages for its practitioners.

Green Manufacturing

Green manufacturing is a new tool that can be viewed as a products environmental friend. Green Manufacturing means increasing production efficiency, lowering raw material costs, basic designing, manufacturing, delivering, and disposing products that produce minimum negative effect on environment ie reducing environmental safety expenses in society which are economically viable. Green manufacturing can be termed as an economically-driven, plant-wide and integrated approach to reduce and eliminate all waste associated with the product i.e. design phase, manufacture, use and/or disposal of products and materials. The drivers and barriers of green manufacturing practices in India as seen in Small scale industries differ from those large enterprises due to the fact that small scale industries lack the raw data, resources, technical expertise and experience required to implement green manufacturing initiatives. Studies on green manufacturing topic are very few till date The implementation of Green Manufacturing in INDIAN industries is possible only with the collaborated efforts of government and industry in a strategic way by mitigating the Green Manufacturing barriers. In today's scenario the problem of e-waste is the major issue, green technology is the only solution to this as it is the application of one or more of environmental science, green chemistry, environmental monitoring and electronic devices to monitor, model and conserve the environment. The main goal of Green Manufacturing issustainabilityHowever, there has been few studies which focus the issue of Green Supply Chain Management performance evaluation. The process of Green Manufacturing involves investing in production process improvements rather than control technology, substitute renewable sources for finite ones, employee recycling and the companies must decide whether to make or buy the product. Burk and Goughran (2007) also presented another framework for sustainability to realize green manufacturing. The framework on their study was based on SME manufacturers who achieved ISO 14001 certification. Green manufacturing (GM) is defined in most generic manner as "manufacturing practices that do not harm the environment during any of its journey phases" (Srivastava,2007). It involves green design of products, use of environmental friendly raw materials, eco-friendly packing, distribution, and reuse after end of life of product. It slows the depletion of natural resources and lowers the trash (Foster,2001). GM concepts originated in Germany, but its scope, nature of activities and focus kept changing with respect to time. GM is not restricted to manufacturing alone. One can notice, it has been continuously evolving and has been demanding comprehensive treatments.

The increasing need for achieving higher economic prosperity among firms with least environmental impact has led to the birth of a new manufacturing paradigm of Green Manufacturing (GM). However, the implementation of Green Manufacturing in any industry is not an easy task mainly in

developing and underdeveloped country because of many issues
limited financial and human resources, awareness about environmental aspect of manufacturing, governmental policies, immediate impact on GDP, etc. The implementation of Green Manufacturing is possible only with combined efforts of government and industry in a planned way. So there is a need to understand the role and potential of various drivers helping in the implementation of Green Manufacturing in any industry. The standards to reach green manufacturing include zero potential safety problems, zero health threats on the operators and product users, and zero environmental pollution, waste recycling, and waste disposal during the production process as much as possible (Gao et al. 2009).

Lean Manufacturing

Lean manufacturing, often pronounced as Toyota production system (TPS) in many academic literature, ea started in Toyota Motor Manufacturing Company after the Second World War when many Japanese firms including Toyota were facing with the new challenge of managing production system with limited resources (Liker, 1998; Pavnaskar et al., 2003). Firms that have successfully reduced their internal waste through lean production methods also implement practices for better environmental management. Lean manufacturing is a conceptual work identified in many industrial organizational. Accordingly, the goal of lean manufacturing is to minimize the waste in human effort, inventory maintained, product availability timely to market and manufacturing space to become highly responsive to customer demand while producing quality products in the most efficient and economical manner. Lean manufacturing is a concept which mainly aims at sounder, more productive as well as more effective manufacturing by eliminating all elements of waste in the manufacturing process. Lean manufacturing can be best defined as eliminating waste in a production process (Womak & Jones, 1996). Anything whether process or product which may be tangible and intangible that does not add value to the final product is called waste (Henderson & Larco, 2003).Basically lean manufacturing aims to perform production with zero defects, to reduce costs, so that firm meet customer requests with amount desired, to hold no excess inventories, and to continually make improvements by eliminating waste product. Elimination of the waste elements is one of the most important elements to obtain the maximum outputs with minimum inputs in all processes in production during the lean manufacturing process. Lean Manufacturing aims at delivering sustainable competitive advantage to organizations as a change and improvement strategy it has not been successfully implemented in manufacturing industries at large.

Green Marketing

The concept of green marketing has now become important in the last few decades due to dramatic increase in environmental awareness worldwide. Green marketing practices as such till date has not received much attention what they deserve, there are several studies on green marketing that indicates both the importance of examining actions/doings and the social complexity involved in accomplishing green marketing. Though green marketing is a more fluctuating issue in the western countries, the emerging economies in Asian countries is not left too far behind. A good green consumer can be defined as one who avoids any such product which may harm or damage to any living organism, cause deterioration on the environment during process of manufacturing or during process of usage, and consume a large amount of non-renewable energy. Green products can be

used for a number of reasons, including being manufactured through a green way or products when used make for a greener way of life (Mohanasundaram, 2012) .The dramatic growth of new green industries indicated the positive attention by the consumers. There are many evidences that various types of companies are now switching to adopt green philosophies such as traditional manufacturing companies become more profitable after transforming to green manufacturing system .

Conclusion

Cost and complexity are considered as the biggest barriers for implementing Green SCM, which focuses the need for cost effective way with easy to implement solutions .Through this paper an overview of green supply chain management has been focused. The conclusion is based on the literature survey done on GSCM which provides us to better understand the GSCM with few surveys. To meet desired result many papers were collected year wise, country wise, and methods wise. From number of papers collected which were published in last few years indicates that there is a rising interest and concern of going green issues among researchers. This study gives us the view of past and present research trend of the study on GSCM.Recycling of raw materials and component parts are the top main green manufacturing and production focused initiatives. Adopting green practices is highest in those areas of the supply chain where there is a direct relation between cost savings and efficiency, for example in inventory reduction, recycling of raw materials. Many existing studies on the topic of green supply chain management have solely examined issues pertaining to barriers to green SCM in the Indian context.Green design is an important process in the supply chain management as it has the advantage over other similiar processes because it is closest to product conceptualization among all supply chain processes. Finally, comparisons of emerging studies in many countries likeIndia, China and Brazil can be used in a cross national synthesis of studies that examine sustainability and implementation issues in those contexts.

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