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Investigating Barriers in Green Supply Chain Management

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Abstract

The Green Supply Chain Management (GSCM) has emerged in today's scenario in response to the growing concern of environmental sustainability. Green Supply Chain is a term that has its importance in the entire supply chain starting from the designing of the product to raw material procurement to manufacturing of the product to distribution and until the end-of-life of the product. Its main aim is to minimize the negative impact of the supply chain activities and also to maximize the efficiency of resources along with reduction of the waste generation. There are a number of challenges in implementing green practices in the organization, which include the need for cooperation, collaboration and coordination among the partners of supply chain and also the need to identify the cost-effective green practices and technologies. There are a number of strategies which have been proposed to address the challenges faced. These include packaging which is eco-friendly, the concept of reverse logistics etc. The organizations which adopt the green supply chain practices in their organizations, gain various types of benefits from it. These benefits include savings in the costs as there is reduction in the consumption and also waste generation. The brand image of the organization is enhanced by the adoption of green practices and there is increase in the customer loyalty etc. Companies which use green supply chain management in their supply chain include Johnson and Johnson, Ford, Adidas, Nestle, Coca-Cola, Tesla etc. The adoption of green supply chain management (GSCM) faces multiple challenges including financial barriers, lack of awareness and supplier engagement, and regulatory complexity, while cultural resistance and technological limitations also impede its implementation. Success relies on top management support and overcoming these hurdles to develop sustainable practices across the entire supply chain.

Keywords: eco-friendly, sustainable, reduction in wastes and costs, pollution.

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Introduction

The term sustainable or green supply chain refers to the process of incorporating the eco-friendly processes into the conventional supply chain. Rather than mitigating harmful impact of business and supply chain operations, green supply chain includes the value addition and/or value creation through the operations of whole chain. Reduction in air pollution, water pollution, land pollution and waste pollution can be considered as the main aim or goal of green supply chain, while the firms' operations can be enhanced through green operations in terms of reducing waste manufacturing, reusing, and recycling of products, reducing the costs of manufacturing, improving

the assets' efficiency, building positive image and improving the satisfaction of the customers. (Yan, L., & Xia, L. H. (2011, March). Study on performance measurement for green supply chain management. In 2011 IEEE International Conference on Cyber Technology in Automation, Control, and Intelligent Systems (pp. 293-297). IEEE.), (Perotti, S., Zorzini, M., Cagno, E., & Micheli, G. J. (2012). Green supply chain practices and company performance: the case of 3PLs in Italy. International Journal of Physical Distribution & Logistics Management, 42(7), 640-672.), (Zhu, Q., Sarkis, J., & Lai, K. H. (2011). An institutional theoretic investigation on the links between internationalization of Chinese manufacturers and their environmental supply chain management. Resources, Conservation and Recycling, 55(6), 623-630.), (Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. Management Research Review, 33(4), 380-392.), (Holt, D., & Ghobadian, A. (2009). An empirical study of green supply chain management practices amongst UK

manufacturers. *Journal of manufacturing technology management*, 20(7), 933-956.).

Aim

The aim of this study is to look into the barriers which the organizations or businesses face while implementing green supply chain practices in their organizations. To see the measures which can be taken to educate the people about the concept of green supply chain management.

Barriers in Implementing Green Supply Chain

- a) **Costs and Investments** – Although the investments made in the implementation of the green supply chain is a one-time investment, still its costs are a little high. The companies find it difficult to bear its costs.
- b) **Lack of awareness and education** – There is lack of awareness among individuals and organizations. There is less education regarding the term green supply chain management.
- c) **Supplier relations** – There should be good relations with the suppliers. Not being on good terms with the suppliers can be a major barrier in implementing green supply chain management in organizations.
- d) **Technology Integration** – The integration of the latest technology in the supply chain is a very important factor in implementing green supply chain. Hence, the integration of technology can be a factor which can be a barrier in implementing green supply chain.

Literature Review

The investigation of barriers in supply chain management involves identifying and understanding the obstacles that can hinder the smooth flow of goods, services, and information across the entire supply chain. Key barriers can be categorized into various dimensions, including operational, technological, organizational, and environmental factors. Operational barriers may include inefficiencies in processes, lack of coordination, and inadequate infrastructure. Technological barriers involve challenges related to outdated systems, insufficient integration, and cyber security risks. Organizational barriers encompass issues such as poor communication, conflicting interests among stakeholders, and a lack of collaboration. Environmental barriers relate to external factors like economic uncertainties, geopolitical events, and natural disasters that can disrupt the supply chain. Investigating these barriers is crucial for organizations to develop effective strategies and solutions to enhance supply chain resilience and performance.

It was concluded from this study that the management of the internal environment is necessary for the development of the Green Supply Chain Management programs in China. (Yan, L., & Xia, L. H. 2011, March). Study on performance measurement for green supply chain management. There is limited adoption of the Green supply chain practices among the providers of the 3PLs. (Perotti, S., Zorzini, M., Cagno, E., & Micheli, G. J. 2012). Green supply chain

practices and company performance: the case of 3PLs in Italy. It was found that the large Japanese companies have made considerable improvements in the financial and environmental performance. (Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. 2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. The green supply chain management practices among the manufacturers of UK are focusing on the internal higher risk and descriptive activities. (Holt, D., & Ghobadian, A. 2009). An empirical study of green supply chain management practices amongst UK manufacturers.

Objectives

- To understand the concept of green supply chain management and also understand the problems faced in implementing green practices in the organizations.
- To study and learn about the companies that have implemented green practices in their supply chain.
- To understand the impact of using green practices on the environment.

Methodology

Research type: Qualitative research.

Research design: The study is partially of descriptive nature and partially analytical. The study is done by using both primary and secondary data.

Sampling area: The area in Lucknow was the area where the study was conducted.

Sample size: 200

Tools for data collection: The data was collected through the use of questionnaire survey which included 10 questions prepared for collecting data.

Data collection methodology:

- a) **Primary data collection:** The data was collected by preparing a questionnaire and it was collected from the people.
- b) **Secondary data collection:** The data was collected from different sources such as books, internet sources etc.

Data Analysis:

A set of 10 questions were prepared. Apart from these, the questions also included the name, occupation etc. of the participant.

1. Demographic data

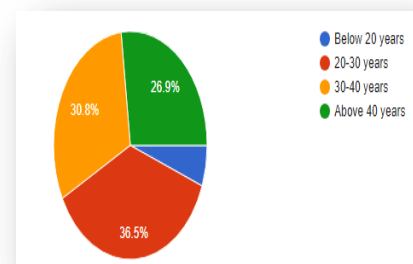


Figure 1 – Demographics

The maximum number of people who took part in the

survey were in the age group of **20-30 years**, which accounts for **36.5%**.

2. The familiarity of the people with the concept of green supply chain management.

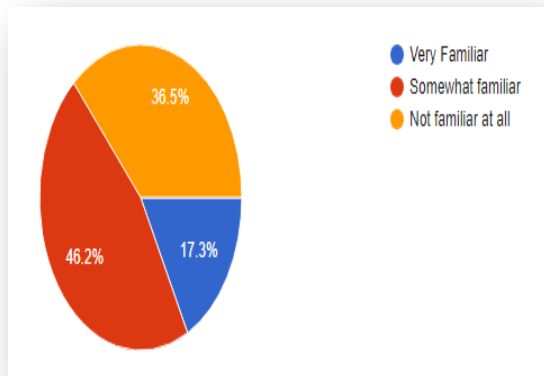


Figure 2 – Familiarity of People with The Concept

The maximum number of people who took part in the survey were “**somewhat familiar**” with the concept of green supply chain management (**46.2%**). This signifies that it is very important to make people aware of this concept by arranging for campaigns to educate people about this concept. In the coming period, green supply chain management will gain a lot of importance.

3. Views on if it is correct to implement green practices in an organization.

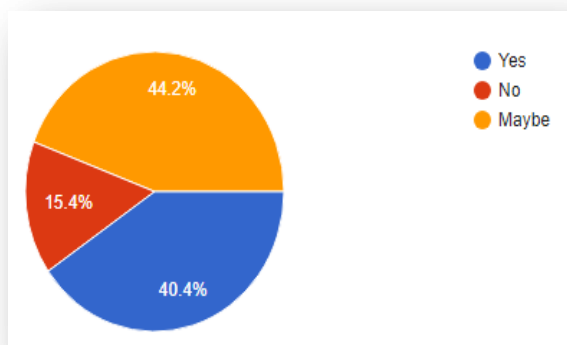


Figure 3 – Views of People on Green Practices in an Organization

44.2% of the people said that it maybe or may not be right to implement green practices in an organization. This is because of the lack of awareness about the concept of green supply chain management. Although, we know that it is right to implement green practices in an organization, still most of the people are not sure about it.

4. Reasons to incorporate green supply chain practices in an organization.

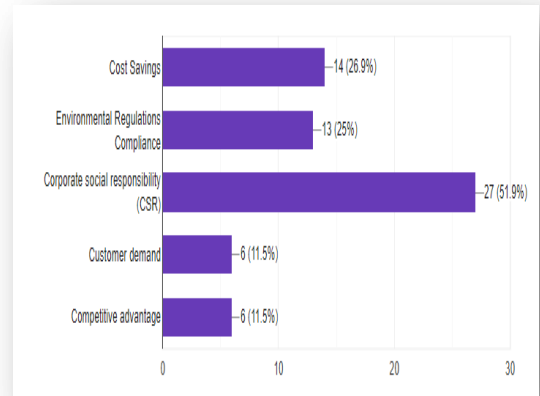


Figure 4 – Reasons to Incorporate Green Supply Chain

27 people, who account for **51.9%** of the people who participated in the survey, believe that the green supply chain practices **should be incorporated in an organization** because it is a Corporate Social Responsibility (CSR). Apart from that, it will also result in cost savings in an organization.

5. Challenges faces by the organizations in implementing green practices.

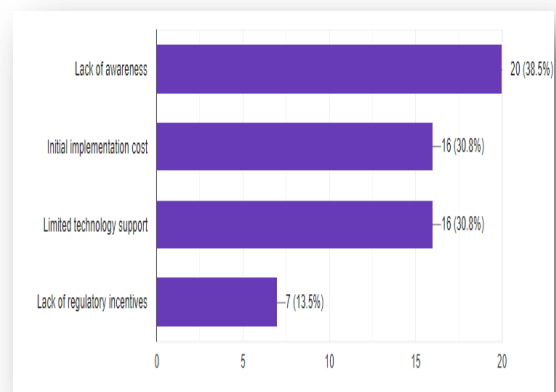


Figure 5 – Challenges Faced in Implementing Green Practices

Out of the **52 people** who participated in the survey, **20 people (38.5%)** believe that it is because of the **lack of awareness** that organizations are facing problems in implementing green practices in the organizations. The people should be educated and made aware about his concept as it is now becoming a very important practice for the environment.

6. The main aim or goal of green supply chain management.

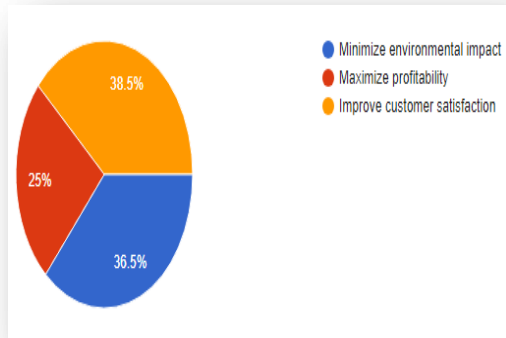


Figure 6 – Aim of Green Supply Chain Management

According to the people taking part in the survey, **38.5%** believe that the main goal of green supply chain management is to **improve customer satisfaction**. In addition, it also contributes to the environment. It has a positive impact on the environment.

7. Benefits of implementing green supply chain management practices.

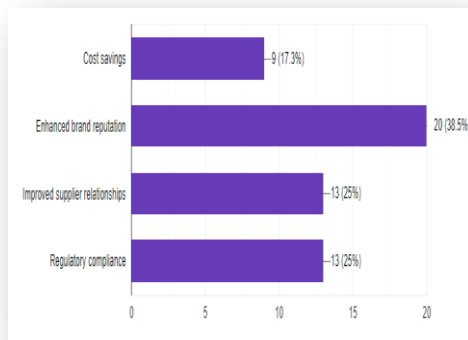


Figure 7 – Benefits of Implementing Green SCM

20 people (38.5%) out of 52 people believe that if an organization implements green supply chain management, **it will improve their brand reputation**. In addition, it is also important as it contributes to the regulatory compliance and in improving the supplier relationships.

8. Initiatives which are effective in promoting the green supply chain management practices.

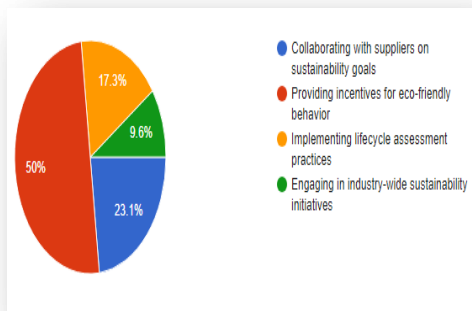


Figure 8 – Initiatives for Promoting Green SCM

50% of the people which means 26 people say that **providing incentives for eco-friendly behaviour would be the most effective in promoting green supply chain management**. Apart from that, collaborating with suppliers on the sustainability goals is also effective in promoting the green supply chain management practices.

9. The contribution of green supply chain management in achieving environmental sustainability.

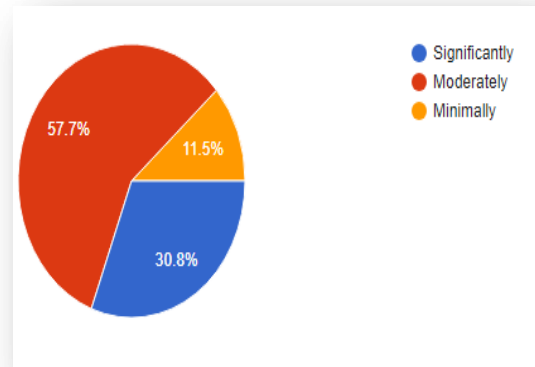


Figure 9 – Contribution of Green SCM to the Environment

Majority people (57.7%) believe that the green supply chain management **contribute moderately** to achieving environmental sustainability. Thus, we can achieve environmental sustainability by implementing green supply chain management practices.

10. The technologies which play a significant role in enabling green supply chain practices.

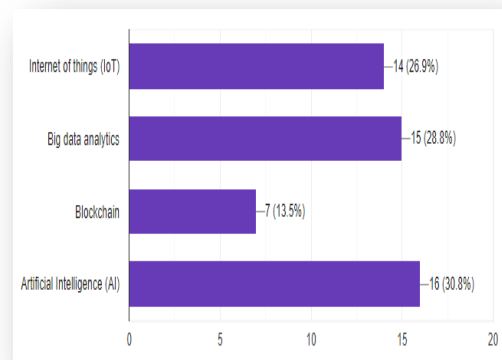


Figure 10 – Technologies in Enabling Green Supply Chain

According to 16 people (30.8%), **Artificial Intelligence (AI)** plays a significant role in enabling green supply chain practices. Apart from AI, the other technologies include **Internet of things (IoT)**, **big data analytics** and **block chain**.

Findings

Here are some key findings on the topic:

- **Financial Barriers:** One of the most common barriers is the cost associated with implementing

green initiatives. Investments in new technologies, equipment, and processes can be significant, and the return on investment may take time to realize.

- **Lack of Awareness and Knowledge:** Organizations may not have sufficient knowledge about GSCM practices or may not be aware of the potential benefits. This lack of awareness can hinder their ability to develop and implement effective green strategies.
- **Organizational Resistance to Change:** Resistance to change within an organization can impede the adoption of GSCM practices. Employees and management may be hesitant to alter established processes and practices.
- **Supply Chain Complexity:** Green supply chain management often requires collaboration across the entire supply chain, including suppliers, manufacturers, distributors, and customers. This complexity can pose challenges in terms of coordination and communication.
- **Regulatory and Legal Challenges:** Varying regulations and standards across different regions can create challenges for organizations operating in multiple jurisdictions. Compliance with these regulations can be a barrier to implementing consistent green practices.
- **Lack of Supplier Engagement:** Achieving sustainability goals requires the active participation of suppliers. Some suppliers may not be willing or able to adopt green practices, which can pose a barrier to the overall success of GSCM.
- **Technological Limitations:** The availability of appropriate technologies to support GSCM may be limited, particularly in certain industries. This can hinder the adoption of green practices.
- **Performance Measurement Challenges:** Measuring the performance of GSCM initiatives can be challenging due to the lack of standardized metrics and the difficulty of quantifying environmental benefits.
- **Cultural and Behavioral Barriers:** Organizational culture and employee behavior may not be aligned with sustainability goals. Changing mindsets and creating a culture of sustainability can be a significant challenge.
- **Supply Chain Disruptions:** External factors such as natural disasters, political instability, and market fluctuations can disrupt the supply chain and pose challenges to maintaining green practices.
- **Limited Support from Top Management:** Without strong commitment and support from top management, it can be difficult for organizations to prioritize and invest in GSCM initiatives.

Conclusion

With the help of the survey conducted through the questionnaire, it can be concluded that the people are not

fully aware of the concept of green supply chain management practices. There should be proper measures taken to make the people aware. This is important because by implementing green practices in the organizations, we can save the environment from the harmful practices being done. Green practices will not only help in not depleting the environment but also it will increase the brand image of the organization and contribute to Corporate Social Responsibility (CSR).

The GSCM practices have occupied considerable attention due to the gradually growing environmental concerns among the people. The companies have started understanding how important it is to implement and integrate the eco-friendly practices into their supply chain operations which can contribute in reducing the carbon footprint and also increasing the efficiency.

The implication of green supply chain management can have positive impacts like

- Reduction in the negative environmental impact
- Savings in the cost
- Improvements in the efficiency
- Mitigating the risk
- Improvement in the brand reputation

It can be finally concluded that the implementation and integration of the green supply chain practices does not only result in regulatory compliance, but it can also be regarded as a business strategy. Companies that give priority to the GSCM practices, have greater chances of long run sustainability.

Limitations and Challenges

- **Limited Data Availability:** Depending on the scope of your investigation, finding comprehensive data on green supply chain practices and associated barriers may be challenging. This could restrict the depth of your analysis or require you to rely on secondary data sources, which might not fully capture the nuances of the topic.
- **Industry Specificity:** Barriers to green supply chain management can vary significantly across industries. Focusing on one specific industry might provide rich insights, but it could limit the generalizability of your findings to other sectors.
- **Geographical Variations:** The challenges faced in implementing green supply chain practices can also differ based on geographical location due to variations in regulations, infrastructure, and market dynamics. Not accounting for these differences could limit the applicability of your research findings.
- **Subjectivity in Barrier Identification:** Identifying and categorizing barriers in green supply chain management can be subjective, as perceptions of what constitutes a barrier may vary among stakeholders. Ensuring robust methodologies for barrier identification and validation can help mitigate this limitation.
- **Dynamic Nature of Green Practices:** Green supply chain management practices and associated barriers

are constantly evolving due to changes in technology, regulations, and consumer preferences. Your research findings may represent a snapshot of the current landscape, but they might become outdated relatively quickly.

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Conflict of Interest

Authors are declared that no conflict of interest.

Author Contribution

All author are contributed equally

Inform Consent and Ethical Considerations

Not Required

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