FACTORS INFLUENCING GREEN SUPPLY CHAIN PRACTICES IN THE INDIAN AUTOMOTIVE INDUSTRY

#1Dr. D.N.V.Krishna Reddy, Associate Professor,
#2D.Naga Teja, Assistant Professor,
Department of MBA
SAISPURTHI INSTITUTE OF TECHNOLOGY, SATHUPALLI, KHAMMAM.

ABSTRACT: Automakers are adopting a new management technique known as "green supply chain management" (GSCM) to enhance their economic competitiveness while minimizing their environmental impact. The study examines the use of environmentally sustainable supply chain management solutions within India's automobile industry. The global business environment is characterized by ambiguity and significant volatility. Supply chain management must effectively address the challenges posed by environmental contamination and industrial development in response to the escalating environmental concerns. Consequently, Green Supply Chain Management (GSCM) is becoming increasingly important for industrial firms seeking to improve their performance in multiple areas, such as the environment and economy. GSCM has launched a parallel program to encourage the use of eco-friendly products in response to the increasing environmental concerns of organizations. The objective of the article is to examine the factors that impact the implementation of environmentally-friendly supply chain management practices in the automobile industry in India.

Keywords: GSCM, Green Business, Global Business Environment, Environmental Issues.

1. INTRODUCTION

Due to the depletion of natural resources, the worsening of the environment, consumer awareness, social media, and strict environmental regulations, academics are studying green supply chain management. Supplies are acquired, assembled, manufactured, and distributed to consumers through a distribution network and facilities (Borade et al. 2008).Supply chain management covers all suppliers and consumers, not just one company. The supply chain includes all actions and information flows that transfer and convert products from raw materials to consumers. Information and commodities move through the supply chain.Handfield and Nichols (1999) page 2.Gilbert (2000) defines green supply chain management as integrating environmental factors into conventional supply chain management. Godfrey (1998) mentioned It involves supply chain-wide environmental performance improvement methods. Hsu et al. (2008) define green supply chain management as modernizing industrial processes and products to comply with environmental requirements to improve environmental performance. According to

Srivastava (2007). GSCM incorporates environmental issues into SCM, including product design, material procurement, manufacturing, customer delivery, and end-of-life management. Environmental supply chain management (GSCM) combines environmental issues into procurement, shipping, manufacturing, distribution, disposal, and reuse/recycling.

As Dubey and Gunasekaran say "The green supply chain management (GSCM) is an organization philosophy which can provide competitive advantage to the organization in terms of high product quality, high service quality, minimum wastes, zero pollution, better image, and high return on investment." As one of the largest manufacturing sectors, the auto industry affects society and the environment. Millions depend on cars, but they harm the environment. The automotive industry has taken steps to improve its economy in response to stakeholder demands for a competitive edge, government requirements, customer pressure, and environmental and social implications. In recent years, automakers have been under pressure to go green. A literature study suggests that green supply chain management

(GSCM) strategies may help firms improve their environmental, economic, and operational performance. This study examines the relationship between GSCM practices and performance in Indian organizations that have implemented or plan to use GSCM. The test results show that GSCM procedures vary by organization performance. This suggests that organisations are ignoring the link between GSCM processes and performance.

2. LITERATURE REVIEW

Mitra et al. (2014) surveyed Indian manufacturing enterprises to assess their use of Green Supply Chain Management (GSCM) methods. The data revealed that Indian firms are still in the early stages of implementing GSCM processes. Furthermore, there has been a major decrease in customer focus on environmental sustainability, and India's legislative structure is insufficient to promote environmental sustainability. Collaboration with suppliers is vital for ecologically sustainable product design and logistics, as it improves economic performance and competitiveness. Mohanty et al. (2014) conducted an empirical study on green supply chain management (GSCM) practices in micro, little, and medium-sized enterprises (MSMEs) in India. The study looked precisely at the impact of external and internal factors on these practices. MSMEs in India are forced to embrace Green Supply Chain Management (GSCM) techniques due to internal considerations such as on-the-job training.

Furthermore, research has shown that internal forces entirely govern external elements as well as the implementation of Green Supply Chain Management (GSCM). Mohanty et al. (2014) conducted research on green supply chain management (GSCM) practices in India's Micro, Small, and Medium Enterprises. They employed Structural Equation Modelling (SEM) to see if the greening rankings accurately measured a widely used framework called GSCM. They also explored whether external and internal stakeholder pressures have an impact on GSCM practices, while taking into consideration differences in MSME types and the nature of the industries in

which they operate. Luthra et al. (2015) evaluated the major factors that contribute to environmental sustainability in India's automobile supply chain. A factor analysis was conducted to identify six key success factors (CSFs) for successfully implementing green supply chain management (GSCM) techniques to improve sustainability. In addition, four performance metrics were created to evaluate the overall effectiveness of GSCM practice implementation. The interpretive ranking way (IRP) modeling approach is used to assess the contextual relationships between critical success factors (CSFs) and award a score based on overall performance criteria. Mathiyazhagan et al.'s (2014) study aims to identify the elements that influence the adoption of Green Supply Chain Management (GSCM). After undertaking a thorough literature analysis, they discovered 65 pressures. Using the Analytic Hierarchy Process (AHP), these forces were divided into six categories: government policies and regulations (GPR), global competitiveness (GC), customer (C), external factors (EFs), financial factors (FFs), and production and operational factors.

The implementation of GSCM in industries is a critical procedure that requires collaboration at all levels of the workforce, from employees to senior executives. Geng et al. (2017) investigated the manufacturing sector in Asian Emerging Economies (AEE), which included China, Taiwan, India, Malaysia, Indonesia, Thailand, and South Korea. Their goal was to study the relationship between green supply chain management and firm performance. They gathered empirical data via a rigorous literature review. Their studies showed that implementing GSCM approaches improves performance in four critical domains: economic, environmental, operational, and social performance. Factors such as industry type, business size, ISO certification, and export orientation all influence the relationship between GSCM procedures and performance. Laosirihongthong et al. (2013) investigated the deployment of proactive and reactive green supply chain management (GSCM) systems and evaluated their influence on environmental, economic, and intangible performance, using business strategy as the organizational priority.

Their research involved gathering data from 190 Thai firms that were ISO 14001 certified.

Corporations frequently use reactive measures, such as legal threats and regulations, to improve their environmental, economic, and intangible performance.Passive techniques, such as reverse logistics, have little flexibility and do not considerably improve the efficiency of the Green Supply Chain Management (GSCM) system. Mangla et al. (2015) argue that Green Supply Chain Management (GSCM) has the potential to improve the sector's environmental performance by reducing resource consumption and encouraging sustainable production. Because of the inherent risks associated with managing a green supply chain, the efficacy of Green Supply Chain Management (GSCM) is limited. This article tries to identify and prioritize GSC (Global Supply Chain) hazards, allowing the industry to focus on the most significant risks and build appropriate strategies.Singhatel's (2014) study used the Analytic Hierarchy Process (AHP) to validate a scale with many components. The goal of this scale was to identify the characteristics and variables that influence the adoption of green management practices in India's Micro, Small, and Medium Enterprises (MSME) sector.

Green management is linked to several aspects of product design, process design, technology, packaging materials, and design. Vijayvargy et al. (2017) explored the relationship between organization size, adoption of Green Supply Chain Management methods in the Indian industry, and their impact on organizational performance.A pre-tested structured questionnaire was used to investigate the adoption of Green Supply Chain Management (GSCM) practices by businesses of all sizes, including small, medium, and large enterprises. According to their findings, Indian businesses have successfully implemented most environmental practices, with the exception of ISO 14001 and Tier - II supplier evaluation. In addition to 21 practices, medium-sized businesses have adopted the majority of large-sized enterprises' practices, with the exception of environmental management systems, assistance from middle and upper management, and supplier

evaluation for environmental practice.

Yu et al. (2017) developed a theoretical framework linking green supply chain management to performance. They conducted an empirical study to validate this paradigm and discovered that individuals who engage in green purchasing and supplier selection have a significant beneficial impact on green supplier collaboration. This partnership, in turn, has a considerable and positive impact on both environmental and operational outcomes. Muduli et al. (2016) investigated the use of ecologically friendly practices in three mining sectors. The findings revealed that large-scale firms have successfully integrated green supply chain management, whereas small-scale industries have obstacles in doing so. They also push for legislative changes targeted at reducing barriers to green supply chain management and increasing the efficiency of the mining industry, particularly smaller firms. Green et al. (2012) conducted a study to investigate how the application of GSCM techniques influences organizational performance. Furthermore, they create a model that integrates Green Supply Chain Management (GSCM) approaches and connects manufacturers, suppliers, and customers. To improve supply chain sustainability, data was collected from 159 manufacturing managers on the level of collaboration between their organization and suppliers/customers. This data was then evaluated using the structural equation modeling (SEM) method. Research has shown that adopting Green Supply Chain Management (GSCM) methods by industrial organizations improves both their economic and environmental performance, hence positively improving their operational performance.In their paper,

Ambekaratel (2018) proposes a framework for developing a low carbon culture with the goal of reaching justifiable carbon capabilities. This framework includes numerous aspects, such as freedom or control, both externally and internally within the competing values framework (CVF), as well as the level of carbon emissions (LCE). Based on a review of the literature, they suggest this model. The new carbon culture classification

now includes the following categories: "Red," "Antagonist," "Obligatory," "Early Adopter," "Follower," "Transitive," "Pragmatist," and "Green." These categories help to find the most effective methods for lowering carbon emissions. Choi et al. (2015) explore the effects of Green Supply Chain Management (GSCM) practices on business performance, using collaborative capacities as a moderator.

Their study used hierarchical regression to investigate data from 230 manufacturing units in South Korea, and it found that implementing GSCM practices can improve the organization's financial and environmental performance. Firms can expect improved financial performance if they include their partners in the Green Supply Chain Management (GSCM) implementation process. Srivastava (2007) developed a classification system for green supply chain management to address the needs of regulatory agencies, academics, researchers, and practitioners seeking a comprehensive framework. This classification is based on the problem context, methodology, and approach employed in the green supply chain, with a focus on the reverse logistics element. It also provides a chronological depiction of pertinent scientific articles. Luthra et al. (2011) present a thorough methodology for identifying the barriers to adopting environmentally friendly supply chain management strategies in the Indian automobile industry.

The researchers used MICMAC analysis to classify and the ISM technique to identify contextual links between major barriers to implementing Green Supply Chain Management (GSCM) in the Indian automobile industry. A review of the literature and interviews with business and academic experts discovered 11 barriers to Green Supply Chain Management (GSCM). These barriers are composed of five dependent variables: market competition and uncertainty, the absence of green practices, cost consequences, and consumer and supplier resistance to change. In addition, there are three driver variables: a lack of government support mechanisms, senior management commitment, and IT implementation.

Finally, three links contribute to these hurdles.

There are no independent variables involved. Four hurdles are recognized as both top-level and bottom-level challenges, and techniques for overcoming them are explored. There are four major barriers that have been identified: (1) Market competition and uncertainty; (2) Inadequate implementation of green practices; (3) Cost implications; and (4) Customer unawareness. Among these, the absence of government assistance systems is regarded as the most significant barrier at the bottom. Eliminating these barriers will speed up the implementation of GSCM in the Indian automobile sector. Kumar Atel (2012). An analysis was done to look into the relationship between Green Supply Chain Management (GSCM) practices and environmental performance in India's electrical and electronics product manufacturing industry. This analysis included a literature review, in-depth interviews, and a questionnaire survey. It was discovered that eco procurement, eco accounting, eco logistics design, eco product design, and eco manufacturing are common practices in the industry.

Sen (2009) investigates global warming and its negative implications, concluding that GSCM (Green Supply Chain Management) is the most efficient strategy to mitigating pollution and waste caused by inefficient resource use and industrial practices. Enterprises operating in emerging markets such as India place a strong priority on avoiding resource waste and mitigating the negative environmental impacts of their products and operations throughout their life cycle. Their findings show that Green Supply Chain Management (GSCM) and business performance aren't mutually exclusive. GSCM promotes extraordinary shareholder value while simultaneously contributing positively to Corporate Social Responsibility (CSR). Kushwaha (2010) investigates the primary variables that inspire businesses to participate in environmentally friendly projects.

These considerations include compliance with government rules, return on investment (ROI), reverse logistics implementation, supply chain efficiency improvement, and a general feeling of business responsibility. Understanding these

drivers can assist businesses in making educated strategic decisions about the adoption of green practices. While carrying out design operations and controlling the supply chain. Indian businesses are lacking in these areas. According to Wang (2014), the successful implementation of GSCM is dependent on the formation of partnerships. The lack of corporate social responsibility (CSR) linkages in the eco-friendly supply chain would exacerbate the problem. In order to enhance the relationship in GSCM, they have prioritized partner selection based on corporate social responsibility criteria. The researchers discovered that the level of satisfaction with corporate social responsibility (CSR) influences the selection of an acceptable partner. Major corporations are more inclined to select companies with a high level of accountability in the green supply chain. Effective collaboration enables corporations to achieve their societal commitments. It supports the cultivation of harmonious relationships, the selection of mates, and the performance of societal tasks.

RESEARCH OBJECTIVES

1. To identify the factors affecting green supply chain management initiatives In India

3. RESEARCH METHODOLOGY

A survey questionnaire for measuring of greening of the supply chain was implemented which was pilot tested with 50 respondents working in diverse automotive industry having grasp of SCM methods. Data were acquired via questionnaires for identifying variables of GSCM . The responders have to agree on a scale ranging from 1 to 5. 120 questionnaires were collected from respondents and factor analysis was carried out and we found 5 components explaining 87.22% variation. Cronbach's Alpha was found to be .870

Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.835
Bartlett's Test of Sphericity	Approx. Chi-Square	1544.438
	df	78
	Sig.	.000

Table1KMO and Bartlett's Test

The KMO and Bartlett's Test for sampling adequacy yielded a value of.835, which is both statistically significant and close to one.True factor analysis requires a substantial p-value, which indicates a sufficiently robust statistical link between the variables. For factor analysis, the data are suitable. With Eigen values larger than one, the five components account for 82% of the variance.

Table2 Rotated Component Matrix^a

	Component				
	1	2	3	4	5
IG1	.769				
IG2	.899				
IG3	.876				
CG1		.844			
CG2		.924			
CG3		.671			
EG1			.685		
EG2			.603		
CI1				.544	
CI2				.860	
RL1	.				.961
RL2					.741
RL3					.919

Extraction Method: The rotation method of Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

The table above shows the association between the variables and the extracted factors. Five variables were determined by applying the rotation matrix. The five factors are identified as follows: reverse logistics, inbound greening, compliance greening, ecological greening, and outgoing greening. As mentioned, outbound greening concentrates on recycling internal waste and informing customers about environmentally friendly products through a range of sales and marketing channels. Processes that use environmentally friendly raw materials to cut pollution and adhere to emission laws are known as compliance greening. Inbound greening is described as the process of choosing suppliers based on environmental factors in order to reuse trash from other industries. The cost-effective recovery and remanufacturing of end-of-life products is included in reverse logistics greening.

4. CONCLUSION

Greening is a common marketing tactic used by businesses, despite its historical association with environmental movements. It is becoming

increasingly important to apply greening concepts to all aspects of the supply chain, including sourcing, purchasing, manufacturing, and distributing green products to customers through the use of green technologies. The study found five essential factors: eco-greening, compliance greening, inbound greening, outgoing greening, and reverse logistics. The goal of GSCM is to promote efficiency, which is why organizations that use its principles aim to use resources more efficiently. It is a comprehensive approach that enhances both economic and environmental effectiveness.

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