A STUDY ON IMPACT OF GREEN SUPPLY CHAIN PRACTICES IN SUPPLY CHAIN MANAGEMENT WITH REFERENCES TO MANUFACTURING SECTOR IN BENGALURU

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Abstract:

Bengaluru, known as the Silicon Valley of India, has not only witnessed rapid urbanization but also substantial industrial growth, particularly in the manufacturing sector. This sector, comprising diverse industries such as automotive, textiles, pharmaceuticals, electronics, machinery, chemicals, food processing, and renewable energy, has become a key driver of the city's economy. However, this growth has come with its own set of environmental challenges, including pollution, resource depletion, and ecological degradation. In response to these challenges, manufacturing companies in Bengaluru have been increasingly adopting green supply chain practices aimed at reducing their environmental footprint and promoting sustainability. This research study delves into the multifaceted world of green supply chain practices within Bengaluru's manufacturing sector. It aims to comprehensively analyze the impact, challenges, and opportunities presented by the integration of environmentally responsible practices into supply chain management. Through a combination of secondary data analysis and primary data collection via surveys and interviews, this study seeks to uncover the current state of green supply chain practices in the city's manufacturing sector.

Keywords: *Manufacturing Sector, Green Supply Chain Practices, Sustainability, Environmental Impact, Urbanization, Technology-driven, Eco-friendly, Policy, Industrial Growth, Resource Depletion, Pollution, Sustainable Practices.*

Introduction:

Bengaluru's diverse manufacturing sector, spanning automobiles, textiles, pharmaceuticals, electronics, machinery, and more has played a pivotal role in the city's economic growth. However, this growth has brought environmental challenges including pollution and ecological degradation. To mitigate these issues, manufacturing companies in Bengaluru are exploring green supply chain practices which encompass sustainable product creation, reduced carbon

emissions in transportation and improved waste management. Green leadership signifies a fundamental shift toward responsible business practices. The motivation for embracing these practices stems from a sense of environmental and social responsibility, increasing consumer demand for eco-friendly products and a commitment to reducing environmental impact. This research delves into the realm of green supply chain practices in Bengaluru's manufacturing sector examining their impact, challenges and opportunities. It explores how industry stakeholders are balancing growth with environmental preservation, reshaping manufacturing in a sustainable urban landscape where tech innovation and eco-consciousness intersect.

Review of Literature:

Sirish Kumar Gowda and Hartha Saranga (2018) empirically studied the impact of sustainability practices on supply chain risk using primary data from six manufacturing sectors across 21 countries including both developed and emerging markets. Their findings revealed that risk mitigation strategies don't consistently reduce actual supply chain risk for firms but sustainability efforts to help mitigate supply chain risk particularly in emerging markets.

Hassan Younis, Balan Sundarakani, and Barry O'Mahony (2020) conducted research on the relationship between green supply chain management (GSCM) practices and corporate performance (CP). The study utilized a mixed methods research design and discovered that the lack of impact of GSCM practices on various CP dimensions is often attributed to implementation issues.

Abhijeet Digalwar, Rakesh D. Raut, Vinay S. Yadav et al. (2020) evaluated critical criteria influencing the successful implementation of sustainable supply chain practices (SSCP) in lean-agile manufacturing firms. They conducted a systematic literature review and collected data from 16 experts employing interpretive structural modeling (ISM) and analytic network process (ANP) for analysis.

C. Ganeshkumar and G. Madan Mohan (2015) conceptualized and tested dimensions of green supply chain management (SCM) practice, competitive advantage, and performance. They collected data from 62 manufacturing organizations and used Partial Least Square (PLS) - Structural Equation Modeling and Sobel Test to examine relationships. Results indicated that green SCM practices positively impact competitive advantage and performance.

Tonape, Sanket, and Oak, Murli (2013) advocated for the widespread applicability of green supply chain management (GSCM) across sectors. GSCM promotes environmental and social

integrity through technology applications, earning trust from stakeholders, customers, shareholders and employees.

Objectives of the study:

- To identify current green supply chain practices in the manufacturing sector in Bengaluru.
- To analyze key challenges and issues faced by manufacturing companies in implementing green supply chain practices.
- To examine the role of industry promoting green supply chain practices in manufacturing sector in Bengaluru.
- To identify potential areas of improvement of green supply chain practices in manufacturing sector.
- To provide recommendations for enhancing supply chain practices in manufacturing sector.

Methodology:

For the purpose of this research, questionnaire was collected from 100 respondents through Google forms. Descriptive research design is used for this study to analyze the attributes of the population. The respondents are selected through the purposive sampling method. Predominantly, the data is collected for the first time through questionnaires from 100 respondents, so the data collected can be referred as the primary source of data. Secondary data sources are also used to collect data i.e. books, magazines, journals etc. which facilitated understanding regarding green supply chain practices in the manufacturing sector.

Results and Discussion:

- The majority of the respondents working in the manufacturing sector belong to the age group between 25-34 (53%) years. This implies that it has a relatively seasoned workforce, young blood which is a plus in manufacturing sector.
- From the survey it shows that there are 68% of male and 32% of female are working in the manufacturing sector. This shows that the manufacturing sector has more male worker than female.
- From the survey it shows that most of the respondents from the manufacturing sector were from FMCG (32%). %). This demonstrates that many of them are from FMCG compared to others it may reflect their closer alignment with consumers for eco-

friendly products and ethical business conduct.

- From the survey it shows that most of the respondents selected agree (73%), around 17% of the respondents selected neutral. This indicates that majority of the respondents have a positive outlook on green supply chain practices. This indicates a prevailing recognition of the potential benefits and value associated with incorporating sustainability into supply chain operations.
- The majority of respondents (73%) demonstrated a positive understanding of green supply chain concepts within their organizations, indicating a strong awareness of environmentally conscious practices.
- From the survey it shows that most of the respondents selected agree (56%). This shows that workforce is receptive to green procurement policies and recognizes their potential positive impact.
- From the survey it can be deduced that most of the respondents selected agree (57%). The combination of "agree" and "disagree" responses (69%) indicates that the majority of respondents agree with the importance of using energy efficient systems. This provides a conducive environment for the implementation of sustainable measures and highlights the importance of ongoing efforts to promote and implement energy efficiency in manufacturing sector.
- Notable agreement (57% agree, 10% strongly agree) was observed regarding integrating waste reduction and recycling practices into supply chain operations, signifying a dedicated effort towards sustainability.
- Respondents demonstrated strong agreement (66% agree, 9% strongly agree) that their organizations actively promote eco-friendly transportation methods, showcasing an eco-conscious approach.
- A majority (56% frequently) indicated the regularity of environmental impact assessments, reflecting a proactive approach to assess environmental implications. This demonstrates a commitment to environmental responsibility and recognizes the benefits of sustainable practices.
- Respondents predominantly agreed (64% to a great extent, 4% to a very great extent) that their organizations collaborate extensively with suppliers to implement green practices, highlighting the collaborative nature of the supply chain.

- Respondents concurred (57% agree, 10% strongly agree) on the integration of waste reduction and recycling practices into supply chain operations, showcasing a commitment to sustainable waste management.
- From the survey it shows that most of the respondents selected to a great extent (63%). t signifies an understanding of the potential advantages, such as reduced energy consumption, lowered environmental footprint, and potential cost savings.
- From the survey it shows that most of the respondents selected agree (64%). Most respondents agree or agree that a lack of knowledge and understanding can hinder the successful implementation of green practices.
- From the survey it shows that most of the respondents selected agree (47%). Organizations should weigh investments in green practices against short-term and long-term benefits, recognizing that financial constraints exist but to overcome with this they should be careful planning and innovative approach.
- From the survey it shows that most of the respondents selected agree (52%). This shows that it involves fostering stronger communication, aligning incentives, and sharing the benefits of sustainable practices.
- From the survey it shows that most of the respondents selected agree (50%). This tells the importance of using advanced measurement techniques, investing in data analysis and fostering a culture of transparency to overcome barriers.
- It shows that most of the respondents selected disagree (39%). The findings highlight the need to balance technology with operational planning to overcome technology challenges and leverage technology solutions to drive green practices.
- It shows that most of the respondents selected agree (69%). It highlights the importance of using for sustainability guidance to guide sustainability. The findings highlight the importance of collaboration between industry institutions and organizations to improve knowledge sharing, best practices and support.
- It shows that most of the respondents selected agree (55%). The importance of closely monitoring the market, consumers' behavior and preferences is to promote the integration of green culture and align the business strategy with the changing needs of the business.
- A significant proportion (69%) agreed that industry associations provide guidelines and

support for implementing green practices, while 57% agreed that industry certifications and eco-labels influence companies to adopt green strategies. This underscores the influential role of industry collaboration and certifications in promoting sustainability.

- It shows that most of the respondents selected agree (58%). the significance of fostering transparency to gain accurate insights into the environmental and social impacts of supply chain processes.
- A notable majority (59% agree, 13% strongly agree) confirmed that organizations invest in research and development for eco-friendly materials and technologies, reflecting a commitment to innovation and sustainability.
- Respondents largely agreed (54% agree, 18% strongly agree) that conducting regular sustainability audits ensures compliance with green guidelines. This highlights the importance of monitoring and maintaining adherence to environmentally friendly practices.
- Approximately 60% of respondents agreed that the industry encourages knowledge-sharing and capacity building for green practices. This emphasizes the significance of fostering a learning culture to enhance sustainability efforts.

Suggestions:

To promote environmental sustainability and enhance green supply chain practices in the manufacturing sector, organizations should prioritize technology and process investments to reduce energy consumption and improve overall performance. Collaborating closely with suppliers to foster green practices within the supply chain including education and knowledge sharing is crucial. Addressing financial constraints through sustainable financial research, grants, subsidies, and incentives from governments and financial institutions can facilitate green start-ups. Additionally, investing in advanced IT solutions for monitoring and measuring environmental impacts coupled with employee skill development can enhance transparency and compliance. Capacity-building efforts through training and workshops help in better implementation of green practices. Implementing regular sustainability audits, promoting research and development for environmentally friendly technologies and responding to market demands for sustainable products are also vital. Business certifications, transparency and collaboration with stakeholders along with top management's commitment foster a culture of

sustainability. Collaboration with government agencies, long-term green strategies adopting a circular economy approach, continuous improvement and networking within sustainability-focused networks are key strategies to drive environmental sustainability and responsible business opportunities in the manufacturing sector, ultimately contributing to a healthier and safer future.

Conclusion:

This study explores the impact of green supply chain practices in Bangalore's manufacturing sector. Despite facing challenges such as financial constraints and vendor issues, organizations have embraced environmentally friendly strategies, in line with global sustainability trends. The study calls for increased collaboration, knowledge sharing, and compliance monitoring. It highlights the role of chambers of commerce, certifications, and industry stakeholders in promoting a green culture. While this research offers insights into Bangalore's manufacturing, expanding to other sectors and regions would provide a more comprehensive understanding of green practices. In conclusion, the study emphasizes the growing significance of environmental initiatives in the manufacturing sector advocating for support and innovation as key drivers for success.

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