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A Study of Green Logistic Initiatives and ESG Implication for Enhancing Operational Efficiency

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Abstract: Sustainable development become a crucial concept in modern days. The survival of mankind become vulnerable question due to degradation of environment. Environmental issues become alarming question day by day. This paper focuses the realm of sustainability with respect to green logistic platform. The logistics industry plays a pivotal role in mitigating its ecological footprints., This paper tries to investigate the ESG implication of green logistics initiatives. This paper focuses light into enhancing operational efficiency and competitiveness along with sustainable practices.

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I. INTRODUCTION

Green logistics addresses the existing logistics infrastructure and focuses on reducing the environmental impact of operations by optimizing transportation routes to minimize fuel consumption and emissions, implementing energy-efficient warehouse practices, using eco-friendly packaging and adopting technology to improve resource utilization.

The overriding goal of green logistics is to lessen a company's negative impact on the environment by incorporating more sustainable practices into its logistics and supply chain management to achieve a circular economy through these three main principles:

Reduce- Minimizes the amount of resources used and waste generated throughout the supply chain.

Recycle-The process of converting waste materials into reusable materials and products through conscious efforts made in the following areas: Material selection, Recycling programs, Closed-loop systems, Collaboration with recycling firms.

Reuse-Emphasizes the repeated use of products and materials without reprocessing them.

Adopting Green Logistics practices is not a mere choice but a necessity, with logistics companies in India recognizing the need to minimize their environmental impact. This pursuit involves the active exploration of sustainable fuels. Furthermore, sustainable warehousing solutions are on the rise, witnessing a high rise in the use of solar panels in warehouses over the past three years. This trend not only reduces energy consumption but also lowers operational costs.

India's transportation and logistics industry is poised to grow to a US$26 trillion economy by 2048, which offers both opportunities and difficulties. The government must act decisively to meet net-zero goals by 2050 in order to fight the sector's large contribution to CO2 emissions. Adopting cleaner alternatives and streamlining logistics procedures are crucial. The government, financial institutions, foreign partners, and the private sector are working together to make significant progress in sustainable transportation finance.

The logistics sector is recognizing the urgency of adopting sustainable practices, particularly in light of increasing regulatory scrutiny and consumer expectations for corporate responsibility. Several key trends are emerging in response to ESG considerations:

- Many logistics companies are committing to achieving carbon neutrality within specific timeframes, often aligned with broader industry goals set by international agreements like the Paris Agreement. This involves a comprehensive assessment of their carbon footprints, investing in renewable energy sources, and adopting electric or hybrid vehicles.
- ESG principles are driving companies to scrutinize their sourcing practices. This includes evaluating suppliers based on their environmental and social performance, ensuring that they adhere to sustainable practices. Organizations are increasingly favoring suppliers who demonstrate commitment to sustainability, thereby promoting responsible sourcing throughout the supply chain. This shift is essential for mitigating risks associated with environmental degradation and poor labor practices in supply chains.

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II. LITERATURE REVIEW

- Title: "A Study On Sustainable Development Through Green Logistics: A systematic literature review" Definition: A Study On Sustainable Development Through Green Logistics refers to the implementation of strategies and practices aimed at minimizing the overall greenhouse gas emissions and environmental impact associated with the production, transportation, and distribution of goods and services within a supply chain network.
- Title: "Sustainable approaches for A Study On Sustainable Development Through Green Logistics: A comprehensive review" Definition: Sustainable A Study On Sustainable Development Through Green Logistics involves the adoption of environmentally friendly practices, technologies, and policies to mitigate the negative environmental consequences of supply chain activities, thereby contributing to the overall goal of achieving ecological balance and resource conservation.
- Title: "Integrated strategies for carbon footprint reduction in global supply chains: A literature review" Definition: Integrated strategies for carbon footprint reduction in global supply chains encompass a holistic approach to incorporating eco-friendly measures and green technologies throughout the entire supply chain, with a focus on minimizing carbon emissions, optimizing energy consumption, and promoting sustainable production and distribution practices.
- Title: "Policy interventions for A Study On Sustainable Development Through Green Logistics: A review of current literature" Definition: Policy interventions for A Study On Sustainable Development Through Green Logistics refer to governmental or organizational measures, regulations, and incentives designed to encourage the adoption of environmentally responsible practices, technologies, and policies within supply chains, thereby fostering a more sustainable and eco-conscious business environment.
- Title: "Advancing sustainability through carbon footprint reduction in supply chain networks: A literature review and conceptual framework" Definition: Advancing sustainability through carbon footprint reduction in supply chain networks involves the systematic integration of innovative technologies, renewable energy sources, and sustainable logistics solutions to reduce the overall carbon emissions and ecological footprint associated with the movement of goods and services across the supply chain, contributing to a more environmentally conscious and resilient global economy.

➢ *Research Objectives:*

- To assess the current status of green logistics implementation in the industry.
- To analyze the impact of green logistics on reducing carbon emissions and environmental footprint.
- To identify key challenges and barriers to the adoption of sustainable logistics practices.

➢ *Research Methodology*

A combination of qualitative and quantitative approaches, including surveys, interviews, and case studies, to gather data on current practices, challenges, and opportunities in the integration of green logistics for sustainable development.

➢ *Research Design*

The method of random sampling has been utilized, and the number of clients included in the sample for this investigation is fifty. In addition, both male and female clients are represented in this sample. The purpose of to determine that feelings of customers based on green logistic perspective.

➢ *Data Collection Method*

Both primary and secondary sources were used in the course of compiling the data for the study. Collection of primary data through interviews with industry experts, logistics managers, and policymakers, as well as the use of surveys distributed to logistics organizations and companies. Secondary data would be collected through an extensive review of literature, reports, and existing studies on green logistics and sustainable development.

The sample size for the client is 120 respondents, and responses have been received from all of them. In order to complete the analysis, Tables, pie chart, and histograms are used

III. RESULT & DISCUSSION:

Table 1 Age

Age group	Respondent	%
18-25	24	20
26-35	26	22
36-45	30	25
46-55	22	18
Above 55	18	15
Total	120	100

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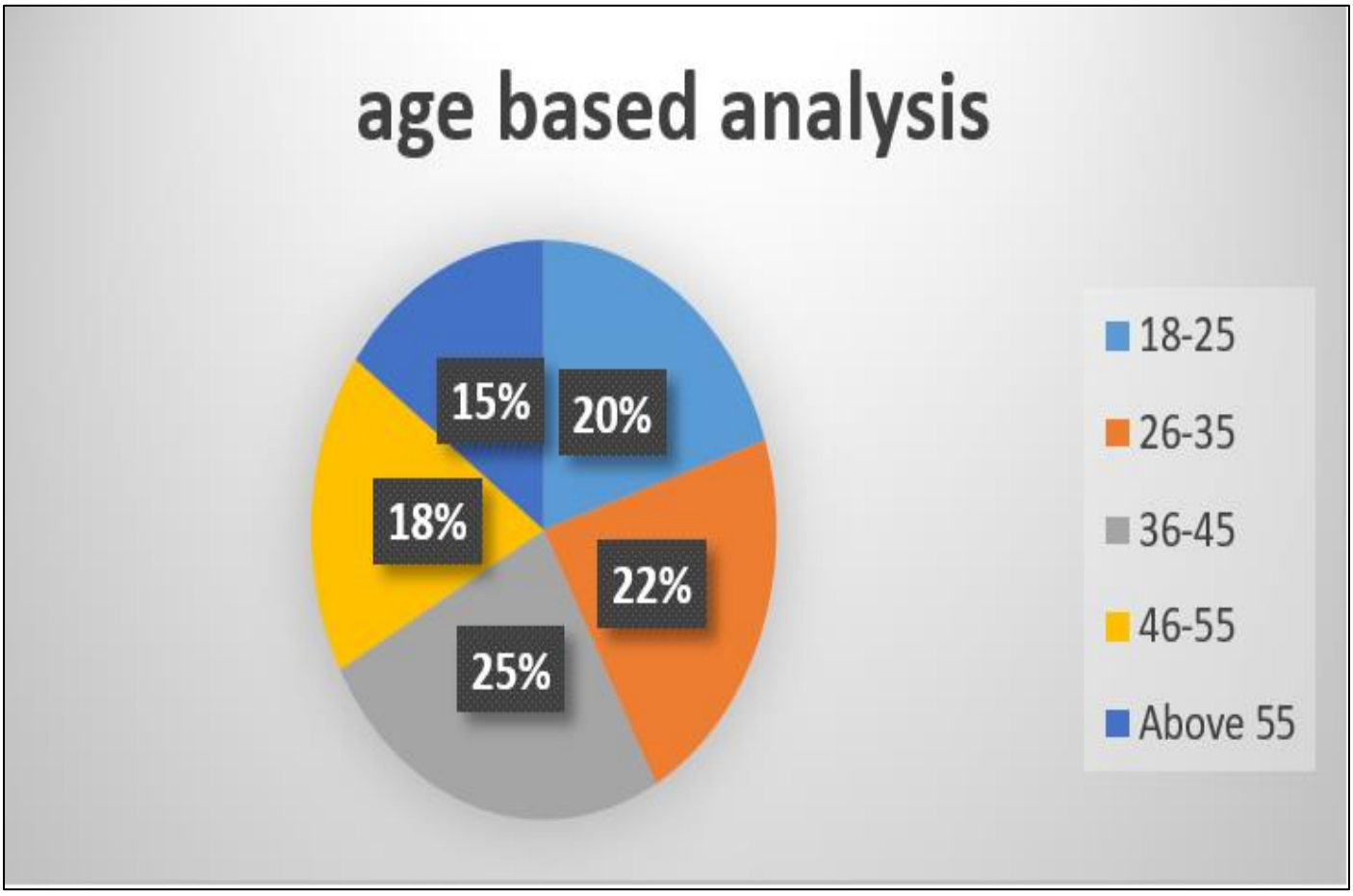

Fig 1 Age Based Analysis

➢ *Interpretation:*

The data illustrates the age distribution of the 120 respondents involved in the study. The results indicate that the majority of the respondents, comprising 22%, fall within the 26-35 age bracket, closely followed by those in the 18-25 age range, accounting for 20%. Additionally, individuals aged 36-45 constitute 25% of the respondents, individuals aged 46-55 constitute 18% of the respondents while those aged above 55 make up 15% of the total sample. This distribution highlights a relatively balanced representation across various age groups, with a significant portion of the participants falling within the young and middle-aged categories, suggesting a diverse demographic composition that can potentially offer multifaceted perspectives and insights relevant to the study.

Table 2 Gender

Particular	**Respondent**	**%**
Male	91	76
Female	29	24
Total	120	100

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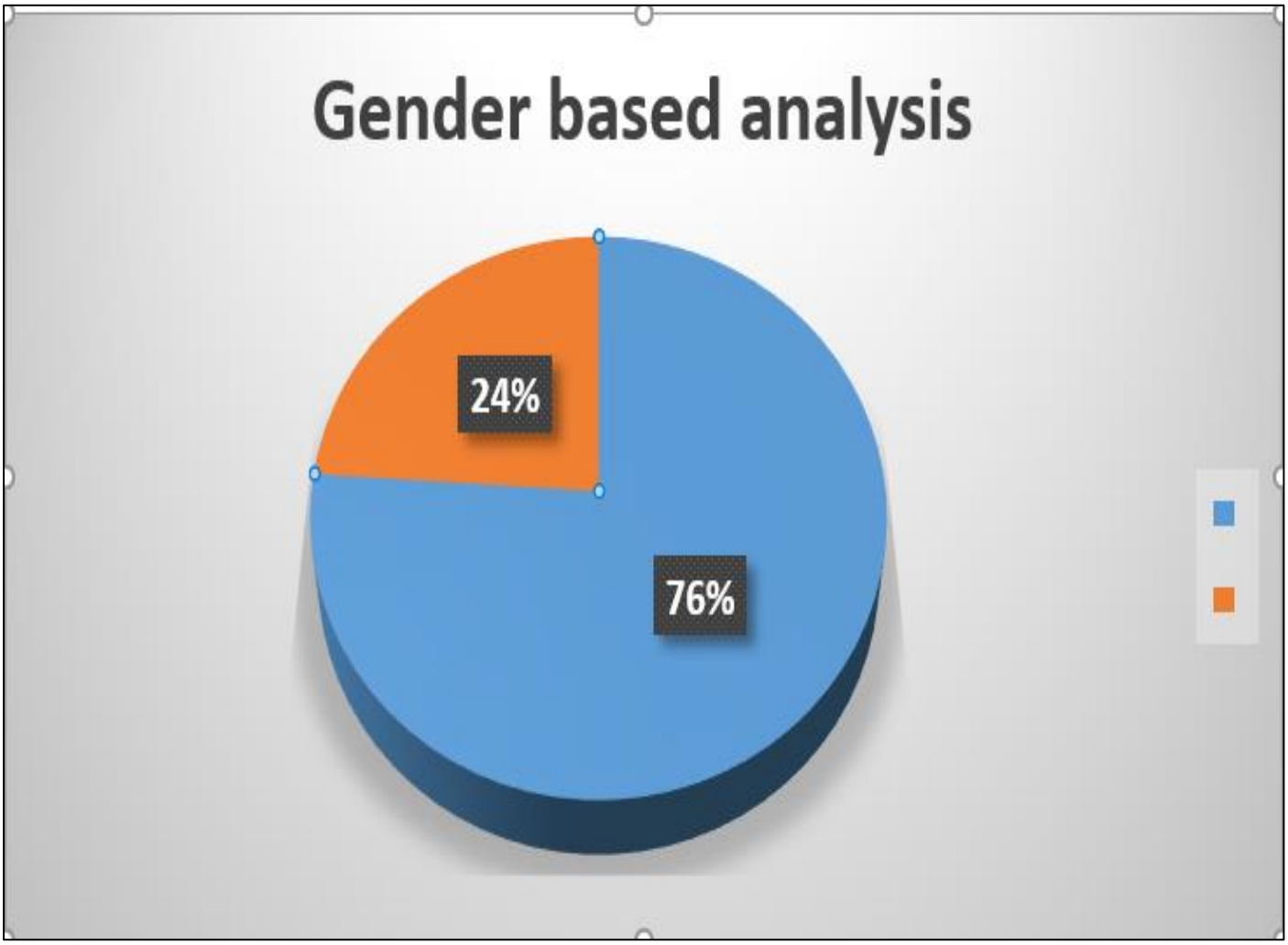

Fig 2 Gender Based Analysis

The data reveals the gender distribution among the 120 respondents involved in the study, with 76% of the participants being male and 24% female. This significant gender disparity within the sample suggests a notable overrepresentation of male respondents. This finding implies a potential gender bias in the study, which could influence the overall outcomes and conclusions drawn. Understanding this gender gap is crucial for ensuring a comprehensive analysis that considers diverse perspectives and experiences related to the study's subject matter, thereby enabling a more nuanced and inclusive interpretation of the research findings

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Table 3 Awareness Based on Logistic

Particular	**Respondent**	**%**
Very aware	32	27
Moderately aware	38	32
Less aware	30	25
Not having awareness	20	16
Total	120	100

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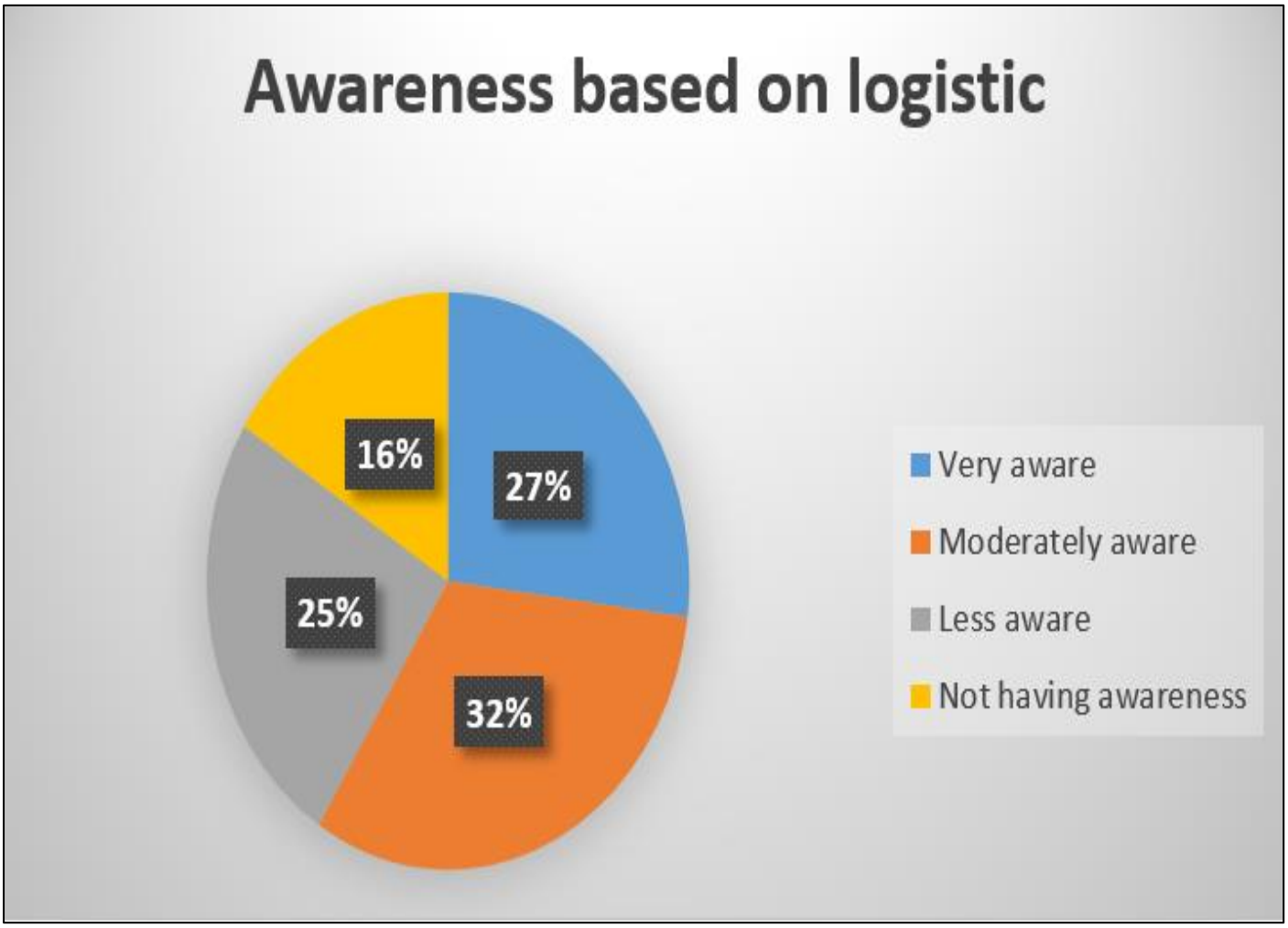

Fig 3 Awareness Based on Logistic

➢ *Interpretation:*

The data presents the respondents' self-reported levels of awareness regarding green logistics, indicating that 27% of the participants consider themselves "Very Aware," while 32% report being "Moderately Aware." Additionally, 25% of the respondents claim to be "Slightly Aware," and 16% indicate having "No Awareness" of green logistics. These findings suggest a diverse spectrum of knowledge levels among the participants, with a considerable portion expressing a significant degree of familiarity with the concept. However, a notable proportion also acknowledges a lack of awareness, highlighting the necessity for targeted educational and awareness-building initiatives to promote a deeper understanding of green logistics and its potential implications for sustainable development.

Table 4 Integrating Sustainable Practices in Logistics Operations

Particular	**Respondent**	**%**
Renewal energy	32	27
Efficient route planning	38	32
Eco friendly packaging material	34	28
Waste reduction initiatives	16	13
Total	120	100

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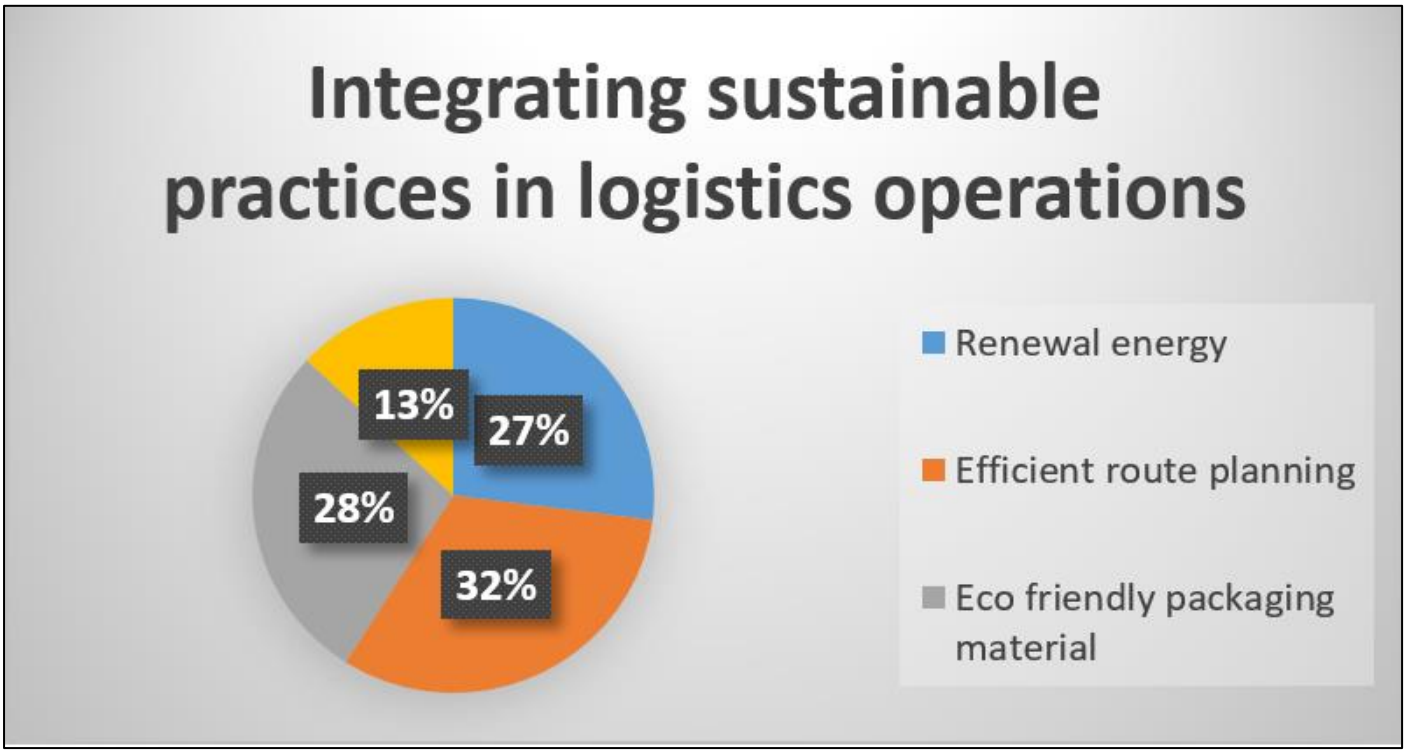

Fig 4 Integrating Sustainable Practices in Logistics Operations

The data illustrates the respondents' perspectives on critical factors for integrating sustainable practices in logistics operations, revealing that 32% of the participants emphasize the importance of "Efficient Route Planning," followed closely by 27% who prioritize "Renewable Energy Usage." Moreover, 28% of the respondents underscore the significance of "Eco-friendly Packaging Materials," while 13% highlight the relevance of "Waste Reduction Initiatives." These findings emphasize the multifaceted nature of sustainable logistics, suggesting that while efficient route planning and renewable energy adoption are perceived as crucial, attention to eco-friendly packaging materials and waste reduction initiatives also holds significant importance in promoting sustainable practices within logistics operations. Understanding these diverse perspectives is imperative for devising comprehensive strategies that holistically address various aspects of sustainability within the logistics industry.

- *How Do People Perceive the Connection of Green Logistics and ESG into Overall Environmental Sustainability?*

Table 5 Impact of Environmental Sustainability

Particular	Respondent	%
Highly positive	36	30
Positive	34	28
Neutral	30	25
Negative	20	17
Total	120	100

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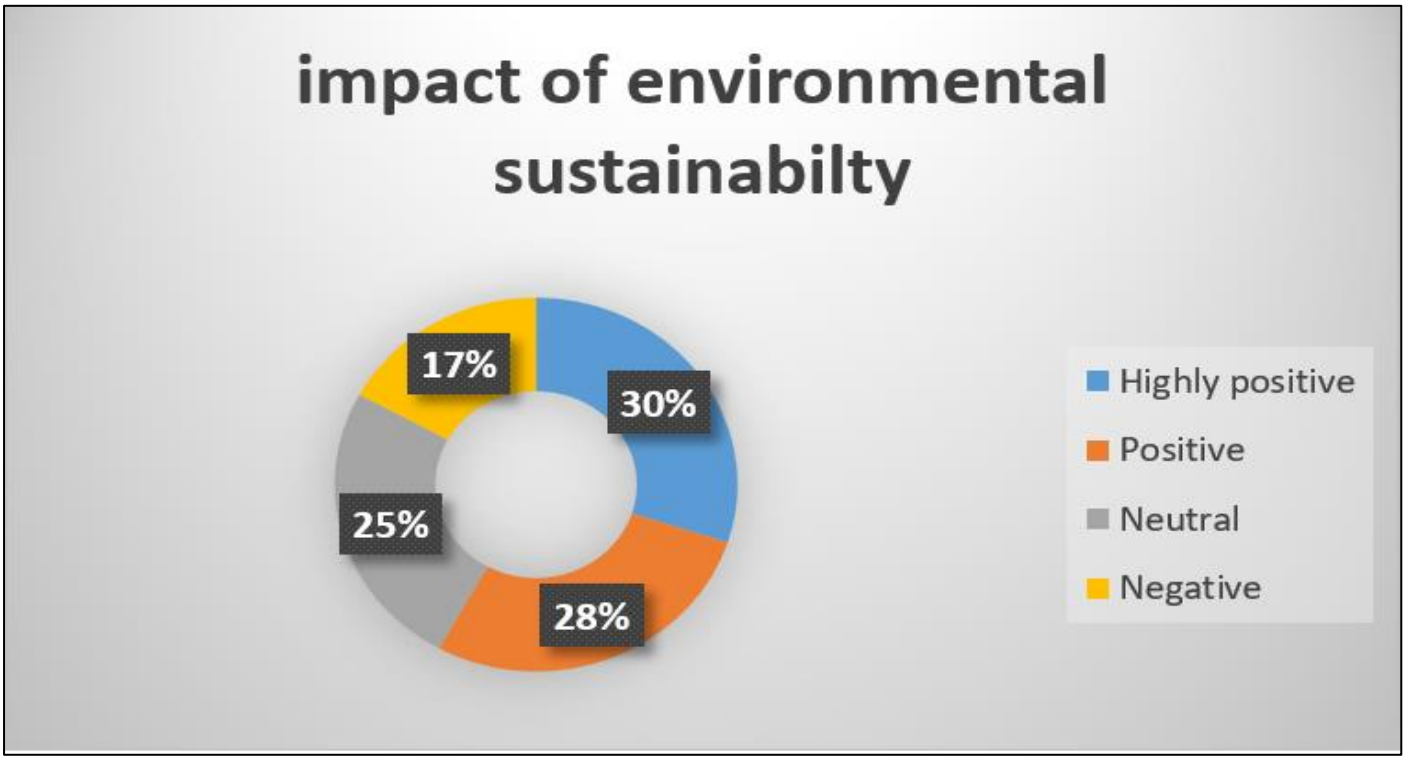

Fig 5 Impact of Environmental Sustainability

➢ *Interpretation*

The data indicates diverse perceptions regarding the impact of green logistics on overall environmental sustainability, with 30% of the respondents expressing a "Highly Positive" outlook and 28% considering it "Somewhat Positive." Furthermore, 25% maintain a "Neutral" stance, while 17% view the impact as "Negative." These findings suggest a somewhat optimistic view overall, with a significant proportion acknowledging the potential positive influence of green logistics on environmental sustainability. However, the presence of a neutral stance and a minor proportion perceiving a negative impact highlights the need for further investigation and a nuanced understanding of the complexities surrounding the implementation of green logistics practices, emphasizing the necessity for comprehensive strategies that can effectively address potential challenges and concerns to maximize the positive environmental impact.

IV. RECOMMENDATION

➢ *There Are Some List of Suggestions Which Can Be Effective in Future.*

- *Bio Mimicry-*

The emerging field of Bio mimicry is developing new technologies created from biologically inspired engineering at both macro scale and Nano scale levels. Companies are required to explore this approach for better sustainable performance.

- *Waste Management-*

Waste generated by one company can be used as a raw material of other company. Hazardous material must be disposed of securely. A proper waste management process must be followed in order to segregate hazardous waste from non- hazardous waste.

- *Green Stakeholders-*

There must be a compulsory audit of suppliers and the supplier must audit their suppliers. A proper guideline regarding green supply chain management must be design so that all the stakeholders comply with it.

- *E-Waste-*

IT sector is an important industry of a country. IT industry produces a lot of e- waste like obsolete computers, batteries, etc. should be returned to the supplier for the proper disposal.

- *Driver Not a Barrier-*

Companies must consider the green concept as a driver and not a barrier. Where other companies see risks and costs, they must see this as an opportunity for growth and innovation.

V. CONCLUSION

Green is a journey and not a destination. By greening the supply chain, the companies will gain importance in the years to come. The current system of operation will soon have a disastrous impact on the environment; green supply is a solution to keep the environment safe. Constant time and efforts are required to enhance the green capabilities. In the present world, consumers are becoming environmental conscious and they are putting pressure on the companies to adopt green practices and reduce wastes and carbon footprint. In order to implement green practices, organizations are

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required to invest large amount of capital on network design, sourcing, procurement, changes in packaging, etc. By lowering carbon footprint corporate image of the company enhances and a company gain competitive advantage over others. For implementing green supply a company has to undergo various obstacles like installing expensive technologies, recycling of raw materials. As green supply is in the initial stages, awareness and knowledge of green supply must be spread and proper guidelines should be designed for the implementation of green supply chain. Green supply chain management has financial benefits, Social benefits and environmental benefits. By implementing green practices companies will be benefited cost saving, improved corporate image and reduction in environmental liability. The leaders and managers should see green supply as a core part of their business which will be beneficial in the long run.

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