SUSTAINABLE LOGISTICS AND INTERNATIONAL TRADE: A CROSS COUNTRY ANALYSIS OF DEVELOPED AND EMERGING ECONOMIES

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Journal	Samvakti Journal of Research in Business Management ISSN (Online) : 2582-8347 https://www.sjrbm.samvaktijournals.com Volume 6 Issue 1 Year of Volume 2025 Page No : 244 - 257
Discipline	Supply Chain
Conference	**Innovative Management Techniques for sustainable Development (IMTSD) - 2025**
Conference Dates	Start Date: February 21, 2025 End Date : February 22, 2025
Institute Name	Kalinga University Raipur

Date Received : March 15, 2025 **Publication Date**: April 23, 2025
ID : sjrbm.2025.59 **Paper Type** : Conference Paper

ABSTRACT

This paper look into the effect of logistics on global business, studies the ecological and economic outcomes of adopting sustainable logistics methods in both developed and developing countries. Since environmental issues become stronger, the logistics industry plays a critical role in addressing global sustainability challenges. Sustainable logistics highlights on decreasing the environmental impact of logistics activities, incorporating transportation, warehousing, packaging, and distribution. The survey emphasizes how sustainable logistics practices affects trade effectiveness, environmental impacts, and cost structures, in industrialized and emerging countries. The results show that sustainable logistics encourages global business by improving efficiency and reducing environmental damage in developed nations, challenges in infrastructure, financing, and policy implementation hamper its embrace in developing countries. This paper also analyses the responsibility of government principles, trade regulations, and international agreements in endorsing sustainable logistics practices. This study also explores the

impact of green logistics on international trade, comparing evidence from developed and developing countries. Sustainable logistics, which aligns environmentally sustainable methods into supply chain operations, has become essential in decreasing greenhouse gas emissions, optimizing resources, and addressing global environmental obstacles. Developed countries frequently govern in adopting sustainable logistics due to advanced infrastructure, for endurable goods. On the other hand, developing countries face difficulties such as inadequate infrastructure and financial obstacles but are more and more recognizing the economic advantage of sustainable practices. The investigation examines how sustainable logistics influences trade efficiency, competitiveness, and market access in both situations. By examining case studies and data, the research also points out the disparities in implementation, the responsibility of government policies, and the possibility for sustainable logistics to improve global trade sustainability. The results provide understanding in fostering sustainable logistics practices across diverse economic landscapes to support international trade growth.

KEYWORDS: Sustainable logistics, Developed, Developing, International Trade, Infrastructure, Sustainability, Transportation, Warehousing, Packaging, Distribution, Environmental

INTRODUCTION

The rapid growth of international trade throughout the past few years has been accompanied by an increase in transportation-related carbon emissions, resource depletion, and environmental degradation. Sustainable logistics has surfaced as a key strategy to resolve these challenges, focusing to minimize the environmental impact of logistics system at the same time as maintaining or improving the effectiveness of international trade.

It encompasses incorporating eco-friendly methods into logistics processes such as reducing energy consumption, optimizing routes, adopting sustainable packaging, and utilizing renewable energy sources.

In this research, we investigate the significance of sustainable logistics on international trade by comparing case studies from developed and developing countries.

We investigate the economic, environmental, and logistical results of adopting sustainable logistics practices, studying on how these practices affects trade efficiency, operational costs, and environmental sustainability. By investigating both developed and

developing economic systems, the objective is to provide a comprehensive understanding of the global implications of sustainable logistics.

The impact of sustainable logistics on international trade is important, as it can motivate trade efficiency and facilitate access to international markets that focus on sustainability. For developed countries, the implementation of sustainable logistics may be driven by strict policy and consumer demand for environmentally friendly products.

However, emerging countries face difficulties related to infrastructure and resource limitations, yet are gradually recognizing the economic and environmental benefits of sustainable logistics methods. This research goal is to examine the effect of sustainable logistics on global business by comparing facts from both industrialized and emerging countries.

By investigating the different strategies, challenges, and outcomes, the study seeks to understand how sustainable logistics can form trade activity, support sustainability, and contribute to global efforts to challenges climate change. The findings will provide insights into the role of sustainable logistics in driving trade competitiveness and environmental responsibility.

LITERATURE REVIEW

Green logistics has emerged as an essential aspect of sustainable supply chain management, concentrating on decreasing the ecological imprint of logistics actions such as transportation, warehousing, and distribution. As international trade continues to increase, it has become a significant contributor to environmental challenges, including greenhouse gas emissions and resource reduction. Developed countries have been at the forefront of adopting green logistics practices due to advanced infrastructure, stringent environmental regulations, and consumer demand for sustainability. However, developing countries face obstacles such as inadequate infrastructure, high implementation costs, and limited awareness, which hinder their ability to adopt such practices effectively.

Regardless of these challenges, the incorporation of green logistics in international trade provides significant benefits, including reduced emissions, improved efficiency, and enhanced global competitiveness. This research examines the facts from both industrialized and emerging countries to analyse the impact of green logistics on global business, highlighting opportunities, challenges, and the need for worldwide collaboration in promoting sustainable practices.

Green logistics refers to the incorporation of ecological thoughts into logistics supervision, focusing on limiting the carbon imprint of logistics operations and improving sustainability. The logistics sector, which includes transportation, warehousing, and distribution, is responsible for a significant share of global carbon emissions. According to McKinnon (2018), green logistics is an effective approach to reducing the environmental impacts of international trade while improving supply chain efficiency. It encompasses several strategies, including the adoption of energy-efficient transportation modes, reducing packaging waste, optimizing route planning, and implementing sustainable warehousing practices [4].

International trade relies heavily on the efficiency of logistics systems, which are integral to ensuring the timely and cost-effective movement of goods across borders. The growing emphasis on sustainability in trade requires businesses to adopt greener logistics practices to comply with international environmental regulations and meet the expectations of environmentally conscious consumers. Developed countries, such as those in the European Union (EU), Japan, and the United States, have pioneered the integration of green logistics through regulatory frameworks, technological advancements, and infrastructure investments. In contrast, developing countries, which face challenges such as inadequate infrastructure, limited access to clean technologies, and financial constraints, have been slower to adopt green logistics practices.

Green logistics offers a dual benefit: it reduces environmental harm while potentially improving economic efficiency. In terms of environmental impact, adopting green logistics practices can lead to significant reductions in carbon emissions, air pollution, and energy consumption. For example, research by Liao et al. (2020) suggests that shifting from road transportation to rail or maritime transport, which are more energy-efficient, can lower the carbon footprint of trade by up to 30%[3]. Economically, green logistics can lead to cost savings in the long term. While the initial investment in green technologies may be high, efficient supply chain practices, such as optimized routing, reduced fuel consumption, and waste minimization, can lower operational costs. Moreover, green logistics can enhance the competitiveness of companies in international markets by aligning their operations with the growing demand for sustainability. A study by Chen et al. (2019) found that firms that implemented green logistics strategies were more likely to experience cost reductions and improved profitability [1].

However, the economic benefits of green logistics are not immediate and may vary across countries. In developed economies with well-established infrastructures and

financial resources, the transition to green logistics can be relatively smooth. In contrast, in developing countries, the upfront costs associated with adopting green technologies and practices can pose significant barriers for industries, mostly slight and minor-sized enterprises (SMEs)[5] (Rao & Holt, 2020).

Government policies and regulations play a crucial role in promoting green logistics. In developed countries, environmental regulations and incentives have driven the adoption of green logistics practices. The European Union's Green Deal, for example, aims to make Europe the first climate-neutral continent by 2050, which includes the implementation of sustainable logistics practices. The EU has introduced policies such as the carbon pricing mechanism, low-emission zones, and incentives for electric vehicles (EVs), which encourage businesses to adopt greener logistics practices.

Japan has also implemented a range of policies to promote green logistics, including the adoption of energy-efficient transportation systems, investment in electric and hydrogen-powered vehicles, and policies to improve the environmental performance of the logistics sector. These efforts have been successful in reducing emissions and enhancing trade efficiency.

In contrast, the regulatory environment in developing countries often lacks the stringent enforcement required to promote widespread adoption of green logistics. While countries like China and India have made progress by introducing policies to reduce emissions and promote sustainable logistics, the lack of infrastructure, financial resources, and political will hinders the widespread implementation of green logistics practices. International trade agreements can play a significant role in encouraging the adoption of green logistics in developing countries by providing technical assistance, financial support, and setting global sustainability standards.

METHODOLOGY

This research employs a qualitative comparative analysis of case studies from both developed and developing countries. Key data sources include government reports, policy documents, and academic literature, as well as interviews with logistics professionals and industry experts. The paper focuses on specific case studies from the European Union, Japan, China, and India to examine the effect of green logistics on international business in different economic contexts.

Research Method

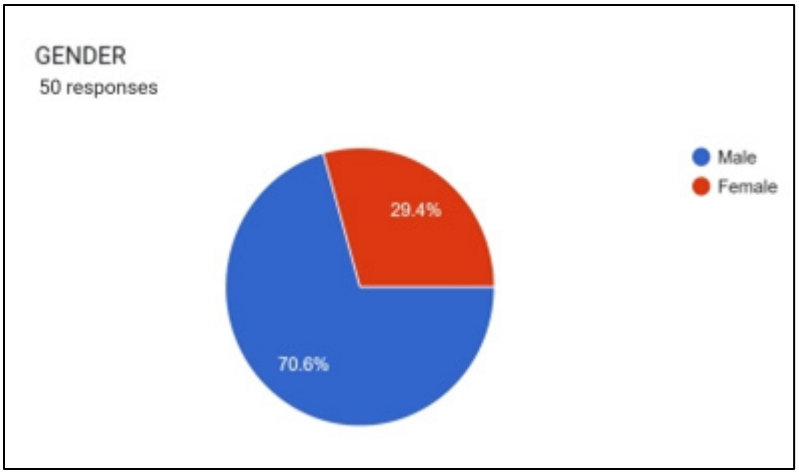
The study will employ a mixed-methods approach combining both qualitative and quantitative research methods. This approach allows for a comprehensive analysis of the effect of green logistics on global business, capturing numerical data as well as in-depth insights. The research will utilize a descriptive design to explore the relationship between green logistics and international trade in developed and developing countries. The study will include 50 participants, selected using random sampling to ensure representation from both developed and developing countries. The sample will consist of 25 participants from developed countries (e.g., logistics professionals from countries like the USA, Germany, and Japan).25 participants from developing countries (e.g., professionals from nations such as India, Brazil, and South Africa).

Data Collection Procedure

Questionnaire was distributed through online platforms to collect accurate and precise data. This design ensures a balanced representation and facilitates comparative analysis of the differences in green logistics practices between developed and developing countries.

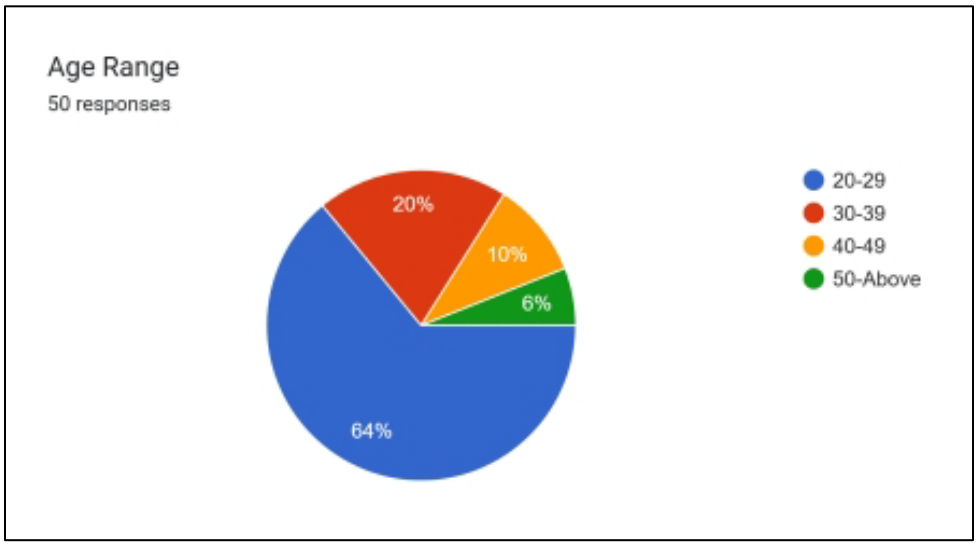
DATA PRESENTATION AND ANALYSIS

This chapter deals with data presentation, interpretation and analysis based on data collected from the respondents, in accordance with the research's objectives



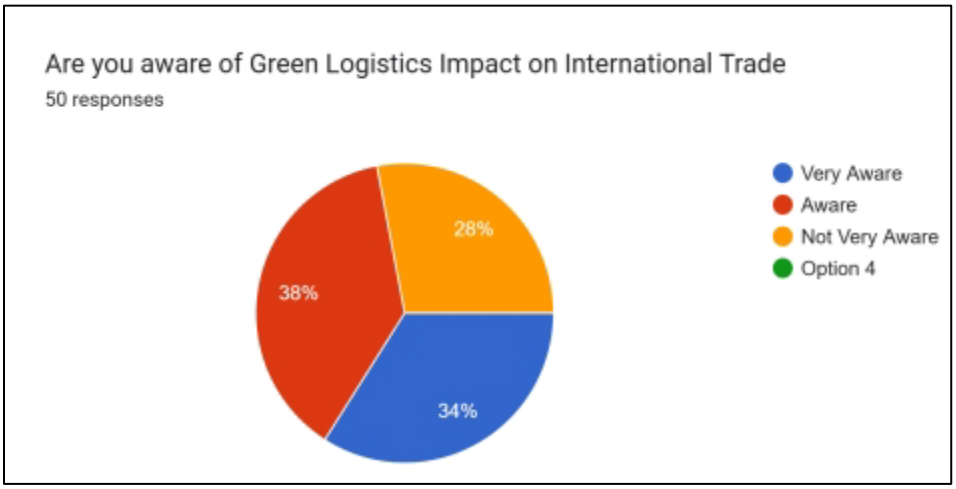
Pie Chart 1 : Gender distribution of respondents

In *Pie Chart 1*, 70.6% of the respondents are male while 29.4% of the respondents are female, constituting 100%.



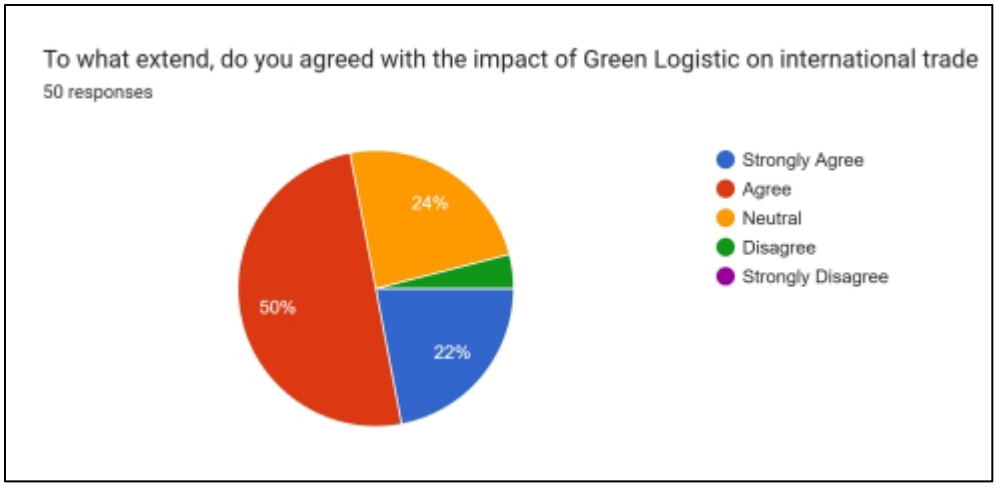
Pie Chart 2: Age Distribution

In *Pie Chart 2*, between male and female, from the age range 20-29, 64% are male and female .From the age range 30-39, 20% are male and female. From the age range 40-49, 10% are male and female, while the age range from 50 and above are 6%.



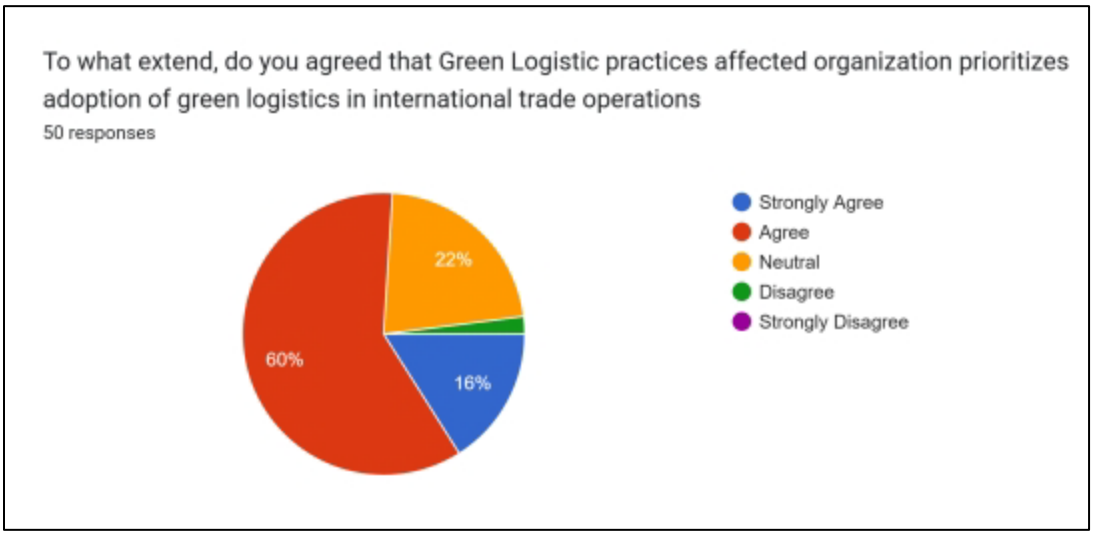
Pie Chart 3 : Logistics impact on International Trade

In *Pie Chart 3*, 38% of the respondents, responded aware of green logistic on international trade, 34% responded very aware of green logistic on international trade 28% responded not very aware of green logistic on international trade.



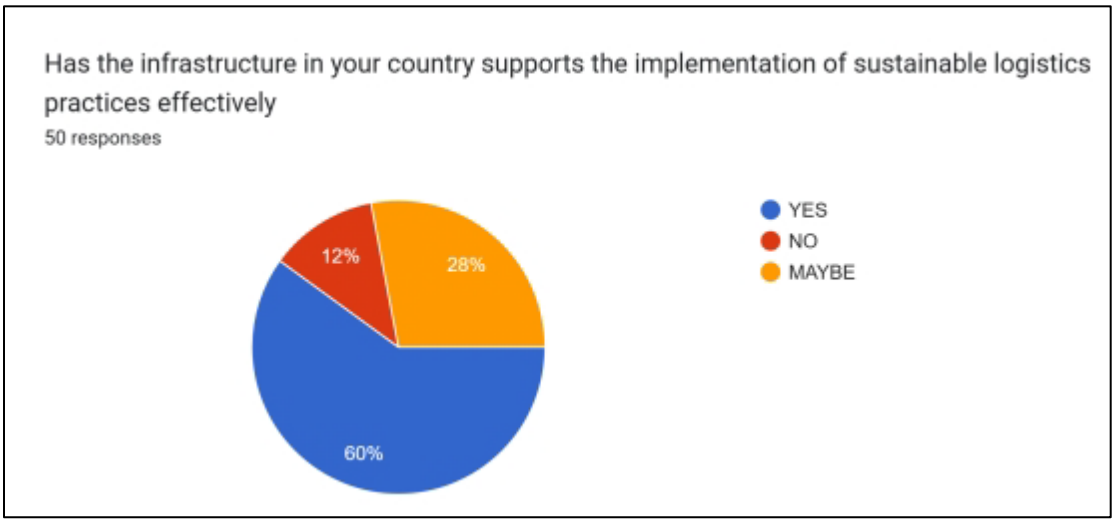
Pie Chart 4 : Extent of Logistics on international trade

In *Pie Chart 4*, 50% of the respondents responded that they have agreed with the impact of green logistic on international trade. 24% responded neutral, 22% responded strongly agreed, 4% responded disagreed.



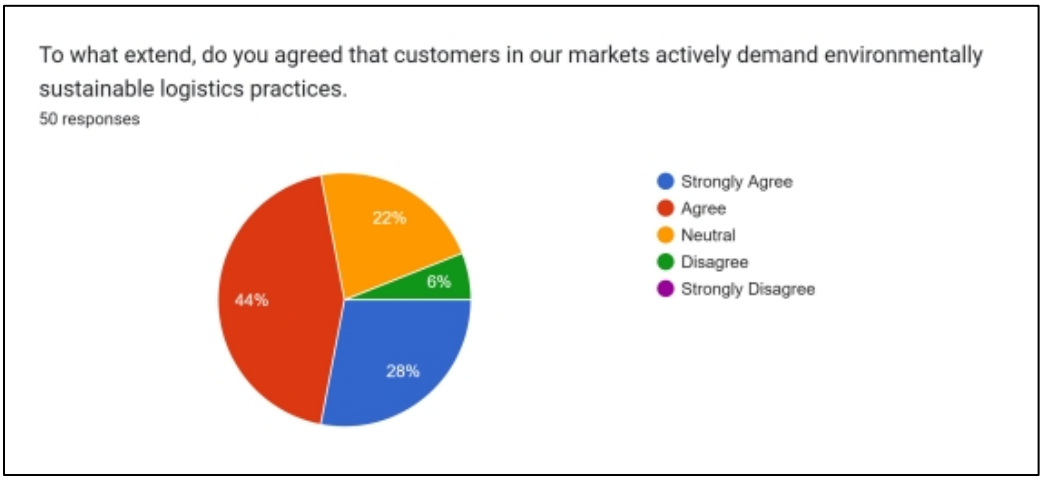
Pie Chart 5 : Logistic practices

In *Pie Chart 5*, 60% of the respondents, responded that they have agreed with green logistic practices affected organization priorities adoption of green logistic in international trade operation, 22% neutral, 16%strongly agreed, 2% disagreed.



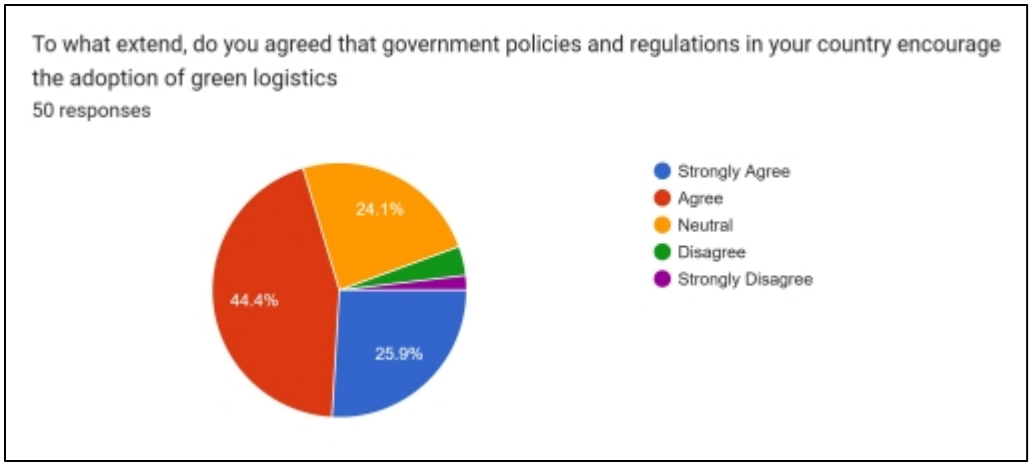
Pie Chart 6 : Implementation of sustainable logistic practices

In *Pie Chart 6*, 60% of the respondents responded YES, that the infrastructure in your country supports the implementation of sustainable logistic practices effectively, 12% responded NO, while 28% responded MAYBE.



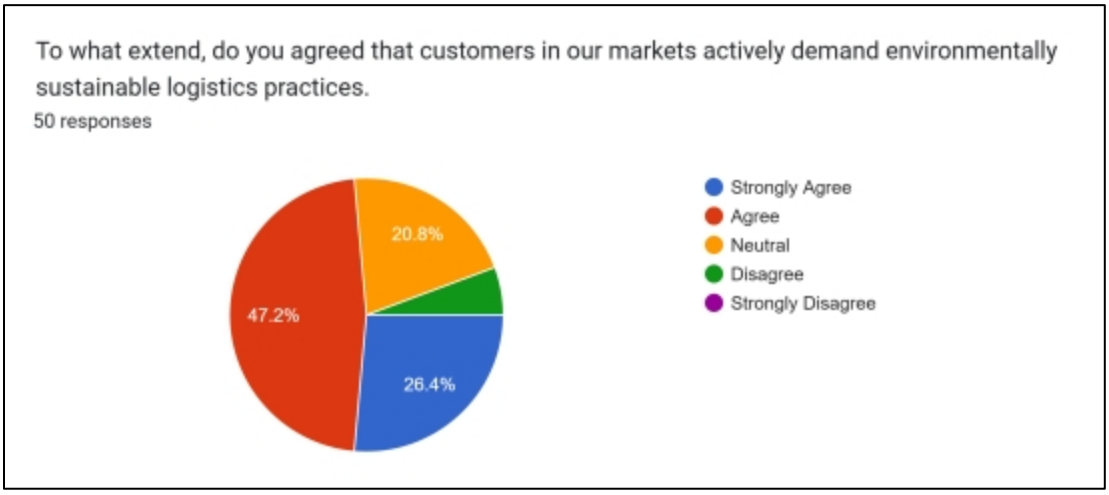
Pie Chart 7 : Customers in the market demand

In *Pie Chart 7*, 44% of the respondents, responded that they have agreed that customers in our markets actively demand environmentally sustainable logistics practices,28% responded strongly agreed,22% responded neutral,6% responded disagreed.



Pie Chart 8 : Government Policies and regulation

In *Pie Chart 8*, 44.4% of the respondents, responded that they have agreed that government policies and regulations in your country encourage the adoption of green logistics, 25.9% responded strongly agreed, 24.1% responded neutral, 3.7% responded disagreed while 1.9% responded strongly disagreed.



Pie Chart 9 : Environmental sustainable logistics practice

In *Pie Chart 9*, 47.2% of the respondents, responded that customers in our markets actively demand environmentally sustainable logistics practices,26.4% responded strongly agreed, 20.18% responded neutral,5.7% responded disagreed while 0% responded strongly disagreed.

Findings of the study and discussion of the findings

Base on the above data collected. 70.6% of the respondents are male while 29.4% of the respondents are female, constituting 100%.

Between male and female, from the age range 20-29, 64% are male and female .From the age range 30-39, 20% are male and female. From the age range 40-49, 10% are male and female, while the age range from 50 and above are 6%.

38% of the respondents, responded aware of green logistic on international trade, 34% responded very aware of green logistic on global business. 28% responded not very aware of green logistic on global business.

50% of the respondents responded that they have agreed with the effect of green logistic on global business. 24% responded neutral, 22% responded strongly agreed, 4% responded disagreed.

60% of the respondents, responded that they have agreed with green logistic practices affected organization priorities adoption of green logistic in international trade operation, 22% neutral, 16%strongly agreed, 2% disagreed.

60% of the respondents responded YES, that the infrastructure in your country supports the implementation of sustainable logistic practices effectively, 12% responded NO, while 28% responded MAYBE.

44% of the respondents, responded that they have agreed that customers in our markets actively demand environmentally sustainable logistics practices,28% responded strongly agreed,22% responded neutral,6% responded disagreed.

44.4% of the respondents, responded that they have agreed that government policies and regulations in your country encourage the adoption of green logistics,25.9% responded strongly agreed,24.1% responded neutral,3.7% responded disagreed while 1.9% responded strongly disagreed.

47.2% of the respondents, responded that customers in our markets actively demand environmentally sustainable logistics practices,26.4% responded strongly agreed,20.18% responded neutral,5.7% responded disagreed while 0% responded strongly disagreed.

Summary

This research was conducted to explore the influence of sustainable logistics on global business by comparing information from improved countries. It investigates how the implementation practices, such as waste reduction, energy efficient transportation, and eco – friendly packaging, impacts global trade flows.

This research also utilize a descriptive design to discover the connection among green logistics and global business in developed and developing countries.

Questionnaires were distributed through online platforms to collect accurate and precise data. This design ensures a balanced representation and facilitates comparative analysis of the differences in sustainable logistics practices between developed and developing countries.

The study include 50 participants, selected using random sampling to ensure representation from both developed and developing countries. The sample consist of 25 participants from developed countries, like USA, Germany, and Japan. 25 participants from developing countries like India, Brazil, and South Africa.

The research finds that green logistics policies extensively enhance trade efficiency and competitiveness, particularly in developed countries with advanced infrastructure and administrative blueprints.

CONCLUSION

The findings of this research study highlighted that sustainable logistics has a crucial impact on international trade, with a higher percentage of male respondents and youthful individuals showing awareness. A larger portion of respondents agrees on its positive impacts and organizational adoption.

However, challenges such as infrastructure, government policies, and market demand endure. While most respondents believe infrastructure and guidelines support sustainable logistics, consumer demand for sustainable methods is a notable driver in both developed and developing countries.

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ABBREVIATIONS

EU – European Union

SMEs – Small Medium Enterprises

EVs – Electric Vehicles

End