Assessing the Strategic Impact of Green and Reverse Logistics on Efficiency and Sustainability in EXIM Supply Chains

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Abstract-- **This article examines the strategic impact of green and reverse logistics on the efficiency and sustainability of Export-Import (EXIM) supply chains with reference to the Indian logistics sector. The study highlights how environmentally responsible logistics practices can enhance cost efficiency, operational performance, and compliance with sustainability goals. Data were collected from 50 logistics professionals across multiple departments, and analyzed using descriptive statistics, chi-square, ANOVA, correlation, and regression tests. Findings reveal moderate adoption of sustainable practices, consistent perceptions across departments, and significant influence of government policies and eco-friendly vehicles on sustainability reporting. The study concludes that sustainability initiatives must be institutionalized through stronger reporting frameworks, training, and alignment with national logistics policies.**

I. INTRODUCTION

The rapid expansion of international trade has placed Export-Import (EXIM) logistics at the center of global commerce. However, this growth has also intensified environmental challenges such as carbon emissions, energy consumption, and waste generation. Green logistics aims to minimize environmental impact through eco-friendly transportation, sustainable packaging, and energy-efficient warehousing. Reverse logistics focuses on managing product returns, recycling, and waste reduction to promote circular economy models. This study, focusing on Shaan's Cargo Pvt. Ltd., explores how these sustainable logistics practices influence operational efficiency and sustainability in EXIM supply chains.

II. RESEARCH METHODOLOGY

The study adopted a descriptive research design with a hybrid deductive–inductive approach. Purposive sampling was used to collect responses from 50 professionals across departments such as Marketing, Customs Clearance, Sales, and Customer Care. Data analysis included descriptive statistics, one-sample t-tests, chi-square tests, ANOVA, correlation, and regression analysis.

The main hypotheses were: (1) Green logistics positively impacts cost efficiency, and (2) Reverse logistics improves sustainability performance.

III. RESULTS AND DISCUSSION

The demographic data revealed that 62% of respondents were male and 56% belonged to middle management, indicating strong representation from experienced logistics professionals. Descriptive results showed moderate agreement with statements on sustainability practices. Reverse logistics was viewed as contributing to cost savings (mean 3.34), while green logistics improving environmental performance scored moderately (mean 2.82). Chi-square and ANOVA tests indicated no significant differences in perceptions across departments or experience levels, suggesting a uniform organizational outlook toward sustainability. Regression analysis revealed that government policies encouraging eco-friendly transport and the use of fuel-efficient or electric vehicles significantly influenced sustainability reporting ($p < 0.05$). However, other factors such as packaging or reverse logistics cost benefits were statistically insignificant. The overall model explained 25.7% of the variance in sustainability reporting, indicating that external policy factors play a stronger role than internal initiatives.

IV. SUGGESTIONS

1. Strengthen green logistics adoption through carbon-efficient transport, energy-saving warehousing, and standardized sustainability processes.

2. Enhance reverse logistics systems by developing centralized return, repair, and recycling programs.

3. Integrate sustainability into core operations through eco-packaging, renewable energy usage, and waste reduction SOPs.

4. Improve sustainability reporting by documenting emissions, publishing environmental performance reports, and aligning with GRI and ISO 14001 standards.

5. Provide employee training and departmental goals for sustainability awareness and accountability.

6. Leverage government incentives and digital technologies for data-driven sustainability monitoring.

VII. CONCLUSION

The study concludes that green and reverse logistics are crucial for sustainable EXIM operations. While awareness and partial adoption exist, comprehensive implementation and reporting remain limited. Uniform perceptions across departments suggest that sustainability is organizationally accepted but not yet fully institutionalized. Government policies and eco-friendly transport practices significantly influence sustainability outcomes. Organizations must align strategies, reporting mechanisms, and technological integration to achieve long-term environmental and operational benefits.

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