A Study On Sustainable Logistics Practices In Super Auto Forge Private Limited

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Abstract: This study, titled "A Study on Sustainable Logistics Practices in Super Auto Forge Pvt Ltd," investigates the current logistics operations of the company with a focus on environmental sustainability. The objectives include assessing existing practices, identifying key challenges in adopting green logistics, and exploring strategies for improvement. Data was collected through a structured questionnaire targeting employees involved in logistics activities, and analyzed using descriptive statistics such as percentages, mean scores, and visual charts. The findings reveal that while some sustainable practices are in place, there are significant gaps in areas like energy-efficient transportation, waste reduction, and employee awareness. Major challenges include high implementation costs, limited infrastructure, and insufficient training. The study recommends increasing investment in green technologies, enhancing employee training programs, and adopting an integrated approach to sustainable logistics planning. Overall, the research highlights the need for a strategic, cost-effective, and employee-inclusive model to strengthen sustainability in the forging industry.

Key Terms - Green logistics, sustainable logistics, forging industry, Super Auto Forge, supply chain sustainability, cost-benefit analysis

I. INTRODUCTION

Sustainability has become a key focus across industries, with logistics playing a crucial role in reducing environmental impact. The forging industry, known for its energy-intensive processes and substantial material consumption, faces unique challenges in adopting sustainable logistics practices. Efficient logistics in a forging company involves optimizing supply chain operations, reducing carbon emissions, minimizing waste, and implementing energy-efficient transportation and warehousing solutions.

This study explores the sustainable logistics practices in a forging industry, with a specific focus on Super Auto Forge Pvt Ltd. It aims to identify the challenges faced in implementing green logistics initiatives and the opportunities for improving environmental and economic performance. By examining aspects such as material handling, transportation efficiency, and waste management, the study seeks to provide insights into how sustainability can be integrated into logistics operations without compromising productivity and profitability.

II. REVIEW OF LITERATURE

Byrne, Ryan, and Heavey (2013) conducted an exploratory study on sustainable logistics in Irish manufacturing organizations, highlighting the evolving nature of logistics operations as firms increasingly integrate environmental considerations. Their findings revealed varying levels of willingness among organizations to adopt green supply chain practices, often hindered by concerns over hidden costs and implementation risks. Complementing this, Marchett and Melacini (2013) emphasized the growing relevance of environmental sustainability in logistics and freight transportation due to escalating concerns about carbon emissions, resource depletion, and climate change. Their research identified key strategies such as fuel-efficient vehicles, alternative energy sources, and digital optimization tools as effective means to enhance sustainability. Together, these studies underscore both the opportunities and challenges in implementing sustainable logistics, emphasizing the importance of corporate responsibility, government regulations, and innovative technologies for building a more environmentally responsible logistics network.

III. OBJECTIVES

Primary Objective:

A study on sustainable logistics practices in super auto force private limited company Secondary Objectives:

- Assess the current logistics operations and their impact on sustainability.

- To identify key challenges faced in implementing green logistics in the forging industry.

- To explore opportunities for improving logistics sustainability.

- To evaluate the cost-benefit analysis of adopting sustainable logistics practices.

IV. RESEARCH METHODOLOGY

This study uses a descriptive research design. Primary data was collected using structured questionnaires from 114 employees at super auto forge pvt ltd, selected through stratified sampling. Secondary sources included journal articles and reports.

1. Research Design

This study adopts a descriptive research design to analyze sustainable logistics practices at Super Auto Forge Pvt Ltd. The research focuses on assessing current logistics operations, identifying challenges, exploring opportunities, and evaluating the cost-benefit of sustainable logistics practices in the forging industry.

2. *Data Collection Methods*

Primary Data: Collected using structured questionnaires targeting employees at super auto forge pvt ltd. Sample size:

114 employees selected through **stratified sampling** to ensure diverse representation. Questionnaires designed to measure employee perceptions of Super Auto Forge Pvt Ltd.

Secondary Data: Gathered from journal articles, books, company reports, and industry research. Sourced from industry reports, academic journals, company records, government policies, and case studies on sustainable logistics.

3. *Sampling Technique*

Stratified Sampling: Employees were categorized based on department, tenure, and hierarchical level.

This ensures balanced insights across various organizational roles.

4. *Data Analysis Techniques*

The study applies multiple statistical tools to evaluate Super Auto Forge Pvt Ltd.

- **Percentage Analysis**: Used to summarize demographic details and general responses.

- **Chi-Square Test**: Determines the relationship between categorical variables (e.g., age and received training on sustainable logistics practices)

- **ANOVA (Analysis of Variance)**: Tests **group-wise differences** in perceptions about department of the respondents & the respondents ratings for current logistics of super auto forge pvt ltd

- **Correlation Analysis**: Assesses the link between experience of the respondents & the respondents digital tools usage in super auto forge pvt ltd

V. ANALYSIS TOOLS

- Percentage Analysis: To describe demographic data.

- Chi-Square Test: To identify relationships between categorical variables.

- ANOVA: To test group-wise perception differences about super auto forge pvt ltd.

- Correlation Analysis: To evaluate the relationship between two variables.

SUMMARY OF STATISTICAL TESTS

Test Type	Variables Tested	Test Statistic	Degrees of Freedom (df)	Significance (p-value)	Inference
Chi-Square Test	Age vs received training on sustainable logistics practices	0.492	1	0.483	No Significant relationship exists
ANOVA Test	Department vs Rating of Current Logistics Practices	2.469	5, 109	0.049	Significant difference exists
Correlation Analysis	erience vs Digital Tool Usage	-0.092(r)	-	0.328	ficant correlation exists

VI. Findings

➢ Majority of respondents (78%) were male and most were aged between 25-35 years.

➢ 79% of employees received training on sustainable logistics practices.

➢ 57% believe only some employees need further training; 22% say significant training is required.

➢ Road transport is the primary logistics mode (89%).

➢ 60% of employees said fuel consumption is tracked daily.

➢ Digital tools are used, but only 31% say extensively; 52% say usage is limited.

➢ 46% say only a few emission-reduction strategies are in place; 39% report multiple strategies.

➢ 47% state environmental impact is regularly assessed

➢ 43% believe automation/digitalization has some impact, 42% say it plays a major role.

➢ AI-based route planning (28%) and electric trucks (36%) are seen as key technologies.

➢ 38% feel green logistics is more expensive; 42% feel cost is similar.

➢ 44% observed minimal savings from sustainable practices; 37% noted significant savings.

➢ 55% believe sustainable logistics will lead to long-term cost savings.

➢ High cost (47%) and lack of technology (42%) are major barriers.

➢ Infrastructure limitations like poor rail access (46%) and lack of EV charging stations (23%) hinder adoption.

➢ Only 29% see strong supplier collaboration.

VII. Suggestions

- Expand Training Programs: Conduct regular training sessions for all employees to improve understanding of sustainable logistics.

- Improve Digital Tool Adoption: Increase the use of route optimization and fuel-tracking software to reduce emissions.

- Encourage Departmental Collaboration: Align all departments with sustainability goals for a unified approach.

- Address Cost Concerns: Explore grants and partnerships to offset the initial costs of green technologies.

- Enhance Supplier Collaboration: Work closely with suppliers to ensure they follow eco- friendly practices.

- Invest in Infrastructure: Improve internal infrastructure such as EV charging stations and recycling systems.

- Monitor and Evaluate: Regularly track carbon footprints and environmental impacts to assess progress.

- Employee Incentives: Reward teams or departments that excel in implementing green practices.

- Customer Awareness Campaigns: Promote sustainability initiatives to clients to improve brand value.

VIII. Conclusion

This study on sustainable logistics practices at Super Auto Forge Pvt Ltd provides critical insights into the company's current operations and their alignment with environmental sustainability. The analysis revealed the adoption of certain eco- friendly initiatives, such as route optimization, energy reduction, and waste minimization. However, notable gaps remain in areas like advanced technology adoption and employee awareness of green logistics.

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