A STUDY ON OPTIMIZING FREIGHT COST USING DATA ANALYSIS

Dr.B. Selvakumar

Assistant Professor, Department of Management Studies, Easwari Engineering College

Gayathri T T[2], Priyanka R[3], Jeya Sudheksha R V[4], Muthuram Venkatesh N[5], Jaya Shree V[6]

II Year MBA, Easwari Engineering College, Chennai.

ABSTRACT:

This study explores how businesses use data analytics to optimize freight costs, a crucial aspect of supply chain management. The complexity of global trade and rising transportation costs have led to a growing interest in data analytics as a strategic tool for cost reduction and performance improvement. The study focuses on the use of analytics tools in freight management, data-driven decision-making, and the impact of digital transformation on cost reduction. Supply chain experts were surveyed to understand their experiences with tracking techniques, freight cost optimization, difficulties, and analytical tool investment. Results showed that software programs like SAP, Oracle Transportation Management, and Power BI are essential for increasing freight cost effectiveness. However, adoption obstacles like poor training, lack of visibility, and reliance on outdated cost-tracking techniques persist. The study suggests that companies must invest in sophisticated analytical solutions and personnel up skilling to improve decision-making skills. The study aims to offer organizations a data-driven perspective on freight cost management to optimize operations and enhance cost efficiency

Keywords: *Freight cost management, data analysis, supply chain, digital transformation.*

1.INTRODUCTION

The study explores the use of data analytics in freight cost optimization, analysing industry practices, obstacles, and analytical tools. It uses a questionnaire to gather insights from supply chain experts, aiming to determine if additional analytical capabilities are needed and how businesses incorporate data analytics into their logistics plans.

2. REVIEW OF LITERATURE

2.1.1 Claudia Archetti, Lorenzo Peirano, M. Grazia Speranza . Content: Globalization has increased the demand for multimodal transportation, necessitating optimization strategies. This literature review examines current studies, identifying recurring themes and proposing new directions for further investigation in this complex system.

2.1.2 Alexandra Kravets, Viktor Bogachev, Irina Egorova, Taras Bogachev. Content: The paper presents a multi-criteria method for optimizing cargo flow distribution in multimodal transport networks, with a specific focus on grain cargo flows for Russian exports.

2.1.3. Yadong Wang, Qiang Meng. Content: Determining the optimal freight rate for spot containers in a shipping network, considering uncertainties such as variable demand and ship capacity.

2.1.4 Anton Zackrisson, Albin Engholm, Ou Tang. Content: Using a data-driven analytical approach, over 100,000 scenarios for internal combustion engine trucks (ICETs) and battery electric trucks (BETs) are assessed. The results demonstrate the effectiveness of large-scale electrification in improving service quality and utilization.

3.1 OBJECTIVES OF STUDY

- To analyse the Freight cost optimization is a priority for the organization.
- To examine the factors considered while choosing a freight carrier.
- To measure the success of freight cost optimization efforts.
- To analyze the impact of data analytics on optimizing freight cost efficiency and identifying cost-reduction opportunities in logistics and transportation.
- To assess the adequacy of organizational investments in tools for freight cost analysis and their impact on cost optimization and efficiency in logistics.

4.1 RESEARCH METHODOLOGY

Research methodology refers to the systematic processes, techniques, and procedures used to conduct research and gather data. It encompasses both theoretical and practical approaches to problem-solving

4.1.1 RESEARCH DESIGN

The researcher adopted descriptive research design to enhance data reliability and minimize bias by selecting and analysing various parameters for efficient data collection and analysis.

4.1.2 DESCRIPTIVE RESEARCH DESIGN

Satirical research uses statistical computations to provide accurate data about a population, while descriptive research involves surveys and fact-finding inquiries to establish causal relationships. Population-The study will cover on FLSmidth Private Limited employees in Chennai.

SAMPLE DESIGN

The researcher adopted convenience sampling as the sampling technique.

SAMPLING METHOD

The study employs convenience sampling, selecting population elements based on their accessibility. The sample size is 110.

4.1.3 DATA COLLECTION METHODS

Primary Data - Such as questionnaires, is original and collected by researchers for specific purposes. Secondary Data -This research uses secondary sources, including a magazine, to gather information that is already available in the market.

5. DATA ANALYSIS AND INTERPRETATION

5.1 RATE THE CURRENT USE OF DATA ANALYTICS FOR FREIGHT COST OPTIMIZATION

Current Use of Data Analytics for Freight Cost Optimization:	No. of Respondents	% of Respondents
Yes	83	91.3%
No	27	29.7%
Total	110	100%

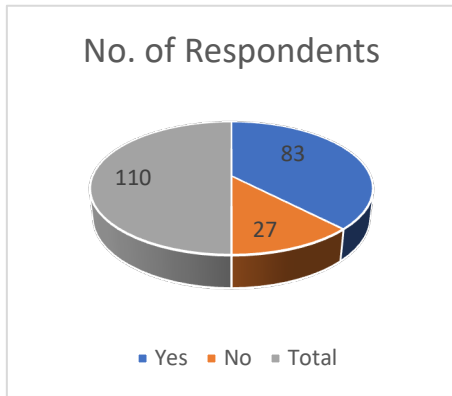**(Source: Primary Data)**   **Table 5.1**

Chart 5.1

INFERENCE: The table indicates that most workers use analytics for cost control, while some still employ conventional methods.

5.2 HOW DO YOU TRACK FREIGHT COSTS IN YOUR ORGANIZATION?

Tracking freight cost in organisation	No. of Respondents	% of Respondents
Manually	21	19%
Using Spreadsheets	37	34%
Through Software Tools	52	47%
Total	110	100%

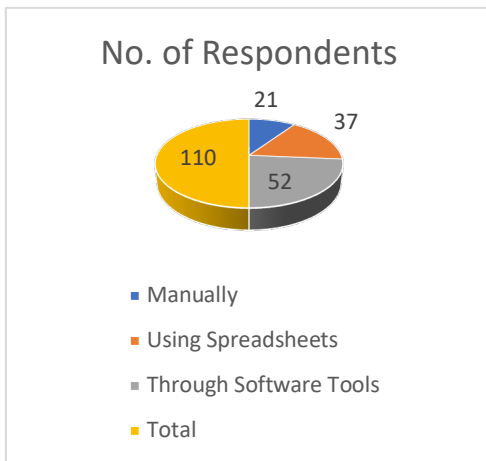**(Source: Primary data)**   **Table 5.2**

Chart 5.2

INFERENCE: The table shows software tools (47%), spreadsheet usage (34%), and manual usage (19%) are the most used tracking techniques, indicating automation and a transitory stage of sophisticated tools.

6. STATISTICAL TOOLS AND ANALYSIS

6.1 CORRELATION ANALYSIS

Finding Relationship between Data Analytics Usage and Perceived Freight Cost Reduction

NULL HYPOTHESIS (H₀): There is no significant linear correlation between the use of data analytics and the belief that data analytics reduces freight costs.

ALTERNATIVE HYPOTHESIS (H₁): There is a significant linear correlation between the use of data analytics and the belief that data analytics reduces freight costs.

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CORRELATION
    /VARIABLES = freightcostoptimization AgreementLevel
    /PRINT = TWOTAIL NOSIG.
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Correlations

		freight cost optimization	Agreement Leve;
freight cost optimization	Pearson Correlation	1.000	.023
	Sig. (2-tailed)		.811
	N	110	110
Agreement Leve;	Pearson Correlation	.023	1.000
	Sig. (2-tailed)	.811	
	N	110	110

INTERPRETATION - The Agreement Level and Freight Cost Optimisation have a 0.023 Pearson correlation coefficient, indicating no significant correlation between the two variables.

INFERENCE -The analysis shows no significant correlation between Freight Cost Optimisation and Agreement Level, indicating a likely chance-based association.

6.2. KRUSKAL WALLIS TEST

Finding relationship between Freight cost optimization is a priority for the organization and **Organization invests adequately in tools for freight cost analysis.**

NULL HYPOTHESIS (H₀): There is no significant difference in investment levels across different levels of priority for freight cost optimization.

ALTERNATIVE HYPOTHESIS (H₁): There is a significant difference in investment levels across different levels of priority for freight cost optimization.

Ranks

		N	Mean Rank
Freight cost optimisation is priority for organisation	Strongly Disagree	1	2.00
	Disagree	1	2.00
	Neutral	17	10.94
	Total	19	

Test Statistics

	Freight cost optimisation is priority for organisation
Chi-Square	5.75
df	2
Asymp. Sig.	.056

INTERPRETATION - The organization's freight cost optimization priority is ranked as strongly disagreed, disagreed, or neutral.

INFERENCE - The Chi-Square test revealed no significant differences in respondents' opinions on freight cost optimization, with most choosing "Neutral," indicating uncertainty or lack of strong opinion.

7.1 FINDINGS, SUGGESTIONS AND CONCLUSIONS:

7.1.1. FINDINGS

91.3% of employees using **data Analytics for Freight Cost Optimization.47% of employees using software technology to track freight cost in the organisation. 34% of employees using spreadsheets to track freight cost in organisation.19% of employee's manual method (traditional method) to track freight cost in organisation**

7.1.2. SUGGESTIONS

- ✓ The organization should offer regular employee training to enhance data-driven decision-making.
- ✓ Implement analytics tools to reduce expenses, address route design issues, increase freight analytics investment,
- ✓ Digitize freight cost monitoring, and transition to automated software tools for cost optimization.

7.1.3 CONCLUSIONS

The study emphasizes the importance of data-driven decision-making in supply chain management and logistics, highlighting the benefits of real-time tracking and route

optimization. It suggests that barriers like inefficient route planning and limited data visibility can be overcome through strategic AI solutions.

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