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A Study on Cost Analysis of Switching Air Freight to Sea Freight

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Abstract: ***In the modern globalized economy, logistics and transportation play a crucial role in ensuring efficient supply chain operations. Companies often rely on different transportation modes such as air freight and sea freight to move goods across international markets. While air freight offers speed and reliability, it also involves significantly higher costs compared to sea freight. This study aims to analyze the cost implications of switching from air freight to sea freight in logistics operations. The research focuses on identifying the potential cost savings, operational challenges, and strategic considerations associated with this transition. Primary data were collected from 150 respondents using a structured questionnaire. Statistical tools such as percentage analysis, ANOVA, and Chi-Square tests were used to analyze the data. The findings reveal that sea freight can significantly reduce transportation costs, although longer transit time and logistical coordination remain major challenges. The study concludes that organizations can achieve substantial cost benefits by strategically shifting suitable shipments from air freight to sea freight while maintaining supply chain efficiency.***

Keywords: Air Freight, Sea Freight, Logistics Cost, Supply Chain Management, Transportation Efficiency, Cost Analysis.

I. INTRODUCTION

Transportation is an essential component of logistics and supply chain management, enabling the movement of goods from production centers to markets across the world. With the rapid expansion of international trade, companies increasingly rely on efficient transportation systems to maintain competitiveness and meet customer demands. Among the various transportation modes available, air freight and sea freight are widely used for international shipping. Air freight is known for its speed, reliability, and ability to transport time-sensitive and high-value goods. It enables businesses to deliver products quickly, maintain inventory efficiency, and respond rapidly to market demand. Despite its cost advantages, sea freight involves longer transit times and potential delays due to port operations, weather conditions, and customs procedures . As companies face increasing pressure to reduce logistics costs and improve operational efficiency, many organizations are considering shifting certain shipments from air freight to sea freight. This study examines the cost implications and operational feasibility of switching transportation modes to achieve better logistics performance and cost optimization.

II. REVIEW OF LITERATURE

Several studies have examined the efficiency and economic implications of different freight transportation modes.Baxter (2011) highlighted the importance of international air freight services in global logistics systems. The study emphasized that air cargo plays a vital role in transporting time-sensitive goods, although many airlines treat freight as a secondary service compared to passenger operations. Abreu (2023) examined the competitiveness of short sea shipping by considering external transportation costs and environmental regulations. The study concluded that maritime transport can remain economically competitive for many routes.Fan and Gu (2020) conducted a cost–benefit analysis of shipping fuel compliance with international environmental regulations. Their research emphasized the importance of cost-effective operational strategies in maritime transport..Overall, previous research indicates that selecting an appropriate transportation mode is essential for improving logistics efficiency and reducing operational costs.

III. OBJECTIVES OF THE STUDY

1) To understand the concept of air freight and sea freight in logistics operations.
2) To analyze the cost differences between air freight and sea freight transportation.
3) To examine the feasibility of switching from air freight to sea freight.
4) To identify the factors influencing transportation mode selection.
5) To suggest strategies for improving cost efficiency in logistics operations.

IV. RESEARCH METHODOLOGY

A. Research Design

The study adopts a descriptive research design to analyze and compare existing air freight practices with the proposed alternative of sea freight in terms of cost, time, and operational efficiency.

B. Sample Size

The study uses a sample size of 150 respondents involved in logistics and freight management activities

C. Sampling Technique

A stratified sampling method is used to categorize shipments based on type, route, and product characteristics to ensure representative data collection.

D. Sources of Data

Primary Data: Collected through structured questionnaires from logistics professionals.
Secondary Data: Collected from journals, books, reports, and online publications related to logistics and transportation.

E. Statistical Tools Used

- Percentage Analysis
- ANOVA (Analysis of Variance)
- Chi-Square Test

V. RESULTS AND ANALYSIS

TABLE 1
Years Of Experience Of Respondents

Years of Experience	Frequency	Percentage
Below 2 years	32	21.33%
2 – 5 years	46	30.67%
5 – 10 years	39	26.00%
Above 10 years	33	22.00%
Total	150	100%

Interpretation: The table shows the years of experience of the respondents involved in logistics and freight management. The majority of respondents (30.67%) have 2–5 years of experience, indicating a strong representation of mid-level logistics professionals. About 26% have 5–10 years of experience, reflecting the presence of experienced employees who understand operational challenges in freight transportation. Around 21.33% have less than 2 years of experience, representing entry-level professionals. Respondents with more than 10 years of experience account for 22%, indicating the presence of senior personnel with strategic decision-making roles in logistics operations.

TABLE 2
Current Primary Mode Of Transport Used

Mode of Transport	Frequency	Percentage
Air Freight	68	45.33%
Sea Freight	41	27.33%
Combination of Air & Sea	29	19.33%
Other Modes	12	8.00%
Total	150	100%

Interpretation: The table shows that 45.33% of respondents primarily use air freight for transporting goods due to its speed and reliability. 27.33% use sea freight, mainly for bulk shipments and cost advantages. About 19.33% use a combination of air and sea freight, indicating a hybrid logistics strategy that balances speed and cost. The remaining 8% use other modes of transportation, such as road or rail, depending on operational requirements.

VI. FINDINGS

Air freight offers faster delivery but involves significantly higher transportation costs. Sea freight is more economical for bulk shipments and non-urgent deliveries. Organizations can reduce logistics costs by strategically shifting certain shipments to sea freight. Transportation mode decisions depend on shipment urgency, product characteristics, and supply chain strategy. Effective planning and inventory management are essential for successfully switching to sea freight.

VII. SUGGESTIONS

1) Companies should conduct detailed cost-benefit analysis before switching transportation modes.
2) Organizations should adopt better inventory planning to accommodate longer sea freight transit times.
3) Digital tracking systems should be implemented to monitor shipments in real time.
4) Training programs should be provided to employees to improve documentation and freight management processes.

VIII. CONCLUSION

The study concludes that transportation mode selection plays a crucial role in determining logistics cost and operational efficiency in international trade. While air freight remains the preferred option for urgent and high-value shipments, sea freight offers substantial cost advantages for bulk and non-time-sensitive cargo.By carefully analyzing shipment requirements and adopting strategic logistics planning, organizations can optimize transportation costs and improve overall supply chain performance. The study emphasizes that a balanced approach combining both air and sea freight can help businesses achieve cost efficiency while maintaining service reliability.

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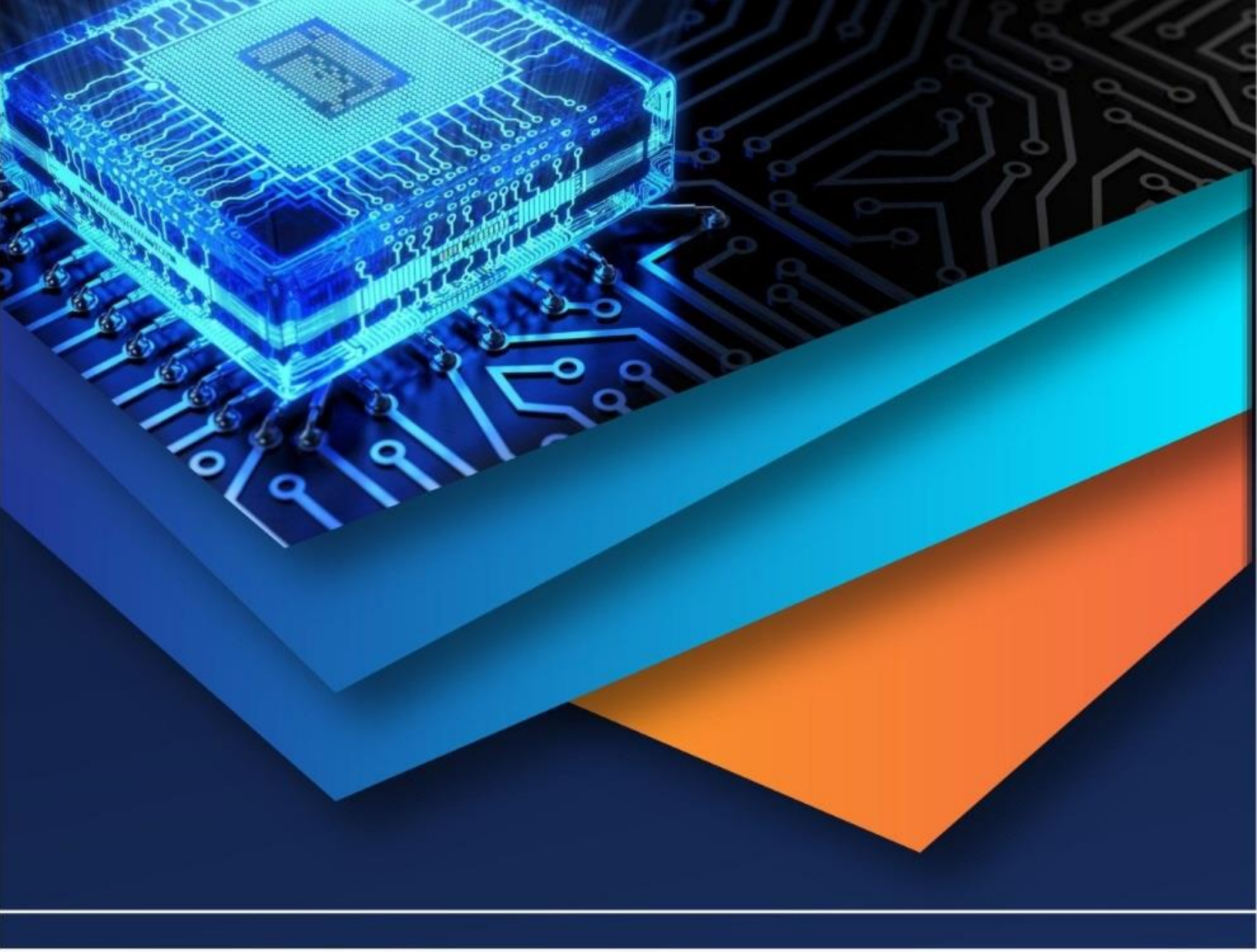

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