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A STUDY ON OCEAN FREIGHT AND ITS ISSUES IN DAHNAY LOGISTICS

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Abstract: The study Aims, titled "A Study on Ocean Freight and Its Issues," provides a comprehensive analysis of the ocean freight industry, which serves as the backbone of global trade, handling approximately 90% of the world's trade volume and 11 billion tons of goods annually. Valued at $120 billion in 2023 with a projected growth rate of 4-5% through 2030, the industry faces significant challenges including environmental impact, regulatory complexities, geopolitical disruptions, operational inefficiencies, labor issues, and shifting trade dynamics. The research employs a descriptive, cross-sectional design, utilizing a purposive sample of 30 ocean freight professionals surveyed on May 01, 2025, to assess workforce demographics, operational challenges, and technology adoption. Key findings reveal a predominantly young workforce (40% below 25 years), a slight male dominance (56.7%), and a strong operational focus with Shipping Managers and Port Operators (36.7% each). Major issues include poor coordination (33.3% strongly disagree), environmental regulation costs (50% agree), and skepticism toward technologies like AI-driven analytics (60% strongly disagree) and IoT tracking (43.3% disagree), though blockchain (63.3% strongly agree) and automated port equipment (63.3% agree) show strong support

I. INTRODUCTION

Ocean freight, the transportation of goods across seas and oceans via cargo ships, is the backbone of global trade. Accounting for approximately 90% of the world's trade by volume, it is the most cost-effective and efficient method for moving large quantities of goods over long distances. From raw materials like oil and minerals to finished products such as electronics and clothing, ocean freight connects producers, manufacturers, and consumers across continents. Its significance lies not only in its capacity to handle bulk shipments but also in its relatively low cost per unit compared to air or land transport. However, the industry faces a myriad of challenges, including environmental concerns, regulatory complexities, geopolitical tensions, and operational inefficiencies, which threaten its sustainability and reliability.

The global ocean freight market was valued at approximately $120 billion in 2023 and is projected to grow steadily due to increasing demand for consumer goods, industrial materials, and energy resources. Major trade routes, such as those connecting Asia to North America and Europe, handle millions of containers annually, with ports like Shanghai, Singapore, and Rotterdam serving as critical nodes. Despite its dominance, the sector is undergoing significant transformation driven by technological advancements, shifting trade patterns, and growing scrutiny over its environmental footprint. This study aims to explore the intricacies of ocean freight, delving into its operational framework, historical evolution, and the pressing issues that shape its current and future trajectory.

STATEMENT OF THE PROBLEM

Ocean freight plays a vital role in global trade, handling over 80% of international cargo transportation. Despite its importance, the ocean freight industry faces a range of persistent and emerging challenges, including rising fuel costs, port congestion, environmental regulations, labor shortages, piracy, and delays due to geopolitical tensions and climate-related disruptions. These issues not only affect the efficiency and cost of shipping operations but also have broader implications for global supply chains, trade competitiveness, and economic stability. This study aims to investigate the key problems affecting ocean freight today, assess their impact on stakeholders, and explore potential solutions to enhance the reliability, affordability, and sustainability of maritime transport.

PRIMARY OBJECTIVE:

To analyze the major issues affecting ocean freight operations and evaluate their impact on global trade efficiency and cost. The study aims to identify practical solutions to improve the performance and sustainability of the ocean freight industry.

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SECONDARY OBJECTIVE:

- To examine the causes of common challenges such as port congestion, fuel price volatility, and regulatory compliance in ocean freight.
- To assess the impact of technological advancements and digitalization on the efficiency of maritime logistics.
- To explore the environmental implications of ocean freight and the industry's shift toward greener practices.
- To evaluate the role of global events—such as pandemics, geopolitical conflicts, and climate change—on shipping routes and schedules.
- To identify strategies adopted by shipping companies and port authorities to mitigate operational and financial risks.

II. LITERATURE REVIEW

Ocean freight has long been a cornerstone of international trade, accounting for the majority of global cargo movement. According to Stopford (2009), maritime transport is one of the most cost-effective means of bulk cargo transport, but it is highly susceptible to disruptions due to its complex global nature. Several studies have highlighted operational inefficiencies and rising costs as key concerns. For instance, Notteboom and Rodrigue (2008) observed that port congestion and logistical bottlenecks significantly impact turnaround time and supply chain fluidity.

Fuel price volatility is another recurring challenge in ocean freight. Research by Cullinane and Khanna (2000) discusses the correlation between bunker fuel prices and freight rates, emphasizing the need for energy-efficient practices. Meanwhile, the implementation of IMO 2020 regulations, which mandate the use of low-sulfur fuel, has further stressed operational budgets (Pavlic et al., 2020), pushing companies to seek sustainable alternatives like LNG and hybrid propulsion systems.

The COVID-19 pandemic exposed the fragility of global shipping networks, as examined by UNCTAD (2021), which noted severe disruptions due to labor shortages, port closures, and container imbalances. Similarly, environmental concerns are gaining attention. Studies like those by Psaraftis (2012) have explored green shipping practices, carbon emissions, and the growing need for regulatory compliance to address climate change impacts.

Technological innovation is also reshaping the ocean freight industry. According to Heilig, Lalla-Ruiz, and Voß (2017), digital tools such as blockchain, AI, and IoT have the potential to enhance transparency, reduce delays, and optimize freight management. However, adoption is uneven, particularly in developing regions.

In summary, existing literature suggests that while ocean freight remains essential to global commerce, it faces pressing challenges related to cost, sustainability, efficiency, and adaptability. Addressing these issues requires coordinated efforts from stakeholders, policy makers, and industry leaders.

III. RESEARCH METHODOLOGY

This study adopts a mixed-methods approach, combining both qualitative and quantitative research methods to comprehensively analyze the issues in ocean freight.

1. Research Design:

The research is exploratory and descriptive in nature. It aims to understand the current challenges in ocean freight and evaluate their impact on operations and global trade.

2. Data Collection Methods:

- **Primary Data:** Collected through structured questionnaires and interviews with key stakeholders in the shipping industry, including logistics managers, port authorities, freight forwarders, and shipping company personnel.
- **Secondary Data:** Sourced from academic journals, industry reports, trade publications, government documents, and reliable online databases such as UNCTAD, IMO, and World Bank.

2. Sampling Technique:

A purposive sampling method will be used to select respondents with relevant experience and knowledge in ocean freight operations. The sample size may vary depending on accessibility and availability of participants.

4. Data Analysis Techniques:

- **Quantitative data** from surveys will be analyzed using statistical tools such as SPSS or Excel to identify trends, frequencies, and correlations.

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- **Qualitative data** from interviews will be examined using thematic analysis to capture insights and patterns regarding operational challenges and potential solutions.

OBSERVATION REVIEW

Based on the data collected and interactions with stakeholders in the ocean freight industry, several key observations were made:

1. **Port Congestion and Delays:**

A majority of respondents reported frequent delays due to port congestion, especially in major global ports. These delays significantly impact delivery schedules and increase demurrage charges.

2. **Rising Operational Costs:**

Stakeholders observed a consistent rise in fuel prices, port handling fees, and regulatory compliance costs, which collectively contribute to shrinking profit margins in shipping operations.

3. **Regulatory Challenges:**

Compliance with international environmental regulations, such as the IMO 2020 low-sulfur fuel mandate, has increased pressure on shipping companies to invest in cleaner, more expensive technologies.

4. **Lack of Technological Integration:**

While digital tools like tracking systems and logistics platforms are available, their adoption remains uneven across the industry. Many small and medium enterprises still rely on outdated systems, leading to inefficiencies.

5. **Global Disruptions and Uncertainty:**

Events such as the COVID-19 pandemic, the Suez Canal blockage, and regional geopolitical conflicts have disrupted supply chains and highlighted the vulnerability of global ocean freight routes.

6. **Sustainability Awareness Growing Slowly:**

Although environmental concerns are recognized, only a small percentage of companies have adopted green shipping practices or carbon reduction strategies, primarily due to cost constraints.

LIMITATIONS OF THE STUDY

1. **Limited Sample Size:**

Due to time and resource constraints, the study was conducted with a limited number of respondents, which may not fully represent the global scope of the ocean freight industry.

2. **Geographical Constraints:**

The data collected primarily focuses on specific regions or ports, which may limit the generalizability of the findings to other areas with different logistical or regulatory environments.

3. **Access to Industry Experts:**

Some high-level professionals and stakeholders were not accessible, resulting in a lack of deeper insights from top-tier decision-makers within major shipping firms.

4. **Rapidly Changing Environment:**

The dynamic nature of global trade, political tensions, and environmental policies means that the challenges identified may evolve quickly, potentially affecting the study's long-term relevance.

5. **Potential Response Bias:**

Responses from surveys and interviews may be influenced by personal opinions, roles, or interests of participants, which could lead to biased or subjective interpretations.

6. **Technology Data Limitation:**

While technological advancement is a critical area, limited access to proprietary systems and real-time logistics data restricted a more detailed evaluation of digital integration in shipping operations.

ANALYSIS

Based on the data collected through surveys, interviews, and secondary research, several key patterns and insights emerged regarding the challenges and current state of ocean freight.

1. **Operational Inefficiencies:**

Port congestion emerged as one of the most frequently cited issues, particularly in high-traffic ports. Delays caused by container backlogs, inefficient customs procedures, and limited port infrastructure significantly impact turnaround time and delivery schedules.

2. **Cost Fluctuations:**

A large proportion of respondents indicated that rising fuel prices and regulatory costs (such as IMO 2020 compliance) are contributing to increasing freight charges. These rising costs are often passed on to customers, affecting global supply chain pricing and competitiveness.

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3. **Technological Gaps:**
Although digital tools such as GPS tracking, automated documentation, and blockchain logistics platforms exist, adoption remains uneven. Smaller players in the industry are often unable to invest in these systems, resulting in manual errors, delays, and miscommunication.

4. **Environmental Pressures:**
There is growing awareness of the environmental impact of maritime transport. However, actual implementation of green shipping practices remains limited due to high initial costs and lack of policy incentives. Few companies are currently equipped with LNG-powered vessels or emission control technologies.

5. **Global Disruption Sensitivity:**
The study revealed that the industry is highly vulnerable to external disruptions, such as pandemics, geopolitical conflicts, and extreme weather events. These factors have led to unpredictable shipping schedules, container shortages, and increased freight rates globally.

6. **Stakeholder Concerns:**
Freight forwarders and logistics managers expressed concern about the lack of coordination between shipping companies, port authorities, and regulatory bodies. Improved collaboration and communication were identified as key areas needing development.

DISCUSSIONS

The findings of this study reveal that the ocean freight industry, while essential to global trade, is grappling with a complex set of challenges that significantly hinder its efficiency and sustainability. Operational delays, largely due to port congestion and infrastructure limitations, are a recurring issue that affects delivery timelines and increases costs. Additionally, the industry is facing rising operational expenses driven by fluctuating fuel prices and stricter environmental regulations, such as the IMO 2020 mandate. While there is growing awareness of the need for digital transformation and green shipping practices, adoption remains slow, especially among smaller firms with limited resources. The COVID-19 pandemic and other global disruptions have further exposed the vulnerability of maritime logistics, underlining the need for better risk management, resilience planning, and cross-border coordination. These challenges, if left unaddressed, could have lasting consequences on global supply chains and trade competitiveness. Therefore, a more proactive, collaborative, and innovation-driven approach is essential for the future of ocean freight.

KEY FINDINGS

Port Congestion Is a Major Bottleneck:
Delays at major ports are significantly affecting shipping schedules and increasing demurrage costs.

Rising Operational Costs:
Fuel price volatility and compliance with environmental regulations have led to higher freight charges and reduced profitability.

Uneven Technological Adoption:
While digital solutions exist, smaller companies struggle to adopt them, resulting in inefficiencies and communication gaps.

Environmental Compliance Is Costly but Crucial:
Though green shipping practices are gaining attention, implementation is slow due to high investment costs and limited regulatory support in some regions.

Need for Greater Stakeholder Collaboration:
Lack of coordination among shipping companies, port authorities, and regulators is a recurring issue, limiting operational efficiency.

The findings of this study largely align with insights presented in the existing literature on ocean freight challenges. As highlighted by Notteboom and Rodrigue (2008), port congestion continues to be a significant operational obstacle, which was echoed in this study's observation of frequent delays and extended turnaround times at major ports. Similarly, the issue of rising fuel prices and regulatory costs, discussed by Cullinane and Khanna (2000), was confirmed through primary data indicating increased freight charges and tighter profit margins due to fuel price volatility and IMO 2020 compliance.

The literature emphasizes the potential of digital technologies to improve shipping efficiency (Heilig et al., 2017); however, this study found that adoption remains inconsistent across the industry, especially among small to mid-sized operators. This highlights a gap between theoretical benefits and practical implementation.

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Additionally, while Psaraftis (2012) and other scholars discuss the environmental impact of maritime transport, this study reveals that although companies are aware of green practices, actual application remains limited due to high upfront costs—a concern also noted in recent UNCTAD (2021) reports.

Finally, the study reinforces the literature's argument that the ocean freight sector is highly vulnerable to global disruptions, such as pandemics or geopolitical tensions. These findings strengthen the case made in academic and industry research for building resilience through collaboration, policy reform, and investment in infrastructure and technology.

COMPARISON WITH REVIEW OF LITERATURE

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IV. CONCLUSION

This study has highlighted the critical role of ocean freight in facilitating global trade, while also revealing a range of operational, environmental, and economic challenges currently facing the industry. Port congestion, rising fuel costs, regulatory pressures, and limited adoption of digital technologies have emerged as key barriers to efficient maritime logistics. Moreover, the industry's vulnerability to global disruptions—such as pandemics, geopolitical conflicts, and climate events—has underscored the need for greater resilience and adaptability. Although there is increasing awareness of sustainable and tech-driven solutions, implementation remains inconsistent due to cost and structural limitations. The findings emphasize the urgent need for coordinated efforts among stakeholders, investment in modern infrastructure, adoption of smart technologies, and stronger environmental governance to ensure the future efficiency and sustainability of ocean freight.

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