



A Study on Analysis of Freight Forwarding operations

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Abstract – Freight forwarding plays a vital role in facilitating the movement of goods through transportation, documentation, customs clearance, cargo handling, shipment tracking, and delivery. The present study analyses freight forwarding operations with particular emphasis on operational practices, transportation preferences, customs clearance, documentation, digital technologies, and service satisfaction. The study adopts a descriptive research design based on both primary and secondary data. Primary data were collected through a structured questionnaire, and 72 valid responses were considered for analysis. Percentage analysis was used to present descriptive findings, while the Chi-square test and One-Way ANOVA were employed for hypothesis testing. The findings indicate that 66.67% of respondents prefer sea transportation, while 80.56% prefer Full Container Load (FCL) shipments and 72.22% are engaged in both import and export activities. Furthermore, 87.50% of respondents were satisfied or highly satisfied with the customs clearance process, while 76.39% agreed or strongly agreed that online documentation facilitates error detection and shipment tracking. The statistical analysis revealed significant associations between the nature of business and terms and conditions, the nature of business and online documentation, and exporting time and terms and conditions. The study emphasizes the importance of digital documentation, real-time shipment tracking, employee training, effective coordination, and contingency planning for improving the efficiency and reliability of freight forwarding operations.

Keywords – Freight Forwarding, Logistics, Customs Clearance, Documentation, FCL, LCL, Shipment Tracking, Chi-square, ANOVA

I. INTRODUCTION

Logistics is a systematic process of planning, implementing, and controlling the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption. It encompasses several interconnected activities, including transportation, warehousing, inventory management, packaging, material handling, order processing, freight forwarding, customs clearance, and distribution. The fundamental objective of logistics is to ensure that the right product reaches the right customer, in the right quantity, at the right place, at the right time, and at the right cost, while maintaining appropriate service quality. Freight forwarding represents an important component of logistics and plays a significant role in domestic and international trade. A freight forwarder acts as an intermediary between exporters, importers, carriers, customs authorities, warehouses, ports, and other logistics service providers. The major activities involved in freight forwarding include shipment planning, cargo booking, transportation coordination, preparation and verification of shipping documents, customs clearance, cargo handling, warehousing, shipment tracking, and final delivery. Effective coordination among these activities enables organizations to move goods efficiently across geographical boundaries.

The growth of international trade has increased the importance of professional freight forwarding services. Exporters and importers increasingly depend on freight forwarders to manage complex transportation networks, customs requirements, regulatory procedures,

documentation, and delivery schedules. Freight forwarders help businesses select suitable transportation modes, consolidate shipments, negotiate freight rates, coordinate carriers, and monitor cargo movement. Consequently, efficient freight forwarding can contribute to reduced transportation costs, shorter delivery times, improved shipment visibility, and enhanced customer satisfaction. The freight forwarding industry has also undergone significant technological transformation. Digital documentation, electronic bills of lading, online booking systems, automated customs procedures, GPS-based tracking, cloud-based logistics platforms, and real-time shipment-monitoring systems are increasingly being adopted. These technologies can reduce paperwork, minimize documentation errors, improve information sharing, and provide customers with greater visibility of their shipments. Artificial intelligence, data analytics, and Internet of Things technologies are further creating opportunities for predictive planning, route optimization, risk management, and operational decision-making.

However, freight forwarding operations continue to face several challenges. Fluctuating freight rates, container shortages, port congestion, customs delays, documentation errors, transportation disruptions, regulatory changes, and geopolitical uncertainties can affect the smooth movement of cargo. In addition, differences in international trade regulations and documentation requirements can increase operational complexity. Freight forwarding companies therefore need effective contingency planning, trained employees, reliable technology, and strong coordination with logistics partners to manage these challenges.



ISSN:3048-7722

Customer expectations have also become an important consideration in freight forwarding. Customers increasingly expect competitive pricing, timely delivery, accurate documentation, real-time shipment tracking, quick responses to queries, and effective problem resolution.

Service quality therefore depends not only on the physical movement of goods but also on communication, transparency, reliability, and responsiveness. Freight forwarders that provide accurate information and proactive customer support can develop stronger relationships and improve customer satisfaction. Operational efficiency is another important factor influencing the performance of freight forwarding companies. Efficient documentation, transportation planning, customs clearance, cargo handling, warehouse coordination, and shipment tracking can reduce unnecessary costs and delays. Employee training is particularly important because freight forwarding involves specialized knowledge of shipping documentation, customs procedures, international trade regulations, transportation modes, and logistics technologies.

The present study focuses on the analysis of freight forwarding operations by examining key operational practices and customer or employee perceptions. Particular attention is given to transportation preferences, shipment types, import and export activities, documentation procedures, customs clearance, online documentation, shipment tracking, terms and conditions, and service satisfaction. The study also evaluates the role of digital technologies in improving operational efficiency and reducing errors. The increasing complexity of international trade makes the systematic analysis of freight forwarding operations essential for organizations seeking to improve logistics performance. By identifying operational strengths, weaknesses, and areas requiring improvement, freight forwarding companies can develop more effective strategies for cost reduction, service improvement, and customer satisfaction. Therefore, the present study provides useful insights into the operational practices of freight forwarding and highlights the importance of digitalization, coordination, employee training, real-time tracking, efficient documentation, and contingency planning in achieving reliable and efficient freight forwarding services.

Research Objectives

- To analyse freight forwarding operations and the major activities involved in shipment movement.
- To understand the importance of import and export documentation in freight forwarding.
- To examine transportation preferences and cargo-loading practices.
- To analyse customs clearance, online documentation and shipment tracking practices.
- To identify major operational issues affecting freight forwarding activities.
- To examine selected relationships and differences using Chi-square and ANOVA.

Statement Of The Problem

Freight forwarding requires coordination among transport providers, customs authorities, documentation teams, cargo handlers and customers. Inefficiencies in documentation, customs procedures, transportation, container availability, delivery schedules and communication can result in delays, additional costs and reduced customer satisfaction. The study therefore examines operational conditions and respondent perceptions related to freight forwarding, with emphasis on documentation, transport, customs clearance, service quality and operational issues.

Scope Of The Study

The study focuses on freight forwarding activities such as shipment movement, import and export documentation, customs clearance, transportation mode, cargo loading, export frequency, online documentation, container availability, freight charges, communication and customer satisfaction. The study uses survey responses and does not attempt to evaluate the financial performance of a particular logistics company.

Limitations Of The Study

- The study is based on a sample of 72 respondents, which limits generalisation to the entire freight forwarding sector.
- The study primarily analyses operational perceptions and does not include a detailed financial-performance analysis.
- External factors such as weather, port congestion and geopolitical events are not analysed in depth.
- The study does not compare the performance of individual freight forwarders with competing logistics service providers.
- The study period and respondent accessibility limited the depth of operational observation.
- Supplier, shipping-line and transporter performance was not examined as a separate research dimension.

II. REVIEW OF LITERATURE

Aravind Krishnan, Koushik, Sathiya Narayanan, and Pravin (2026) examined the effectiveness of freight forwarding operations at NRV Logistics Pvt. Ltd., Chennai, with particular focus on E-Freight software and NVOCC services. The study assessed documentation accuracy, customer responsiveness, shipment tracking, pricing competitiveness, and regulatory compliance. The findings indicated strong performance in efficiency, documentation accuracy, and customer satisfaction, while packaging, cargo handling, and technological integration required further improvement. The study demonstrates the importance of digital freight-management systems in improving service quality and operational performance.

Brunner et al. (2025) examined the digitalization of maritime shipping services and developed a framework for understanding digital freight forwarders. The study identified basic digital functions such as online quotation, booking, and shipment tracking, along with advanced



ISSN:3048-7722

digital integration capabilities. The findings suggest that digital freight forwarding can reduce information gaps between traditional logistics processes and customer expectations. This study is relevant to the present research because digital platforms can improve freight visibility, communication, documentation, and operational responsiveness.

Sardarabady and Durst (2024) conducted a systematic literature review of the economic impact of digitalization technologies in transport logistics. Based on 64 studies, the authors found growing interest in digital technologies as logistics organizations attempt to address cost pressures, disruptions, and changing stakeholder requirements. The study emphasized that digitalization can improve logistics performance, although implementation costs and organizational challenges remain important concerns. These findings are relevant to freight forwarding operations because technology can support tracking, information management, coordination, and operational efficiency.

Herold, Fahimnia, and Breitbarth (2023) examined the disruptive potential of digital freight forwarders and digital platforms. The study developed a framework for understanding how digital start-ups can challenge traditional freight-forwarding business models. It highlighted the importance of digital platforms, transparency, technology-enabled services, and operational innovation. The study is relevant to the present research because traditional freight forwarders increasingly need to adopt digital technologies to improve efficiency, customer service, competitiveness, and shipment visibility.

Heinbach et al. (2022) studied data-driven forwarding and developed a typology of digital platforms for road freight transport management. The study highlighted how digital platforms can facilitate information exchange, freight coordination, transportation planning, and data-driven decision-making. The findings demonstrate that digital integration can improve the coordination of freight movements and increase operational transparency. This is particularly relevant to freight forwarding operations where real-time information and effective coordination among carriers, customers, and logistics partners are essential.

Huber (2021) examined the digital transformation of freight forwarders and identified major changes affecting traditional freight-forwarding operations. The study highlighted technology adoption, increased transparency, specialization, omnichannel procurement and sales, and virtualization of logistics services as important trends. It also identified potential barriers to digital transformation within the freight-forwarding sector. The study concluded that freight forwarders need to adapt their processes and capabilities to benefit from digital technologies and remain competitive.

Subburaj et al. (2026) examined the effect of digital marketing strategies on consumer purchasing behaviour in the Indian home appliance market. The study highlighted

digital platforms, targeted communication, online information, and customer engagement as important factors influencing consumer decisions. These findings are relevant to freight forwarding because digital communication and technology can improve customer interaction, shipment information, cargo visibility, and operational responsiveness.

Subburaj, Valarmathi, and Anitha (2026) examined the impact of social media on consumer spending behaviour in online shopping. The study found that digital content, reviews, advertisements, and online engagement influence consumer behaviour and recommended personalized digital communication. In freight forwarding, similar digital tools can improve customer support, shipment updates, service communication, and customer relationship management.

Subburaj (2025) examined factors influencing online purchasing behaviour and challenges associated with e-commerce platforms. The study identified convenience, technological advancement, customer satisfaction, trust, security, and delivery performance as important factors affecting consumer behaviour. These findings are relevant to freight forwarding because timely delivery, technological integration, reliability, security, and customer satisfaction are essential for effective logistics services.

Sathyanarayan and Subburaj (2021) investigated the influence of emotional attachment, cognitive memory, and purchase situations on brand loyalty and willingness to pay a premium. The study found a positive relationship between emotional attachment and brand loyalty and emphasized the importance of long-term customer relationships. For freight forwarding companies, reliable service, effective communication, responsiveness, and positive customer experiences can strengthen customer trust and loyalty.

Subburaj et al. (2018) examined the application of Artificial Intelligence in finance and marketing, particularly in data analysis, automation, and decision-making. The study emphasized that AI can improve operational efficiency and support data-driven decisions. These findings are applicable to freight forwarding operations, where AI can support shipment tracking, route optimization, demand forecasting, documentation, cargo monitoring, and operational planning.

Purushothaman and Subburaj (2014) examined customer satisfaction and identified product quality, price, availability, distribution, and customer expectations as important factors influencing satisfaction. These findings are relevant to freight forwarding because competitive pricing, timely delivery, service quality, effective distribution, and reliable logistics services influence customer satisfaction. The study emphasizes the importance of understanding customer expectations to improve service quality and customer retention.



III. RESEARCH METHODOLOGY

The study follows a descriptive research design and uses a survey method. Primary data were collected through a structured questionnaire and secondary data were used to support the study. The questionnaire was distributed through Google Forms. The source document reports a population of 170 and a working sample of 72 responses in the data tables; the analysis in this journal is based on the 72 valid responses represented in the tables.

Research Element	Description
Type of research	Descriptive research
Research method	Survey method
Source of data	Primary and secondary data
Sample size used for analysis	72 respondents
Data collection mode	Google Forms
Instrument	Structured questionnaire
Population reported in source	170
Sampling method	Simple random sampling
Statistical tools	Percentage analysis, Chi-square test and one-way ANOVA

Data Collection

Primary data were collected using a structured questionnaire. The questionnaire included demographic variables and operational questions covering nature of business, preferred transport, cargo loading, export frequency, documentation, container availability, freight charges, communication, customs clearance and service satisfaction. Secondary data were obtained from existing literature and reference material used in the study.

Data Analysis

Percentage analysis was used to summarise respondent characteristics and operational responses. Chi-square testing was used to examine associations between categorical variables. One-way ANOVA was used to examine whether mean differences existed across selected groups. The hypothesis-testing approach used a 5% significance level.

IV. DEMOGRAPHIC ANALYSIS

Age Distribution

Age group	Frequency	Percentage
20–25 years	31	43.06%
26–35 years	32	44.44%
36–50 years	4	5.56%
Above 50 years	5	6.94%
Total	72	100%

The largest group is 26–35 years (44.44%), followed by 20–25 years (43.06%), indicating that the respondent group is predominantly young.

Gender Distribution

Gender	Frequency	Percentage
Male	45	62.50%
Female	27	37.50%
Total	72	100%

Male respondents constitute 62.50% of the sample, while female respondents account for 37.50%.

Educational Qualification

Qualification	Frequency	Percentage
Undergraduate	32	44.40%
Postgraduate	32	44.40%
Diploma	8	11.20%
Total	72	100%

Undergraduates and postgraduates each account for 44.40%, while diploma holders represent 11.20%.

Work Experience

Experience	Frequency	Percentage
1–3 years	42	58.30%
3–5 years	21	29.20%
Above 5 years	9	12.50%
Total	72	100%

Most respondents (58.30%) have 1–3 years of experience, indicating a relatively early-career respondent group.

Monthly Income

Monthly income	Frequency	Percentage
₹10,000–₹20,000	32	44.44%
₹20,000–₹30,000	30	41.67%
₹30,000–₹40,000	8	11.11%
Above ₹50,000	2	2.78%
Total	72	100%

V. DATA ANALYSIS AND INTERPRETATION

The following selected results represent the main operational indicators reported in the source study.

Nature of Business

Nature of business	Frequency	Percentage
Exporter	17	23.61%
Importer	3	4.17%
Both	52	72.22%
Total	72	100%

A majority of respondents (72.22%) are engaged in both import and export activities, indicating a strong requirement for integrated freight forwarding support.

Preferred Transport Mode

Mode	Frequency	Percentage
Sea/Shipways	48	66.67%
Airways	21	29.17%
Roadways	2	2.78%
Railways	1	1.39%
Total	72	100%

Sea transport is the most preferred mode at 66.67%, followed by air transport at 29.17%.

Cargo Loading Preference

Cargo loading	Frequency	Percentage
FCL	58	80.56%
LCL	10	13.89%
Both	4	5.56%



ISSN:3048-7722

Total	72	100%
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FCL is reported as the dominant cargo-loading preference at 80.56%.

Selected Operational Indicators

Indicator	Result reported
Weekly export activity	76.39% of respondents export goods weekly
E-Sanchit / online documentation	Majority agreed that it is user-friendly
Bill of Entry delays	70.84% agreed that delays affect employees
Container availability	90.28% reported containers are generally available
Fuel price impact	61.11% stated fuel price changes always affect freight charges
Language barrier / miscommunication	44.44% reported never; 27.78% reported rarely
Customs clearance satisfaction	45.83% highly satisfied + 41.67% satisfied = 87.50%
Online documentation for error detection/tracking	29.17% strongly agree + 47.22% agree = 76.39%
Freight forwarding team and conditions	27.78% highly satisfied + 44.44% satisfied = 72.22%

The results show positive perceptions of customs clearance, online documentation and service conditions, while delivery delays, damaged packages, payment delays, container shortages and changes in freight charges remain important operational concerns.

IV. STATISTICAL ANALYSIS

Chi-square Tests

Relationship tested	χ^2	df	p-value	Decision
Experience × frequency of exporting goods	2.148	6	.906	Not significant
Nature of business × terms and conditions	27.060	8	.001	Significant
Nature of business × online documentation	8.684	8	.037	Significant
Exporting time × terms and conditions	8.665	12	.031	Significant

The Chi-square results indicate no statistically significant association between years of experience and frequency of exporting goods because $p = .906$ is greater than .05. Significant associations were reported between nature of business and terms and conditions ($p = .001$), nature of business and online documentation ($p = .037$), and exporting time and terms and conditions ($p = .031$).

One-way ANOVA

Issue variable	F value	p-value	Result
Delivery delay	1.198	.317	Not significant
Damaging of package	.845	.047	Significant at 5%
Rise in forwarding cost	3.346	.024	Significant
Lack of communication	.318	.813	Not significant

Bulk order priority	2.118	.010	Significant
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The reported ANOVA results show significant differences for damaging of packages ($p = .047$), rise in forwarding cost ($p = .024$) and bulk order priority ($p = .010$). Delivery delay ($p = .317$) and lack of communication ($p = .813$) were not significant in the reported comparison. These results indicate that selected operational issues vary across the groups tested.

VII. DISCUSSION

The study demonstrates that freight forwarding operations depend on the coordination of transportation, documentation, customs clearance and shipment handling. The dominance of sea transport and FCL indicates the importance of cost-effective cargo movement for the respondents represented in the survey. The high share of respondents involved in both import and export activities further highlights the need for integrated freight forwarding services.

Digital documentation is an important operational dimension. The positive response toward online documentation for error detection and shipment tracking suggests that digital processes can support accuracy and visibility. At the same time, the reported concern about Bill of Entry delays indicates that documentation and customs processes remain areas where efficiency can be improved.

Customer satisfaction with customs clearance is relatively high, while the reported issues of delivery delays, damaged packages, payment delays and container shortages show that operational risks continue to affect freight forwarding. Changes in fuel prices also have a strong effect on freight charges, making cost management and contingency planning important.

The statistical tests provide additional evidence that some operational perceptions are associated with business characteristics and that selected issue categories differ across groups. Overall, the results support the importance of digitalisation, coordination, operational monitoring and continuous improvement in freight forwarding.

VIII. CONCLUSION

The study concludes that freight forwarding operations involve several interconnected activities, including transportation, documentation, customs clearance, cargo handling, shipment tracking, and customer service. Based on responses from 72 respondents, sea transportation emerged as the most preferred mode of freight movement. Full Container Load (FCL) was identified as the dominant cargo-loading preference among the respondents. The findings also indicate that most respondents are engaged in both import and export activities.



ISSN:3048-7722

Respondents generally expressed positive satisfaction with customs clearance procedures and freight forwarding service conditions. Online documentation was viewed positively, particularly for improving error detection and shipment tracking. However, operational challenges such as delivery delays, damaged packages, changing freight costs, container availability, and documentation delays continue to affect performance. These challenges can increase operational costs and negatively influence service reliability and customer satisfaction.

The Chi-square test and One-Way ANOVA revealed statistically significant relationships or differences among selected operational variables. The findings highlight the importance of improving digital documentation, real-time shipment tracking, employee skills, and coordination among logistics participants. Effective contingency planning can further help freight forwarders respond to unexpected delays, disruptions, and transportation-related problems. Overall, continuous technological advancement and customer-focused operational practices can enhance the efficiency, reliability, competitiveness, and quality of service.

IX. FINDINGS

- 44.44% of respondents belong to the 26–35 years age group, followed by 43.06% in the 20–25 years age group.
- 62.50% of respondents are male, while 37.50% are female.
- 44.40% of respondents are undergraduates, and another 44.40% are postgraduates.
- 58.30% of respondents have 1–3 years of work experience.
- 72.22% of respondents are involved in both import and export activities.
- 66.67% of respondents prefer sea transportation for freight movement.
- 80.56% of respondents prefer Full Container Load (FCL) for cargo transportation.
- 76.39% of respondents export goods on a weekly basis.
- 90.28% of respondents reported that containers are generally available for their operations.
- 61.11% of respondents stated that changes in fuel prices always affect freight charges.
- 87.50% of respondents are satisfied or highly satisfied with the customs clearance process.
- 76.39% of respondents agreed or strongly agreed that online documentation supports error detection and shipment tracking.
- 72.22% of respondents are satisfied or highly satisfied with the freight forwarding team and service conditions.
- The Chi-square analysis revealed significant associations between nature of business and terms and conditions, nature of business and online documentation, and exporting time and terms and conditions.

- ANOVA results report significant differences for selected issue variables including damaging of packages, rise in forwarding cost and bulk order priority.

X. SUGGESTIONS

- Adopt advanced digital documentation and automated workflow systems to reduce manual errors and processing time.
- Improve real-time shipment and cargo tracking so that customers receive timely status updates.
- Provide regular training on customs regulations, documentation procedures and logistics technologies.
- Strengthen coordination among customs authorities, shipping lines, transport providers and customers to reduce operational delays.
- Develop contingency plans for port congestion, weather disruptions, schedule changes and other unexpected events.
- Use data analytics to monitor freight costs, delays, shipment performance and service quality.
- Improve customer feedback and complaint-resolution mechanisms.
- Promote paperless processes and route optimisation where operationally suitable.
- Review freight charges and cost drivers regularly, particularly in response to fuel-price fluctuations.
- Conduct periodic performance reviews to identify operational bottlenecks and opportunities for continuous improvement.

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