Demand and Supply Dynamics in the Indian Maritime Industry: A Study of the Impact of Economic Factors on Shipping Demand

Sapovadia, Vrajlal

NFSU

8 July 2025

Demand and Supply Dynamics in the Indian Maritime Industry: A Study of the Impact of Economic Factors on Shipping Demand

Dr. Vrajlal Sapovadia, Adjunct Professor, Gujarat Maritime University and Professor of Practice, NFSU, Gandhinagar, Gujarat, India

Abstract

This research paper explores the intricate demand and supply dynamics within the Indian maritime industry, with a particular focus on the impact of various economic factors on shipping demand. The global economy, commodity trades, average haul distances, and local economic indicators significantly influence the volume and nature of cargo transported by sea. India, with its extensive coastline and burgeoning economy, relies heavily on its maritime sector for international trade and domestic logistics. This study will analyze how macroeconomic trends, government policies, infrastructure development, and technological advancements shape the demand for shipping services in India. It will also examine the current state of supply, including fleet capacity, port infrastructure, and shipbuilding capabilities, and identify the mismatches that exist. Through a comprehensive literature review, explanation of key terminologies, and a case study, this paper aims to provide actionable insights and recommendations for stakeholders to foster sustainable growth and enhance the competitiveness of the Indian maritime industry.

Keywords

Maritime Industry, India, Shipping Demand, Economic Factors, Supply Dynamics, Port Infrastructure, Trade Volume, Government Policy, Freight Rates, Shipbuilding, Logistics.

1. Introduction

The maritime industry serves as the backbone of global trade, facilitating the movement of over 80% of world merchandise trade by volume. Its significance cannot be overstated, as it connects economies, supports supply chains, and fuels industrial growth. For a rapidly developing nation like India, with its vast coastline spanning over 7,500 kilometers and increasing integration into global supply chains, the maritime sector plays a pivotal role in its economic trajectory. The demand for shipping services in India is a derived demand, intrinsically linked to the country's import and export activities, industrial production, and overall economic health.

However, the maritime industry is highly susceptible to economic fluctuations. Global recessions, geopolitical tensions, shifts in trade policies, and commodity price volatility can significantly impact shipping demand and, consequently, freight rates, vessel utilization, and profitability. Understanding these complex demand-supply dynamics is crucial for policymakers, investors, shipping companies, and port authorities to make informed decisions and ensure the sector's resilience and sustainable growth.

This paper seeks to provide a comprehensive analysis of the factors influencing shipping demand and supply in the Indian context, considering both global economic forces and specific domestic developments. By examining the interplay of these elements, we aim to shed light on the challenges and opportunities facing the Indian maritime industry and propose strategic recommendations for its future development.

2. Literature Review

The existing literature extensively highlights the strong correlation between global economic activity and shipping demand. Studies by Stopford (2009) and Glynn (2014) emphasize the world economy as the primary driver of seaborne trade, noting that business cycles, long-term economic trends, and economic "shocks" directly translate into fluctuations in demand for sea transport. The concept of "ton-miles," representing tonnage of cargo multiplied by the average transportation distance, is a crucial metric for measuring shipping demand (Marinet, n.d.).

Specific economic factors impacting shipping demand include:

World Economy: GDP growth, industrial production, and consumer spending directly influence trade volumes.

Seaborne Commodity Trades: Demand for specific commodities (e.g., crude oil, coal, iron ore, containerized goods) dictates the demand for specialized vessel types. Changes in sources of supply or processing of raw materials before shipment can alter trade flows and demand.

Average Haul: Longer transportation distances, often due to changes in supply chains or geopolitical shifts, increase the demand for ton-miles.

Freight Costs: While shipping is generally cost-effective, variations in freight rates can influence shipper choices, especially for high-value goods (UKEssays, n.d.).

Speed, Reliability, and Security: For many shippers, particularly for finished goods, these factors are as important as cost in selecting a shipping firm (GoodFirms, 2025).

In the Indian context, several reports and analyses provide insights into the maritime sector's current state and challenges:

The Indian maritime industry is undergoing significant transformation, driven by government initiatives like the Sagarmala Programme and Maritime India Vision 2030, which focus on port modernization, capacity expansion, and improved hinterland connectivity (Drishti IAS, 2025; Invest India, 2025).

India's port capacity has significantly increased, with major ports seeing a rise from 871.52 million tonnes to 1,629.86 million tonnes between 2014-2024 (Drishti IAS, 2025).

Despite these efforts, India faces challenges such as an aging fleet, low share in global shipping (only 1.2% of global tonnage), and reliance on foreign ports for transshipment (Drishti IAS, 2025).

Government policies, including the Maritime Development Fund (MDF) and the revamped Shipbuilding Financial Assistance Policy (SBFAP 2.0), aim to boost domestic shipbuilding and increase India's share in international maritime trade (IMPRI, 2025). However, Indian-flagged vessels still face structural disadvantages due to higher operating costs and taxation compared to foreign counterparts (Times of India, 2025).

The demand for shipping in India is closely linked to its growing economy, increasing trade volumes, and the shift towards containerization and value-added logistics services (IMARC Group, 2024).

Forecasting shipping demand in India is crucial for resource allocation, cost efficiency, and service quality, with technological advancements like AI, IoT, and blockchain playing a growing role in improving forecast accuracy (Envision Enterprise Solutions, 2023; Jusda Global, 2025).

While existing literature highlights the various economic factors and policy initiatives, a more integrated analysis focusing on the dynamic interplay between global economic shifts and their specific ramifications for India's maritime demand and supply, coupled with detailed case studies, is warranted.

3. Explanation of Basic Terminology with Suitable Examples

To ensure clarity, the following key terms are defined with examples relevant to the maritime industry:

Shipping Demand: The total volume of goods and cargo that needs to be transported by sea, often measured in "ton-miles."

Example: If India imports 1 million tons of crude oil from the Middle East, and the average distance is 5,000 nautical miles, the shipping demand generated is 5 billion ton-miles for that specific cargo.

Shipping Supply: The total capacity available in the global and national shipping fleet, including the number of vessels, their types, and their carrying capacity.

Example: The combined deadweight tonnage (DWT) of all Indian-flagged bulk carriers, tankers, and container ships, plus the available slots at Indian ports, represents a part of the shipping supply.

Derived Demand: The demand for a good or service that arises from the demand for another good or service. Shipping demand is a classic example.

Example: The demand for container shipping services is derived from the demand for consumer goods (e.g., electronics, apparel) that are manufactured in one country and consumed in another. If consumer spending decreases globally, the demand for container shipping will also likely decrease.

Freight Rates: The price charged by a shipping company for the transportation of cargo. These rates are highly volatile and influenced by supply-demand imbalances.

Example: During periods of high global trade and limited vessel availability, container freight rates for a 40-foot equivalent unit (FEU) from Shanghai to Mundra might skyrocket from $2,000 to $10,000.

Deadweight Tonnage (DWT): A measure of a ship's carrying capacity, representing the maximum weight of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew that a ship can carry safely.

Example: A Very Large Crude Carrier (VLCC) might have a DWT of 300,000 tons, indicating its immense capacity for oil transportation.

Twenty-foot Equivalent Unit (TEU): A standard unit of measurement for cargo capacity of container ships and container terminals, equivalent to one standard 20-foot long container.

Example: A container ship with a capacity of 10,000 TEUs can carry 10,000 twenty-foot equivalent containers.

Port Throughput: The total volume of cargo handled by a port over a specific period, usually measured in metric tons or TEUs.

Example: Jawaharlal Nehru Port Authority (JNPA) reporting a throughput of 5.5 million TEUs in a financial year signifies its handling capacity for containerized cargo.

Hinterland Connectivity: The transportation links (road, rail, inland waterways) connecting a port to its inland production and consumption centers.

Example: Improved rail links from Chennai Port to industrial clusters in Tamil Nadu enhance the port's hinterland connectivity, facilitating faster and more efficient cargo evacuation.

Cabotage Laws: Regulations that restrict foreign-flagged vessels from transporting goods or passengers between two ports within the same country.

Example: India's cabotage laws, though recently relaxed for certain types of cargo, historically favored Indian-flagged vessels for coastal trade, aiming to promote domestic shipping.

Sagarmala Programme: A flagship initiative by the Government of India aimed at port-led development, including port modernization, new port development, port connectivity enhancement, and coastal community development.

Example: The development of a new deep-draft port under Sagarmala would directly contribute to increasing India's port capacity and improving its ability to handle larger vessels.

4. Research Methodology

This research will employ a mixed-methods approach, combining quantitative data analysis with qualitative insights to provide a holistic understanding of the demand and supply dynamics in the Indian maritime industry.

4.1. Data Collection:

Secondary Data:

Economic Indicators: GDP growth rates (global and India-specific), industrial production indices, inflation rates, trade balance data (imports and exports by value and volume), commodity prices (oil, coal, iron ore), and exchange rates from reputable sources like the World Bank, IMF, Reserve Bank of India, Ministry of Commerce and Industry, and UNCTAD.

Maritime Industry Statistics: Port traffic data (cargo handled, container throughput), fleet size and composition (number of vessels, DWT, TEU capacity, vessel types, age profile), shipbuilding orders and deliveries, freight rate indices (e.g., Baltic Dry Index, Shanghai Containerized Freight Index), and port performance metrics (turnaround time) from sources like the Ministry of Ports, Shipping and Waterways, Indian Ports Association, maritime databases (e.g., Lloyd's List Intelligence, VesselsValue), and annual reports of major shipping companies and port trusts.

Policy Documents: Government reports, policy papers (e.g., Maritime India Vision 2030, Sagarmala Programme documents, Shipbuilding Financial Assistance Policy), and industry association publications (e.g., Indian National Shipowners' Association).

Academic Literature and Industry Reports: Research papers, articles, and market analyses from maritime consulting firms, financial institutions, and academic journals.

4.2. Data Analysis:

Quantitative Analysis:

Regression Analysis: To establish statistical relationships between key economic factors (independent variables like GDP growth, trade volume, commodity prices) and shipping demand (dependent variable, measured in ton-miles or cargo throughput). This will help in identifying the most significant drivers of demand.

Time Series Analysis: To analyze historical trends in shipping demand, supply, and freight rates, and to identify cyclical patterns, seasonality, and long-term growth trajectories. This will aid in forecasting future trends.

Correlation Analysis: To determine the strength and direction of relationships between various economic indicators and specific segments of shipping demand (e.g., dry bulk, tanker, container).

Comparative Analysis: Benchmarking India's maritime performance (e.g., port efficiency, fleet competitiveness) against global and regional counterparts.

Qualitative Analysis:

Content Analysis: Reviewing government policies, strategic documents, and industry reports to understand the policy landscape, regulatory environment, and strategic objectives impacting the maritime sector.

Case Study Analysis: In-depth examination of specific events or policy interventions (e.g., impact of the COVID-19 pandemic on cargo volumes, effects of specific infrastructure projects) to understand their qualitative impact on demand and supply dynamics.

Expert Interviews (if feasible within scope and time): Insights from industry experts, port officials, shipping company executives, and policymakers could provide nuanced perspectives on market conditions, challenges, and future outlook. (Acknowledged as potential, but not guaranteed due to typical research constraints).

4.3. Research Design:

The research will follow a descriptive and analytical design. It will first describe the current state of demand and supply in the Indian maritime industry. Subsequently, it will analyze the underlying economic factors influencing these dynamics, identifying causal relationships and their implications. The specific focus will be on the period from 2010 to present, allowing for the analysis of trends across various economic cycles and policy shifts.

5. Research Limitations

This study, while aiming for a comprehensive analysis, is subject to certain limitations:

Data Availability and Granularity: While macroeconomic data is generally available, granular, real-time data for specific segments of the Indian maritime industry (e.g., precise breakdowns of cargo types handled at non-major ports, detailed operational costs for small shipping companies) can be challenging to obtain.

Forecasting Accuracy: Economic forecasting inherently carries uncertainties due to unpredictable global events (geopolitical conflicts, pandemics, sudden economic shocks). Therefore, any future projections will be based on current trends and assumptions, which may change.

Causality vs. Correlation: While statistical analysis can identify strong correlations, establishing definitive causality between economic factors and shipping demand can be complex due to the multitude of interacting variables.

Dynamic Nature of the Industry: The maritime industry is constantly evolving with technological advancements (e.g., automation, green shipping), new trade routes, and regulatory changes. This dynamism means that findings might require periodic updates to remain fully relevant.

Confidentiality of Commercial Data: Private shipping companies and logistics firms often consider detailed operational and financial data confidential, limiting access to certain proprietary information that could further enrich the analysis.

Scope of Economic Factors: While the study focuses on key economic factors, other non-economic factors like environmental regulations, technological disruptions, and unforeseen events also significantly influence the industry but may not be exhaustively covered in this economic-centric analysis.

6. Future Research Leads

Building upon the findings of this study, several avenues for future research emerge:

Impact of Green Shipping Initiatives: A detailed study on the economic implications of India's green shipping initiatives (e.g., LNG/hydrogen-powered vessels, carbon-neutral ports) on operational costs, freight rates, and international competitiveness.

Technological Adoption and Productivity: Research into the specific impact of emerging technologies (AI, IoT, blockchain, autonomous vessels) on port efficiency, supply chain visibility, and overall productivity in the Indian maritime sector.

Regional Disparities in Port Development: A deeper analysis of demand-supply dynamics and economic impact across different major and non-major ports in India, considering their unique hinterlands and trade profiles.

Financing and Investment in Indian Shipping: A comprehensive study on the challenges and opportunities in attracting domestic and foreign investment for fleet expansion and shipbuilding in India, including the effectiveness of current financial incentives.

Human Capital Development in the Maritime Sector: An investigation into the demand and supply of skilled manpower (seafarers, port management professionals, logistics experts) in the Indian maritime industry, and strategies to address any shortages or skill gaps.

Resilience of Indian Maritime Supply Chains: A study on how the Indian maritime industry is building resilience against global supply chain disruptions, geopolitical events, and climate change impacts.

Role of Coastal Shipping and Inland Waterways: A detailed economic analysis of the potential and challenges of enhancing coastal shipping and inland waterways for domestic cargo movement, thereby reducing reliance on road and rail for certain types of goods.

7. Case Study: The Impact of Global Oil Price Volatility on India's Tanker Shipping Demand (2014-2022)

Background: Crude oil is a critical import for India, accounting for a significant portion of its total import bill. The transportation of this crude oil relies almost entirely on tanker shipping. Global oil prices are

notoriously volatile, influenced by geopolitical events, OPEC+ decisions, global demand, and supply disruptions.

Objective: To analyze how fluctuations in global crude oil prices have impacted the demand for tanker shipping services in India between 2014 and 2022.

Methodology (Illustrative):

Data Collection: Monthly data on Brent crude oil prices, India's crude oil imports (volume and value), tanker freight rates (e.g., dirty tanker rates on key routes to India), and India's refinery throughput.

Analysis:

Phase 1: High Oil Prices (e.g., 2014 peak, 2022 post-Ukraine invasion): When oil prices surge, the cost of imports for India increases. This can lead to:

Reduced Import Volumes (Potentially): If prices remain high for extended periods and domestic demand softens or alternative energy sources are explored, India might strategically reduce import volumes, thus lowering tanker demand.

Shift in Sourcing: India might seek crude from closer or more cost-effective sources, impacting average haul distances and specific tanker routes.

Pressure on Freight Rates: While high oil prices increase bunker costs for shipping companies, the overall demand picture (due to potentially reduced import volumes) can influence freight rates. In 2022, the Russia-Ukraine war led to significant re-routing and longer hauls, creating a surge in tanker demand and freight rates despite high oil prices, as India diversified its sources.

Phase 2: Low Oil Prices (e.g., 2015-2016, 2020 COVID-19 slump): Conversely, low oil prices make imports cheaper, potentially leading to:

Increased Import Volumes and Strategic Stockpiling: India might increase crude oil imports to take advantage of lower prices and build strategic reserves, boosting tanker demand.

Higher Refinery Utilization: Lower input costs can encourage higher refinery runs, further stimulating crude imports.

Impact on Freight Rates: While lower bunker costs benefit shipping companies, an oversupply of tankers during periods of weak global demand (as seen during the initial COVID-19 slump) can depress freight rates, despite potentially higher import volumes into India for stockpiling.

Correlation and Regression: Quantify the relationship between oil price volatility, India's crude import volumes, and tanker freight rates.

Qualitative Assessment: Analyze government policies related to crude oil imports, strategic petroleum reserves, and their influence on tanker demand.

Expected Findings (Hypothetical):

A general inverse relationship between oil prices and the propensity to import, but with significant deviations due to strategic considerations (e.g., stockpiling during low prices, re-routing during geopolitical events).

The overall impact on tanker demand is complex, as it is a function of both import volumes and average haul distances. The Russia-Ukraine war in 2022, for instance, dramatically increased average haul for Indian crude imports (as India sourced more from Russia), boosting ton-miles even if overall import volumes didn't surge.

Freight rates are influenced not only by import demand but also by global tanker fleet supply and other global trade dynamics.

This case study would highlight how a single, critical economic factor (oil prices) interacts with strategic national interests and global events to shape a specific segment of India's maritime demand.

8. Discussion

The demand and supply dynamics in the Indian maritime industry are shaped by a complex interplay of global and domestic economic forces. Globally, the overall health of the world economy, business cycles, and significant economic shocks directly dictate the volume of seaborne trade. India's growing integration into the global economy means that its shipping demand is highly sensitive to these international trends. For instance, a global slowdown leading to reduced consumer demand in Western markets directly translates to lower export orders from India, impacting container shipping demand.

Domestically, India's robust economic growth, increasing industrial production, and rising consumption are fundamental drivers of shipping demand. The government's ambitious infrastructure development projects, such as the Sagarmala Programme, are crucial in enhancing port capacity and connectivity, thereby facilitating smoother cargo movement and potentially stimulating demand by reducing logistics costs. The push for "Make in India" and diversification of manufacturing bases also implies a potential shift in import patterns of raw materials and export of finished goods, influencing the types of vessels in demand.

However, challenges persist on the supply side. India's aging fleet and relatively small share in global tonnage necessitate reliance on foreign-flagged vessels for a large portion of its EXIM trade, leading to significant foreign exchange outflow. The domestic shipbuilding industry, despite government incentives like MDF and SBFAP 2.0, faces competitiveness issues due to higher operating costs, taxes, and capital constraints compared to global shipbuilding powerhouses. This supply-side constraint can lead to higher freight costs for Indian businesses, impacting their competitiveness in international markets.

The ongoing focus on green shipping initiatives and technological adoption (AI, IoT) represents both a challenge and an opportunity. While these initiatives require substantial investment and potentially higher initial operational costs, they are crucial for long-term sustainability, efficiency gains, and meeting international environmental regulations. Smart ports and integrated logistics solutions promise to enhance efficiency and reduce turnaround times, positively impacting overall shipping demand by making maritime transport more attractive.

9. Analysis

Analyzing the interdependencies, it becomes clear that India's maritime sector faces a delicate balancing act. While demand is largely driven by its economic growth and global trade integration, the domestic supply capacity struggles to keep pace.

Impact of Economic Growth: India's sustained GDP growth directly correlates with increased trade volumes, particularly in containerized cargo and bulk commodities like coal and iron ore, driving up shipping demand. However, the exact elasticity of shipping demand to GDP growth can vary by cargo type.

Government Policy as a Catalyst: Initiatives like Sagarmala have demonstrably increased port capacity and improved turnaround times. The planned increase in port capacity to 3,130 MT by the Maritime Agenda is a critical factor in meeting future demand. The focus on increasing India's share in global shipping tonnage through financial assistance policies is a direct attempt to bridge the supply-side gap and reduce foreign dependence. However, the limited success of previous subsidy schemes highlights the need for a more holistic approach addressing structural disadvantages.

Freight Rates and Global Shocks: Global events like the COVID-19 pandemic and geopolitical conflicts (e.g., Russia-Ukraine war) have vividly demonstrated the fragility of supply chains and the immediate impact on freight rates. India, as a significant trading nation, is directly affected by these global price shocks, which can increase the cost of imports and exports, influencing overall trade volumes and hence shipping demand. The case study on oil price volatility underscores this point.

Infrastructure-Demand Nexus: Investments in port infrastructure and hinterland connectivity are vital not only for handling increased cargo volumes but also for reducing logistics costs. Lower logistics costs make Indian exports more competitive and imports more affordable, thus stimulating demand for maritime transport. The shift towards multimodal logistics parks further strengthens this nexus.

The Shipbuilding Conundrum: The struggle of the Indian shipbuilding industry to meet domestic fleet requirements is a significant concern. A larger and younger Indian-flagged fleet would not only reduce foreign exchange outflow but also provide greater control over shipping capacity, offering strategic advantages during times of global supply chain disruptions. The current low share in global shipbuilding (less than 1%) compared to China and South Korea indicates a significant technological and investment gap.

In essence, while demand for shipping services in India is robust and growing, the supply side faces structural impediments, leading to a continued reliance on foreign operators and potential inefficiencies.

10. Recommendation

Based on the discussion and analysis, the following recommendations are proposed to optimize demand and supply dynamics in the Indian maritime industry:

Holistic Policy Reforms for Domestic Shipping: Beyond subsidies, the government should address the fundamental structural disadvantages faced by Indian-flagged vessels. This includes reviewing taxation policies (e.g., GST on vessel imports, input tax credits, seafarer wages), streamlining regulatory frameworks, and providing easier access to long-term, competitive financing for ship acquisition and modernization. A level playing field with international competitors is crucial.

Accelerated Port Modernization and Capacity Expansion with Technology Focus: Continue and accelerate investments in port infrastructure under Sagarmala and Maritime India Vision 2030, with a strong emphasis on automation, digitalization (smart ports), and green technologies. This will enhance efficiency, reduce turnaround times, and prepare ports for larger vessels and growing cargo volumes. The shift to an 80% landlord model by 2030 should be expedited.

Strategic Development of Shipbuilding and Ship Repair: Implement targeted policies to boost domestic shipbuilding, focusing on niche areas where India can develop a competitive advantage (e.g., specialized vessels, green vessels). This requires investments in R&D, skill development, and fostering an ecosystem of ancillary industries. Explore public-private partnerships for building a strategic national fleet to meet critical import needs.

Enhance Hinterland Connectivity and Multimodal Logistics: Prioritize projects that improve rail, road, and inland waterway connectivity to major and non-major ports. The development of Multi-Modal Logistics Parks (MMLPs) is critical for seamless integration of different transport modes, reducing logistics costs and transit times, thereby stimulating maritime demand.

Proactive Demand Forecasting and Market Intelligence: Invest in advanced demand forecasting models incorporating AI and big data analytics. This will enable better resource allocation, infrastructure planning, and proactive response to market fluctuations and global economic shifts. Collaboration between government agencies, ports, and private shipping lines for data sharing will be vital.

Promote Green Shipping and Sustainability: Develop a clear roadmap and provide incentives for the adoption of sustainable practices, including the use of alternative fuels (LNG, green hydrogen), renewable energy at ports, and energy-efficient vessel designs. This aligns with global environmental goals and can attract environmentally conscious cargo.

Skill Development and Human Resource Management: Address the shortage of skilled manpower by strengthening maritime education and training institutes, offering attractive career pathways for seafarers and shore-based maritime professionals, and promoting continuous professional development.

Diversification of Trade Routes and Partnerships: Encourage Indian businesses to explore new markets and diversify trade routes to mitigate risks associated with over-reliance on specific regions or geopolitical vulnerabilities, thereby stabilizing shipping demand.

11. Conclusion

The Indian maritime industry is at a critical juncture, poised for significant growth driven by the nation's economic aspirations. The demand for shipping services is robust and intrinsically linked to India's burgeoning trade volumes. While significant strides have been made in enhancing port infrastructure and capacity through ambitious government initiatives, challenges on the supply side, particularly regarding fleet competitiveness and domestic shipbuilding capabilities, persist.

Addressing the structural disadvantages faced by Indian-flagged vessels, accelerating the adoption of green technologies and digitalization, and fostering a truly integrated multimodal logistics ecosystem are paramount. By implementing holistic policy reforms, encouraging strategic investments in shipbuilding, and leveraging advanced analytics for demand forecasting, India can strengthen its maritime self-reliance, reduce foreign exchange outflow, and establish itself as a formidable global maritime powerhouse. The future success of the Indian maritime industry hinges on its ability to strategically manage the dynamic interplay between global economic factors and its inherent demand and supply capabilities.

12. References

Chowgule Brothers. (2025). Growth of the Shipping Industry in India: Trends & Future Outlook. Retrieved from https://chowgulebrothers.com/growth-of-the-shipping-industry-in-india-trends-future-outlook/

Drishti IAS. (2025). Navigating India's Maritime Path. Retrieved from https://www.drishtiias.com/daily-updates/daily-news-editorials/navigating-india-s-maritime-path

Envision Enterprise Solutions. (2023). Navigating Smoothly: The Role of Demand Forecasting in Operational Management at Seaports. Retrieved from https://www.envisionesl.com/blog/navigating-smoothly-the-role-of-demand-forecasting-in-operational-management-at-seaports

Equitymaster. (2024). Indian Shipping Industry Report - Shipping Sector Research & Analysis in India. Retrieved from https://www.equitymaster.com/research-it/sector-info/ship/Shipping-Sector-Analysis-Report.asp

GoodFirms. (2025). The Global Shipping Industry - Demands, Challenges, and the Future Outlook. Retrieved from https://www.goodfirms.co/resources/global-shipping-industry-demands-challenges-future

Glynn, J. (2014). The Economics of Shipping. Routledge. (Referenced in search results about factors affecting demand for shipping)

IMARC Group. (2024). India Maritime Freight Market Size & Report 2033. Retrieved from https://www.imarcgroup.com/india-maritime-freight-market

IMPRI Impact And Policy Research Institute. (2025). India's Shipbuilding Revolution: Inside The Maritime Development Fund (MDF). Retrieved from https://www.impriindia.com/insights/policy-update/indias-shipbuilding-revolution/

Invest India. (2025). Investment Opportunities in Ports & Shipping. Retrieved from https://www.investindia.gov.in/sector/ports-shipping

Jusda Global. (2025). Growth Trends Shaping India's Ocean Freight Market in 2025. Retrieved from https://www.jusdaglobal.com/en/article/growth-trends-ocean-freight-india-2025/

Marinet. (n.d.). FACTORS AFFECTING DEMAND FOR SHIPPING. Retrieved from http://www.maritime.gr/law/demand.htm

Maersk. (2024). 7 factors affecting shipping costs (+ checklist). Retrieved from https://www.maersk.com/logistics-explained/transportation-and-freight/2024/02/27/seven-factors-affecting-shipping-costs

Munich Personal RePEc Archive. (2025). The impacts of covid-19 on maritime sector: the case study of India. Retrieved from https://mpra.ub.uni-muenchen.de/123492/1/MPRA_paper_123492.pdf

Stopford, M. (2009). Maritime Economics. Routledge. (Referenced in search results about factors affecting demand for shipping)

Times of India. (2025). Shipping policy revamp: How Centre plans to promote domestically-flagged ships; 200 ships worth Rs 1.3 lakh crore in demand. Retrieved from https://timesofindia.indiatimes.com/business/infrastructure/shipping-policy-revamp-how-centre-plans-to-promote-domestically-flagged-ships-200-ships-worth-rs-1-3-lakh-crore-in-demand/articleshow/122295806.cms

UKEssays. (n.d.). The Determinants of the Demand for Shipping Services. Retrieved from https://www.ukessays.com/essays/economics/the-determinants-of-the-demand-for-shipping-services-economics-essay.php

UPSC GUIDE. (2025). India's Shipping Industry: Challenges, Reforms, and the Road Ahead. Retrieved from https://upscguide.in/india-shipping-industry-challenges-reforms-budget-2025

VesselsValue. (n.d.). Shipping market forecast. Retrieved from https://www.vesselsvalue.com/solutions/forecasting/