"A COMPREHENSIVE STUDY ON INDIAN DRY BULK SHIPPING MARKET"

Project report submitted to the School of Maritime Management, Indian Maritime University in partial fulfilment for the requirements for the award of degree of

MASTER OF BUSINESS ADMINISTRATION
In
INTERNATIONAL TRANSPORTATION AND LOGISTICS MANAGEMENT

Submitted by

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DECLARATION

I, **Kartik Raman, Reg. No.2303305022** student of **School of Maritime Management, Indian Maritime University**, pursuing **MBA in International Transportation and Logistics Management** hereby declare that submission of this project report titled **"A COMPREHENSIVE STUDY ON INDIAN DRY BULK SHIPPING MARKET"** - has been prepared by me towards the partial fulfilment of the degree of Master of Business Administration in International Transportation and Logistics Management under the supervision of **Dr. Lekha Ravi** Assistant Professor, Indian Maritime University, Chennai Campus. I also declare that this project report is my original work and has not been copied from any other report previously submitted for the award of any degree, fellowship or other in the similar title.

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CERTIFICATE

This is to certify that this project report entitled **"A COMPREHENSIVE STUDY ON INDIAN DRY BULK SHIPPING MARKET"** submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus in partial fulfilment of the requirement for awarding the degree, MBA in International Transportation and Logistics Management (ITLM) is a genuine work of **KARTIK RAMAN (Reg No. 2303305022).**

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ABSTRACT

The dry bulk shipping industry is essential to promoting international trade and bolstering India's economic development, especially in areas like agriculture, steel, and electricity. By examining important commodities like coal, iron ore, and grains as well as vessel classifications like Capesize, Panamax and Handymax, this study investigates the dynamics of the dry bulk shipping business in India. The study explores market patterns, freight rate volatility, infrastructural capacity, environmental laws, and geopolitical factors. Using secondary data from industry reports and scholarly literature, the study evaluates how macroeconomic uncertainty, overcapacity and changes in fuel prices affect freight traffic. Along with an examination of important Indian ports like Paradip and Visakhapatnam, particular attention is paid to how China and India influence world demand. The study also looks at how technology developments and decarbonization initiatives affect operational effectiveness. It concludes with strategic insights and provides business and policy recommendations to improve India's competitiveness in the global dry bulk market through sustainable shipping methods, regulatory reforms and infrastructure development.

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CHAPTER I

1.0 INTRODUCTION TO THE DRY BULK MARKET IN INDIA

1.1 About the Industry

India's dry bulk market is very important to the growth of the economy of the country, especially in industries such as mining, agriculture, and infrastructure. Some of the dry bulk commodities include iron ore, coal, grains, bauxite, cement and fertilizers, which are shipped in large volumes by sea. With the growing industrial base of India and rising trade activity, India's dry bulk market has grown due to demand from domestic and international markets.

India is among the largest producers and consumers of major dry bulk commodities. The nation's dependence on coal for power generation, iron ore for steel making, and grains for food security highlights the need for a well-organized and efficient dry bulk logistics system. The shipping and ports industry, which constitutes the backbone of dry bulk transportation, has witnessed significant policy reforms and infrastructure expansion in recent times with a view to improving efficiency and lowering the cost of logistics.

The dry bulk shipping industry is vital for carrying unpacked commodities such as coal, iron ore, and grain1. It enables the timely and cost-efficient transportation of raw materials to core industries, boosting economic growth and supply chain reliability.

Global Growth and Demand: Market growth is associated with global industrial growth and growing demand, while fluctuations in commodity prices and changes in regulation dynamics.

Dry Bulk Shipping Market is projected to grow to a valuation of approximately USD 2094.46 Million by 2031 from USD 1646.98 Million valued as of 2024. Large shipping companies and charterers are key to the market. The Asia-Pacific region dominates demand, while the Americas are key suppliers.

1.2 Statement of the Problem

The dry bulk shipping sector is presently confronting a series of sophisticated challenges that risk its efficiency, profitability, and sustainability. As international trade keeps changing, the sector needs to address concerns on overcapacity, environmental compliance and unpredictable freight rates, all of which present uncertainty and operational challenges for the stakeholders.

One of the main issues of the dry bulk shipping industry is the on-going problem of overcapacity—an excess of ships compared to demand. This excess of ships places downward pressure on freight rates, driving profit margins of shipping companies down. Furthermore, the sector is exposed to a very volatile market, where freight rates move based on international economic fundamentals, geopolitical tensions and trade policy. Addressing this volatility demands improved operating efficiency, utilization of fleets and more efficient cost control techniques.

Among the key issues affecting the dry bulk shipping industry is the ever-green concern of excess capacity—over-supply of ships over and above demand. This excess tonnage depresses freight rates and hence cuts the profit margins for shipping lines. Moreover, the sector is performing in a most volatile market that sees freight costs changing based on international economic performances, geopolitical climates, and terms of trade. Handling this volatility demands greater operation efficiency, optimization of fleets and enhanced strategies for cost cutting.

Apart from economic stress, the sector has to contend with stricter environmental requirements. Governments and global regulatory agencies are forcing more environmentally friendly shipping practices, with tighter emissions controls and the promotion of a shift to cleaner, energy-efficient ships. The implementation of environmentally friendly shipping solutions, however, comes with several challenges. The expense of converting to alternative fuels, retrofitting current fleets with green technology and achieving compliance standards is a major financial and logistical challenge.

Additionally, the effectiveness of these sustainability initiatives on industry performance as a whole is still in doubt and shipping firms cannot plan long-term strategies confidently.

The dry bulk shipping business is at the crossroads with its industry-threatening challenges that necessitate creative solution and strategic response. To make the business last and be profitable in the long run, business entities need to devise means to improve operational performance, control supply-demand volatility, and hasten the use of green technology. Proactive intervention in these areas will be decisive in managing the uncertain future environment and establishing a more secure destiny for the industry.

1.3 Objectives

- The purpose of this study is to assess market trends within the dry bulk shipping market within India based on commodity demand, freight prices, and the growth of fleets.

- It tries to measure the effect of environmental regulation and overcapacity on market forces and the evaluation of general industry expansion and rising issues.

- Moreover, the research seeks to predict future trends by looking at technological advancements and changes in world trade patterns.

1.4 Research Methodology

- **Data Collection**: The research will employ secondary data from market reports, industry journals and statistical databases.

- **Qualitative Analysis**: Industry specialist views and qualitative information will be collected to give insights into market trends and issues.

1.5 Scope

- **Geographical Scope:** The study will be on the global dry bulk shipping market, with a specific focus on the Asia-Pacific region.

- **Temporal Scope:** The period from 2024 to 2031 will be covered in the study, with historical analysis and forecasts for the future.

- **Industry Segments:** Different segments of the dry bulk shipping industry, such as vessel types (Capesize, Panamax, Supramax, Handysize) and commodities (iron ore, coal, steel, bauxite, nickel), will be included in the study.

1.6 Limitations

- **Data Availability**: Access to accurate and real-time data on targeted market segments could be restricted.

- **Forecasting Accuracy**: Market predictions are prone to inherent uncertainties and can be influenced by unexpected events.

- **Qualitative Data Bias**: Qualitative data and expert opinions can be prone to biases and subjective judgments.

CHAPTER II
2.0 LITERATURE REVIEW

The dry bulk shipping market, a cornerstone of global trade and logistics, has been the subject of extensive academic scrutiny, particularly regarding volatility spillover, market inefficiency, and the influence of macroeconomic and commodity market dynamics. Early research highlights the interconnectedness of shipping with economic, financial, and commodity markets, noting that fluctuations in agricultural and energy commodity prices, such as crude oil, directly impact freight rates and volatility (Kavussanos et al., 2014; Alexandridis et al., 2017, 2018; Sun et al., 2018; Gavriilidis et al., 2018). These findings are particularly relevant for India, where the import and export of bulk commodities like coal and iron ore are critical for industrial growth and supply chain stability.

A recurring theme in the literature is the presence of inefficiencies in the dry bulk market, especially in revenue distribution across different loading regions. Studies reveal that geographical disparities, driven by supply-demand imbalances, sailing distances, and regional tonnage availability, contribute to systematic differences in profitability for shipowners (Revenue Gradient concept). Market segmentation, oligopolistic tendencies, and the Atlantic-Pacific market split further exacerbate these inefficiencies, underscoring the need for improved forecasting and risk management tools (Alizadeh & Nomikos, 2016).

The volatility of freight markets is another focal point, with research emphasizing the importance of implied volatility (IV) as a predictor of market movements. Factors such as spot freight rates, forward curve slopes, and global economic indicators (e.g., VIX index) are shown to influence IV, while volatility spillovers between vessel types and the use of freight derivatives for risk mitigation are explored as strategies to manage uncertainty (Tsouknidis, 2016; Wan et al., 2019). Despite advancements in statistical modeling, gaps remain in understanding how IV captures market expectations and informs hedging strategies.

Long-term trends in bulk shipping prices have been investigated through cointegration analyses, revealing that freight rates across routes exhibit similar long-run behaviors. Multi-factor stochastic models are recommended for capturing price movements and informing investment decisions, taking into account variables such as ship size, subsidies, and seasonality (Alizadeh et al., 2016). These insights are crucial for logistics professionals seeking to develop robust hedging policies and investment strategies.

Risk measurement in the sector is addressed through methodologies like Value at Risk, option pricing models, and Monte Carlo simulations. The choice between stationary and non-stationary models significantly affects risk estimates, with the literature advocating for models that recognize shared long-term trends to reduce financial uncertainty (Alexandridis et al., 2018). The strategic use of freight derivatives and diversification is highlighted as a means to enhance risk management.

The cyclical nature of the dry bulk shipping market is explored through the lens of shipping cycles, with studies employing Granger causality tests to analyze relationships between freight rates, second-hand ship prices, and new-building prices across different cycle phases. The 2008 financial crisis serves as a case study for examining shifts in market forces, reinforcing the importance of understanding volatility and inter-market correlations for strategic decision-making (Sun et al., 2018).

In the context of India, the literature underscores the sector's potential as an "ocean of opportunities." India's strategic location, extensive coastline, and growing demand for bulk commodities position it as a key player in global maritime trade. However, challenges such as regulatory gaps, infrastructure limitations, and underdeveloped coastal shipping hinder the realization of this potential. The integration of road, rail, and port infrastructure, along with supportive legislation, is deemed essential for enhancing India's competitiveness (Indian Shipping Industry Review).

Recent studies introduce innovative approaches to market analysis, such as the "fear index," which measures market sentiment using proxies like money committed and price-to-earnings ratios. This index has been shown to predict freight rate returns and volatility, particularly during periods of financial stress, offering a valuable tool for risk assessment

in the Indian context (Wu, Chou & Liu, 2021).

The imperative for decarbonization is gaining momentum, with research advocating for entropy management and the adoption of alternative energy sources to reduce emissions from dry bulk carriers. Technological advancements, regulatory pressure, and corporate environmental responsibility are driving the sector toward more sustainable practices, which will have significant implications for Indian shipping companies seeking to align with global standards (Murat Koray, 2024).

CHAPTER III

MARKET TREND ANALYSIS

3.1 Data Analysis for the Market for Dry Bulk

A vital component of international trade, the dry bulk shipping sector is shaped by changes in freight rates, commodity movements, and trade volumes. Key trends and industry projections are summarized in the study that follows.

3.2 The volume and forecast of dry bulk seaborne trade

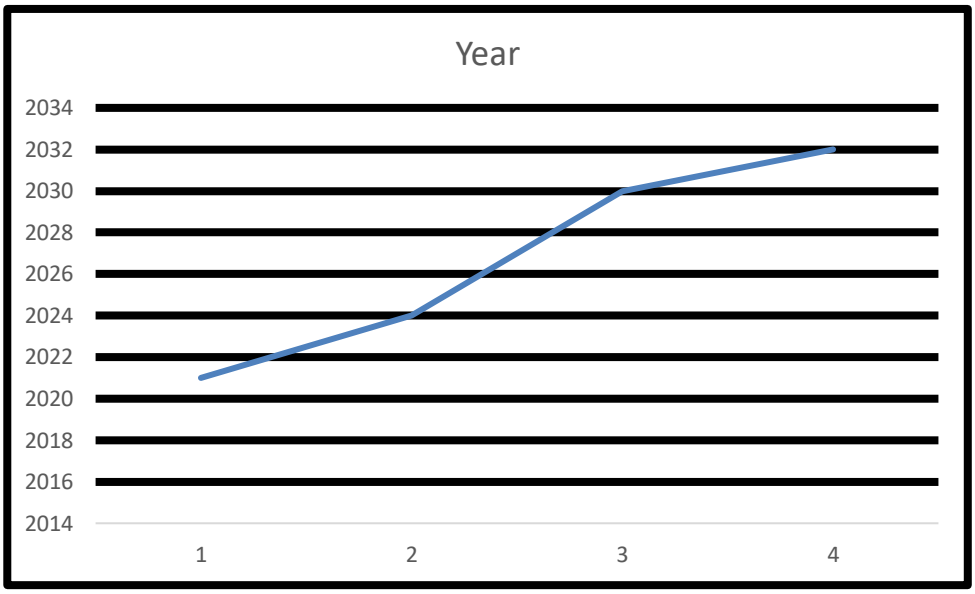
Figure 3.1: Dry Bulk Seaborne Trade (2021-2032)

Summary Table: Dry Bulk Seaborne Trade (2021–2032)

Year	Estimated Volume (Billion Tons)	Key Commodities	Major Regions	Market Trends
2021	~4.8–5.0	Iron ore, coal, grain	Asia-Pacific	Stable demand, post-COVID recovery
2024	>5.0	Iron ore, coal, grain	China, India	Record iron ore, coal imports
2030	+11.1% vs 2021	Iron ore, coal, grain	Asia-Pacific, Africa	Growth in Africa, regulatory impact
2032	~4.8–5.0 (forecast)	Iron ore, coal, grain	Global	Slight decline, efficiency focus

Source: https://www.nyk.com/english/ir/library/fact/

Figure 3.2: Graphical Representation of Dry Bulk Seaborne Trade



Source: By Author

According to many projections, the overall amount of dry bulk seaborne trade will fluctuate between 4.8 and 5.0 billion tons between 2021 and 2032, remaining comparatively constant. This consistency points to a developed market with steady demand for dry bulk goods.

Iron ore continues to make up the greatest portion of these commodities, underscoring its dominance in dry bulk trade. The demands of energy production and steel manufacture also drive the importance of coking and steam coal. Grain commerce also makes up a sizeable amount, which is indicative of the continuous demand in global agricultural markets.

It is anticipated that total trade volumes will somewhat decrease through 2032. This tendency could be caused by a number of factors, such as evolving energy regulations that favour renewable energy sources, shifts in the patterns of steel production around the world, improvements in the efficiency of material utilization, and geopolitical influences that affect commodities demand and trade routes. A major participant in the maritime sector, NYK Line, provides the data that backs up these conclusions.

3.3 Implications for Logistics and Transportation

Better long-term planning of supply chain networks, port facilities, and vessel capacity is made possible by the stability of trade volumes. These forecasts can be used by shipping corporations to maximize fleet size and deployment tactics. Furthermore, knowing how commodities are broken down aids in evaluating the risks associated with particular trading routes and market price volatility.

3.4 China's Imports of Iron Ore and Production of Crude Steel

Trade data shows a strong correlation between China's imports of iron ore and its output of crude steel. China, a major producer of steel worldwide, is mostly dependent on imported iron ore, which strengthens its hold on the dry bulk market. Data on market share indicates that China is still a major and expanding force in the production of crude steel and the import of iron ore, indicating a change in the global economic environment. Data from Clarkson's Dry Bulk Trade Outlook (April 2024) served as the basis for these observations.

3.5 Implications for Logistics and Transportation

The significance of effective dry bulk carrier operations is underscored by the significant concentration of trade routes serving China. Port congestion brought on by high import quantities may call for smart port management and logistics. Furthermore, the demand for iron ore and freight prices can be greatly impacted by changes in China's steel production, therefore it is imperative that industry participants keep a careful eye on these developments.

3.6 Trends by Type of Bulk Carrier

The volatility of freight rates differs for various kinds of bulk carriers. Depending on the

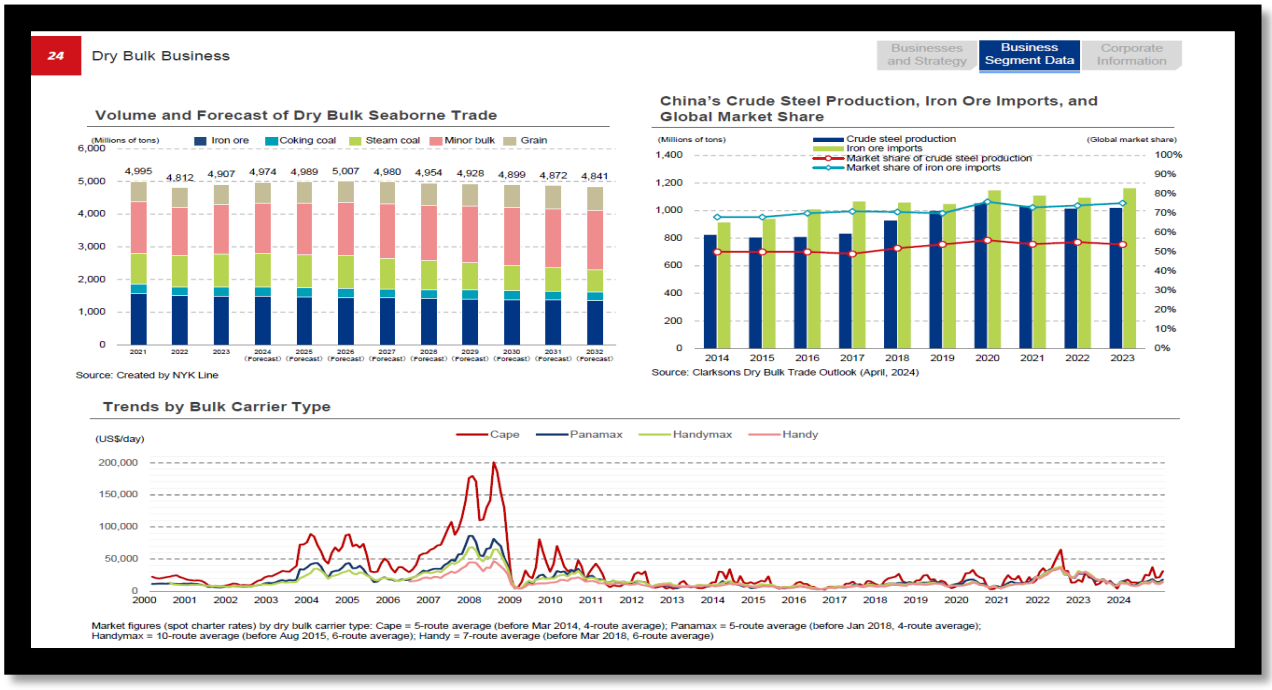
type of vessel, spot charter rates vary greatly; cape-sized boats are most volatile because of their big capacity and exposure to important commodity trades like coal and iron ore. Cape Vessels financial performance was characterized by significant variations in earnings, especially around 2009. Because of their varied load and trade routes, Handymax and Handy vessels have the least volatility, but Panamax vessels show moderate volatility. The information comes from spot charter rates, and averages are computed for each type of vessel based on various trade routes.

3.7 Implications for Transportation and Logistics

A thorough understanding of freight rate trends is essential for accurate budgeting and rate forecasting. Shippers can make informed decisions on vessel selection based on expected freight rates, trade routes, and cargo volumes. Additionally, this information plays a key role in contract negotiations between shippers and carriers. Freight rate volatility presents risks for both parties, necessitating the adoption of risk management strategies such as hedging.

3.8 Trends by Type of Bulk Carrier; Sustainability and Supply Chain Dynamics

Figure 3.3: Trade Volume, Steel Production Trends and Carrier Rate Dynamics



Source: https://www.nyk.com/english/ir/library/fact/

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Commodity pricing, geopolitical events, environmental restrictions and global economic growth are some of the many interrelated elements that impact the dry bulk market. Pressure to lessen the industry's environmental impact is growing as it develops. To fulfil international environmental standards, this entails investigating alternate fuels, improving vessel efficiency, and implementing sustainable shipping procedures.

3.9 Baltic Dry Index (BDI) Performance

Figure 3.4: Baltic Dry Index

Source: https://www.nyk.com/english/ir/library/fact/

The Baltic Dry Index (BDI) performance throughout a five-year period, ending in March 2025, is depicted in the accompanying graphic. The cost of transporting vital raw resources like coal, iron ore, and grain along important international shipping routes is monitored by the BDI, a crucial economic indicator. It provides information on the status of global trade and economic activity by acting as a barometer of shipping demand relative to the availability of dry bulk carriers.

The 2021 peak

In 2021, the index experienced a significant upswing and peaked at its highest point throughout the monitored period. The post-pandemic recovery in international trade, a surge in the demand for raw materials, and supply chain interruptions that resulted in a brief shipping capacity deficit are all responsible for this sharp rise. This high in shipping prices was caused by the COVID-19 epidemic, which had previously hampered international trade. As economies recovered, demand for bulk goods skyrocketed.

Volatility and Decline (2022–2023)

The BDI fell after its peak in 2021, although it continued to be extremely erratic in 2022 and 2023. This volatility was caused by a number of factors, such as changes in the world economy, inflationary pressures, and geopolitical tensions like the conflict between Russia

and Ukraine. Shipping demand fluctuated as a result of these disasters, which also affected commodities prices and interrupted international trade flows. The index may also have been impacted by shifts in energy prices and industrial production during this time.

In 2024, moderation

Although it continued to show sporadic surges, the index seemed to level down by 2024 in comparison to prior years. The dynamics of supply and demand in the dry bulk shipping sector were steadily improving. With shipping capacity more in line with the demand for commodities worldwide, the industry may have adapted to post-pandemic trade conditions.

Fresh Rebound (Early 2025)

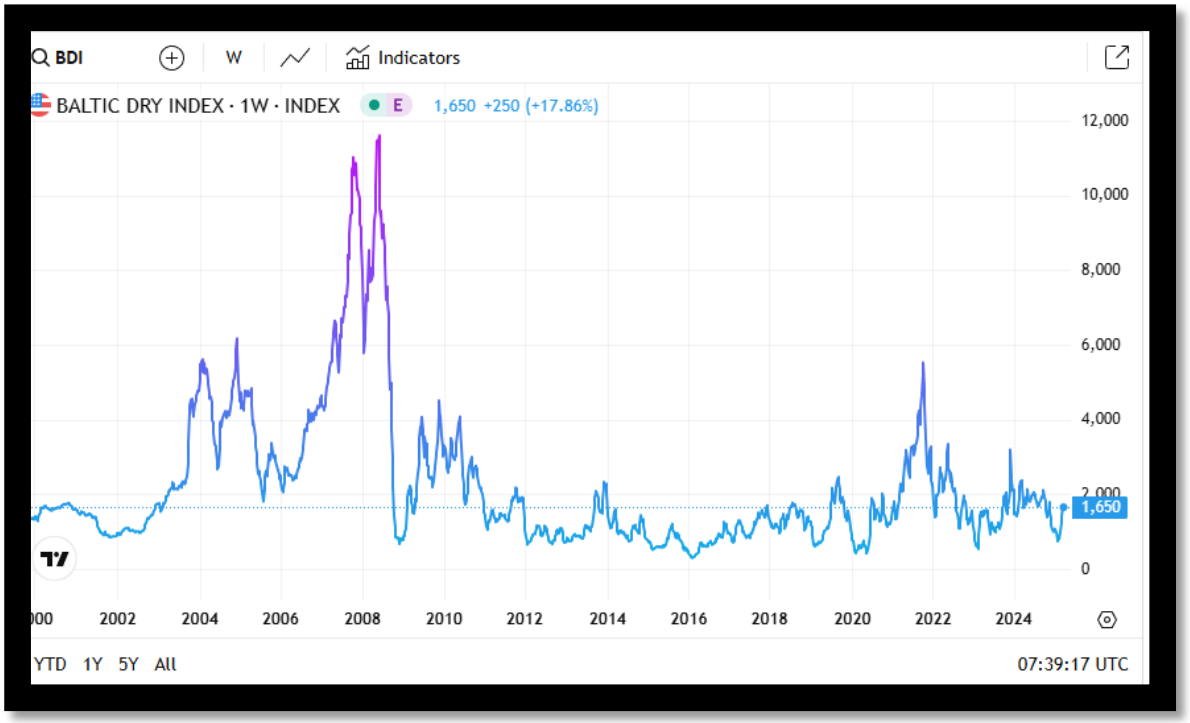
The BDI has exhibited indications of revival as of March 2025, increasing 17.86% to 1,650 points. This increasing trend may be a sign of better market conditions, such as a rise in trade volumes, an increase in industrial activity, or the relaxation of supply chain restrictions. Stronger demand for raw materials and a possible resurgence in global economic activity might be indicated by a prolonged index recovery.

The BDI's swings emphasize how crucial it is to keep an eye on macroeconomic developments, such as trade volumes, commodity demand and geopolitical developments, all of which have a big influence on the maritime sector. Businesses in the shipping and logistics industry can improve operations, control expenses and make wise strategic choices by becoming and being more aware of these developments.

In the dry bulk shipping sector, the recent upward trend in 2025 might also offer chances for growth and investment. Businesses in this industry may see higher freight rates and more profitability if the demand for raw materials keeps rising. However, external variables like global economic slowdowns, regulatory changes, or geopolitical disturbances could modify market circumstances in the future, so ongoing monitoring is required.

3.10 Historical Performance of Baltic Dry Index (BDI)

Figure 3.5: Historical of Baltic Dry Index



Source: https: https://www.nyk.com/english/ir/library/fact/

The Baltic Dry Index's (BDI) historical performance from 2000 to 2025 is shown in the accompanying chart. The cost of transporting raw goods including coal, iron ore, and grain via key international marine routes is tracked by the BDI, a vital economic indicator. It is frequently used in international transportation and logistics to evaluate the state of shipping demand and worldwide trade. The indicator has fluctuated dramatically over the last 20 years, reflecting changes in economic cycles, market speculation and worldwide disturbances.

2000–2008: Boom Before the Financial Crisis

The BDI grew significantly during this time, reaching a record high of more than 11,000 points in 2008. Strong global economic growth, especially from emerging economies like China and India that have enormous raw material demands, was a major factor in this spike. At the same time that commodities prices were rising, there was a surge in speculation in the shipping industry, which created a bubble effect.

Global Financial Crisis and Market Collapse, 2008–2009

As the global financial crisis developed, the BDI fell precipitously, plunging below 1,000 points after peaking in 2008. Global trade shrank precipitously as a result of the economic

slump, which abruptly reduced demand for shipping services. The shipping industry's susceptibility to economic shocks was brought to light by the collapse of freight rates and the slowing of industrial activity as major economies entered a recession.

2010–2019: Attempts at Recovery and Volatility

The BDI made modest attempts to recover after the financial crisis, but it was still exceedingly erratic and much below its pre-crisis peak. The shipping industry has to contend with issues like uneven global economic recovery, oversupply of vessels, and shifting commodity prices. The overall trend stayed muted despite sporadic increases in freight costs because extra shipping capacity prevented prices from reaching their previous highs.

2020–2022: The Effects of the Pandemic and the Recovery from COVID-19

The BDI first fell in 2020 as a result of the COVID-19 pandemic, which severely disrupted international trade through lockdowns and decreased industrial output. However, supply chain disruptions, a post-pandemic recovery in demand for raw materials, and limited transportation capacity caused the index to soar past 5,000 points by 2021–2022. Freight rates surged due to the short-term mismatch between supply and demand, which was reminiscent of previous periods of high volatility.

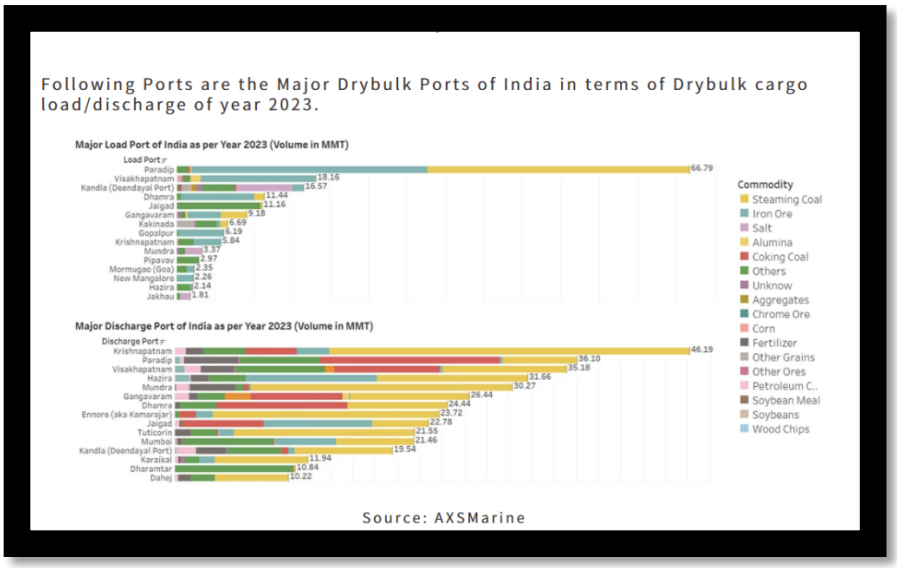
2023–2025: Lower-Level Stabilization

The BDI has been stable between 1,500 and 2,000 points in the most recent time frame (2023–2025). This pattern suggests that international supply networks have become more standardized, that transportation capacity and demand are better balanced. These figures indicate a stable level of international commerce activity with fewer disruptions than in prior years, while being far lower than the 2008 peak or the increases during the epidemic.

The BDI's significant volatility highlights how cyclical international trade is and how susceptible it is to macroeconomic variables including supply chain interruptions, economic growth, and geopolitical events. Strong demand is frequently indicated by high peaks, but when maritime companies overinvest in new boats during boom periods, it can also result in overcapacity problems.

3.11 Freight Index

Figure 3.6: Major Dry Bulk Ports of India



Source: https://public.axsmarine.com/

A thorough analysis of India's main dry bulk ports for 2023 is shown in the attached graphic, which is arranged according to the cargo load and discharge volumes, which are shown in million metric tons (MMT). According to the data, several ports play a crucial role in supporting different industrial sectors by handling a variety of commodities, including iron ore, salt, alumina, steaming coal, and others.

Due in large part to steaming coal, Paradip Port stands out as the leading major load port with an impressive cargo load of 66.79 MMT. With 18.16 MMT, Visakhapatnam comes next, managing a wide range of commodities such as alumina and steaming coal. Third-place Kandla (Deendayal Port) handles 16.57 MMT, of which a sizable amount is made up of bulk goods like salt. Other noteworthy ports that contribute to the loading activities are Gangavaram (9.18 MMT), Jaigad (11.16 MMT), and Dhamra (11.44 MMT), all of which have a significant emphasis on steaming coal and associated goods. Additionally, ports like Krishnapatnam, Mundra, and Mormugao handle between 2 and 6 MMT, which is a lesser but still significant amount.

Imports of steaming coal account for the majority of Krishnapatnam Port's remarkable 46.19 MMT discharge volumes, placing it first in the field. With 36.10 MMT, Paradip comes in second, handling a combination of fertilizers and steaming coal. With an

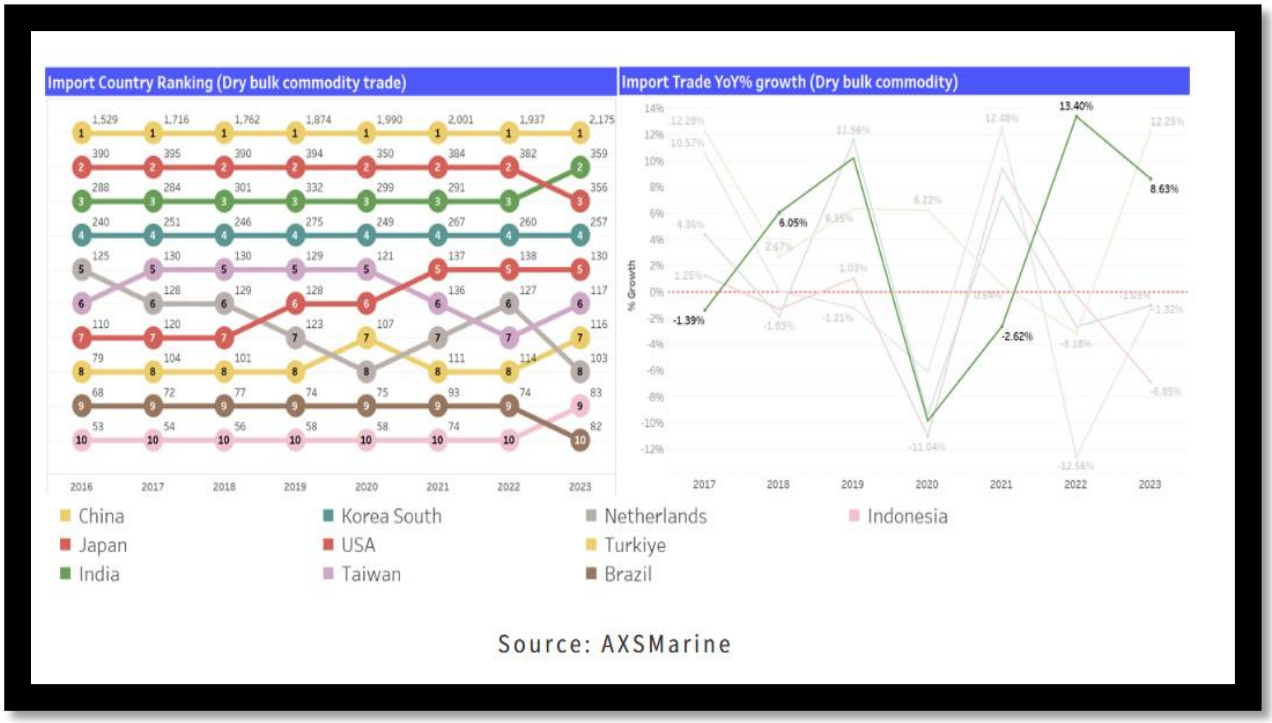
emphasis on steaming coal and other grains, Visakhapatnam and Hazira also record high discharge figures, at 35.18 MMT and 31.66 MMT, respectively. Other important discharge ports that are crucial for handling dry bulk cargo are Mundra (30.27 MMT), Dhamra (26.44 MMT), and Ennore/Kamarajar (23.72 MMT). Although their quantities are relatively lower than those of the major ports, ports like Tuticorin, Mumbai, and Kandla also participate in the discharge operations.

The data's commodity patterns show that steaming coal is the most common loading and unloading activity in the majority of ports, highlighting its vital role in powering India's energy industry. The vast amount of steaming coal takes precedence over iron ore, alumina, fertilizers, and grains, albeit they all play a significant role. While ports like Paradip have a more varied commodity portfolio that includes fertilizers in addition to coal, other ports, like Kandla, are notable for their expertise in handling salt.

Considering all things, the report emphasizes how strategically significant Paradip Port is as India's top centre for dry bulk shipping. Along with highlighting regional specializations among other ports, it provides insightful information for supply chain optimization and logistics planning in industries like manufacturing, energy and agriculture.

3.12 Country-wise Dry Bulk Imports

Figure 3.7: Dry Bulk Commodity Imports – Country Rankings and Year-on-Year Trade Growth Trends



Source: https://public.axsmarine.com/

A thorough examination of import country rankings and year-over-year (YoY) growth rates for the trade of dry bulk commodities from 2016 to 2023 is presented in the charts that are provided. Important patterns and changes in the dynamics of trade are visible here.

During this time, China has continuously been the largest importer of dry bulk commodities. From 1,529 million tons in 2016 to 2,175 million tons in 2023, its import volume climbed rapidly, highlighting China's critical position in international commerce and its strong reliance on raw resources to sustain economic growth and industrial production. With comparatively consistent import quantities that ranged from 390 million tons in 2016 to 356 million tons in 2023, Japan was able to hold its position as the second-largest importer.

With 240 million tons in 2016, India was ranked fourth; by 2020, it had risen to third place with 275 million tons, surpassing South Korea. India's imports reached 257 million tons by 2023, demonstrating the country's growing industrial base and rising demand for infrastructural expansion. Although it dropped from third to fourth place over time, South Korea continued to be a major importer. In comparison to India, its import quantities fluctuated somewhat, suggesting steady but slower growth.

With relatively low import quantities, other nations like the US, Taiwan, the Netherlands, Turkey, Brazil and Indonesia continued to occupy lower positions. These nations' dry bulk trade patterns throughout time revealed few variations, indicating consistent demand and no significant changes to their standing in international trade.

Growth rates vary by country and year, according to the YoY growth analysis. With a strong post-pandemic rebound and steady demand for commodities, China showed high growth, reaching a peak of 13.40 percent in 2022 before easing to 8.63% in 2023. India's growth was generally good, reaching a noteworthy record of 11.55% in 2019. But like the majority of nations, it saw a drop during the epidemic, falling -2.62% in 2020, before recovering.

Mature economies, such as South Korea and Japan, on the other hand, showed steadier or decreasing growth rates throughout time, indicating slower expansion and predictable demand. The severe drops observed in 2020, with China suffering a -11.04% reduction, demonstrated the COVID-19 pandemic's worldwide impact. The recovery that followed in the next years serves as an example of how resilient and flexible global logistics and trade networks can be.

This research reveals a number of important conclusions. Due to its hegemony in dry bulk imports, China is a major factor affecting the demand for shipping worldwide and a key location for logistics planning. India's increasing imports indicate that there are more prospects for foreign transportation companies hoping to enter developing markets.

CHAPTER IV

4.0 AN ANALYSIS OF DRIVERS OF GROWTH OF BULK TRADE

4.1 Introduction

Global economic developments and the dynamics of commodities demand and supply are directly linked to the success of the dry bulk shipping sector. The demand for commodities and raw materials is driven by factors such as population increase, infrastructure development, industrialization and economic expansion, which also affects freight rates and shipping volumes in the dry bulk industry.

China has a impact on the dry bulk shipping sector because it is the biggest importer of dry bulk commodities worldwide. The demand for bulk carriers is fueled by the nation's appetite for coal, iron ore and other raw resources, which also shapes shipping routes, freight market dynamics and trading patterns. Global dry bulk shipping is significantly impacted by changes in China's industrial activity, infrastructural spending and policy.

The market for dry bulk shipping is changing dramatically in the direction of regulatory compliance and environmental sustainability. In order to reduce their environmental impact and guarantee regulatory compliance, vessel owners and operators are being compelled by strict emissions standards, such as the International Maritime Organization's (IMO) sulfur cap regulations and greenhouse gas (GHG) reduction targets, to implement cleaner fuels, energy-efficient technologies, and eco-friendly practices.

The dry bulk shipping industry is changing due to innovation and technical breakthroughs that improve operational performance, safety, and vessel efficiency. In order to improve fleet management, lower fuel consumption, and improve environmental sustainability, the industry is embracing technology-driven solutions, from the adoption of digitalization and automation technologies to the creation of environmentally friendly propulsion systems.

4.2 Analysing Future Outlook as per CAGR

Figure 4.1: Dry Bulk Shipping Market Size and Growth Forecast (2018–2030)

Source: *https://www.globenewswire.com/news-release/2025/01/16/3010876/0/en/Dry-Bulk-Shipping-Industry-Business-Analysis-Report-2024-2030-Featuring-Key-Players-Oldendorff-Carriers-Pacific-Basin-Shipping-and-Star-Bulk-Carriers.html*

An overview of the dry bulk shipping market's growth trajectory from 2018 to 2030, stated in USD billion, is shown in the accompanying image. The market has grown steadily throughout the years and from 2023 to 2030, a compound annual growth rate (CAGR) of 4.00% is anticipated.

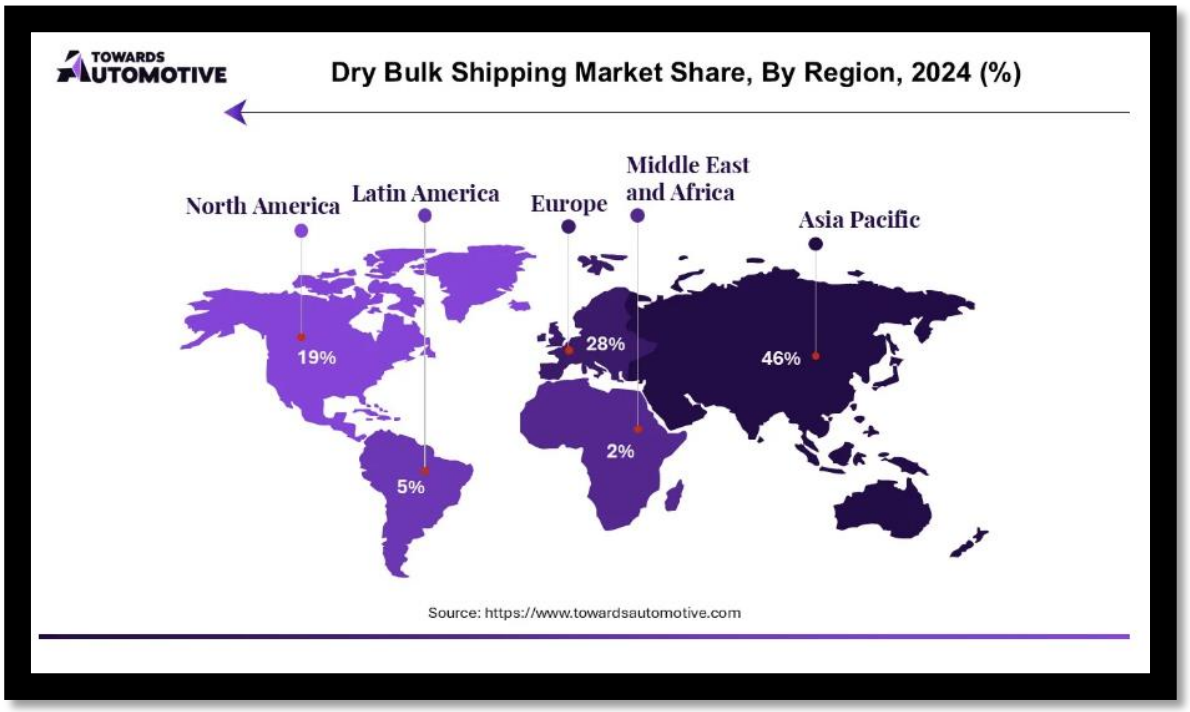
By 2020, the market has grown greatly from its relatively small size in 2018. The market size increased marginally to USD 4.2 billion in 2023 from USD 4.1 billion in 2022. This suggests that demand for dry bulk shipping services, which are necessary for moving commodities like coal, iron ore, cereals, and other raw materials vital to international trade and industrial production, is steadily rising.

According to the prediction, the market will continue to rise until 2030, when it is anticipated to reach USD 5.3 billion. This growth demonstrates how dry bulk shipping is becoming more and more important as international trade volumes increase and enterprises need effective bulk commodities transportation.

This information illustrates how crucial dry bulk shipping is to international supply networks and how it boosts both the industrial and agricultural sectors. Gaining insight into the dynamics of this market can aid in locating chances for innovation, and investment.

4.3 Current State of Dry Shipping Market Share

Figure 4.2: Dry Bulk Shipping Market Share, By Region (2024) [%]



Source: *https://www.towardsautomotive.com/insights/dry-bulk-shipping-market-sizing*

The anticipated regional dry bulk shipping market share for 2024 is shown in the accompanying image. Bulk transportation of commodities like coal, grain, iron ore, and other raw materials is known as dry bulk shipping. Significant geographical differences in market dominance are highlighted by the analysis.

With a dominant 46% market share, the Asia-Pacific area is anticipated to dominate the global dry bulk shipping industry, indicating its significance as a significant centre for industrial production and the consumption of raw materials. The enormous demand for commodities in the region, especially in nations like China and India.

With 28% of the market, Europe is the second-largest contributor globally. This illustrates Europe's well-established industrial base and its dependence on raw material imports to maintain its manufacturing operations. The region's important role in dry bulk shipping is supported-infrastructure.

Driven by its export-oriented economy, especially in agricultural and energy goods, North America has a moderate 19% share. Despite having a strong maritime sector, North America's contribution is lower than that of Asia-Pacific and Europe because of its comparatively lesser imports.

Only 5 percent of the market is in Latin America. The region's smaller industrial base and reliance on exporting particular commodities, such as grains and minerals, rather than a variety of bulk shipping activities, are probably the causes of this modest contribution.

Despite having abundant natural resources, the Middle East and Africa barely account for 2% of the world market for dry bulk shipping. Low industrial activity, inadequate port infrastructure and a lack of integration into international trade networks for dry bulk commodities that are the reasons behind the variations for this small and narrow share.

The picture highlights how Asia-Pacific dominates dry bulk shipping because of its enormous industrial demand, with Europe and North America following in moderate percentages. Due to economic and infrastructure limitations, Latin America and the Middle East and Africa fall far behind. In addition to highlighting prospects for investment or strategic planning in underrepresented regions, this data offers insights into regional trade dynamics to students studying logistics and international transportation.

4.4 Glimpse of the Growth of Dry Bulk Shipping Market

Figure 4.3: Global Dry Bulk Shipping Market Outlook (2025–2029)

Source: https://www.technavio.com/report/dry-bulk-shipping-market-industry-analysis

- **Industry Growth:** A compound annual growth rate (CAGR) of 3.9% is anticipated for the industry. This suggests that the dry bulk transportation industry will grow steadily.

- **Incremental Growth:** The industry is expected to increase by $3604.5 million over time. This absolute growth number gives an idea of the market's growing size, which is important for strategic planning and investment.

- **APAC Contribution:** It is anticipated that 56% of the total growth will come from the Asia-Pacific area (APAC). This demonstrates how important Asian economies are in fueling the market for dry bulk shipping. This is particularly significant for your studies in India since it indicates both regional competition and possible opportunities.

- **Growth for 2025:** In particular, a 3.7% growth rate is projected for 2025. A more immediate insight on the market's performance is provided by this short-term forecast.

- **Market Fragmentation:** The market is described as "fragmented," which means that a number of companies are present. In contrast to a consolidated market, this points to a competitive environment with possibly lower profit margins. Additionally, it suggests chances for specialization or consolidation.

4.5 Common Drivers of Bulk Trade Agreement

Bulk trading is essential to international transportation and global logistics, especially when it comes to moving commodities like metals, grains, and oil. The realization of economies of scale, which allow buyers and sellers to drastically lower costs per unit by distributing fixed expenses like infrastructure and overhead over a larger number of units, is one of the main benefits of bulk trading. For logistics and transportation companies that manage large transaction volumes, this cost effectiveness not only boosts profitability but also gives them a competitive edge in fiercely competitive sectors.

Bulk trade agreements are heavily influenced by the dynamics of commodity supply and demand. Global patterns in production, consumption, and economic development have a direct impact on contract terms and pricing because these exchanges frequently involve raw materials. The number and direction of bulk shipments, for example, can be affected by changes in trade flows brought on by variations in the world's demand for energy or agricultural items. In order to make accurate predictions in this field, one must take into account a number of interrelated elements, such as industrialization, economic policy and even geopolitical developments, rather than depending only on past patterns.

In bulk commodity markets, price volatility is an inherent risk that is influenced by erratic variables like weather, political unpredictability and market speculation. Bulk trade agreements usually include provisions for fixed pricing, price adjustment procedures, or hedging techniques in order to reduce these risks. For logistics managers and traders to maintain financial stability and predictability in an otherwise turbulent market environment, these contractual protections are essential.

The feasibility and efficiency of bulk trade are also heavily influenced by "**logistics and transportation infrastructure"**. The availability and quality of ports, railways and road networks determine not only the cost but also the reliability of bulk shipments. Efficient infrastructure reduces transit times, minimizes losses and supports the large-scale movement of goods, which is essential for maintaining the economies of scale that bulk trading relies upon.

Regulatory environments further shape bulk trade by imposing tariffs, import/export restrictions and quality standards. These regulations can either facilitate or hinder trade flows, affecting the competitiveness of suppliers and the cost structure for buyers. For logistics professionals, staying abreast of regulatory changes is vital for compliance and for optimizing trade strategies within the global supply chain.

Geopolitical variables and trade links also have a big impact. Access to important markets can be opened or closed, supply chain routes can be changed and the negotiation of bulk trade agreements can be impacted by diplomatic relations, membership in trade blocs (such the EU or ASEAN) and the application of sanctions. For people working in international logistics and transportation, being able to navigate these intricacies is essential.

Another important factor is **"Supply volume and Quality Consistency"**. Because supply chain failures can have a domino effect, buyers in bulk trade frequently give preference to suppliers who can consistently fulfil sizable, recurrent orders without sacrificing quality. In bulk logistics, this need emphasizes the value of strong supplier connections and strict quality control procedures.

4.6 Influence of Trade Bloc(s) on Vessel Trading

A variety of geopolitical and economic considerations that seek to improve regional integration and global competitiveness are often the driving forces behind bulk trade agreements spanning regions such as South America, Africa, and Southeast Asia (via ASEAN). The need for greater market access and closer economic integration is one of the

main motivators. Agreements like the ASEAN Free Trade Area (AFTA), the African Continental Free Trade Area (AfCFTA) and South America's MERCOSUR allow member nations to trade more freely by lowering trade barriers like tariffs and duties. This increases intra-regional trade and gives producers access to wider consumer markets.

The desire for economies of scale is another important incentive. Larger trade volumes are encouraged via bulk trade agreements, which lowers costs per unit and boosts price competitiveness. This is particularly important for commodities such as raw materials, industrial inputs, and agricultural products. Additionally, by diversifying supply chains and reducing reliance on anyone trading partner, these agreements enable nations to guarantee steady supplies of vital commodities like minerals, food, and energy. For instance, ASEAN and South American nations concentrate on industries like electronics, agribusiness, and manufacturing, but African nations frequently deal in bulk for energy and mining exports.

Security of strategic resources is also important. Long-term bulk trade agreements are signed by nations to guarantee steady access to necessities, particularly during uncertain times or supply shortages. Another important factor is the growth of infrastructure and logistics, since trade agreements are frequently linked to significant expenditures in cold chain systems, ports, railroads and transportation networks. This reduces logistical expenses and increases the effectiveness of moving big products.

Additionally, policy harmonization and trade facilitation are crucial components. Regional trade agreements often work toward aligning customs procedures, quality standards, and regulatory frameworks, thereby reducing friction at borders and making the movement of goods more predictable and cost-effective. Political and diplomatic considerations also influence these agreements, as they strengthen regional solidarity, support collective bargaining power in international trade platforms and promote South-South cooperation.

Finally, sustainable development and environmental goals are increasingly shaping modern trade agreements. There is a growing emphasis on promoting eco-friendly bulk products and encouraging trade that aligns with climate commitments, such as the exchange of renewable energy technologies or sustainably sourced agricultural goods.

CHAPTER V

5.0 FINDINGS AND CONCLUSION

This research has given us a thorough grasp of how important the dry bulk shipping sector is to India's economic development, especially in areas like steel, energy, and agriculture. The study has brought to light the intricate relationship between global demand, freight rate volatility, and regulatory problems by examining important commodities such as coal, iron ore and cereals, as well as vessel types and port infrastructure. The results highlight how the industry is heavily impacted by overcapacity, shifting fuel prices, changing environmental laws, and macroeconomic uncertainty, all of which have an impact on operational effectiveness and profitability. The study also emphasizes how crucial it is to implement sustainable practices and technology innovations in order to boost resilience and competitiveness. The project's final conclusion, which provides insightful information for both logistics experts and policymakers, is that strategic interventions such as infrastructure development, regulatory reforms and proactive risk management are necessary to guarantee the long-term viability and worldwide competitiveness of India's dry bulk shipping industry.

5.1 Findings

- **Market Demand and Growth**
  - The dry bulk shipping market is projected to grow steadily with a CAGR of 3.9–4.0%, indicating long-term opportunities driven by industrialization, infrastructure expansion and commodity demand.
  - Asia-Pacific, particularly China and India, remains the key growth hub, contributing to over 50% of global market share.

- **Commodity and Vessel Trends**
  - Iron ore, coal, and grain dominate dry bulk trade. China’s crude steel production and iron ore imports directly influence freight dynamics.
  - Capesize vessels are the most volatile due to exposure to major commodity trades; Handymax and Handy vessels offer more stability in earnings.

- **Market Volatility and Risk Management**
  - Freight rate volatility is impacted by macroeconomic variables like oil prices, interest rates, and geopolitical risk (e.g., Russia-Ukraine conflict).
  - Hedging strategies and forecasting models (e.g., ARIMA, SVAR, VECM) are crucial tools for stakeholders to manage market unpredictability.

- **Environmental and Regulatory Pressures**
  - The sector faces stricter emission regulations (IMO sulfur cap, GHG reduction targets), compelling fleet operators to adopt cleaner fuels and energy-efficient technologies.
  - Decarbonisation and entropy management have become essential to align with international climate goals and investor expectations.

- **Trade and Infrastructure Dynamics**
  - Paradip Port emerged as the most significant dry bulk port in India due to high steaming coal traffic.
  - India's dry bulk imports have steadily increased, with a clear rise in demand post-pandemic, offering potential for logistics firms and shipping lines.

- **Geopolitical and Economic Influence**
  - Trade blocs such as ASEAN and MERCOSUR influence shipping patterns and bulk agreements through policy alignment and infrastructure development.
  - Market sentiment indices like the "fear index" provide predictive value in volatile times, helping companies forecast freight movements.

- **Technological Innovations**
  - Digitalization and automation are increasingly adopted to optimize vessel performance and reduce emissions.
  - The use of advanced forecasting and real-time data analytics improves planning, route optimization, and fuel efficiency.

5.2 Suggestions

- Encourage public-private partnerships (PPPs) to modernize Indian ports and improve intermodal connectivity.
- Promote R&D for cleaner fuels and low-emission ship technology to meet IMO targets.
- Develop region-specific freight forecasting tools for better route planning.
- Facilitate bulk cargo clustering and aggregation models to optimize freight economy.

5.3 Conclusion

This study assessed key trends and factors influencing India's dry bulk shipping market, aligning with the research objectives set in Chapter 1. The findings confirm that commodity-specific demand (especially coal and iron ore), freight rate volatility, and environmental regulations are primary drivers shaping the industry. The dominance of Asia-Pacific, particularly India and China, highlights the strategic importance of regional demand in global maritime logistics.

Furthermore, the market is evolving in response to global policy shifts, technological innovation, and cyclical economic patterns. Companies must embrace proactive strategies to manage risks, comply with evolving regulations, and leverage growth opportunities in emerging markets. The study underscores the importance of investing in port infrastructure, digital tools, and sustainable practices to ensure long-term competitiveness.

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6.1 List of Glossary of Terms

- CAGR: Compound Annual Growth Rate
- IMO: International Maritime Organization
- BDI: Baltic Dry Index
- SVAR: Structural Vector Autoregression
- ARIMA: Autoregressive Integrated Moving Average
- VECM: Vector Error Correction Model
- Entropy Management: An environmental strategy to reduce energy waste in shipping systems
- Hedging: Risk reduction technique used in freight rate forecasting