

Project Report on

**A STUDY ON NEO BULK CARGO TRANSPORTATION IN
SELECT MAJOR PORTS IN INDIA**

*Submitted to the School of Maritime Management, Indian Maritime
University in partial fulfillment for the requirements for the award of degree in*

MBA-International Transportation & Logistics Management

Submitted

By

AMAN KUMAR
(Reg. No. 2003305004)

Under the supervision of
Dr. B. SWAMINATHAN
Associate Professor

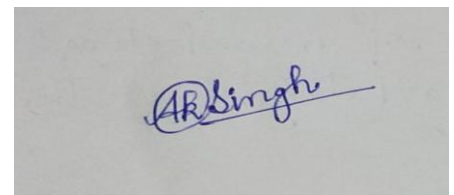


INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
SCHOOL OF MARITIME MANAGEMENT
CHENNAI CAMPUS

2022

DECLARATION

I, hereby declare that the Project report titled **A STUDY ON NEO BULK CARGO TRANSPORTATION IN SELECT MAJOR PORTS IN INDIA** is the bonafide work submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus under the supervision of **Dr.B.SWAMINATHAN** , Associate professor and Head SMM , School of Maritime Management, Indian Maritime University, Chennai Campus, for partial fulfilment of the requirement of award of the degree of **MASTER OF BUSINESS ADMINISTRATION (INTERNATIONAL TRANSPORTATION AND LOGISTICS MANAGEMENT)** is a report of original work done by me and this work has not been submitted previously in part or full to this or any other university or institution for the award of any degree, diploma or any other courses.

A rectangular box containing a handwritten signature in blue ink. The signature appears to be 'Aman Kumar' written in a cursive style.

Place: Chennai

Name: AMAN KUMAR

Date: 20/05/2022

Reg no.: 2003305004

CERTIFICATE

SCHOOL OF MARITIME MANAGEMENT INDIAN MARITIME UNIVERSITY, CHENNAI

This is to certify that the project report entitled “**A STUDY ON NEO BULK CARGO TRANSPORTATION IN SELECT MAJOR PORTS IN INDIA**”, submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus., in partial fulfilment for the award of the degree of Master of Business Administration in International Transportation and Logistics Management, is a record of work carried out entirely by **Aman Kumar**, Reg. No. **2003305004**.

Dr. B. Swaminathan

Project Guide
School Maritime Management
Indian Maritime University
Chennai campus

External Examiner:

Place: Chennai
Date: 20th May 2022

ACKNOWLEDGEMENTS

I express my sincere thanks to my teachers and **Government of State of Bihar** who supported me financially for my education from the primary level.

I acknowledge my deep sense of gratitude to my internship under the supervision of **Dr.B.Swaminathan, Associate professor, Head School of Maritime Management, Indian Maritime University, Chennai Campus**, for their suggestions during the time of report preparation.

I express my deep sense of gratitude to my beloved Parents, and friends, whose supports have enabled me to concentrate on my study and internship.

I would like to express my profound senses of gratitude to my faculty members of School of Maritime Management, Indian Maritime University, Chennai Campus for giving me an opportunity to take this project.

I would like to sincerely thanks to everyone who has contributed in this effort in numerous ways & their invaluable guidance & assistance through the entire phase of this project.

AMAN KUMAR

(Registration No: 2003305004)

CONTENTS

DECLARATION.....	2
CERTIFICATE.....	3
ACKNOWLEDGEMENT.....	4
Chapter 1: Introduction.....	11
1.1 Significant of the Study	11
1.1.1 Ministry of Ports, Shipping and Waterways	12
1.1.2 Major Ports in India.....	14
1.1.3 Relevance of Port in International Trade	15
1.1.4 Cargo and Carrier	15
1.2 Objectives of the Study.....	19
1.3 Scope of the Study	19
1.4 Research Methodology	19
1.5 Limitation of the Study	20
1.6 Chapterisation	21
Chapter 2: Literature Review.....	22
2.1 Review of Literature	22
2.2 Literature Gap.....	30

Chapter 3: Overview of the Select Indian Major Port Industry	31
3.1 Indian Major Ports	32
3.2 Recent Developments	36
3.3 Government Initiative for Port Sector	37
3.4 Port Traffic	37
Chapter 4: Analysis and Interpretation	39
4.1 Methodology Used.....	39
4.2 Analysis & Interpretation of the Study.....	39
4.2.1 Trend of Neo Bulk Cargo Traffic Handled at East Coast of Major Ports in Last 10 Years	40
4.2.2 Trend of Neo Bulk Cargo Traffic Handled at West Coast of Major Ports in Last 10 Years	41
4.3 Year on Year CAGR % at Major Ports in India	42
4.4 Employment of Manpower at Major Ports	49
4.5 Berth Available at Major Ports in India	49
4.5.1 Berth Available at East Coast of Major Ports in India.....	49
4.5.2 Berth Available at West Coast of Major Ports in India	50
4.6 Commodity Wise Neo Bulk Cargo Handled at Major Ports in India (in 000' tonnes).....	50

Chapter 5: Conclusion	57
5.1 Findings of the Study	57
5.2 Suggestions	58
5.3 Conclusion	58
Bibliography	59

LIST OF FIGURE

3.1 Major ports in India	30
3.4 Major ports capacity and traffic	32
3.5 Major ports capacity and Utilisation	32
4.1 Trend of Neo bulk cargo traffic Handled at east coast of major Ports in last 10 years	35
4.2 Trend of Neo bulk cargo traffic Handled at west coast of major Ports in last 10 years	36
4.3 Year on year CAGR % of V O Chidambaranar	37
4.4 Year on year CAGR % of Chennai Port.....	38
4.5 Year on year CAGR % of Kamarajar Port	38
4.6 Year on year CAGR % of Vishakhapatnam Port	39
4.7 Year on year CAGR % of Paradip Port.....	39
4.8 Year on year CAGR % of Haldia Dock Port	38
4.9 Year on year CAGR % of Kolkata Dock Complex	38
4.10 Year on year CAGR % of Deendayal Port Trust.....	41

4.11	Year on year CAGR % of Mumbai Port	41
4.12	Year on year CAGR % of JNPT	42
4.13	Year on year CAGR % of Mormugao Port	42
4.14	Year on year CAGR % of New Mangalore Port	43
4.15	Year on year CAGR % of Cochin Port	43
4.16	Commodity wise Neo bulk cargo handled at Deendayal Port ... trust.....	46
4.17	Commodity wise Neo bulk cargo handled at Mumbai Port....	46
4.18	Commodity wise Neo bulk cargo handled at JNPT.....	46
4.19	Commodity wise Neo bulk cargo handled at Mormugao	
	Port	47
4.20	Commodity wise Neo bulk cargo handled at New Mangalore .. Port	47
4.21	Commodity wise Neo bulk cargo handled at Cochin Port.....	48
4.22	Commodity wise Neo bulk cargo handled at	
	V O Chaidambaranar	48
4.23	Commodity wise Neo bulk cargo handled at Chennai Port....	49
4.24	Commodity wise Neo bulk cargo handled at Kamarajar	
	Port	49
4.25	Commodity wise Neo bulk cargo handled at	
	Vishakhapatnam Port.....	50
4.26	Commodity wise Neo bulk cargo handled at Paradip Port	50
4.27	Commodity wise Neo bulk cargo handled at	
	Haldia Dock Complex.....	51

4.28	Commodity wise Neo bulk cargo handled at	
	Kolkata Dock Complex.....	51

LIST OF TABLES

3.1	Growth in CargoTraffic at Indian Ports in Percentage	26
3.2	List of major ports in India with features	28
3.3	State wise total number of ports in India.....	29
4.1	Trend of Neo bulk cargo traffic Handled at east coast of	
	major Ports in last 10 years	35
4.2	Trend of Neo bulk cargo traffic Handled at west coast of	
	major Ports in last 10 years	36
4.4	Employment of manpower at major ports	44
4.5	Berth Available at east coast of major ports in India.....	44
4.6	Berth Available at west coast of major ports in India.....	45

Chapter 1: Introduction

1.1 Significant of the Study

1.1.1 Ministry of Ports, Shipping and Waterways

The Ministry of Ports, Shipping and Waterways, a part of the Government of India, is the Sovran body for planning and organizing of the standards and guidelines and laws identifying with ports, shipping and waterways, headed by Shri Sarbananda sonowal. Maritime transport is a basic foundation for the social and monetary improvement of a country. It addresses the speed, structure and example of the advancement of water transport in the country.

The Ports are a trade gateway for a nation, their ability to meet the increasing demands of a rapidly growing economy is crucial for addressing the rising import and export traffic. With the objective in mind, the planning commission and the Ministry of Ports, Shipping and Waterways have initiated a coordinated national-level strategic planning exercise to identify, in a structural manner, the required investments in ports and related infrastructure, while at the same time reducing dependence on government funds.

All the major ports are under the administrative control of the Union Ministry of Ports, Shipping and Waterways and are under the regulatory authority of the Tariff Authority for Major Port(TAMP) except the new Port of Ennore. Each Port is managed by Port Trust with the Chairman being appointed by the Ministry of Ports, Shipping, and Waterways. Another member of port trust represents various interest groups, including labours, the shipping industry, and major customers.

The minor or intermediate ports come under the administration of their respective state government. While three states, Gujarat, Maharashtra, and Tamil Nadu have constituted statutory maritime boards to oversee the functioning of the minor ports in the others this role is performed by one of the state departments. Maritime boards have powers almost like those other major port trusts.

1.1.2 Major Ports in India

India has endowed an in-depth coastline of about 7516.6 km dotted with 12 major ports and 187 minor and intermediate ports. Among these 12 significant ports, 6 are situated on the west coast: Kandla, Mumbai, JNPT, Mormugao, New Mangalore & Cochin.

Calcutta, Mumbai, Chennai, and Mormugao are four significant ports that are over 100 years old. The twelfth main ports, the harbor of Ennore, India's largest corporate port, opened for business in the year 2000. Any port that central government may proclaim to be a Major Port by notice in the central gazette under the Indian Port Act 1908, or by any legislation again for time being compelling. A minor port is one that the state government declares as such by publication in the state gazette. The primary port trust statute of 1963 established independent entities that are administered by such a trustees for each port. The central government has overarching responsibility for the effective management and operation of major ports. Other ports are managed by their own governments.

Major ports of India:

➤ Chennai Port Trust

It is the most important port within the Bay of Bengal and the second largest port of India after JNPT. It's the largest port on East Coast.

➤ Cochin Port Trust

Situated on the Willington island on the South-West bank of India, found on the go across streets of the East-West maritime trade, the port is named normal door to the huge modern and farming produce markets of South-west India.

➤ Ennore Port

This port is currently named Kamarajar Port Limited. It's the first corporate port of India and is enlisted as a public organization.

➤ Jawaharlal Nehru Port Trust (JNPT)

It is also alluded to as Nhava Sheva. It is the biggest container port in India, taking care of around half containers of every significant port. It's situated on the east shore of Mumbai harbor off Elephanta Island and is gotten to using Thane brook.

➤ Deendayal Port Trust

Deendayal port was built after partition because the Karachi port on the western coast had gone to Pakistan. It's known for handling much of the petroleum import.

➤ Calcutta Port Trust

Just riverine significant port in India. Dock frameworks viz., Kolkata Dock System (KDS) on the eastern bank and Haldia Dock Complex (HDC) on the western bank of waterway Hooghly.

➤ New Mangalore Port Trust

Situated at a site called Panambur in Karnataka at Gurupura waterway intersection with the Arabian Sea.

➤ Mormugao Port Trust

Mormugao port in Goa is leading ore exporting port of India

➤ Port of Mumbai Trust

One of the oldest modern ports of India. Initially the situation was employed by the navies of Shivaji.

➤ Paradip Port Trust

Situated at the intersection of stream Mahanadi in Bay of Bengal in Odisha. It was the primary significant port on East Coast authorized in autonomous India.

➤ Tuticorin Port Trust

This port has been presently renamed as V.O. Chidambaranar Port. It's found in the Gulf of Mannar. Tuticorin is the lone port in South India to supply a prompt a week after week of container administration.

➤ Vishakhapatnam Port Trust

Vizag port is found in Andhra Pradesh and is understood for the bulk of Cargo handling on East Coast

1.1.3 Relevance of Port in International Trade

Monetary progression has prompted ventures moving from across the world. Speculations to stream in from different pieces of the world principally depend on the comfort of doing an exchange and along these lines, the infrastructural office will benefit. Improvement of foundations is one of the vital factors in deciding the financial improvement of a rural. close by normalization and exchange advancement, quicker, dependable, and less expensive vehicle administrations are adding to the combination of creation measures at the worldwide level. Hence, ports can be considered to be the passage for unfamiliar exchanges which work with a smooth fare and import.

Looking back in time is often easily realized that port has contributor of major citaroundound the world. Early port activities included both military also as commercial reasons.

Gerhardt Muller characterizes a port as —a harbor or safe house where boats may anchor, or a harbor region with marine terminal offices for moving freight/ travelers among boats and land transportation. during this definition, the word marine 'may suggest that port might be a regional unit set up on a coastline.

Port facilities are defining as infrastructural facilities and aren't directly productive. They assist various productive activities, though indirectly used as economic goods. Moreover, infrastructure is that the lifeline of any commercial activity, proper infrastructure increases commercial activity manifold. Presently the function of a port isn't only limited but has expanded to a logistical platform. The efficiency of a port is vital in international trade since a seaport is that the nerve of foreign trade of a rustic.

1.1.4 Cargo and Carrier

1.1.4.1 Types of Marine Cargo

Containerized: Cargo stacked at an office away from the wharf, or at a stockroom into a metal container typically 20 to 40 feet in length, 8.5 feet high, and 8 feet wide. The container is then delivered to a dock and stacked on to a "containership" for transportation. Some freight can't be containerized, for instance, cars, live animals, bulk commodities.

Bulk: Cargo that is stacked and conveyed in bulk, without imprint or count, in a free unpackaged structure, having homogenous attributes. To be stacked on a containership, bulk payload would be placed in compartments first. It could likewise be stowed in bulk as opposed to being stacked into containers. For example: coal, iron metal, crude sugar, etc.

Break-Bulk: Packaged freight that is stacked and dumped on a piece-by-piece premise, that is, by number or count. This can be containerized or arranged in groups of packages covered by shrivel wrap for shipment. Model: coffee, rubber, steel, etc.

Neo-Bulk: Certain kinds of freight that are frequently moved by specific vessels. E.g.: automobiles, logs.

Variety of Neo Bulk Cargo

Vehicles (cars, trucks, trailers, etc.)

Since the introduction of roll-on / roll-off (RoRo) carriers, the delivery of vehicles has been very efficient and efficient. There is no need to drain the fuel tanks and disconnect the batteries because the RoRo carriers are equipped with special built-in mechanisms, so vehicles can be driven directly onto ships. There is also a chocking system to prevent the movement of vehicles during shipping.

There are several types of RoRo companies. PCC (Clean Car Carrier) and PCTC (Clean Car Carrier / Truck) are used for transporting vehicles. Another exception is ConRO or RoLo, a hybrid network company that can load cars and other types of goods.

Heavy machinery

Special equipment for performing construction and operation on the ground, including steam engine or diesel engine.

Logs

Log carriers have a special design to increase the volume of the log. Timber tips often cross the deck of a ship and float on water.

Livestock

Sheep, goats, cattle, or other livestock are transported using modified boats called carriers. Additional needs such as food, water and medicine must also be met. Cattle can be kept in open barns or inside the inner floors of closed herdsman. Medium-sized ships can carry between 30,000 and 40,000 sheep.

Newsprint and Paper

The special vessel is designed to transport paper or newsprint. It is usually equipped with a side loading system and smooth welds on the deck.

Steel, Lumber, etc

Advantages and Disadvantages of Maritime Neo Bulk Shipping

The biggest advantage of neo-bulk shipping is the great power of neo-bulk companies, so it can load a large number of vehicles or equipment. Transferring the same weight of neo-bulk, will take fewer times and cost than air or land shipping. In addition, ships also provide a carbon-saving mode, so it has fewer carbon steps compared to other shipping methods. Several barriers to navigation include the high risk of shipping because it is difficult to predict the state of the ocean and in the event of certain accidents, it will be difficult to collect the remaining vessels at sea.



1.1.4.2 Types of Marine Vessels

Tanker: Vessels intended to convey liquid freight like oil in huge tanks. They can be adjusted to carry different kinds of load like grain or coffee.

Bulk Carriers: Vessels that convey an assortment of cargo payload.

Neo-Bulk Carriers: Vessels intended to convey explicit kinds of cargo such as automobiles, logs, etc.

General Cargo Vessels: These include: (1) Containerships: vessels that carry just containerized load, (2) roll-on and roll-off (RO/RO) vessels: vessels that permit rolling cargo, for example, farm haulers and vehicles to be driven on board the vessel, and (3) LASH (lighter Aboard Ship) vessels: vessels that can carry very large containers like barges. It empowers cargo to be stacked on barges in shallow waters and afterward stacked on board a vessel.

Barges: Unmanned vessels for the most part used for oversized cargo and towed by a towing boat.

Mix Carriers: Vessels that convey travelers and cargo, oil and dry bulk, or containers and bulk cargo. Different combinations are likewise conceivable.

1.1.4.3 Neo Bulk Cargo

Neo bulk cargo may be a third subcategory of general cargo. As of now, it elevates to the primary class of freight, alongside the general cargo and bulk cargo.

It incorporates cargoes that are prepackaged, accountable, moved in characterized load units, and not put away in a container. The ships to hold neo bulk cargo is intended for a particular cargo. A few models are roll-on/roll-off vehicle carrying vessels and log-transporters ships. For the most part, every one of them is called neo-bulk carriers.

1.2 Objectives of the Study

- To study on the neo bulk cargoes at major ports in India
- To analyze factors responsible for neo bulk cargo
- To suggest finding from the above study

1.3 Scope of the Study

- This project provides a clear insight on major port wise neo bulk cargo traffic made by different parts of country
- This project would be helpful for the Government of India or any other organization for getting insight of the ongoing trend in neo bulk cargo
- Students who are interested to explore about neo bulk commodity within Indian major ports can know the present scenario and future prospects.

1.4 Research Methodology

The objective of the present study can be accomplished by conducting a systematic survey but in this pandemic situation it is not possible to do so. So, this study will depend upon the secondary data collected from various sources. The main objective will be carried out by going through the websites of the Minister of Shipping and Indian Port Association of India. These websites will provide a lot of information regarding each and every aspect of the project and the status of it. The information related to the movement of cargo and fairway development are included in this objective of the study. The researcher endeavors to analyze the situation and make critical assessment. The research methodology will be focusing on the study of neo bulk cargo at major ports in India scenario and various data about that.

1.5 Limitation of the Study

- The study depends on the secondary data published in newspapers, books and journals of the researchers. In some cases, data that is published by the researchers can't dissect the fresh data and publish the old data which isn't valid.
- The information collected from various sources may differ in such case there will be error in actual interpretation.
- The main limitations are that the scarcity of data and its volume which was restricted to its official website only.

In certain area due to lack of data available on the web and various reference reports, use of trend analysis has been made to get certain data.

1.6 Chapterisation

The entire project report work is divided into 5 chapters which are as follows:

Chapter 1

In this chapter I have written about the introduction, Significant of the Study, Ministry of Ports, Shipping and Waterways, Major Ports in India, Relevance of Port in International Trade, Cargo and Carrier, Objectives of the Study, Scope of the Study, Research Methodology, Limitation of the Study.

Chapter 2

In this chapter I have written about Review of Literature, Literature Gap.

Chapter 3

In this chapter I have written about , Indian Major Ports, Recent Developments, Government Initiative for Port Sector , Port Traffic

Chapter 4

In this chapter I have written about , Analysis and Interpretation , Methodology Used , Analysis & Interpretation of the Study , Trend of Neo Bulk Cargo Traffic Handled at East Coast of Major Ports in Last 10 Years, Trend of Neo Bulk Cargo Traffic Handled at West Coast of Major Ports in Last 10 Years , Year on Year CAGR % at Major Ports in India , Employment of Manpower at Major Ports , Berth Available at Major Ports in India , Berth Available at East Coast of Major Ports in India , Berth Available at West Coast of Major Ports in India , Commodity Wise Neo Bulk Cargo Handled at Major Ports in India (in 000' tonnes).

Chapter 5

In this chapter I have written about Findings of the Study , Suggestion , Conclusion ,
Bibliography

Chapter 2: Literature Review

2.1 Review of Literature

2.1.1 Dry bulk cargo shipping— An overlooked threat to the marine environment?

Matthias Grote (Marine Pollution Bulletin 110, 2016), gives his views on the potential threats to marine environment (counting human wellbeing) created by dry bulk shipping. Roughly 9.5 billion tons of cargo is moved over the world seas yearly with dry bulk. The sheer mass of data sources assessed to exceed 2.15 million tons each year ought to be viewed as a commitment for a superior measurement of sources of info, openings, and hazards of materials implied in request to permit a more convincing risk assessment. Bulk cargo names distinguished as including potentially HME classified cargoes are overall referring to compounds, which are notable as challenges for marine environment policy.

Disposal of debris after discharging large quantities of dry cargo (bulkers) at sea often creates a threat of pollution.

- The chemical composition of all 168 bulk loads registered in maritime laws is being analyzed.
- The risk classification method used by marine regulators to identify assets as hazardous in the marine environment is used and discussed.
- Maritime risk assessments caused by these dumps are hampered by a lack of information about the properties and the amount of assets involved.

2.1.2 Seaborne Trade between Developed and Developing Countries

Tsz Leung YIP (The Asian Journal of Shipping and Logistics, 2012) analyses the international grain trade flow by using the gravity equation of trade. He found that cereal grain trade value between two countries is the dependent variable. The overall fitness of gravity equations is comparatively good. The distance lays a significant impact on cereal trade. The farther the distance between the two countries, less the cereal they trade. More influential variables are GDP, GDPPC and population. The richer countries will import more cereal and the countries with a large population will import less cereal. And exchange rates have little influence on cereal trades.

In a recent study, Ha, Chung and Seo (2016) found that the increase in revenue had a positive effect on Korean trade volume from ASEAN-5 countries. In another study on the international grain trade, Yip (2012) found that the GDP of a foreign buyer led to a grain trade that grew much faster than the GDP of a trader. The analysis here also regulates trade liberalization, the TL, as foreign trade policies are more effective than inbound trade policies (Edwards, 1993) while free trade theory also imposes that rising trade barriers could have detrimental effects on the economy.

2.1.3 Analysis on Development Interplay between Port and Maritime Cluster

Jasmine Siu Lee Lam & Wei Zhang, has given the review that maritime clusters can maximize competitive advantages in maritime and regional development. Accordingly, the creation and promotion of maritime cluster has been taken as a significant approach tool while considering an array of linked sectors in the maritime industry from the organization's point of view. Of all the areas in a maritime cluster, the port plays a significant part in cluster development. The researchers categorize world famous maritime clusters into two parts with/without strong port throughput support. It is tracked down that port isn't the solitary principle affecting element in the advanced generation of maritime cluster, which is perceived as international maritime cluster with the main function of maritime services centre.

To accept to take further analysis regarding what degree this coordination development

relationship among port and maritime cluster should be kept up, the study proposes DEA model to assess the two frameworks. With this strategy, it provides the reference for maritime clusters, which are headed to be international maritime centers, to deal with the development relationship with ports.

group development, and to show the relationship between port development and the development of the marine collection. To learn integrated development in bulk between different ports and ocean collections, Data Development Analysis (DEA) is proposed, intended to assess the authenticity of the support and use between two systems. The paper presents a useful guide to research and policy proposals regarding the interaction between the marine group and the development of its port maritime cities and regions en route to IMCs produce high value.

2.1.4 A Multi-Stage Data Mining Approach for Liquid Bulk Cargo Volume Analysis based on Bill of Lading Data

Suhyeon Kim, WonhoSohn, Dongcheol Lim, Junghye Lee (Expert Systems with Applications, 2021). The author establishes an analysis system for liquid bulk cargo (LBC) volume, as it can help inform strategies for port planning and management. A multi-stage system that can give comprehensive information about the volume of liquid bulk cargo is developed by utilizing BL data which empowers the analysis to be performed at different and in-depth levels. Never the less, liquid bulk cargo volume analysis is a challenging task for researchers because trends in liquid bulk cargo volume are highly volatile and non-stationary. As international trade is more dynamic now than ever before, the smartization of ports is getting progressively significant. The researcher proposed the novel framework for LBC volume analysis which can accelerate the transformation into smart ports and provide useful information for liquid bulk cargo related port planning. This study breaks the existing volume analysis paradigm that has simply predicted the trends of future cargo volume and gives a direction for new research about port cargo volume analysis.

- Liquid bulk cargo (LBC) is a valuable and competitive cargo in maritime logistics.
- A multi-stage data mining framework for LBC volume analysis is proposed.

- The new item segmentation system enables accurate aggregation of LBC volume.
- The exploratory volume analysis provides spatial and temporal effects on LBC volume.
- The proposed prediction models increased the prediction accuracy of LBC volume

2.1.5 The Future of Rice Production, Consumption and Seaborne Trade: Synthetic Prediction Method

MinjmaaPurevdorj and Masayoshi Kubo, has given the review on rice production and consumption by continent. He used Synthetic Prediction Method to determine the factors affecting the production, consumption and transportation of rice in Asia, Africa, Europe, the Americas, and Oceania. He found that SPM is almost the same as the prediction by e Analytic Prediction Method(APM). Since the average annual increase in population of Africa is rising, the rice deficit is expanding. On the other hand, since the average annual increase in population in Asia may decrease, the volume of consumption may be reduced. For this reason, it is possible that a surplus will occur in Asia. The surplus will be sufficient to compensate for the shortfalls in Africa. The present study is based on rice production and consumption and supply and demand relative to several specific c rice-growing areas of the world. In addition, 1998 population data from the United Nations and the U.S. were used to forecast consumption through 2030. Finally, worldwide calculations of surpluses, defy cites, and requirements for the seaborne transportation of rice were undertaken.

This study identify as the areas of rice scarcity, those of rice surpluses, and their balance. Ultimately, the focus of this study is to provide basic information concerning worldwide food with the goal of contributing to solve the looming food problem.

2.1.6 The berth allocation problem in bulk ports

Nitish Umang, Michel Bierlaire & Ilaria Vacca. Maritime transportation is a major channel of international sea trade which has increased significantly over the past few decades. The proper planning and management of port operations taking into account of the ever growing demand addresses a major challenge. The author found that the waiting times and delays at the berth and yard are significant, which calls for better coordination between berthing activities and yard management at the port. Besides, there is a large degree of uncertainty engaged in the port operations which can potentially disrupt the typical functioning of the port and result in huge deferrals in operations. They believe that integrated planning of operations and robust solutions would allow the terminal to lower delay costs and enhance efficiency. Fundamental outcomes show that the issue is complex and general purpose solvers fails to create good solutions when the problem size increases.

In this work, we begin with a general description of the operation of the ports in bulk, as well as the brief a review of previous publications related to multiple ports. In our collaboration with the official bulk port in the Middle East, SAQR port in Ras Al Khaimah, UAE, find more important news and potentially disruptive sources. We focus on the problem of waiting times accommodation and review of literature on the issue of port allocation to terminals. Then, we present a complete integrated line model of the batch distribution problem ports, which consider interactions between decision-making problems arising from the bedroom and yard managers. We also present the first calculation results for port-promoted events actual data. We conclude the paper with suggestions for future work and open issues.

2.1.7 Study and analysis of seaport operations and productivity improvement by optimised berth utilization

P.G. Saleeshya, C.J. Dheeraj Krishna & U. Manu Krishna (Int. J. Business Innovation and Research, Vol. 13, No. 4, 2017), the author discusses the different dimensions of port's life cycle. It shows the impact of each dimension on each stage. This aids the strategic planner to take different strategies at different stages. It has provided an opportunity for organising these procedures into a systematic and routine approach to operations planning. By now, the importance and value of sound

operations planning procedures in berth management should be apparent and the contribution this can make to improve the performance of cargo handling operations in the port. Establishing such a system will quickly be rewarded by improved productivity, better use of the port's resources and improved quality of service to port users.

Ports, which are part of a value chain-driven supply chain, contribute to competition between other chains driven by value and its efficiency are integrated throughout the chain (Talley, 2013). A transportation system that includes the shipping sector combines different types of transportation and is very profitable accelerating importance in the transportation industry (Ducruet and Lugo, 2013). Due to the highest competition in the field, the geography of transport created by which deviates from the norm in a way that shows strong artistry about transport and operational infrastructure (Keeling, 2007; Ng, 2013). Obviously the link between transportation and city development is particularly prevalent in ports opinion (Ducruet and Lee, 2006; Jacobs et al., 2010, 2011).

2.1.8 Ports face inadequate capacity, efficiency and competitiveness in a developing country: case of India

Prakash Gaur, Shivani Pundir & Tarun Sharma (Department of Transport and Regional Economics, University of Antwerp, 2015). India on a high economic development path faces a sharp increase in cargo throughput at the ports. The Government of India (GoI) is putting forth attempts to increase the capacity of Indian ports to meet the growing demand.

Indian ports need to improve their efficiencies at standard with their international counterparts on all the parameters. The capacity that has been estimated at Indian ports is only effective capacity and it needs to first improve to potential capacity by attaining operational efficiency and thereafter Indian ports should learn best international practices and superior technology to achieve absolute capacity.

The research reveals that Indian ports lack port competitiveness, and thereby port pricing reflects that the market is inefficient and distorted from an economics perspective. The general economic theorem proves that bringing capacity in an inefficient system may increase inefficiency.

Capacities are constantly required to be built up to meet the ever-growing demands with increasing levels of investment. Effectively, if stress is laid upon enhancing the performance of the existing systems in the first level and thereafter upgrading of the systems at the second level, these unused capacities can be effectively utilized without requiring much investment.

These port development initiatives must consider creating capacities by enhancing port performances initially and then capacity addition in an improvised performing port system, thereby realizing higher efficiencies and capacity. The efficiency can be increased double fold within a country and if management efficiency and technology brought in from a best international port, capacity can be enhanced many fold. This will automatically increase the potential capacity of Indian ports without major investment in physical capacity enhancement.

India's largest ports operate under a single decision-maker, namely, the Department of Transport, Roads, Transport and Highways, Department of Transport, Government of India (GoI), in a non-competitive manner. Although major initiatives and initiatives have been initiated to increase the capacity of the ports, there is an urgent need for increased efficiency. Indian airports need to improve their efficiency in line with their international counterparts across the border. This article emphasizes that ports in the developing world must consider and define capacity, and increase from active capacity to dynamic and continuous to full potential. This article develops the Efficiency Index of Indian ports and recommends institutional co-operation between ports to achieve ... dynamic and learning from leading international practices to achieve optimal capacity.

2.1.9 Trade in International Maritime Services: How Much Does Policy Matter?

Carsten Fink, Aaditya Mattoo, and Ileana Cristina Neagu (The world bank economic review, vol. 16, no. 1 81–108). Maritime transport costs impact international trade. In many cases, their trade-inhibiting impact dwarfs that of customs obligations. He tracked down that the overall conviction that cargo reservation strategies, which proliferated during the 1970s and 1980s, are no longer a significant obstruction to trade.

However, it emerged that both public policy, explicitly as limitations on the provision of port services, and private practices keep on exercise a significant effect on maritime transport costs. Interestingly, private anticompetitive practices have a stronger influence on prices than public restrictions do.

Maritime industry sources frequently highlight to the fact that liner operators scarcely break even and, on this premise, argue that there is a little scope for cost decreases. But it is well known that protection and cartel-like behavior in the presence of fixed costs can lead to inefficient entry and reduced profitability. The elimination of policy restrictions to trade in maritime transport services is likely to produce substantial gains. Many of these restrictions can be removed unilaterally, and the gains can be used to bind the openness to reduce uncertainty and the possibility of policy reversals. In any case, it's anything but enough to dispense with policy restrictions. There is additionally a need to manage with the private anticompetitive acts of international maritime cartels.

the importance of the heir over the past decade. In defense, maritime industry sources often point to the fact that line operators are not abusive and, on this basis, argue that it is unlikely to reduce prices. But it is well-known that protection and cartel-like behavior in the face of constant costs can lead to ineffective entry and reduced profits. Competitive advantages often result not only in an increase in the ability to share — that is, in terms of cost close proximity to costs — but also from growing internal efficiency — that is, lower costs. There may be an opportunity to develop this latest type of efficiency in the maritime industry. Our results need to be qualified. First, we focused only on the routes leading to the United States. Although there is a need for further research into other routes, the shortage of international transport data is a major obstacle. Second, the analysis here focused only on the maritime leg of the transport journey and did not examine the distortion of the inland section. Evidence suggests that the sea leg accounts for just over a third of the cost of going from house to house (oecd 1968, Livingston 1986).

2.1.10 Improving the return on investment in ports: opportunities in data management

G.N.Kenyon, M.Goldsmith, B. D. Neureuther & D. Zhou. Ports give a critical connection in the supply chain by connecting sea, air, and land transport.

They provide facilities and services for the transfer, stockpiling, inspection, and control of the products moving both in and out of a country. Inefficient port management can increase costs significantly and hamper the timeliness of delivery. Numerous traditional industry techniques fail to capitalize on the global nature of data, subsequently omitting the maximum benefit accessible.

The current logistical environment has a high degree of vulnerability principally due to an ever-changing commercial environment, the maturing and rationalization of containerization, and the broad business networks that exist within complex logistical frameworks.

Big data is a term for datasets that are so huge or complex that traditional data information processing applications are deficient. It tends to the technical challenges of information engaged in the analysis, capture, information curation, search, sharing, stockpiling, transfer, representation, querying, updating, and privacy. Understanding how the standards of information management, visibility, integration and depth of vision apply to PES's is crucial to improving revenues. The capacity to perceive what lack of concern and deflection affect the true understanding of port operations is also critical. The initial step in this cycle is to perform a comprehensive port evaluation. The subsequent step is to utilize framework integration techniques to develop a port master plan to expand the profundity of vision that ensures maximum data capture across the whole global supply chain.

The third step is for the port authority to lead participating stakeholders in crafting strategies and methodology for the capture, use, and management of port data. When conducted appropriately, a port information sharing process is implemented fostering maximum profitability across the entire PES, prompting improved ROI.

This study proposes to explore the characteristics of an acceptable industry, data management, and business asset management to help coordinate and simplify operating procedures in offshore ports. Specifically, we look at the accepted definition of the Port Community Plan and extend this to the Port Eco-System (PES), a program that includes the addition of interdependent participants. With the PES lens, this study concludes that ports can significantly improve their existing return on investment, by about 30% or more, by simplifying operational processes.

2.2 Literature Gap

The research articles and reference works in this field are limited in number with minimal focus on Neo Bulk Cargo. The available literature mainly emphasized on Bulk Cargo & Liquid Cargo within India. My report mainly focuses on the Neo Bulk Cargo in terms of Quantity and value to India, and provides the Port- wise consumption towards total neo bulk traffic.

Chapter 3: Overview of the Select Indian Major Port Industry

3.1 Indian Major Ports

Indian government has a quasi-federal design, and as indicated by its constitution, maritime transport is to be directed by both Central & the state governments. India has endowed an in-depth coastline of about 7516.6 km dotted with 12 major ports and 187 minor and intermediate ports. The Union Shipping Ministry handles the significant ports, the minor and intermediate ports are managed by the important divisions or services of the particular waterfront states. Over the most recent 5 years, India has supported its ability across all significant ports by more than 65%. More than 54% of the absolute freight being dealt with at Indian Ports is done at 12 Major Ports of India.

In recent years, India's economy has suffered a minor decline in financial development, with Total Additional Value (GVA) at Basic Price falling to 4.1 percent for The period 2019-20 from 5.9 percent for The period 2018-19. During 2019-20, the growth of the two domains of agriculture and industry has slowed. During 2019-20, the unfamiliar exchange rate and import have both decreased. In India, the growth of all out freight handled decreased from 6.1 percent in 2018-19 to 3.0 percent in 2019-20. The payload handled at Quasi Ports increased by 5.6 percent in 2019-20, down from 10.1 percent in 2018-19. The growth in the amount of cargo handled at major ports also slowed, from 2.9 percent in 2018-19 to 0.8 percent in 2019-20.

Around 53.4 percent of cargo handled at Indian ports was handled by India's main ports. Table 3.1 shows the growth profile of cargo traffic at India's main and small ports in terms of overall cargo traffic from 2017-18 to 2019-20:

Table 3.1 Growth in cargo traffic at Indian Ports in percentage

Port	2017-18	2018-19	2019-20
Major	4.78	2.90	0.82
Non Major	9.04	10.12	5.57
All Ports	6.60	6.06	2.98

Source- India Infrastructure Research

The time frame 2001-02 to 2020-21 saw compound annual growth rate(CAGR) of 7.1% in all out cargo throughput at Indian ports. The compound yearly development in cargo took care of at non-significant ports were 10.9% during 2001-02 to 2020-21. The development in load dealt with by significant ports also, non-significant ports during 2020-21 enrolled increment of 6.94% and 9.70% separately.



Figure 3.1 Major ports in India

Table 3.1 List of Major Ports in India with features

Port Name	State	Features
Deendayal Port Trust	Gujarat	<ul style="list-style-type: none"> • Tidal Port • Recognized as Trade Free Zone • Biggest port by volume of cargo dealt with
Mumbai Port Trust	Maharashtra	<ul style="list-style-type: none"> • Largest Natural Port and Harbor in India • Most busiest port in India
Jawaharlal Nehru Port Trust	Maharashtra	<ul style="list-style-type: none"> • Also known as NhavaSheva • Largest artificial port • Largest container port in India
Mormugao Port Trust	Goa	<ul style="list-style-type: none"> • Situated on the estuary of the waterway Zuari
New Mangalore Port Trust	Karnataka	<ul style="list-style-type: none"> • Deals with the iron mineral exports
Cochin Port Trust	Kerala	<ul style="list-style-type: none"> • Sited in the Vembanad • Exports of flavors and salts
V. O. Chidambaranar Port Trust	Tamil Nadu	<ul style="list-style-type: none"> • Manages the manures and petrochemical items
Chennai Port Trust	Tamil Nadu	<ul style="list-style-type: none"> • Artificial Port • Second Busiest Port
Kamarajar Port Limited	Tamil Nadu	<ul style="list-style-type: none"> • India's First corporatized Port
Visakhapatnam Port Trust	Andhra Pradesh	<ul style="list-style-type: none"> • Deepest port of India • Manages the export of iron metal to Japan • Conveniences for building and fixing of ships are accessible

Paradip Port Trust	Odisha	<ul style="list-style-type: none"> • Natural Harbor • Manages the exports of iron and aluminium
Syama Prasad Mookerjee Port Trust	West Bengal	<ul style="list-style-type: none"> • India's just major Riverine Port • Arranged on Hugli Stream • Known as Diamond Harbor

Source- India Infrastructure Research

Table 3.2 State wise total number of ports in India

State	Number of Ports	Coast
Maharashtra	48	West Coast (WC)
Gujarat	46	West Coast
Andaman & Nicobar	23	East Coast (EC)
Kerala	17	West Coast
Tamil Nadu	16	East Coast
Odisha	13	East Coast
Andhra Pradesh	12	East Coast
Lakshadweep	10	West Coast
Karnataka	09	West Coast
Goa	05	West Coast
Puducherry	03	East Coast
Diu and Daman	02	West Coast
West Bengal	01	East Coast
Total	205	EC-6, WC-7

Source- India Infrastructure Research

3.2 Recent Developments

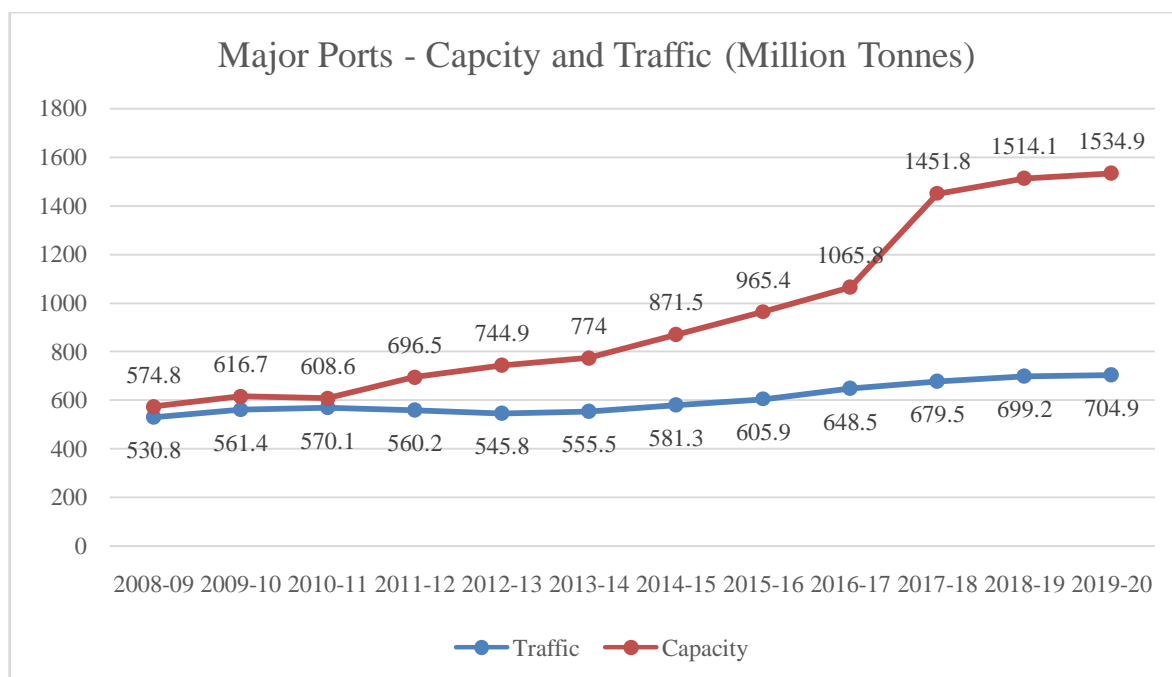
- The Indian Ports Association (IPA) launched e-invoice, e-payment and electronic delivery order (eDO) facilities freed from charge for all the stakeholders on the PCS1x in Sept 2019. Subsequent generation eDO may be a single platform to perform all eDO-related activities together with e-invoice and e-payments, with extremely secure information interchange between the requester and supplier.
- In December 2019, DLDS executed Logistics Data Bank (LDB) administrations at the Paradip International Cargo Terminal, Mormugao port and Kamarajar port. Prior in January 2019, LDB administrations were presented at the Deendayal port.
- The Chennai International Terminal Private Limited (CITPL) possesses expanded the free energy for capacity of DPD and DPE holders. The free stockpiling time for the DPD holders (imports) has been expanded from three days to five days, while the leisure time for the DPE compartments (trades) has been reached out from seven days to 15 days. The adjustment of the free stockpiling time frame has been supported by TAMP. It will stay substantial till August 2022.
- The Union Government introduced RFID port access control framework (PACS) and CCTV activities at the Kolkata Dock System (KDS) in October 2019.
- The Directorate General of Foreign Trade has presented another online office for getting import permit for the confined classification merchandise.
- An understanding has been endorsed between the Container Corporation of India Limited (CONCOR) and Cogo port, advanced cargo booking stage, for booking rail cargo and sea carriage at a solitary spot. Cogo port as of now gives a solitary internet booking stage interfacing exporters and merchants with the delivery lines. The concurrence with CONCOR will add rail administrations to and from the inland compartment stops (ICDs) the nation over to the stage, assisting transporters with arranging their shipments, while decreasing expenses.

3.3 Government Initiative for Port Sector

- Make in India – In accordance with this drive, Ministry of Shipping revised the rules of Right of First Refusal (ROFR) licensing conditions. Contracting of vessels need is given to the vessels worked in India, hailed in the country and possessed by the Indians.
- Union Budget 2021 - Drawing from the public authority's Blue Economy strategy, the Union Budget 2021 makes allotments for development of delivery and inland streams framework alongside ₹2,000 crores for PPP model in every single significant port.
- SAROD-Ports' (Society for Affordable Redressal of Disputes – Ports) is a debate redressal entryway created by Ministry of Shipping for the private players.
- Public Logistics Portal (Marine) will be created to help exporters, merchants and specialist co-ops.
- Significant Port Authorities Bill 2020 has been passed by the Parliament that plans to revoke Major Ports Trust Act, 1963. It's anything but a Board of Major Port Authority for each significant port.

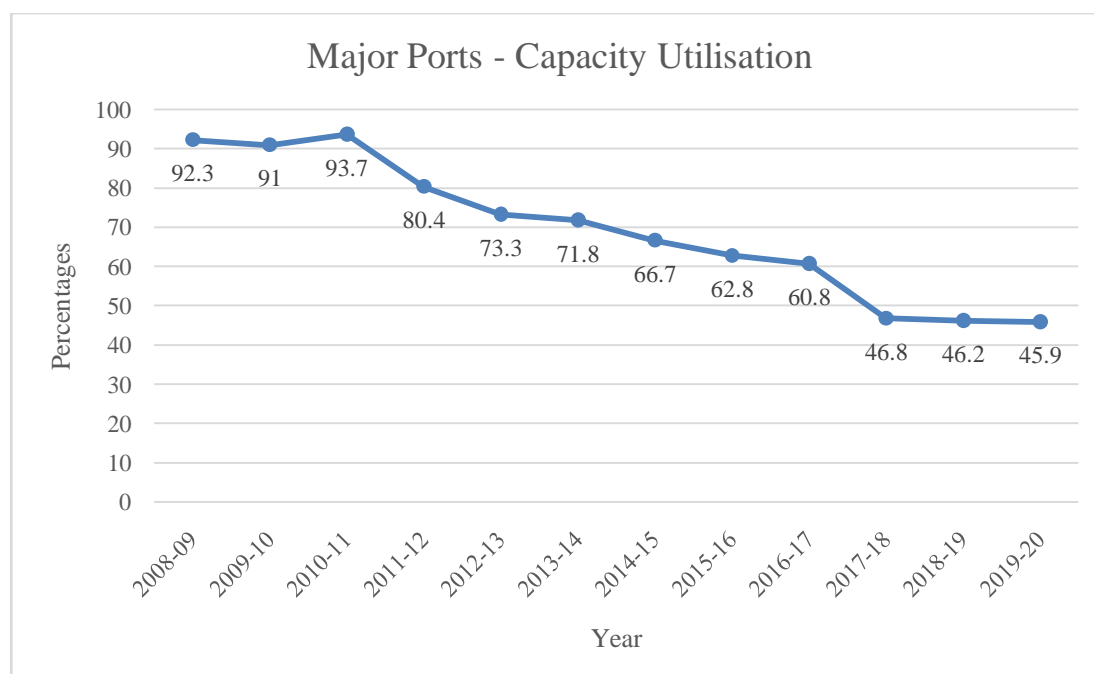
3.4 Port Traffic

In 2019-20, India's twelve major ports handled around 53.4 percent of the country's maritime cargo flow. During the most recent decade, traffic handled at major ports has increased year after year, except in 2011-12 and 2012-13, which coincided with monetary action and amount of currency turnover. The total traffic handled by the major ports increased by over 1.3 times from 530.8 million tonnes during 2008-09 up 704.9 million tonnes in 2019-20. Payload handling limits at major ports have risen in tandem with traffic. The limit, which was established at 574.8 million tonnes at the end of 2008-09, was increased to 1514.1 million tonnes by the end of 2018-19 and was subsequently increased 1534.91 million tons during 2019-20.



Source- India Infrastructure Research

The limit expansion and the efficiency upgrades accomplished by the significant ports combined with developing support of Private Sector in load taking care of have had an ideal sway on productivity of load dealing with tasks at India's significant ports. The limit usage which was 92.3 % in 2008-09, decreased to 45.9% in 2019-20.



Source- India Infrastructure Research

In regard of the traffic dealt with at Major ports, it is likewise seen that over 89% of the traffic took care of during 2019-20 was accounted by three wares viz. other cargo counting Containers (41.5%), POL and Products (31.4%) and Coal (16.9%).

Chapter 4: Analysis and Interpretation

4.1 Methodology Used

Research methodology is a strategy for systematically resolving a study topic by collecting data using various methodologies, interpreting the data acquired, and deriving conclusions from the research data. A research technique is, in essence, the blueprint for a study. The data collection or research focuses on gathering and evaluating information from public sources such as the Basic port statics report published by the Ministry of Ports, Shipping and Waterways, Government of India being the secondary source of data.

This study does a quantitative analysis of neo bulk cargo movement at major ports in India which is identified to be steadily growing with increase in demand over the years by taking the 10 years data from Basic Port Statics i.e., from 2010-2020 into consideration. The study has included cargo measurement units of Tonnes to evaluate the port performance and contribution to neo bulk cargo to the globally shipping industry.

4.2 Analysis & Interpretation of the Study

4.2.1 Trend of Neo Bulk Cargo Traffic Handled at East Coast of Major Ports in Last 10 Years

The data table 4.1 and chart 4.1 represent the trend of neo bulk cargo traffic handled at east coast of major ports in last 10 years from 2010 to 2020 in terms of 000' tonnes. The highest traffic was in 2019-2020 at Paradip Port Trust and at same time Kolkata Dock Complex was handled lowest cargo traffic.

Among the east coast ports, the blue bar line representing the Paradip Port Trust highlights the most neo bulk cargo traffic by the maintaining the 1st position among other east coast ports.

Chart 4.1 Trend of Neo Bulk Cargo Traffic Handled at East Coast of Major Ports in Last 10 Years (000' Tonnes)

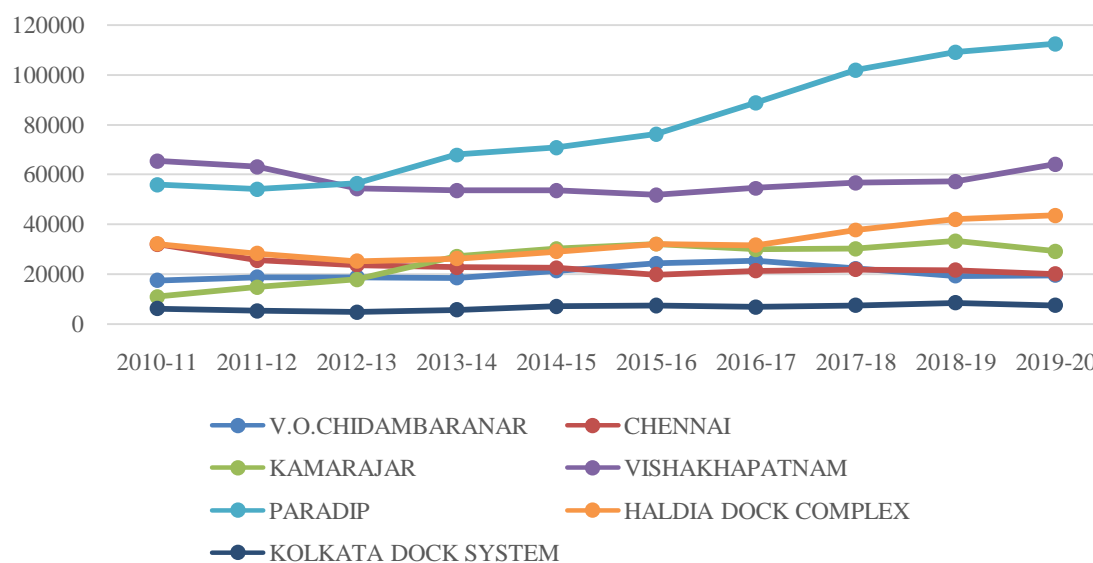


Table 4.1 Trend of Neo Bulk Cargo Traffic Handled at East Coast of Major Ports in Last 10 Years (000' Tonnes)

	V.O.CHIDAMBARANAR	CHENNAI	KAMARAJAR	VISHAKHAPATNAM	PARADIP	HALDIA DOCK COMPLEX	KOLKATA DOCK SYSTEM
2010-11	17558	32039	11009	65469	55969	32170	6320
2011-12	18878	25631	14956	63207	54145	28396	5415
2012-13	18888	23696	17885	54484	56381	25215	4884
2013-14	18513	22775	27337	53588	67904	26281	5812
2014-15	21380	22596	30251	53632	70944	29052	7173
2015-16	24461	19851	32205	51890	76265	32131	7519
2016-17	25472	21364	30019	54592	88916	31674	6923
2017-18	22392	21976	30394	56702	101915	37829	7630
2018-19	19387	21749	33397	57342	109082	42072	8617
2019-20	19640	20048	29222	64073	112468	43648	7536

Source- India Infrastructure Research

4.2.2 Trend of Neo Bulk Cargo Traffic Handled at West Coast of Major Ports in Last 10 Years

Here the stacked line graph represents the neo bulk cargo traffic handled by the west coast ports in India for the period 2010- 2020. Among the west coast ports, the blue bar representing the Deendayal Port Trust highlights the most neo bulk cargo traffic handles by the maintaining the 1st position among the other west coast ports. The highest traffic is observed to be in the year 2019-2020 with 115640 thousand tonnes. The lowest traffic was handles by JNPT during the all period 2010-2020. However, looking at the recent times, Mormugao ports traffic data indicates a negative slope since 2010 to having the lowest traffic handles during the year 2013-2024, i.e. 16101 thousand tonnes.

Chart 4.2 Trend of Neo Bulk Cargo Traffic Handled at West Coast of Major Ports in Last 10 Years (000' Tonnes)

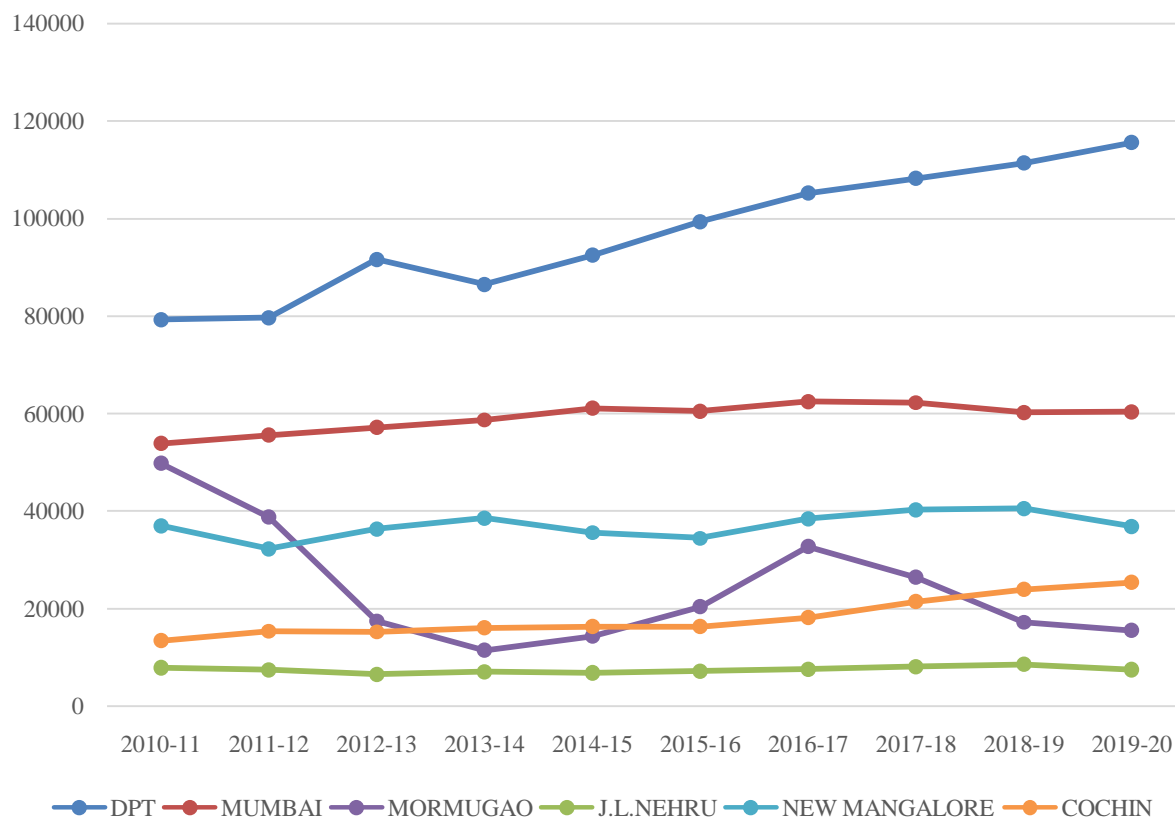


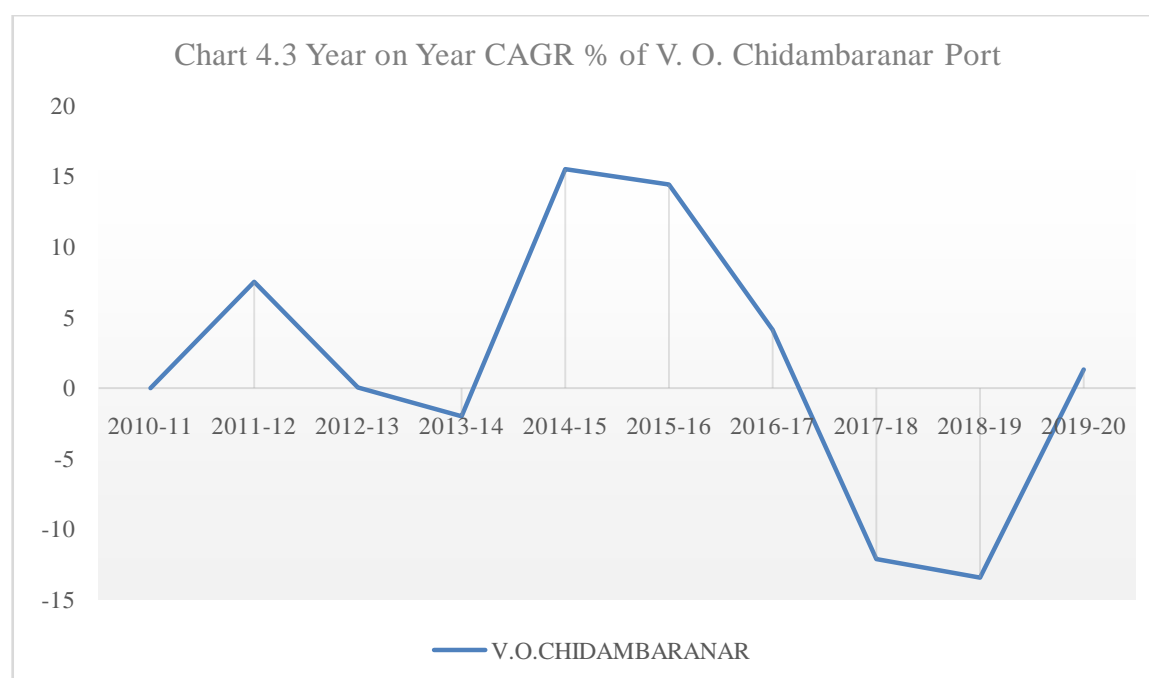
Table 4.2 Trend of Neo Bulk Cargo Traffic Handled at West Coast of Major Ports in Last 10 Years (000' Tonnes)

	DPT	MUMBAI	J.L.NEHRU	MORMUGAO	NEW MANGALORE	COCHIN
2010-11	79294	53933	7891	49840	36982	13454
2011-12	79710	55635	7497	38770	32296	15375
2012-13	91684	57209	6577	17480	36344	15238
2013-14	86552	58735	7098	11503	38618	16101
2014-15	92497	61116	6868	14399	35646	16349
2015-16	99402	60545	7236	20431	34477	16310
2016-17	105267	62490	7622	32779	38525	18167
2017-18	108261	62272	8137	26472	40315	21449
2018-19	111443	60259	8592	17216	40588	23905
2019-20	115640	60406	7509	15599	36867	25410

4.3 Year on Year CAGR % at Major Ports in India

4.3.1 Year on Year CAGR % of V. O. Chidambaranar Port

The Indian major port V. O. Chidambaranar port trust experienced a compound annual growth rate of 7.52 percent in neo bulk cargo throughput in 2011-12. During 2018-19, the annual growth rate of cargo transported at V. O. Chidambaranar port was the lowest it has ever been (-13.42 percent).

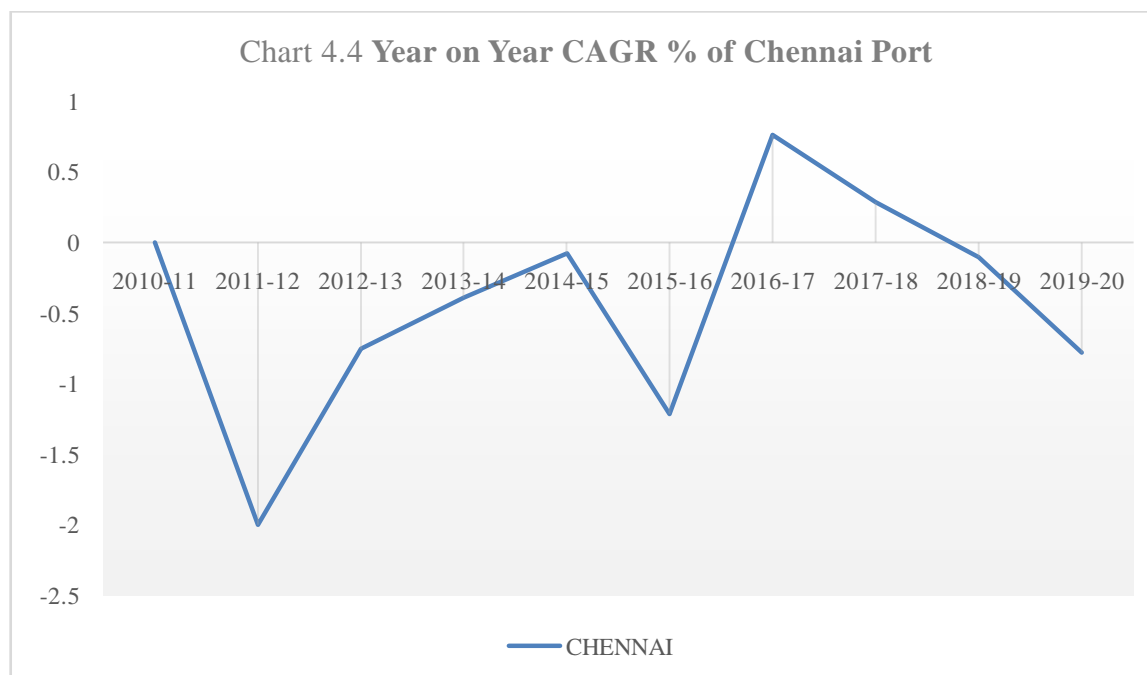


Source- India Infrastructure Research

4.3.2 Year on Year CAGR % of Chennai Port

The period 2011-12 saw the lowest negative compound annual growth rate of 2.00 % in neo bulk

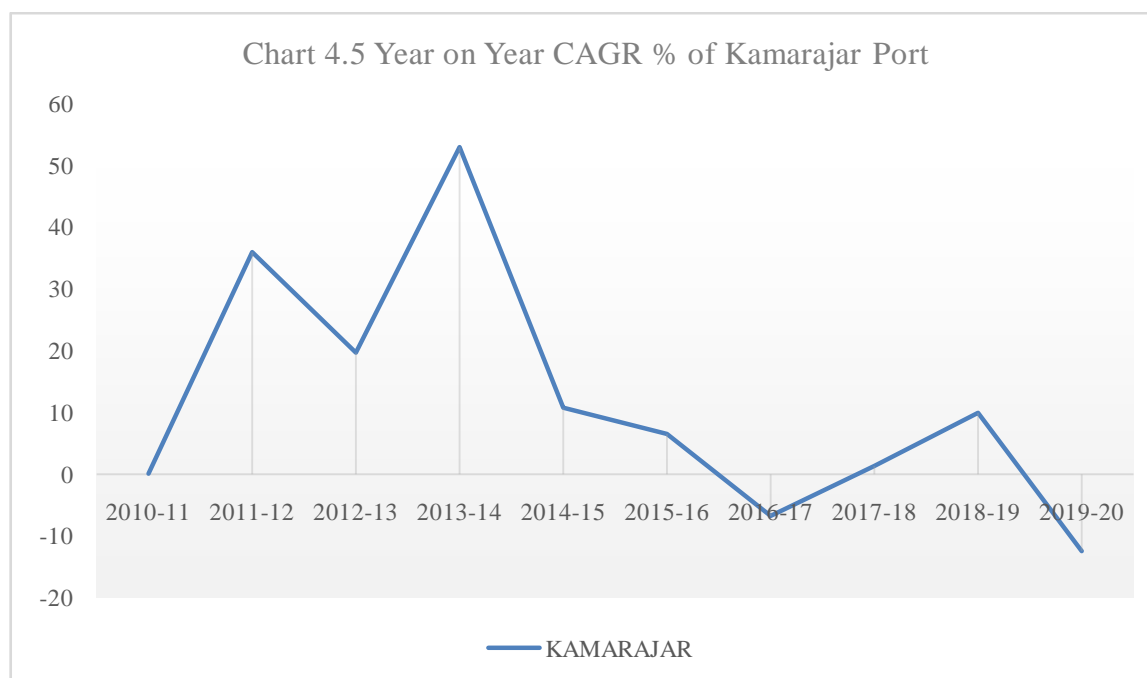
cargo throughput at Indian major port Chennai port trust. The compound annual growth rate in cargo handled at Chennai port during 2016-17 was the positive.



Source- India Infrastructure Research

4.3.3 Year on Year CAGR % of Kamarajar Port

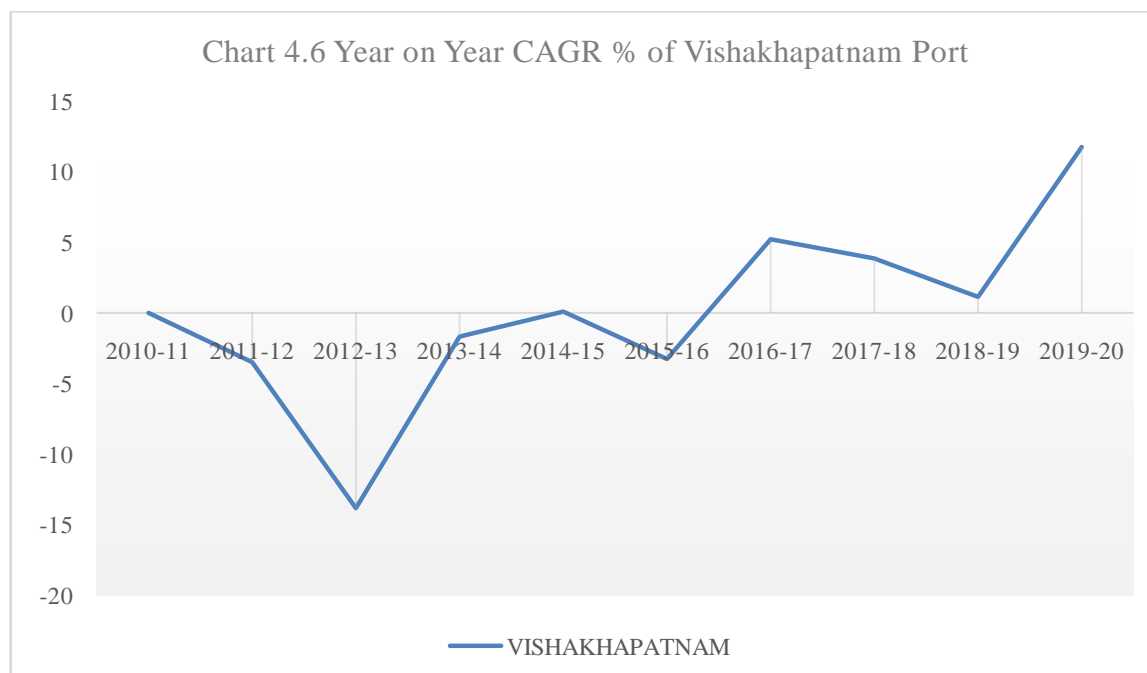
The period 2010 to 2014 saw compound annual growth rate in increasing order at Kamarajar Port Ltd. But after 2015 it saw that compound annual growth rate dropped continuously.



Source- India Infrastructure Research

4.3.4 Year on Year CAGR % of Vishakhapatnam Port

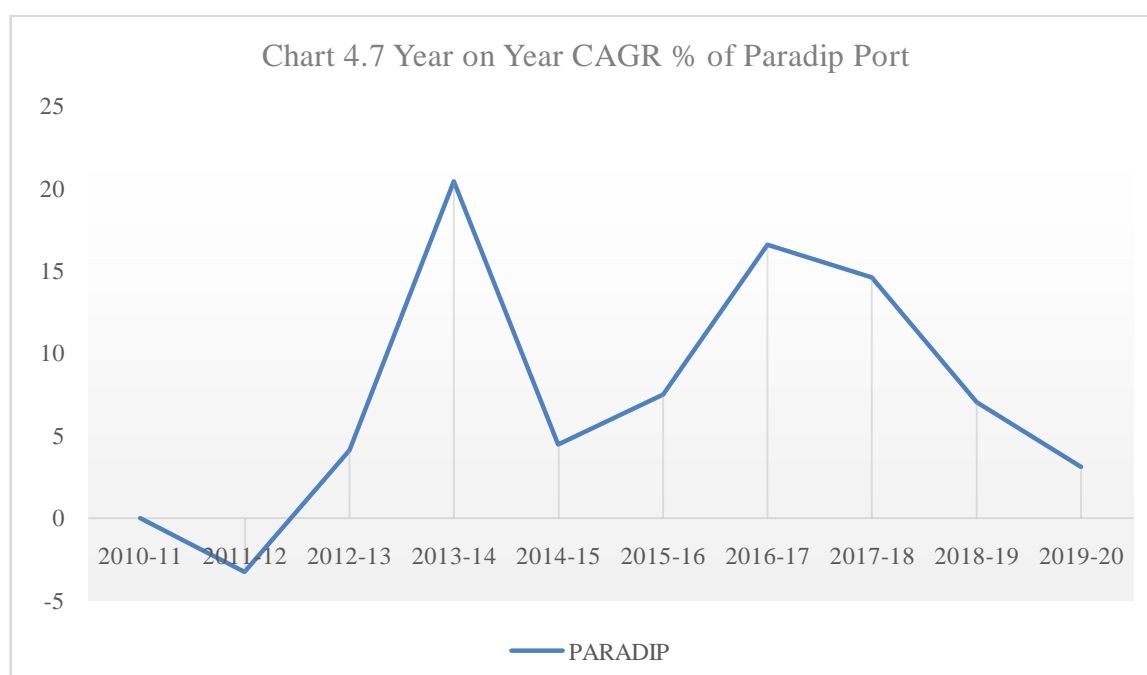
The period 2019-20 saw that compound annual growth rate of 11.73% in Neo Bulk Cargo throughput at Vishakhapatnam Port Trust. The CAGR (%) in Neo bulk Cargo handled at Vishakhapatnam Port Trust during 2011-12 was lowest it dropped to (-13.80%).



Source- India Infrastructure Research

4.3.5 Year on Year CAGR % of Paradip Port

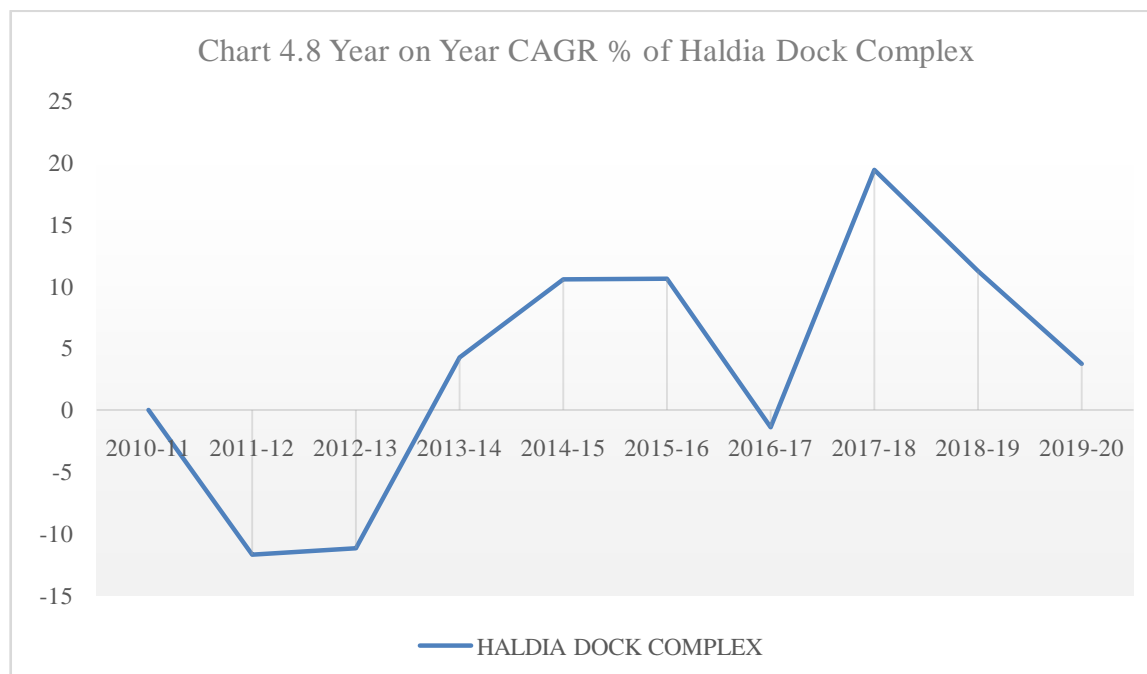
The period 2013-14 saw compound annual growth rate of 20 % in neo bulk cargo throughput at Indian major port, Paradip port trust. The compound annual growth rate in cargo handled at Paradip port during 2011-12 was the lowest it dropped to (-3.25 %).



Source- India Infrastructure Research

4.3.6 Year on Year CAGR % of Haldia Dock Complex

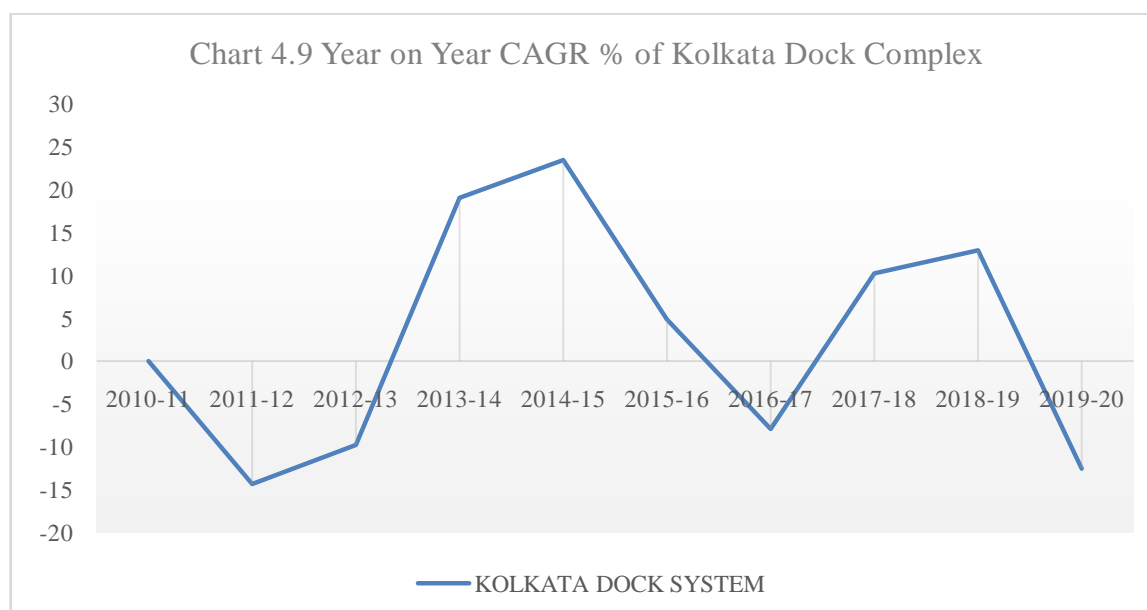
The period 2017-18 saw compound annual growth rate of 19.43 % in neo bulk cargo throughput at Indian major port Haldia Dock System. The compound annual growth rate in cargo handled at Haldia Dock System during 2011-12 was the lowest it dropped to (-11.73%).



Source- India Infrastructure Research

4.3.7 Year on Year CAGR % of Kolkata Dock Complex

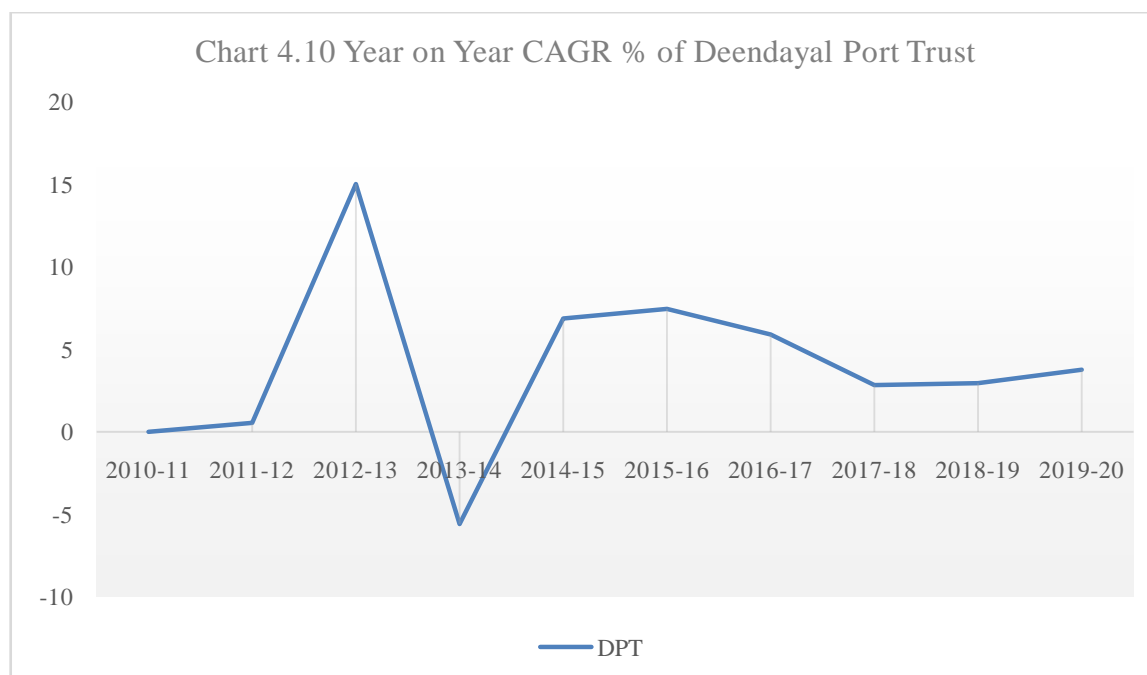
The period 2011-12 saw compound annual growth rate of 23.42 % in neo bulk cargo throughput at Indian major port, Kolkata dock Complex. The compound annual growth rate in cargo handled at Kolkata dock Complex during 2014-15 was the lowest it dropped to (-14.31%)



Source- India Infrastructure Research

4.3.8 Year on Year CAGR % of Deendayal Port Trust

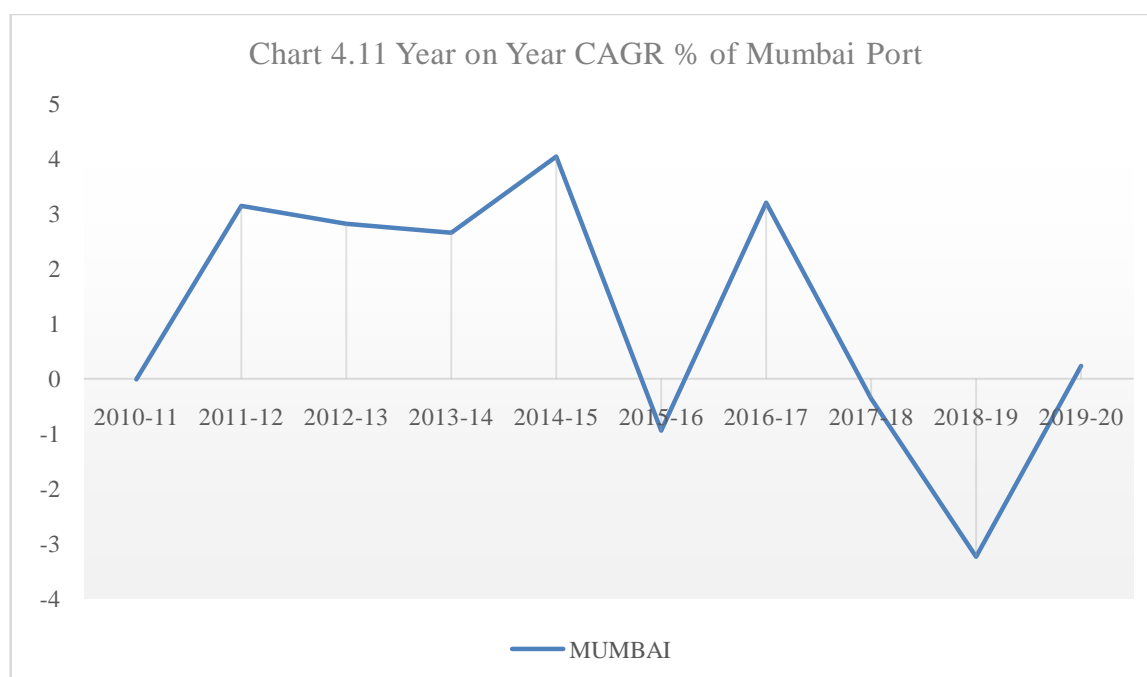
The period 2012-13 saw compound annual growth rate of 15.02 % in neo bulk cargo throughput at Indian major port, Deendayal port trust. The compound annual growth rate in cargo handled at Deendayal port trust during 2018-19 was the lowest it dropped (-5.59%).



Source- India Infrastructure Research

4.3.9 Year on Year CAGR % of Mumbai Port

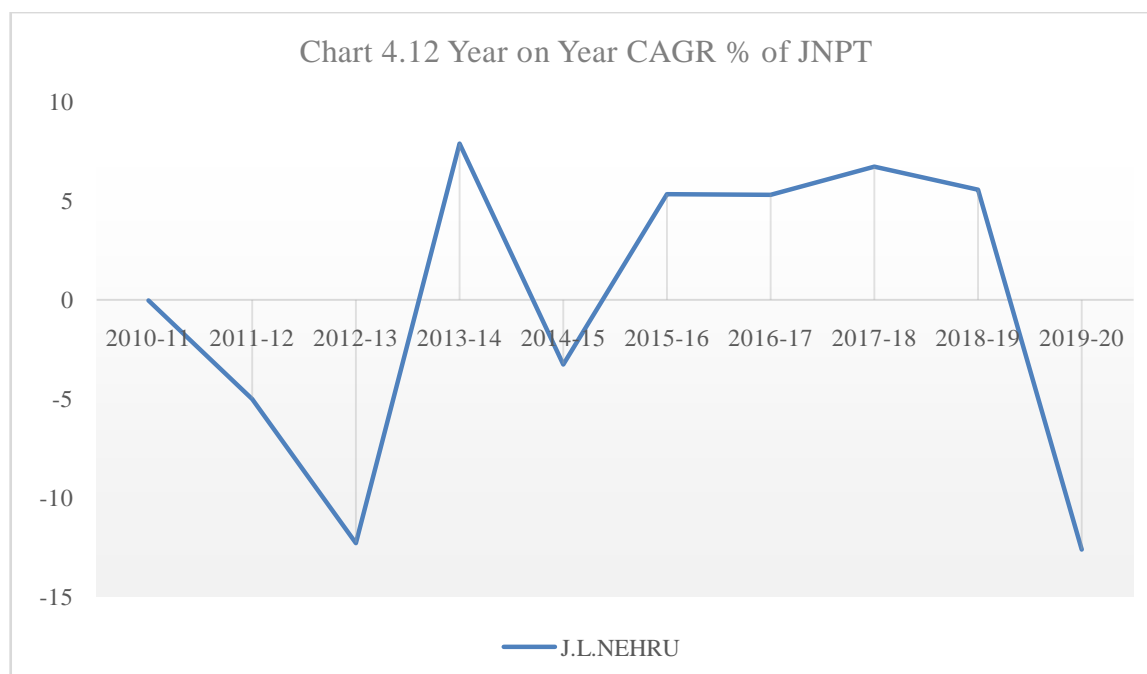
The period 2014-15 saw compound annual growth rate of 4.05 % in neo bulk cargo throughput at Indian major port Mumbai port trust. The compound annual growth rate in cargo handled at Mumbai port trust during 2018-19 was the lowest it dropped (-3.23%).



Source- India Infrastructure Research

4.3.10 Year on Year CAGR % of JNPT

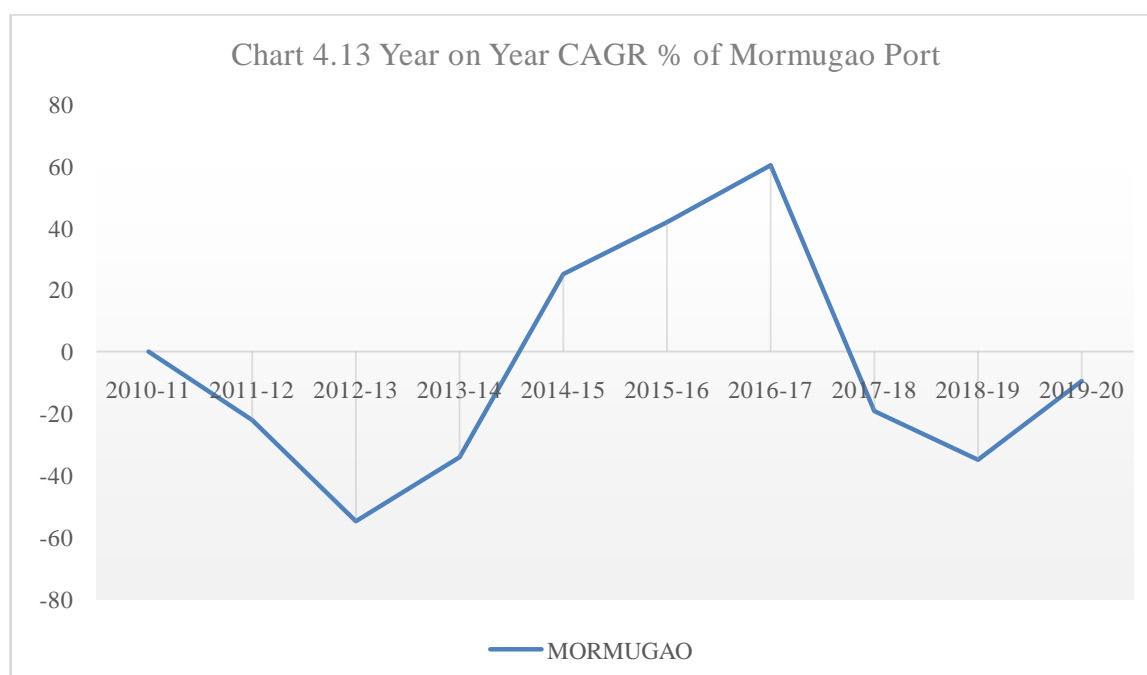
The period 2013-14 saw compound annual growth rate of 7.92 % in neo bulk cargo throughput at Indian major port JNPT. The compound annual growth rate in cargo handled at JNPT during 2019-20 was the lowest it dropped (-12.60%).



Source- India Infrastructure Research

4.3.11 Year on Year CAGR % of Mormugao Port

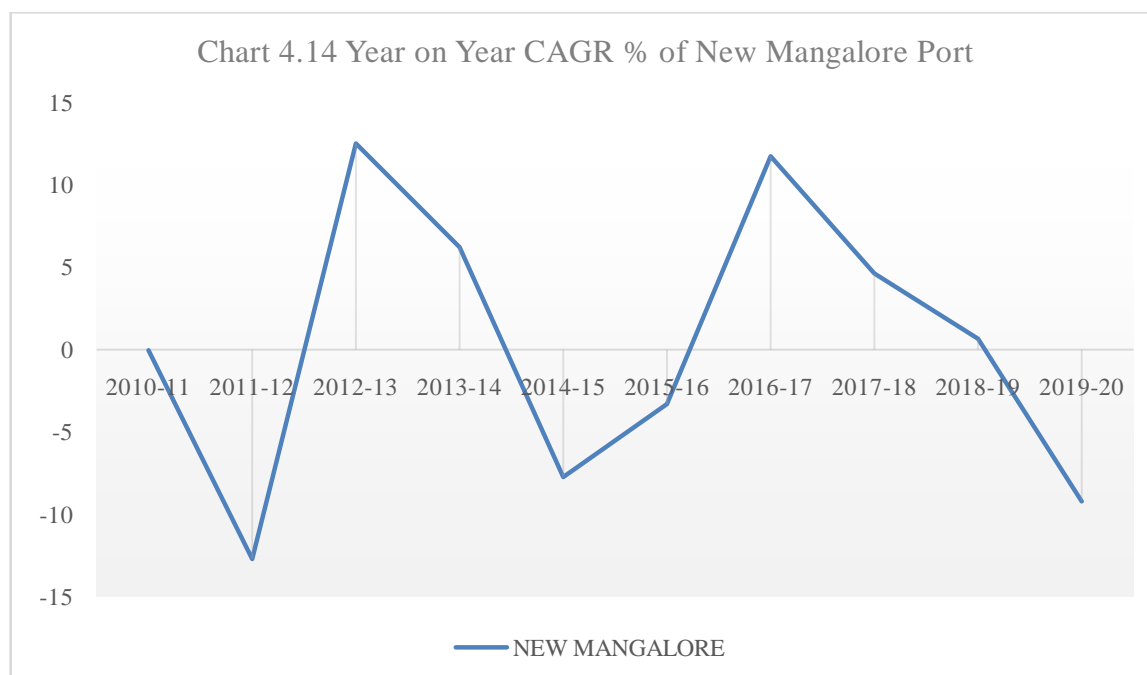
The period 2016-17 saw compound annual growth rate of 60.43% in neo bulk cargo throughput at Indian major port, Mormugao port trust. The compound annual growth rate in cargo handled at Mormugao port trust during 2012-13 was the lowest it dropped (-54.91%).



Source- India Infrastructure Research

4.3.12 Year on Year CAGR % of New Mangalore Port

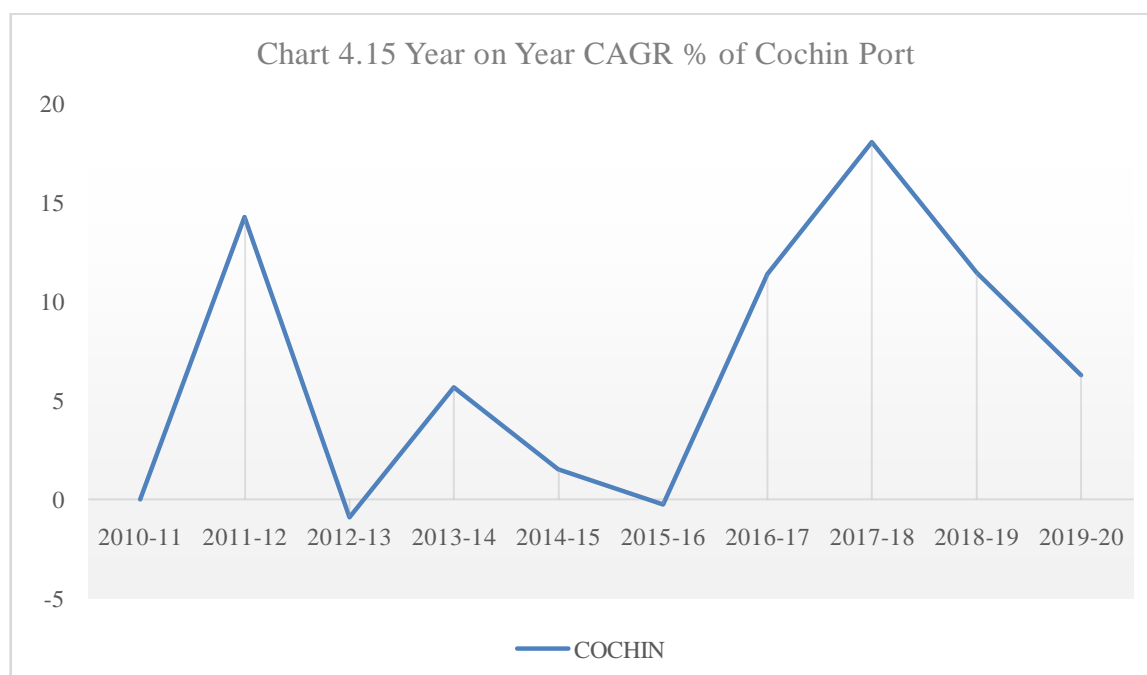
The period 2012-13 saw compound annual growth rate of 12.53% in neo bulk cargo throughput at Indian major port, New Mangalore port trust. The compound annual growth rate in cargo handled at New Mangalore port trust during 2011-12 was the lowest it dropped (-12.67%).



Source- India Infrastructure Research

4.3.13 Year on Year CAGR % of Cochin Port

The period 2017-18 saw compound annual growth rate of 18.06% in neo bulk cargo throughput at Indian major port, Cochin port trust. The compound annual growth rate in cargo handled at Cochin port trust during 2012-13 was the lowest it dropped (-0.89%).



Source- India Infrastructure Research

4.4 Employment of Manpower at Major Ports

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
DPT	4008	3774	4500	4221	3299	3112	2883	3339	2586	2446	2339
MUMBAI	14059	13391	16379	15358	12017	10897	9969	9445	8629	7540	6429
J.L.NEHRU	1739	1730	1718	1706	1697	1669	1638	1615	1567	1521	1473
MORMUGAO	2891	2817	2665	2538	2330	2194	2068	1954	1730	1613	1517
NEW MANGALORE	1719	1636	1544	1435	1332	1255	1125	947	808	732	626
COCHIN	3948	3749	3005	2766	2530	2308	2067	1899	1723	1574	1394
V.O.CHIDAMBARANAR	2191	2079	1954	1813	1646	1496	1366	1000	878	774	691
CHENNAI	8020	7774	7511	6582	5991	5733	5502	4597	4336	4126	3953
KAMARAJAR	86	88	94	100	102	102	102	103	98	108	102
VISHAKHAPATNAM	4877	4584	4189	4941	4703	4596	4158	3678	2778	3348	3150
PARADIP	2761	2634	2437	2234	2015	1771	1454	1222	1007	910	758
KOLKATA DOCK COMPLEX	5675	5374	5068	4828	4503	4150	3792	3425	3754	2794	2527
HALDIA DOCK SYSTEM	3498	3304	3111	2887	2678	2454	2193	2011	1836	1476	1252

Source- India Infrastructure Research

4.5 Berth Available at Major Ports in India

4.5.1 Berth Available at East Coast of Major Ports in India

	V.O.CHID AMBARA NAR	CHENNAI	KAMARAJ AR	VISHAKH APATNA M	PARADIP	KOLKATA DOCK COMPLEX	HALDIA DOCK SYSTEM
2010	13+BZone	17	3	21	15+SBM	29+A	15+2BJ
2011	13+BZone	17	6	21	15+SBM	29+A	15+2BJ
2012	14	17	6	21	15+SBM	29+A	15+2BJ
2013	14	17	6	21	15+3SBM	29+A	15+2BJ
2014	14	17	6	21+1SBM	15+3SBM	29+A	15+2BJ
2015	14	17	6	23+1SBM	16+3SBM	29+A	15+2BJ
2016	15	17	7	23+1SBM	16+3SBM	29+A	15+2BJ
2017	13	17	7	23+1SBM	16+3SBM	29	15+2BJ
2018	13	17	6	24+1SBM	16+3SBM	30	15+2 BJ+2 FAJ
2019	13	17	6+1LNG	24+1SBM	14+3SBM	30	15+3 BJ+2 FAJ
2020	13	19	6+1LNG	24+1SBM	16+3SBM	29	15+3BJs

Data are in numbers

BJ - Barge Jetty

A - Anchorage

SBM - Single Buoy Mooring

VJs= Virtual Jetties

TRANS - Transhipper

Source- India Infrastructure Research

4.5.2 Berth Available at West Coast of Major Ports in India

	DPT	MUMBAI	J.L.NEHRU	MORMUGAO	NEW MANGALORE	COCHIN
2010	19+3SBM+A	29+A	3	6+TRANS	13	13+1SBM
2011	19+3SBM+A	30+A	3	6+TRANS	13	16+1SBM
2012	19+3SBM+A	30+A	4	6+TRANS	14	15+1SBM
2013	20+3SBM+A	30+A	3	6+3TRANS	15+1SBM	16+1SBM
2014	22+3SBM+A	30+A	3	6+3TRANS	15+1SBM	17+1SBM
2015	23+3SBM+A	30+A	3	7+3TRANS	15+1SBM	17+1SBM
2016	24+3SBM+A	33+A	4	8+3TRANS	16+1SBM	18+1SBM
2017	23+3SBM+A	33	3	7+3TRANS	16+1SBM	17+1SBM
2018	27+3SBM	29+pipelines	4	7+Mooring Dolphins	15+1SBM	15+1SBM+1LNG
2019	29+3SBM	29+pipelines	4	6+3Mooring Dolphins	15+1SBM	15+1SBM+1LNG
2020	29+3SBM	32+pipelines	5	6+3Mooring Dolphins	16+1SBM	15+1SBM+1LNG

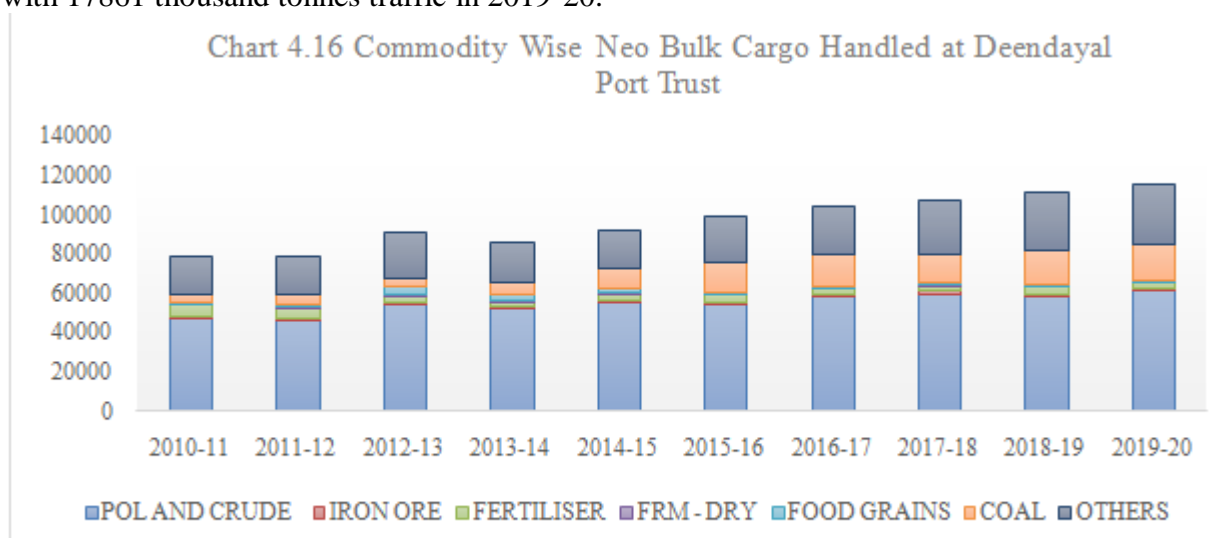
Data are in numbers
 BJ - Barge Jetty
 A - Anchorage
 SBM - Single Buoy Mooring
 VJs= Virtual Jetties
 TRANS – Transhipper

Source- India Infrastructure Research

4.6 Commodity Wise Neo Bulk Cargo Handled at Major Ports in India (in 000' tonnes)

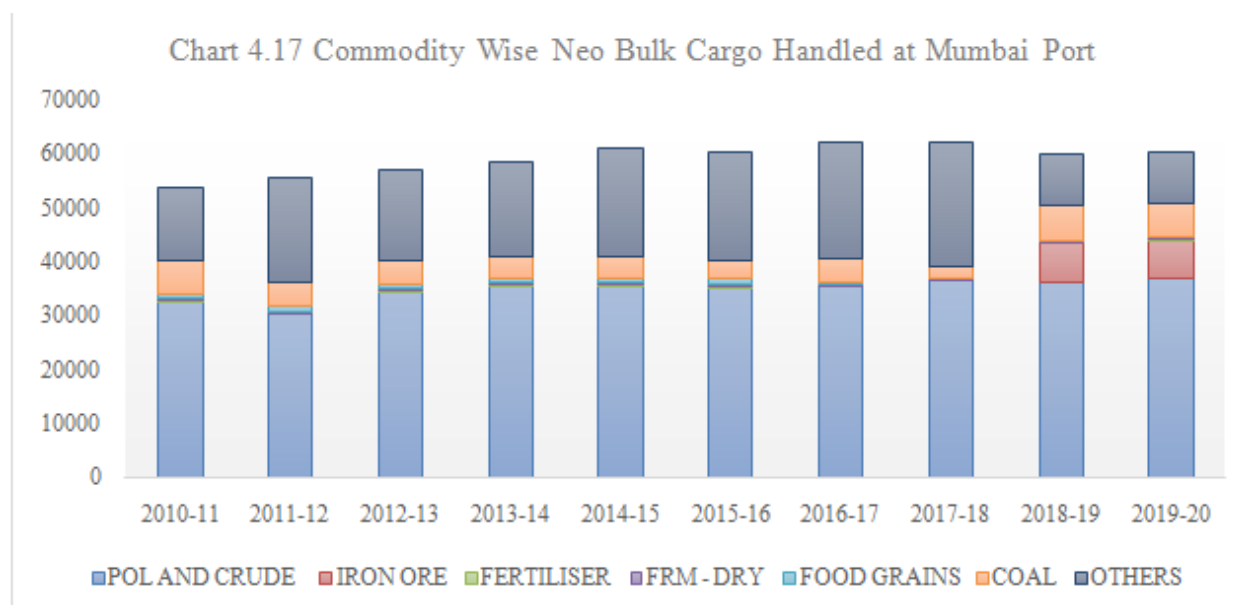
4.6.1 Commodity Wise Neo Bulk Cargo Handled at Deendayal Port Trust

The commodity composition of the total neo bulk cargo traffic at Deendayal Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the DPT constituting 61770 thousand tonnes of traffic followed by coal with 17861 thousand tonnes traffic in 2019-20.



4.6.2 Commodity Wise Neo Bulk Cargo Handled at Mumbai Port

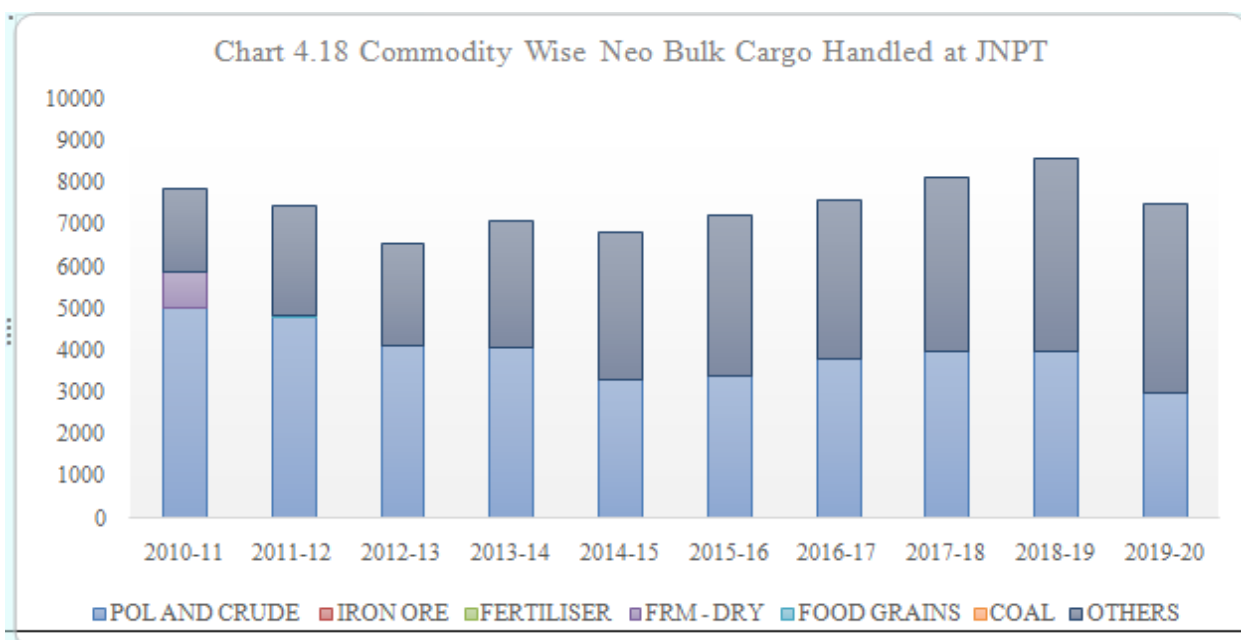
The commodity composition of the total neo bulk cargo traffic at Mumbai Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the MPT constituting 37212 thousand tonnes of traffic followed by iron ore with 7028 thousand tonnes traffic in 2019-20.



Source-India Infrastructure Research

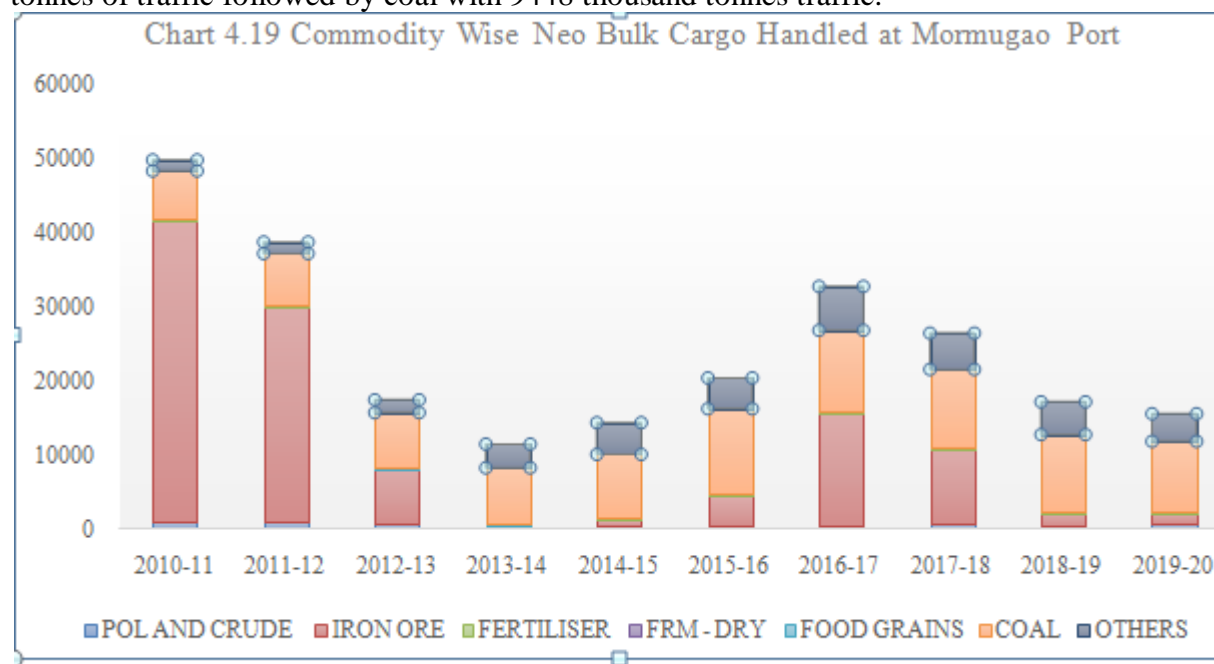
4.6.3 Commodity Wise Neo Bulk Cargo Handled at JNPT

The commodity composition of the total neo bulk cargo traffic at JNPT has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the JNPT constituting 3999 thousand tonnes of traffic followed by others with 4593 thousand tonnes traffic in 2018-19.



4.1.1 Commodity Wise Neo Bulk Cargo Handled at New Mormugao Port

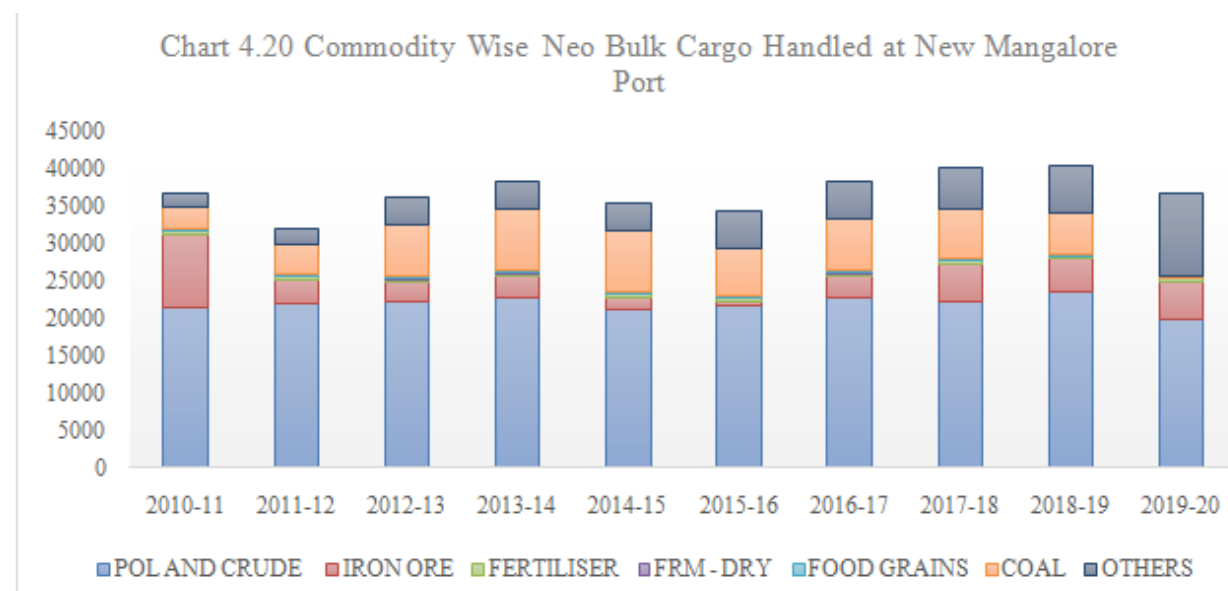
The commodity composition of the total neo bulk cargo traffic at Mormugao Port Trust has shown big difference over the years. Iron ore continue to be the single largest commodity handled by the MoPT constituting 40625 thousand tonnes of traffic followed by coal with 6566 thousand tonnes traffic in 2010-11. But in the period 2019-20, iron ore 1725 thousand tonnes of traffic followed by coal with 9448 thousand tonnes traffic.



Source- India Infrastructure research

4.1.2 Commodity Wise Neo Bulk Cargo Handled at New Mangalore Port

The commodity composition of the total neo bulk cargo traffic at New Mangalore Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the NMPT constituting 20104 thousand tonnes of traffic followed by iron ore with 4988 thousand tonnes traffic in 2019-20.

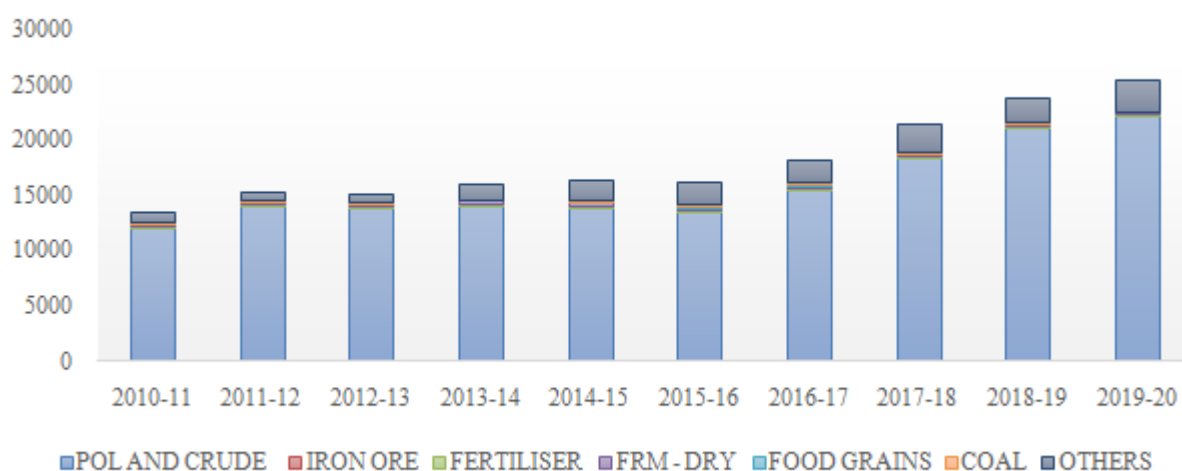


Source- India Infrastructure Research

4.1.3 Commodity Wise Neo Bulk Cargo Handled at Cochin Port

The commodity composition of the total neo bulk cargo traffic at Cochin Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the CoPT constituting 22346 thousand tonnes of traffic followed by other in 2019-20.

Chart 4.21 Commodity Wise Neo Bulk Cargo Handled at Cochin Port

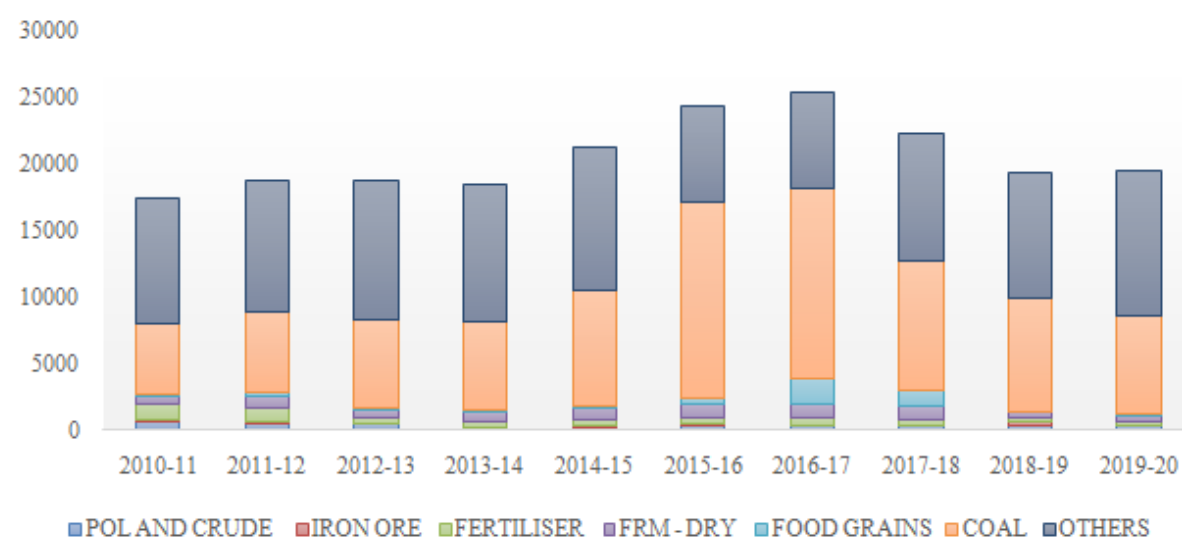


Source- India Infrastructure Research

4.6.7 Commodity Wise Neo Bulk Cargo Handled at V. O. Chidambaranar Port

The commodity composition of the total neo bulk cargo traffic at V. O. Chidambaranar Port Trust has shown marginal changes over the years. Coal and its products continue to be the single largest commodity handled by the VoCPT constituting 7312 thousand tonnes of traffic followed by FRM and others in 2019-20.

Chart 4.22 Commodity Wise Neo Bulk Cargo Handled at V. O. Chidambaranar Port



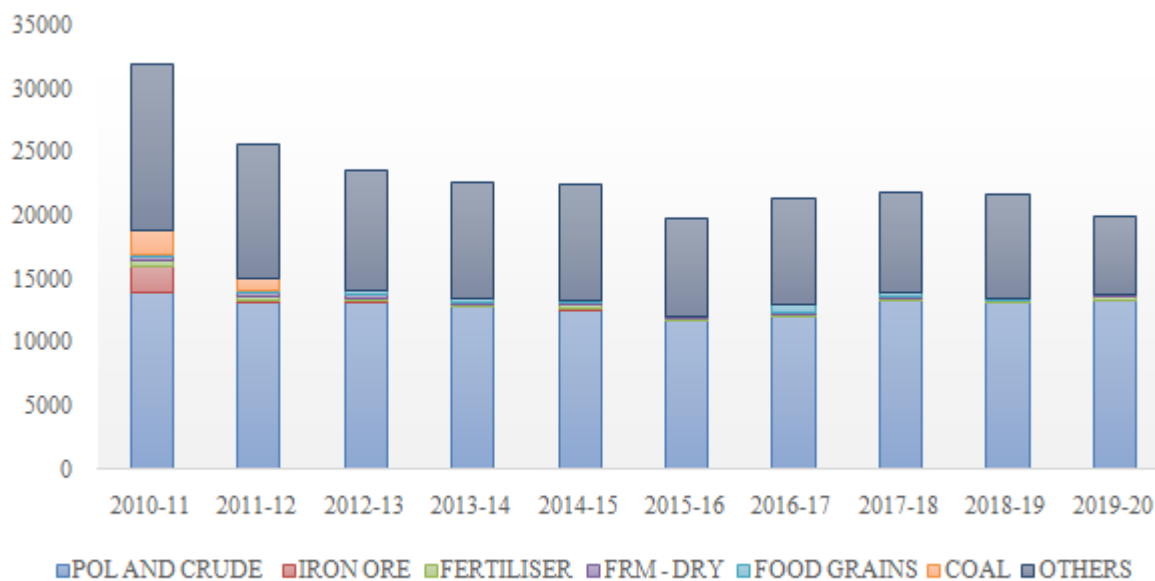
Source- India Infrastructure Research

Source- India Infrastructure Research

4.1.4 Commodity Wise Neo Bulk Cargo Handled at Chennai Port

The commodity composition of the total neo bulk cargo traffic at Chennai Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the ChPT constituting 13420 thousand tonnes of traffic in 2019-20.

Chart 4.23 Commodity Wise Neo Bulk Cargo Handled at Chennai Port

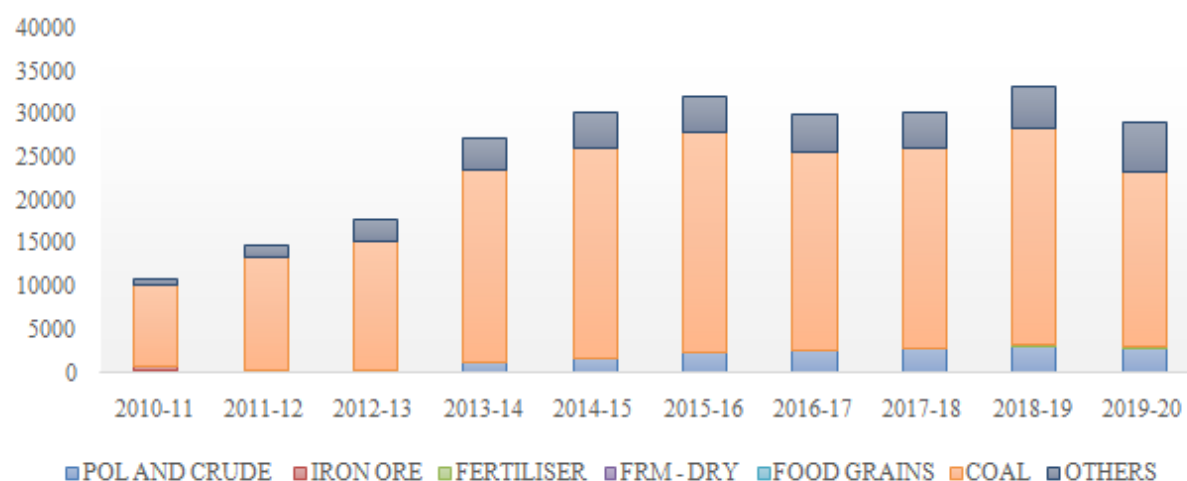


SOURCE- India Infrastructure Research

4.1.5 Commodity Wise Neo Bulk Cargo Handled at Kamarajar Port

The commodity composition of the total neo bulk cargo traffic at Kamarajar Port Trust has shown marginal changes over the years. Coal and its products continue to be the single largest commodity handled by the KPL constituting 20266 thousand tonnes of traffic in 2019-20.

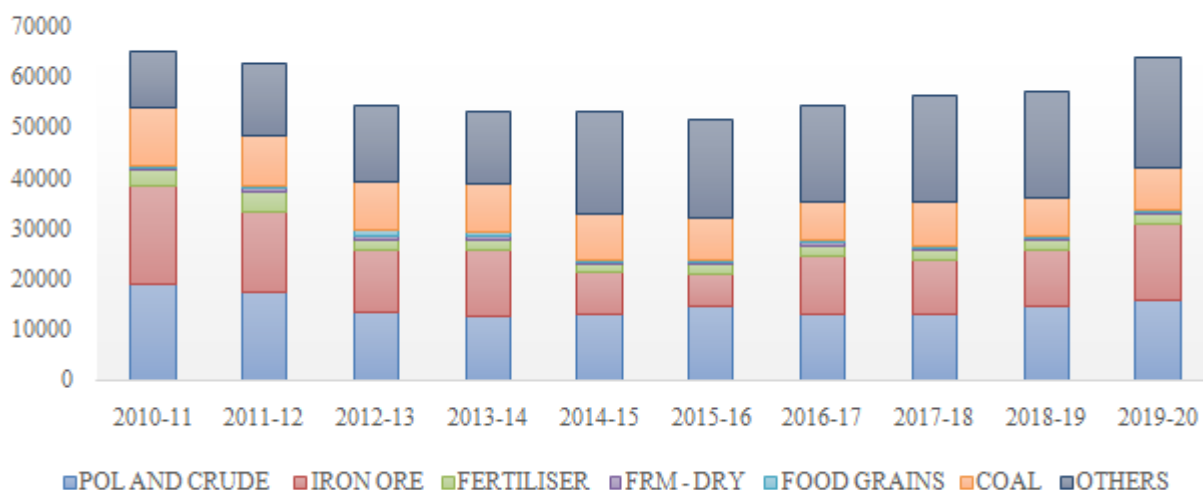
Chart 4.24 Commodity Wise Neo Bulk Cargo Handled at Kamarajar Port



4.1.6 Commodity Wise Neo Bulk Cargo Handled at Vishakhapatnam Port

The commodity composition of the total neo bulk cargo traffic at Vishakhapatnam Port Trust has shown marginal changes over the years. POL and its products continue to be the single largest commodity handled by the VPT constituting 16098 thousand tonnes of traffic followed by iron ore with 14889 thousand tonnes traffic in 2019-20.

Chart 4.25 Commodity Wise Neo Bulk Cargo Handled at Vishakhapatnam Port

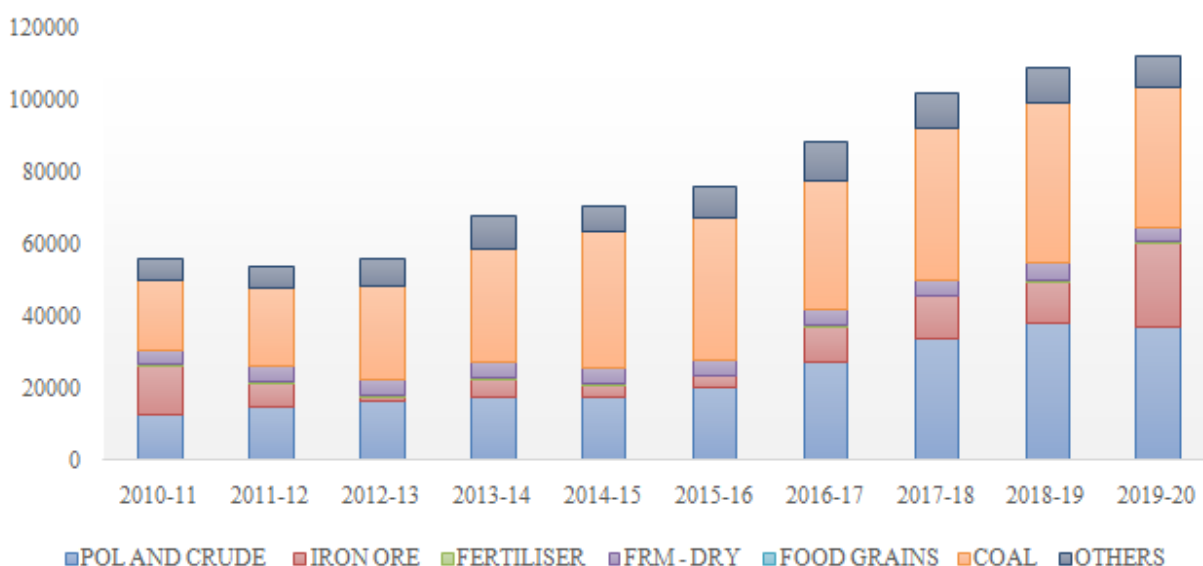


SOURCE- India Infrastructure Research

4.1.7 Commodity Wise Neo Bulk Cargo Handled at Paradip Port

The commodity composition of the total neo bulk cargo traffic at Paradip Port Trust has shown marginal changes over the years. Coal and its products continue to be the single largest commodity handled by the PPT constituting 38999 thousand tonnes of traffic followed by POL and its products with 37329 thousand tonnes traffic in 2019-20.

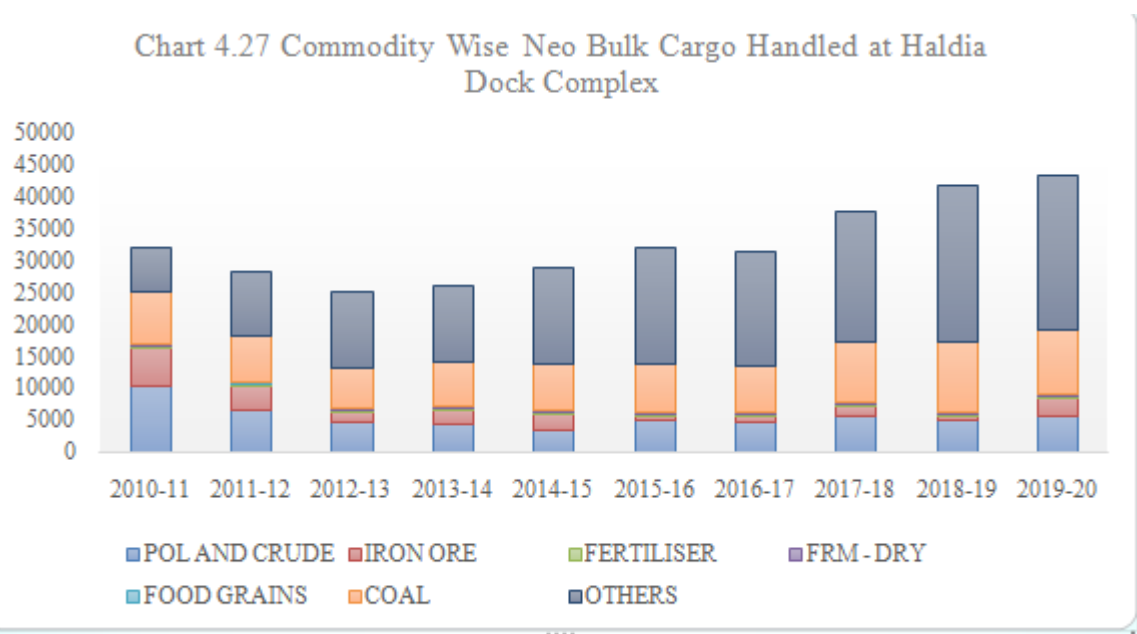
Chart 4.26 Commodity Wise Neo Bulk Cargo Handled at Paradip Port



Source- India Infrastructure Research

4.1.8 Commodity Wise Neo Bulk Cargo Handled at Haldia Dock Complex

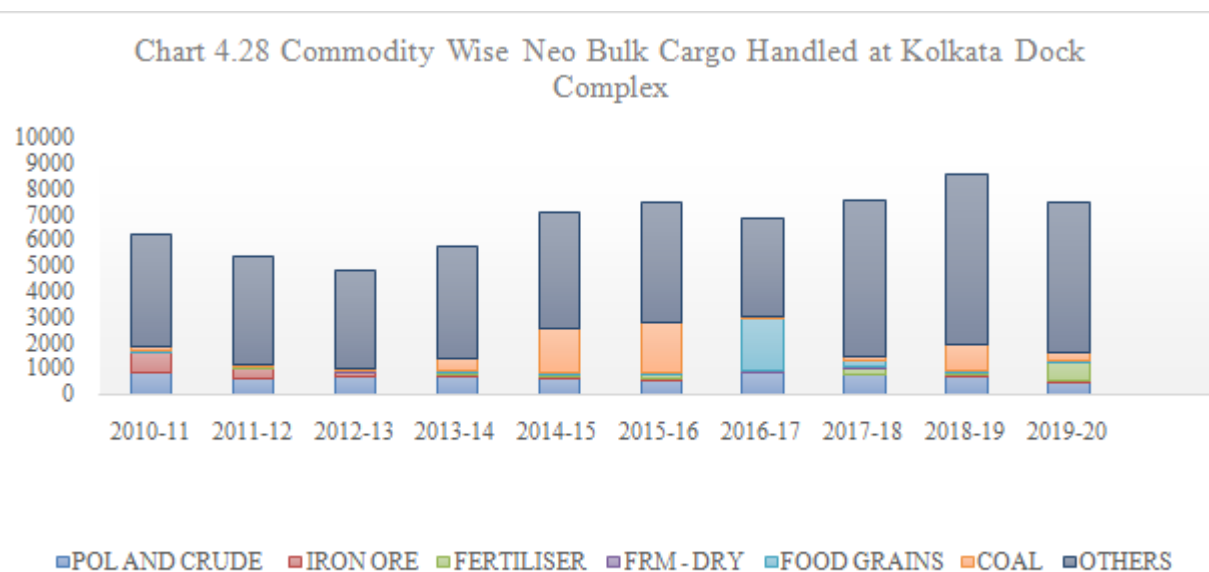
The commodity composition of the total neo bulk cargo traffic at Haldia Dock Complex has shown marginal changes over the years. Coal and its products continue to be the single largest commodity handled by the SMP (HDC) constituting 10038 thousand tonnes of traffic in 2019-20.



Source-India Infrastructure Research

4.1.9 Commodity Wise Neo Bulk Cargo Handled at Kolkata Dock Complex

The commodity composition of the total neo bulk cargo traffic at Chennai Port Trust has shown marginal changes over the years. Fertilizers be the largest commodity handled by the SMP(KDC) constituting 747 thousand tonnes of traffic in 2019-20.



Source-India Infrastructure Research

Chapter 5: Conclusion

5.1 Findings of the Study

Major findings of the study based on the analysis of secondary data are summarized and presented as under:

- At Indian Major Ports, Deendayal Port Trust has increasing trend from the period 2015-16 to 2019-20 and handling the highest neo bulk cargo volume among all the major ports in India.
- Jawaharlal Nehru Port Trust handled lowest neo bulk cargo all among the major ports.
- Paradip Port Trust is the 2nd largest port in handling neo bulk cargo that handled 112468 thousand tonnes neo bulk cargo in 2019-20.
- In 2013-14, most of the major ports in India handled low volume cargo traffic with respect to the period 2012-13.
- Chennai Port Trust has decreasing trend in neo bulk cargo handling all among the major ports in India.
- Deendayal port trust handling the highest volume of POL and its products all the time.
- Mormugao port trust handling the lowest in the volume of POL and its products all the time.
- In term of coal commodity, Paradip Port Trust handling maximum traffic.
- Deendayal Port Trust handling maximum traffic of fertilizer commodity in the period 2019-20.
- Fertilizer raw material handled maximum at Paradip Port trust.
- Food grains handled maximum at Deendayal Port trust in 2019-20.
- Iron ore handled maximum at Paradip Port Trust followed by Vishakhapatnam Port Trust.
- Pol and its products handled maximum at Deendayal Port Trust, Mumbai Port Trust, JNPT, New Mangalore Port Trust, Cochin Port Trust, Chennai Port Trust, Vishakhapatnam Port Trust and Paradip Port Trust all among the major ports in India.
- Coal handled maximum at Deendayal Port Trust, Mormugao Port Trust, V. O. Chidambarnanar Port Trust, Kamarajar Port Ltd., and Haldia Dock Complex all among the major ports of India.

- Iron ore handled maximum at Mumbai Port Trust, Mormugao Port Trust, New Mangalore Port Trust, Vishakhapatnam Port Trust and Paradip Port Trust all among the Major Ports in India.
- Among all of the major ports in India, Deendayal Port Trust have maximum number of available berth followed by Mumbai Port Trust and Haldia Dock Complex for handling neo bulk cargo. At the same time JNPT has least number of available berth for handling neo bulk cargo.

5.2 Suggestions

- On the basis of traffic growth estimates, the government should promote capacity expansion across India's major ports in stages.
- On the east coast, develop Paradip as a world-class neobulk port, while on the west coast, develop Deendayal.
- The government should increase the use of mechanized bulk berth operations in major ports and perform technical assessments to identify viable berths for draught enhancement.
- To boost the expansion of steel coastal freight, the government should develop coastal circuits for steel and agglomeration centers.
- In collaboration with all marine stakeholders, the government should establish berth operating guidelines for each port based on best-in-class practices and on-ground variables.

5.3 Conclusion

This study is able to provide an overview of neo bulk cargo at major ports in India from the point of view of traffic trend in last ten years, berth availability, employment and annual growth of each and every major port. Government of India has taken several initiatives to increase capacity and efficiency of major ports. This study finds that Deendayal Port Trust handling maximum tonnage of neo bulk cargo followed by Paradip Port Trust. The neo bulk cargo traffic is showing the growth year on year which is evident from the traffic handled in recent years. However, there are some issues related to it like maintenance of draft and depth, berth availability, equipment facility, connectivity, etc. for which the Government is taking continuous actions.

Bibliography

- Basic Port Statistics, Ministry of Shipping
- Seyoum, Belay (2008). "Trade documents and Transportation". Export–Import Theory, Practices, and Procedures (2nd ed.). Taylor & Francis. [ISBN](#) 978-0-7890-3419-9
- Review of Maritime Transport 2020
- Ports in India Report_2020
- Maritime India Vision 2030
- Port Management and Operations by Patrick
- https://en.wikipedia.org/wiki/List_of_ports_in_India
- <https://sci-hub.se/https://www.inderscienceonline.com/doi/pdf/10.1504/IJBIR.2017.085099>
- <https://www.semanticscholar.org/paper/Analysis-on-Development-Interplay-between-Port-and-Lam/81a6451ea866bc1811e32c9ac43d19805a39377b>
- <https://imarest.tandfonline.com/doi/abs/10.1080/03088839.2011.572700#.YMskxmgzblU>
- <https://www.sciencedirect.com/science/article/pii/S2092521213000060>
- <https://openknowledge.worldbank.org/bitstream/handle/10986/17191/773820JRN020020ternationalOMaritime.pdf;sequence=1>
- <https://link.springer.com/article/10.1057/s41278-017-0078-4>
- https://infoscience.epfl.ch/record/167446/files/Nitish_STRC2011.pdf
- <https://ageconsearch.umn.edu/record/26751/files/36010250R.pdf>
- <https://www.sciencedirect.com/science/article/pii/S0957417421007338>
- <https://www.sciencedirect.com/science/article/pii/S0025326X16303861>