"An Investigative study of JNPA opting to shift its container terminal JNPCT under PPP"

A Project Report
Submitted to

Indian Maritime University, Chennai

In partial fulfilment of the requirements for the award of the degree of

Master of Business Administration

In

Port and Shipping Management

Submitted by

Jamshid Kc
Reg. No. 2003304017

Under Guidance Of:

Dr. Lekha Ravi

Assistant Professor, School of Maritime Management
Indian Maritime University
Chennai
May-2022

Declaration

I, **Jamshid KC** (Reg. No 2003304017), hereby declare that the project report on **"An Investigative study of JNPA opting to shift its container terminal JNPCT under PPP"** submitted to **Indian Maritime University, School of Maritime Management, Chennai** in partial fulfilment of the requirements for the award of degree **Master of Business Administration** in Port and Shipping Management, under the supervision of **Dr. Lekha Ravi**, Assistant Professor, School of Maritime Management, Indian Maritime University, Chennai. The report represents idea of mind in my own words and where ideas or words of other have been included, I have adequately and accurately cited and referred the original sources.

Place: Chennai **Jamshid KC**

Date: May 2022 **2003304017**

Acknowledgement

With great pleasure and sense of obligation I would like to express my sincere thanks to **Dr. B. Swaminathan**, Head of Department and Associate Professor, School Maritime Management, Indian Maritime University, Chennai campus.

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I would also like to thank all other faculty members of School of maritime management who directly or indirectly guided me.

The completion of this project is not just due to the efforts of one single person; rather it bears the number of persons who directly or indirectly guided me and helped me to complete the project.

Executive summary

JNPA came up as a satellite port with an aim of relieving the congestion of the Mumbai port. Now, JNPA has emerged as the leader with the larger market share on the western coast of India. The port has showed a constant growth and is now operating with 100% efficiency.

JNPA has handled a record total of 5,684,559 TEUs during the Financial Year 2021-22. It is 21.55% higher as compared to the previous year. The port is aiming to achieve the mark of 10 million TEUs in the foreseeable future. In this scenario it was announced that JNPA decided to operate its container terminal JNPCT under PPP model and invited EOI bids.

This report studies the five container terminals of JNPA and the comparison of the port owned JNPCT and the four privatized terminals. It looks at why JNPCT opted to privatize. The study is conducted with the help of secondary data. The objective is to study the advantages which the private terminals are having above JNPCT and the proposed privatization will benefit the port. The study consists of performance indicators like total number of containers handled in terms of TEUs, total turn round time, Average gross berth productivity, Crane productivity, Total vessel turnaround time and Output per ship berth day. The analysis is done based on the data up to 10 years.

Certificate

School of Maritime Management

Indian Maritime University, Chennai.

This is to certify that the project report entitled **"An Investigative study of JNPA opting to shift its container terminal JNPCT under PPP"** 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 Port and Shipping Management is a record of work carried out entirely by Jamshid KC (2003304017).

Dr. Lekha Ravi

Project Guide

School Maritime Management

Indian Maritime University

Chennai campus

External Examiner:

Place: Chennai

Date: 25th May 2022

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CHAPTER - 1

1.1 Ports

Ports is considered as the doorway for cargo and people. A port is defined as an area on both land and water, whether on the sea or river, that provides facilities for shipping vessels to load and discharge passengers and cargo. Ports are crucial to the global economy and trade of the country. Ports are intermodal facilities, a place where rail, truck, barge, ship, and other transport methods converge. In this way, ports play a key role in moving products both, to other countries and to the interior of the country. Ports can be of great significance to a nation, as it promotes the commercial welfare and the trade scenario. It is considered as one of the major sources for employment generation.

The ports are administered under a complex legislative concept and through an organisational style that primarily generates the need for public-private sector integration. The port has both sea and land access which enable them to transport the cargoes and passengers efficiently and to implement effective operations. The ports are fully equipped with various kinds of cargo handling equipment and facilities like cranes, forklifts, RMQC to the modern automated gantry crane, straddle carrier for its operations along with the skilled workforce as per the requirements. Docks or berths are provided by the ports for undertaking the safe berthing and mooring of the vessels with all required supports and equipment. The port provides cargo storage facilities for the safe storage of different kinds of cargoes; including the warehouses, transit shed, tanks for the storage of liquid cargo within the areas. The port provides various kinds of connectivity including road, rail, air, and inland waterways for accessing the port and engaging in business with them. These connectivity facilities are provided with the support of the government, as ports are considered as an important link in trade and also a contributor to the development of the country.

1.2 Ports in India

India has a coastline spanning 7516.6 kilometres, forming one of the biggest peninsulas in the world. According to the Ministry of Shipping, around 95 per cent of India's trading by volume and 70 per cent by value is done through maritime transport. It is serviced by 12 major ports, 200 notified minor and intermediate ports. Ports play vital role in the overall economic development. Out of them, the Mumbai, JNPT, Kandla, Mangalore, Cochin and Mormugao are located at western coast while Kolkata, Vishakhapatnam, Paradeep, Chennai, Tuticorin and Ennore are located on East Coast. Port Blair is located in Andaman and Nicobar Islands.

The Indian peninsula is surrounded by water at three sides. The Bay of Bengal to the east, the Arabian Sea to the west, and the Indian Ocean to the south.

The Ministry of Ports, Shipping, and Waterways owns and operates the majority of India's ports. Private organisations also operate individual terminals and facilities. Companies such as DP World (including the former P&O), AP Moller Terminals, and PSA International operate a substantial share of the terminals in India. Reliance Industries and the Adani Group own the few private ports. A major portion of imports of India is Oils, coming in Iran and the Middle East, contributes for a major share of incoming trade from the East. The major items that move through Indian ports are agricultural produce, fertilisers, natural ores and minerals, automobiles, textiles, and foodstuffs. There are also other naval bases run by the various Indian Naval Commands. The major ports are managed by the Central Government's Shipping Ministry, whereas minor ports are administered by the Ministries of the different states in which they are located.

Given its great maritime importance, India's ports have played a significant part in the country's growth and development.

Major Ports in India

1. Syama Prasad Mookerjee port (Kolkata)
    - Established in 1870
    - Only River line major port in India
    - Known for twin dock system-Kolkata Dock System (KDS) on the eastern bank and Haldia Dock Complex (HDC) on the western bank of river Hooghly.
    - Located in the city of Kolkata, West Bengal, around 203 kilometres from the sea.
2. Paradip port
    - Established in 1962
    - Located at confluence of river Mahanadi and the Bay of Bengal.
    - First major port in the east coast commissioned after independence.
    - Only major port in the state of Odisha
3. New Mangalore port
    - Established in 1974

- Located at a site called Panambur, Mangalore on the west coast of India. It is north of the confluence of Gurupura river to Arabian sea.

4. Cochin port
    - Established in 1928. On 26th May 1928, first vessel crosses the channel and enters the harbour - SS Padma of Bombay Steam Navigation Co.
    - Cochin Port Trust constituted in 1964.
    - Located on Willingdon Island on the south-west coast of India
    - Cochin port is connected to its hinterland enlarging to the state of Kerala, South Tamil Nādu and South Karnataka.
    - Closest to the International East West Shipping routes.
5. Jawaharlal Nehru port
    - Established in 1989
    - It is also known as Nhava Sheva port, is the largest container port in India.
    - Located East of Mumbai in Navi Mumbai's Raigad district, Maharashtra.
    - Handled about 50 % of total containers handled by all major ports in India.
6. Mumbai port
    - Established in 1873
    - It is also known as Bombay port trust, which lies midway on the West coast of India and is gifted with a natural deep-water Harbour of about 400 square kilometres protected by the mainland of Konkan on its East and Island of Mumbai on its West.
    - Port has long been the principal gateway to India and has played a pivotal role in the development of the national economy, trade & commerce and prosperity of Mumbai city in particular.
7. Deendayal port (Kandla)
    - Established in 1931
    - Seaport is in Kutch district of Gujarat state in western India, near the city of Gandhi Dham.
    - Largest port of India by volume of cargo handled
8. Visakhapatnam port
    - Established in 1933
    - Only major port of Andhra Pradesh
    - The only port in India and first of its kind in South Asia to have a Cavern facility for LPG.

- It is a natural port endowed with deep water basins formed by a high promontory into the sea

9. Chennai port
   - Established in 1881
   - Third oldest port among the 12 major ports
   - Emerging hub port in the east coast of India.
   - It is one among major ports having terminal shunting yard& running their own railway operations inside the harbour.
10. V.O Chindambaranar port (Tuticorin)
   - It was declared to be a major port on 1974.
   - Strategically located very closed to the East-West International sea-route.
   - Located in the Gulf of Mannar, with Sri Lanka on the south east and large land mass of India on the west
11. Mormugao port
   - Established in 1885
   - Port is on the western coast of India, in the coastal state of Goa
   - It is one of India's oldest ports.
   - It has a naturally protected open-type harbour that lies on the southern part of the mouth of the river zuari.
   - Leading iron-ore exporting port of India.
12. Kamarajar port (Ennore)
   - Port is situated on the East Coast of India about 20 km north of Chennai Port along the coastline, in the State of Tamil Nadu
   - Kamarajar Port is the first and presently only Corporatized Major Port under the management control of Kamarajar Port Limited (KPL).
   - The port was declared as Major Port under the Indian Ports Act, 1908 in March 1999 and incorporated as Ennore Port Limited under the Companies Act, 1956 in October 1999.

Background to Public Private Partnership (PPP)

The origin of partnership between private and public sectors can be seen as far back as the Roman Empire which is two thousand years ago in Europe. In the Roman Empire, a network of postal stations was created to go with the development of the roadway framework system under the Roman legions. The postal stations are the small communities which are centred around large stables, warehouses, workshops, hotels and military barracks. These were constructed and managed by a private partner for a

period of five year. They also carried out the works including the maintenance of associated highway, under a contract called as "manceps". These contracts were awarded by municipalities under competitive bidding. The construction and operation of Ports and inland harbours also notably conceded the Romans. However, this system of public private partnership has disappeared with the fall of the Roman Empire. Later, it reappeared during the during the 12th and 13th centuries in the south western region of France for the construction of new fortified towns and the occupation of new lands. Then in the 16th and 17th centuries, European countries, mainly in France had begun much more expansive public works under concession agreements. These projects were carried out in the field of canal construction, mail distribution, waste collection, road paving, public lighting and public transportation. The industrialization in Europe of the nineteenth century brought quick urbanization and development of public networks in transport (railways, tramways, metropolitan), water supply and sewerage and energy. This expansion was achieved by private business people by their funding to these projects. This time has been marked as the golden age of concessions in Europe. The construction of railways took place under concessions in almost every European country. The thoughts generated by the French revolution has also influenced the concession agreements. The wars at the twentieth century have impacted to this trend and has influenced negatively for the trend. As a result of the war and the economic turmoil and contractual standby majority of the concession agreements were cancelled and only rarely re-established. In addition, the impact from Communist philosophy were also seen in the concession agreements of that time as the collectivism was considered as a viable and desirable choice to free market principles. After World War I, new public infrastructure was planned, built and financed from public funds and prior to 1982 there was very limited private funding of transport infrastructure in developing nations.

PPP - Public Private Partnership

A public Private Partnership is a relationship between a private sector and a public organization to finish a project which aims to serve the public. Public private partnerships might be utilized to build, finance, operate, and maintain projects such as public transportation, roadways, parks, and many other public sectors. Funding a project through a public-private partnership can allow a task to be finished sooner or make it a chance to complete in a faster way. Public private partnerships commonly have an income source which can be stated as tolls or user fees that might be used to fund the project. Public private partnerships also utilize private sector investments

to back the project while public financing isn't accessible or immediately available. A country's government might be intensely in debt; however, a private party might have an interest in funding the construction and initial operating costs of a public project, in return for income sharing once the project is completed. A successful partnership draws on strengths of both public and private sectors to establish a powerful association among them which leads to a collective success. A public Private Partnership might include a simple form finance plan where the private party funds a portion of the development costs for the project. A public Private Partnership project include a long-term agreement where the private partner designs, builds and finances a project and enters into a long-term lease for a public party to operate and maintain the project. In this period, a portion of the revenues going to the private partner and some going to the public sector partner. The project is turned back over to the public partner at the end of the concession agreement. Then, the public party maintains the operation and maintenance and collection of revenues from the project.

Contract period for public-private partnerships are often 20 to 30 years or longer. Financing is provided in part by the private sector, while payments from the public sector and/or customers are required over the course of the project. The private partner contributes to the project's design, completion, implementation, and funding, while the public partner concentrates on defining and monitoring compliance with the objectives. Risks are dispersed between public and private parties through a negotiating process, preferably but not always according to each's ability to analyse, control, and cope with them. Partnerships between private corporations and governments benefit both parties. For example, private-sector technology and innovation can help increase the operational efficiency of providing public services. For its part, the public sector offers incentives for the private sector to complete projects on time and within budget. Furthermore, increasing economic diversification makes the country more competitive in terms of facilitating infrastructure and promoting linked construction, equipment, support services, and other industries. But it has its own drawbacks too. A public-private partnership may put the private party to additional risks. Construction risks exist for physical infrastructure such as roads and railways. If the product is not delivered on time, costs more than expected, or has technical flaws, the private partner is usually held responsible. Furthermore, the private partner suffers availability risk if it is unable to offer the promised service. A corporation may fail to meet safety or other quality criteria. This risk, however, can be transferred to the public partner if the public partner agrees to pay a minimum fee regardless of demand.

Public Private Partnership can be arranged in several ways. Some of them are;

- Build-Operate-Transfer (BOT): A government transfers all construction and operations to a private entity for a fixed period of time (often several decades or more). After that time, it is turned over to the government.
- Build Operate Own (BOO): Similar to a BOT, except the private firm is not compelled to hand over the project to the government at any point.
- Design-Build (DB): A government pays a private company to design and construct a project. The government retains ownership and has the option of operating it in-house or contracting out operations.
- Buy Build Operate (BBO): A government sells a pre-existing project that has already been finished and may have been run by the government for some time to a private party who will fully take over. The private party may be required to invest in the project's rehabilitation or expansion.
- Design-build-finance-operate (DBFO). Under a long-term lease, the private-sector entity plans, funds, and instals a new infrastructure component and owns the operation and maintenance. When the lease expires, the infrastructure component is transferred to the public-sector partner.
- Build-own-operate-transfer (BOOT). Privatization is provided for the financing, design, construction, and operation of an infrastructure component (as well as the charging of user fees) for a set period of time, after which ownership is returned to the public-sector partner.
- Build-lease-operate-transfer (BLOT). On leased public land, the private-sector partner develops, finances, and constructs a facility. The facility is operated by a private-sector partner for the life of the property lease. Assets are passed to the public-sector partner after the lease expires.

PPP in Port Sector

Ports are major gateway infrastructures that connect an entire region and its inland transportation network (i.e., road, rails, inland waterways) to the worldwide market, as the majority of global trade is carried by sea. As a result, for many emerging and developing countries, creating strong, well-functioning maritime transport infrastructure is a critical component of economic success. Public-private partnerships ("PPPs") in ports have become a means of improving port operations and developing new port infrastructure, which were previously exclusively government duties. In

port PPPs, the government enters into contracts with private port management companies, who operate individual terminals inside the port. The landlord port authority serves as a technical regulator, monitoring the private operator and collecting payments that often include a fixed rental price, a portion of the private operator's earnings, a charge per container handled by the private operator, or a combination of the three. Following liberalisation in the 1990s, the number of projects involving public-private partnerships (PPPs) in India increased exponentially, with the aim of redefining performance through performance improvement, efficiency and productivity enhancement, and increased competition. Following that, the port privatisation programme was launched in India in 1997, which saw, in besides these dynamics, the increase of new funding – including foreign investments in the ports sector. The first PPP terminal was Nhava Sheva International Container Terminal (NSICT) in JNP, Maharashtra. In India, PPPs have been seen in port operations and management, as well as the construction of deep-water ports, container terminals, shipping yards, and bulk ports. In India, frameworks and models are used to support PPP projects. These include Build-Operate-Transfer (BOT), Build-Own-Lease-Transfer (BOLT), Build-Own-Operate-Share-Transfer (BOOST), Build-Own-Operate-Transfer (BOOT), Operate-Maintain-Share-Transfer (OMST) and Design-Build-Finance-Operate-Transfer (DBFOT).

In 1996, the Indian government published rules for private sector participation in major ports. The guidelines called for private sector investment in leasing out existing port facilities, building new infrastructure, leasing private sector equipment for port handling, pilotage, and captive facilities for port-based industries. More guidelines were released in 1997, allowing major ports to form joint ventures with international ports, minor ports, and private firms. These recommendations were also used to guide state government activities for minor ports. Ports were corporatized by the Indian government. They decided that all new ports will be established as companies under the Indian Corporations Act, while existing port trusts would be gradually corporatized and established as companies. The Indian port sector has always been limited by low capacity, outdated infrastructure, and inadequate equipment. These constraints led the government to take significant initiatives toward expanding private sector participation through various incentives. As the government embarks on a new period of economic rebound, which is projected to be significantly strengthened by port-led development, it must lead the efficient implementation of major policies aimed at increasing private engagement.

Key factors in port PPP structuring include:

- Allocation of demand / revenue risk – The port's principal source of revenue would be port user charges, which are based on actual throughput volume. Typically, the private operator pays a concession fee to the public body and collects port user costs under a concession contract (i.e. demand and revenue risk sits primarily with the private party). To make the project commercially appealing to the private contractor, the public body may be compelled to provide a minimum revenue guarantee in specific situations (and its lenders). There may also be systems in place to share revenue gains between commercial and public contracting parties. The specific allocation of this risk will need to be carefully assessed in view of circumstances of a project.
- Competition - The privatisation of port operations might result in complex competition problems. On the one hand, private developers would usually wish to protect the port's profitability through government commitments not to build competitor port facilities within a specific geographic region. The government, on the other hand, would have to ensure that the private operator does not abuse its monopoly position by restricting port access to upstream or downstream competitors (as the private developer may also have a business interest in the supply chain upstream and downstream of the port)
- supporting infrastructure - The availability of supporting and associated infrastructure, such as road and rail networks connecting the port to the inland region, will affect port throughput. Other major areas of concern in port projects are the interface between the port and such other connected infrastructure, as well as responsibility for making such connecting infrastructure available.

JNPA-Jawaharlal Nehru Port Authority

Jawaharlal Nehru Port Authority (JNPA) is an autonomous body under the Major Port Trusts Act, 1963, was commissioned on 26th May,1989 and is considered the Hub Port on the Western Coast of India. It is Located 10km to the South East of Mumbai occupying a land area of 2584 Hectares in Navi Mumbai, Maharashtra. The port was originally planned to decongest the Mumbai port and serve as a hub port for container handling for the region. One of the key advantages JNPT offers as a Port is close proximity to Mumbai, the economic capital of India and also a strongly connected network of rail and roadways network from other major cities across the country. The accessibility to the Port is very critical for key stakeholders as

it makes Trade convenient and provides ease of doing business. This port handles 65% of India's container traffic has a berthing period of 37 hours which is considered to be very long. The Mumbai harbour channel and JNP channel is presently maintained to a depth of 14.2 meters to 13.1 meters below chart datum. The water depths along the main berths at JNP are dredged at 16.5 meters below chart datum. Port operations at JNP started in 1989 with two terminals, one for handling containers and one for dry bulk cargo, like food-grains, fertilizers & its raw materials. A liquid cargo berth on BOT basis has also been operational since 2002 by BPCL/IOC, the two oil PSUs of Govt. of India. It is the gateway port for north-west India and act as a hub port on the west coast with wide hinterland. In a short span it has not only matched the standards of the Indian Maritime Industry but has created a mark that is uniquely different from the rest of the ports in India. It is the gateway port for north-west India and act as a hub port on the west coast with wide hinterland. In a short span it has not only matched the standards of the Indian Maritime Industry but has created a mark that is uniquely different from the rest of the ports in India. Jawaharlal Nehru Port is India’s no.1 container port handling alone 60% container cargo across all major ports in India. It crosses 5 tons of total traffic handling in 2018-19. JNPT container traffic grows 7.24% in 2018. It has total 13 berths. JNPT handles containers, liquid bulk & cement ships and it has five dedicated container terminals namely JNPCT, DP WORLD, GTIPL, NSIGT AND BMCT. Among these 5 container terminals four of them are operated under PPP model. Only JNPCT is operated by the JNPA.

Textiles, equipment, meat, chemicals, and pharmaceutical products are among the primary exports via JNPT. Imports include plastics, equipment, edible oils, aluminium, and nonferrous metals. There is also a project ongoing to connect JNPT to the Western Dedicated Freight Corridor (W-DFC), which will improve road and rail connectivity. A Multi-Modal Logistics Park (MMLP) is also being built. To relieve traffic from the main harbour, JNPT operates a satellite port at Vadhvan Point.

Terminals of JNPA

Jawaharlal Nehru Port Authority (JNPA) is one of the India’s premier container ports Commissioned on 26th May 1989 and is considered the Hub Port on the Western Coast of India. In three decades of its operations, JNPT has transformed from a bulk- cargo terminal to become the premier container port in the country. JNPT is connected to over 200 ports in the world and is ranked 33rd in the list of top 100 Container Ports globally.

Currently JNPT operates five container terminals:

1. The Jawaharlal Nehru Port Container Terminal (JNPCT),
2. The Nhava Sheva International Container Terminal (NSICT),
3. The Gateway Terminals India Pvt.Ltd. (GTIPL),
4. Nhava Sheva International Gateway Terminal (NSIGT),
5. Bharat Mumbai Container Terminals Private Limited (BMCT).

Among these 5 container terminals, four of them are operated under Public Private Partnership (PPP). The Jawaharlal Nehru Port Container Terminal (JNPCT) is being operated by the JNPA. The other four container terminals, The Nhava Sheva International Container Terminal (NSICT) and The Gateway Terminals India Pvt.Ltd (GTIPL) are operated by DP World owned by the Dubai government and each one by APM Terminals Management and PSA International.

Objective of the Study

The objectives of the study are as follows:

- To examine the working of the container terminals in JNPA
- To find out the reasons for JNPA opting for PPP model for JNPCT.

Research Methodology

Research methodology is a way to solve the problems in research systematically. It can be considered as a scientific way of studying the research problem successfully.

The research which is being conducted is entirely depended upon the secondary data. The research is mostly on analysis of the performance of the container terminals of JNPA throughout the years. Interpretation of the terminal traffic and throughput data and applying statistical tools are the major research tools being used in this study.

Limitations of the study

The study is mostly depended on secondary data. The major limitations of the study are;

- Since the study is mainly based upon the port performance, the researcher has to mainly depend upon the data published on the port website.
- The study has been done using only the secondary data, any little difference in the analysis is limited to the data acquired.
- Time constraint has also played a huge role, since the time was short the in-depth research was not possible.

- Many information required financial assistance The data may be outdated, so chances of inaccurate data.
- The chances of getting biased data are high.

Chapter Scheme

INTRODUCTION: A brief introduction about the port infrastructure, major ports in India. Then about the Public Private Participation (PPP), PPP in port sector and history of the Jawaharlal Nehru Port Authority (JNPA), the emergence of the port, infrastructure details and the port terminal facilities.

REVIEW OF LITERATURE: The review of literature contains the body of researches who carried a brief analysis on the Jawaharlal Nehru Port Authority (JNPA) and in the field of Public Private Participation (PPP) around 6 reviews of literature have been sourced in this report.

ANALYSIS 1: The Project analysis describes the JNPT port structure and analysis to find out what made it the largest port in India by studying each terminal, its details and how they are performing as PPP units.

ANALYSIS 2: The Project analysis describes the analysis of JNPA, its comparative performance of terminals which are operating under PPP and the port owned JNPCT. The analysis is done by using terminal data for the past 10 years and to find out the performance of the container terminals. The key parameter which are taken in consideration for evaluating the terminal performance are; number of containers handled, Average Gross Berth Productivity, Crane Productivity, Total Vessel turnaround time and Output Per Ship Berth Day

SUMMARY OF FINDINGS AND SUGGESTION: The take away and the better understanding of the JNPA's container terminal performance and the reasons why they are planning to privatise its own container terminal JNPCT.

CHAPTER - 2

REVIEW OF LITERATURE

As per the article dated February 15, 2004, **MANAGING PORT REFORMS IN INDIA: Case Study of Jawaharlal Nehru Port Trust (JNPT) Mumbai** by Amit S Ray, Professor of Economics School of International Studies, Jawaharlal Nehru University, has stated that, JNPT was founded with the intention of developing a world-class port in India. Indeed, even before the reforms, it clearly had an advantage over other Indian ports in terms of infrastructure and performance. However, it suffered from some of the intrinsic flaws that afflicted the Indian port sector, preventing it from reaching world-class port efficiency standards. JNPT was the ideal option as a test case for privatisation of port operations because it was the most advanced among Indian ports and also had the fewest labour issues. This article outlines the key changes implemented at JNPT, as well as their conception and implementation. The reform process was clearly well organised and optimally scheduled, with active engagement from a diverse spectrum of parties. The specifics of the reform process at JNPT were not imposed from on high. The reform was a moderate success. With the establishment of a new private terminal and the subsequent steps, JNPT has proved its potential to improve the efficiency of the public terminal through the introduction of intra-port competition, and it has achieved the distinction of being the world's 29th largest container port. JNPT has been limited by some of the intrinsic flaws that plague the Indian port sector, preventing it from meeting world standards in port efficiency. JNPT was the ideal option as a test case for privatisation of port operations because it was the most advanced among Indian ports and also had the fewest labour issues. It seems clear that the reform was a reasonable success. With the establishment of a new private terminal and the subsequent steps, JNPT has proved its ability to improve the efficiency of the public terminal by introducing intra-port competition. The manner in which the reforms were implemented ensured that no stakeholders or interest groups were harmed. It has been a win-win situation for everyone – JNPT and its public terminal (JNPCT), the private operator (NSICT), workers, shipping lines, and most importantly, the country's exporting and importing communities and the national economy. The only possible loser was the government bureaucracy, which may have been under increasing pressure to abandon part of its authority and control over port operations.

As per the journal published in 2017 titled **Jawaharlal Nehru Port Trust (JNPT): A Leading Container Port in India** by Prof. Avinash Purandare Associate Professor National Institute of Construction Management and Research (NICMAR) and Dr. Shailesh P. Kasande Director, Vishwakarma

Institute of Management states that, Because of the different activities that occur in a container port, the agents engaged are diverse: port authorities, terminal operators, tug boats, freight forwarders, consigners and consignees, and so on. A port authority, a terminal operator, or inland logistics businesses can handle container shipping within the port. For example, a port authority's goal may be to generate and sustain labour capacity, but a terminal operator's goal may be to maximise profit, and an inland logistics company's goal may be to increase service reliability. A container port is made up of one or more container terminals. Berths for ships to berth, areas for container stacking and storage, and handling equipment to load and unload containers are all required to transport containers from ship to shore and inside the port. Container handling equipment distinguishes container ports from other ports among these facilities. There are many different types of container handling equipment, but they can be divided into two categories: quay cranes and yard handling systems. Containers are transferred between ship and shore on the quayside, and container quay cranes are the primary equipment used for ship loading and unloading. It can be fixed on the ship (ship-mounted cranes) or located on the quay (ship-to-shore (STS) cranes, which are both commonly used in container ports and terminals. Containers are shifted to land transport modes or prepared to be loaded onto other ships on the yard side. The yard area is used for two sorts of activities: container stacking and horizontal movement. The container port facilities must be of sufficient size to manage the port's container cargo traffic.

Dated -15 July 2016, **Effect of Legal Issues in Infrastructure Development: The Case of Container Terminal Bids in Jawaharlal Nehru Port Trust** by G Raghurama, Prashanth Devakumar Udayakumara and Richa Prajapati states that, The Jawaharlal Nehru Port Trust (JNPT) is India's largest container port, handling almost 40% of the country's container traffic in 2014-15. JNPT has five container terminals, three of which are already active, a solo container terminal of 330 metres (m) is partially operational, and a fourth container terminal is being built. While JNPT operates the first container terminal, Jawaharlal Nehru Port Container Terminal, the second and third container terminal s are run by DP World and an APM Terminals-CONCOR venture, respectively. DP World also operates the standalone container terminal, while the fourth container terminal has been granted to PSA International and is currently under development. Case studies, court judgments, published and unpublished papers, media reports, primary data from discussions, and secondary data

were examined using a case-based analytical approach to construct a chronological story of the bids for the five CTs over the twenty-five years since the port's commissioning in 1989. Each container terminal concession to a private stakeholder raised difficult issues, prompting authorities to update policy guidelines on a regular basis to resolve them.

December 2020, **Enhancing Port Performance: A Case of Jawaharlal Nehru Port Trust**, Aman Rathi, Ambesh Pratap Singh and Sundaravalli Narayanaswami, a part of working paper series of the IIMA, has stated Ports are crucial infrastructure that play an important role in international trade. They serve an important role in connecting emerging countries to the global market, hence boosting business and economic progress. This infrastructure is rising in size and complexity. As a result, there is a need for performance indicators to assess competitiveness and plan for future improvements. Port performance tools can be used as an internal strategic management tool as well as a benchmarking tool across a port network. Through this research, they tried to discover the critical metrics of operational efficiency in any port, track the characteristics over time for Jawaharlal Nehru Port Trust (JNPT), and identify areas for improvement to improve overall port performance.

January 2020, **Public Private Partnership (PPP) for Ports Development and Operation**, in Partnership between ESCWA and IsDB And with the cooperation of UNECE states that, Public-private partnerships (PPPs) are becoming more common, demanding greater knowledge and expertise to ensure the success of infrastructure projects from concept to completion. A robust legal and regulatory framework, as well as a clear PPP contract that focuses on outputs, indicators, and follow-up, will ensure that anti-competitive effects do not emerge, which could raise prices and reduce optimum efficiencies. This paper also includes a complete national and regional vision of port PPPs, as well as recommendations for future decision-making in their implementation. The report has pointed out that the government is operating the majority of ports in the Middle East. However, based on the recent global interest in involving the private sector in port financing, management, and operation, it is critical for Middle Eastern countries to examine the potential of PPPs in their ports, learning from previous cases the success factors and potential issues of applying concession agreements. This paper not only discusses whether or not a government should enter into a port concession deal, but also the impact of port concessions on competitiveness and agreements between ports in the Middle East that are geographically close and rely on each other for

goods trade. As a result, unlike some other countries in Europe or America, countries in the Middle East should consider not only their own economic and market demand, but also the political and economic status of neighbouring countries in order to have a clear vision of their respective integration in the regional port network serving national transit and international maritime trade.

FEBRUARY 2017, **PRIVATE PARTICIPATION AT INDIAN PORTS, Resurgence through Reforms** by Bureau of Research on Industry and Economic Fundamentals (BRIEF) studied that, The Indian port sector has long been restricted by low capacity, outdated infrastructure, and inadequate equipment. These constraints prompted the government to take decisive initiatives toward expanding private sector participation through various incentives. As the government embarks on a new period of economic rebound, which is projected to be significantly strengthened by port-led development, it must lead the efficient implementation of major policies aimed at increasing private engagement. It might be argued that changes in PPP projects in the ports sector are critical in terms of making Indian ports more competitive and thereby enhancing India's position in the worldwide supply chain. This policy brief aims to highlight major developments in reshaping PPP arrangements in the Indian port sector, as well as to facilitate greater realisation of the immense potential these projects hold in the overall growth prospects of India's trade, i.e., in meeting surging domestic demand while also providing a necessary boost to export-oriented manufacturing.

Based on this review of literature, the study being conducted here is aiming to analyse the various container terminals of JNPA and the performance analysis of JNPCT corresponding to the other container terminals which are under PPP. The proposed study is an investigative study to analyse the motive and the reasons which paved the way to think about privatisation of JNPA’s own container terminal JNPCT. The study will also analyse the performance of container terminals which are already under PPP and how privatisation has benefited those terminals.

CHAPTER - 3

AN OVERVIEW OF THE FIVE CONTAINER TERMINALS IN JNPA

After receiving approval from the Ministry of Ports, Shipping, and Waterways, the Jawaharlal Nehru Port Trust (JNPT) published a global tender on August 31, 2021 to privatise the Jawaharlal Nehru Port Container Terminal (JNPCT) in Mumbai. The tender is valued $117 million and offers a public-private partnership model, with the successful bidder receiving the container terminal for 30 years and the chance to set terminal prices based on market forces. JN Port Container Terminal (JNPCT), one of JNPT's five container terminals, handled 5,44,027 TEUs in FY21, decreasing from 7,18,863 TEUs in FY20. The government has granted the pot trust authority to implement a special voluntary retirement plan (SVRS) for JNPT employees beginning September 1, 2021. The privatisation project comprises berth upgrades as well as equipment replacement and/or deployment. SBI Caps is serving as the transaction advisor for JNPT's container terminal privatisation. The bid has led terminal operators from around the world to line up as bidders, eager to establish a foothold at India's busiest state-owned container port. At least 12 global port operators have expressed strong interest in the privatisation, which is part of the National Monetisation Pipeline. The players interested in occupying JNPCT are A P M Terminals Management, D P World, International Cargo Terminals and Infrastructure, A P Moller Maersk, Q Terminals (Qatar), Abu Dhabi Terminals, JSW Infrastructure and Adani Ports and SEZ. The terminal has a capacity of around 2 million TEU (twenty-foot equivalent unit), however it works at less than half of its true capacity due to inefficient and outdated equipment.

CONTAINER TERMINALS OF JNPA

Jawaharlal Nehru Port Container Terminal (JNPCT)

JNPCT is the JNPA’s own container terminal and is being operated by them only. It is the only container terminal among the 5 terminals in JNPA which is being operated by the port itself. JNPCT is being operational for more than 30 years and has played a vital role in the country’s EXIM trade. The container terminal is providing facilities to its users and has met all the international standards, user friendly, excellent connectivity by rail and road to hinterland and is economical.

JNPCT	
Berths	3
Quay Length	680Mtr
Draft	15Mtr

Capacity	0.9 (million TEUs)
Reefer Plugs	576
RMQCs	6
RTGCs	27
RMGCs	3
Tractor Trailers	53 (Hired) + 7(Owned)
Backup Area	61.49 (Including Shallow Berth area)
Reach Stackers	04 (Hired)
Railway Siding Tracks for ICD	04
Maximum Permissible LOA of The Vessel	370 Metres

Table 1: JNPCT Specifications

Source: https://www.jnport.gov.in

Shallow Draught Berth

Shallow Draught Berth was commissioned on 1st September 2002. It has a Total Length of 445 meters. Vessels up to 183 meters LOA and up to 10 meters draught are being handled. Container Vessels, General Cargo, Cement and Liquid Cargo Vessels are being handled here. It has a total capacity of 4.5 million Tonnes.

Quay Length	445(meters.)
Maximum draft	10-Max (Tidal) (Meters.)
Capacity	4.5 (In million Tonnes/Year)
Maximum Permissible LOA of The Vessel	183 meters

Table 2: Shallow Draught Berth Specifications

Source: https://www.jnport.gov.in

Nhava Sheva International Container Terminal

Nhava Sheva International Container Terminal which is operated by DP World is one of the most modern container terminals and the first private container terminal and in India. The JNPT has come up with a concession agreement with P&O Ports, Australia in 1997. The PPP model was BOT (Build, Operate, Transfer). The agreement was for 30 years. It was the first totally automated container terminal to be created in India with every one of its operations. The 2-berth Container Terminal was designed to have a capacity of 0.65 million Twenty-Foot Equivalent Units (TEU) per annum in Phase I and a sum of 1.3 million TEU in Phase II. The port was fully operational by July 2000, with both Phase I & II capacity. The terminal is

currently operating at more than 100% capacity. The current capacity of this terminal is estimated about 20.5 million tonnes per year.

NSICT	
Berths	2
Quay Length	600(Metres.)
Maximum draft	15(Metres.)
Design capacity	1.2(Million TEUs Year)
Design capacity	20.5(Million Tonnes/Year)
Reefer Points	772
RMQCs	8
RTGCs	29
RMGCs	3
Yard Area (In Hectares)	25.84
Reach Stackers	2
Maximum Permissible LOA of The Vessel	370 Metres
Quay Length	600(Metres.)

Table 3: NSICT Specifications

Source: https://www.jnport.gov.in

APM Terminals

Gateway Terminals India (GTI) is a Public Private Partnership modal between The Container Corporation of India Ltd (CONCOR) and APM Terminals. In Jawaharlal Nehru Port, GTI is the third container terminal at on a BOT (build, operate and transfer) basis for a period of 30 years. The operations were commenced in March 2006.

APMT	
Quay Length	712(Metres.)
Maximum draft	15 (Metres.)
Design capacity	1.8(Million TEUs Year)
Design capacity	23.7(Million Tonnes/Year)
Reefer Points	840
RMQCs	10

RTGCs	36
RMGCs	3
Area (In Hectares)	54.57
Maximum Permissible LOA of The Vessel	370 Metres
Twin Lift Spreaders	61 Mt Rated Load
Quay Length	712(Metres.)

Table 4: APMT Specifications

Source: https://www.jnport.gov.in

Bharat Mumbai Container Terminal

BMCT, the fourth container terminal of JNPA is also developed under PPP modal. The terminal is developed on Design, Built, Fund, Operate and Transfer (DBFOT). The concession agreement was signed with M/s Bharat Mumbai Container Terminals Pvt. Ltd. They are a subsidiary of PSA (Port of Singapore Authority). The agreement is for 30 years. The project consists of two phases. Phase 1 and Phase 2. 4.8 million TEUs will be the total capacity of the terminal.

BMCT	
Container Berths	6
Depth at Berth	16.5 m
Quay Length	2000 m
Area (Ha)	200
Quay Cranes	24
Designed Capacity	4.8 million TEUs
Rubber Tyred Gantry Cranes	72
Rail Mounted Gantry Cranes	8
Ground Slots	12500

Table 5: BMCT Specifications

Source: https://www.jnport.gov.in

Nhava Sheva (India) Gateway Terminal

NSIGT also operated by DP-World is the fifth container terminal of JNPA. It was commissioned in 2016. The capacity of this container terminal is to be expected to be 0.8 million TEUs per year.

NSIGT	
Quay Length	330(metres.)
Maximum draft	15(metres.)
Design capacity	0.8
Reefer Points	336
RMQCs	4
RTGCs	16
Yard Area (In Hectares)	27
Max. Permissible LOA of The Vessel	370 Metres

Table 6: NSIGT Specifications

Source: https://www.jnport.gov.in

CHAPTER - 4

ANALYSIS OF JNPA, ITS COMPARATIVE PERFORMANCE AND ISSUES

Container traffic at JNPA

Jawaharlal Nehru Port Authority is the biggest container handling port in India. It has been handling almost 50% of the total containerized cargo of the India. In the Financial year 2021-22 JNPA has handled a record number of 5.68 million TEUs. This is 24.55% higher than the total container traffic handled in the financial year of 2020-21. JNPA is considered to be the best port in India as of now. It has been emerged as the No.one port in Indian subcontinent throughout these years. After its establishment in 1989, JNPA has showed a gradual and steady growth in its performance. Now JNPA is connected to over 200 ports around the world and it ranks 33 in the list of top 100 ports in the world. In Vadhvan, JNPA is developing satellite port. They are also developing 4 dry ports to support the port. They are at Jalna, Wardha, Sangli and Nashik. These dry ports will help to promote industrialization of the hinterland. The port is connected with 34 CFSs and 46 ICDs across the country. JNPA is expecting to reach the target of 10 million TEUs by the year 2026. The vision of JNPA is "To become the premier container port of South Asia".

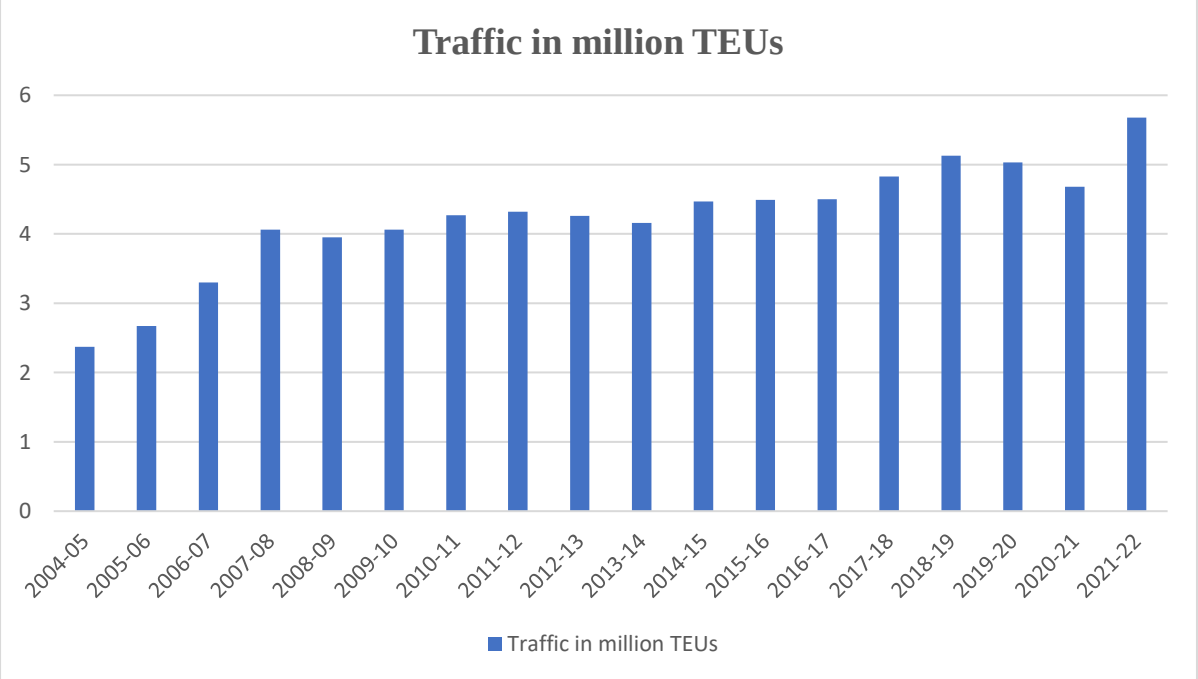

Figure 1: JNPA Total Container traffic of past 18 years

Source: https://www.jnport.gov.in

Container traffic handled in 2021-22

Jawaharlal Nehru Port Authority handled 76 million tonnes of total traffic during the April-2021 to March-2022 of the Financial Year 2021-22. It is 17.26% higher as compared to the 64.81 million tonnes of total traffic handled last year. In terms of TEUs, at JNPA handled a container traffic of 5,684,559 TEUs during the Financial Year 2021-22. It is 21.55% higher as compared to the 4,676,831 TEUs handled in the Financial Year of 2020-21.

The table below shows the number of TEUs handled by each terminal of JNPA in the year 2021-22.

Terminal	Number of TEUs handled in 2021-22	Percentage Change compared to 2020-21
JNPCT	440,210	-19.08%
NSICT	947,887	+26.22%
APMT	1,865,587	+11.79%
NSIGT	1,186,181	+52.12%
BMCT	1,244,694	+33.39%

Table 7: The container traffic handled by JNPA in 2021-22

Source: https://www.jnport.gov.in

CONTAINER TERMINAL PERFORMANCE OF JNPA

The performance of various container terminals of JNPA is being analysed based on various parameters. Container terminal performance is a major parameter in evaluating a port's performance and also its efficiency.

In this chapter, the various container terminals of JNPA are being analysed with regarding the below given parameters.

No. of Containers handled in a year in TEUs

The total number of containers handled by each container terminal of JNPA is being analysed and plotted in graph to show the performance of each container terminal. The data of total number of TEUs handled by each terminal for the past 11 years are being collected and analysed here.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2011-12	1,027,951	1,401,847	1,891,104		
2012-13	1,208,133	1,044,105	2,007,076		
2013-14	1,312,715	969,458	1,879,528		
2014-15	1,294,002	1,160,220	2,012,474		
2015-16	1,429,277	999,680	1,860,283	202,328	
2016-17	1,533,975	728,560	1,792,503	445,111	
2017-18	1,481,768	641,122	2,027,896	659,400	23,212
2018-19	1,056,368	560,661	2,048,454	947,665	520,126
2019-20	718,863	531,354	1,985,473	986,624	808,873
2020-21	544,027	750,978	1,668,903	779,769	933,154
2021-22	440,210	947,887	1,865,587	1,186,181	1,244,694

Table 8: Change in the container traffic in JNPA in terms of TEUs

Source: Compiled by Author

The above table shows the total number of TEUs handled by each terminal in terms of TEUs for the past 11 years.

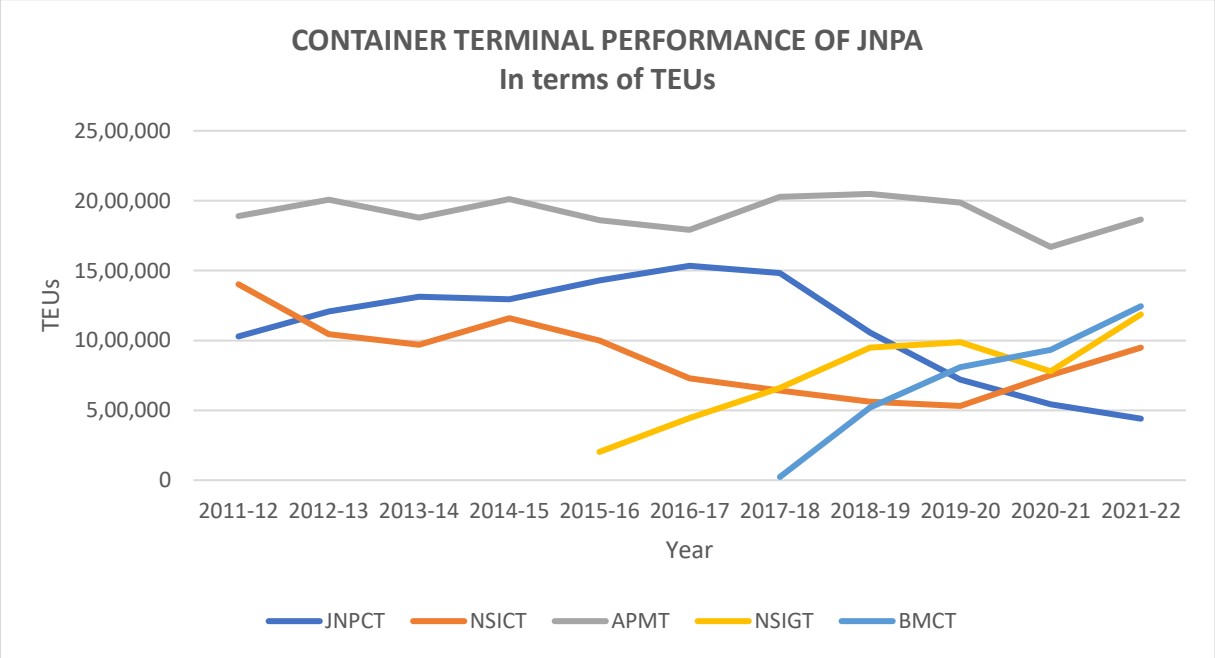

Figure 2: graph showing container traffic handled at 5 terminals of JNPA

Source: Compiled by Author

Interpretation: The above table shows the number of TEUs handled at the various container terminals of JNPA. The data which are shown in the table are plotted in the chart. By analysing the chart, we can understand that there is a clear downtrend in the case of JNPCT's number of containers handles in terms of TEUs and the rest of the container terminals are having a constant uptrend in the graph. They all are having a constant growth in terms of the number of containers handled, while JNPCT is having a constant decline in the numbers from 2016-17 onwards.

The container traffic handled at JNPCT till 2016-17 has shown a gradual growth. After that, it has come down gradually. In 2016-17, JNPCT handled a sum of 15,33,975 TEUs. From there onwards, a constant decline can be seen. It recorded a decline each year as -3.4%, -28.7%, -31.94% and -19.08% respectively from 2016-17 to 2021-22. Now at 2021-22, JNPCT has handled 4,40,210 TEUs. Overall, it has shown a negative growth of 71.3% for the past 5 years.

Average Gross Berth Productivity

The average number of container moves per crane per hour when a ship is at berth is referred to as berth productivity. The Gross Berth Productivity is computed by dividing the total cargo handled (either loaded or unloaded) from the ship during a month by the number of working days of ships in that month at that terminal. The crane rate for containers is calculated by dividing the total number of TEUs hauled on/off ships by the elapsed crane time. The total allocated crane hours less operational and non-operational delays equal the elapsed crane time. The Average Gross Berth Productivity is calculated by the number of moves per hour.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2013-14	62.13	68.31	105.17		
2014-15	59.92	68.79	97.22		
2015-16	64.98	63.09	97.83	67.97	
2016-17	68.06	64.53	96.22	83.69	
2017-18	Data not available				
2018-19	61.52	62.54	99.57	109.30	89.62
2019-20	Data not available				
2020-21	Data not available				

Table 9: Average Gross Berth Productivity in a year in moves/Hr

Source: Compiled by Author

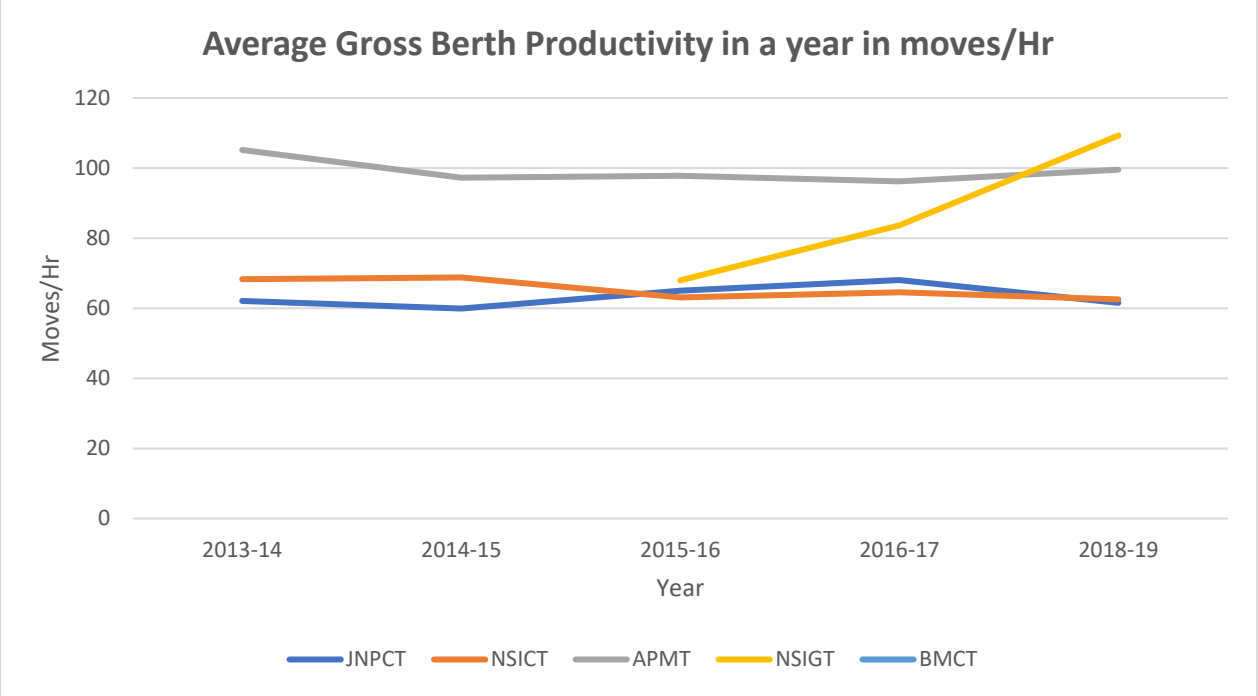

Figure 3: Average Gross Berth Productivity in a year in moves/Hr

Source: Compiled by Author

Interpretation: The gross berth productivity in moves/Hr of various container terminals of JNPA is plotted in the above chart. From the chart itself it can be seen that JNPCT is having the lowest berth productivity in moves/Hr. This means that JNPCT is moving least number of containers in an hour compared to other privatised terminals.

Crane Productivity

Crane productivity is defined as the number of equivalent container moves performed by a crane per crane operating hour. It is determined by dividing the number of comparable container movements handled by a crane by the number of hours the crane was in operation. Crane productivity is often expressed as follows:

- Container moves equivalent per gross crane operating hour
- Container moves per net crane working hour (after deducting all non-operational and idle time).

The following container moves is also equivalent container moves:

i. Each container has been discharged
ii. Each container is fully loaded
iii. Each container shifted to gain access to another container - counts as one move if done within the vessel, but two movements if done via the quay.

iv. Each container transferred to a different place at the request of the ship operator (a restow) - counted as one move if restowed directly to another location on the vessel and as two movements if restow entails unloading to the quay and later reloading to a new position on board the vessel

v. Each container raised in error and returned to the ship was counted twice; and each hatch cover being lifted to the quay and replaced by quayside gantry cranes (or ship mounted cranes) - two moves for each cover removed.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2013-14	17.49	20.68	29.21		
2014-15	17.17	21.66	26.28		
2015-16	18.04	20.95	27.24	22.56	
2016-17	17.49	23.09	27.96	29.21	
2017-18	Data not available				
2018-19	16.11	22.55	29.26	29.94	27.16
2019-20	Data not available				
2020-21	Data not available				

Table 10: Avg. Gross Crane Productivity in a year Moves/Hr./Crane

Source: Compiled by Author

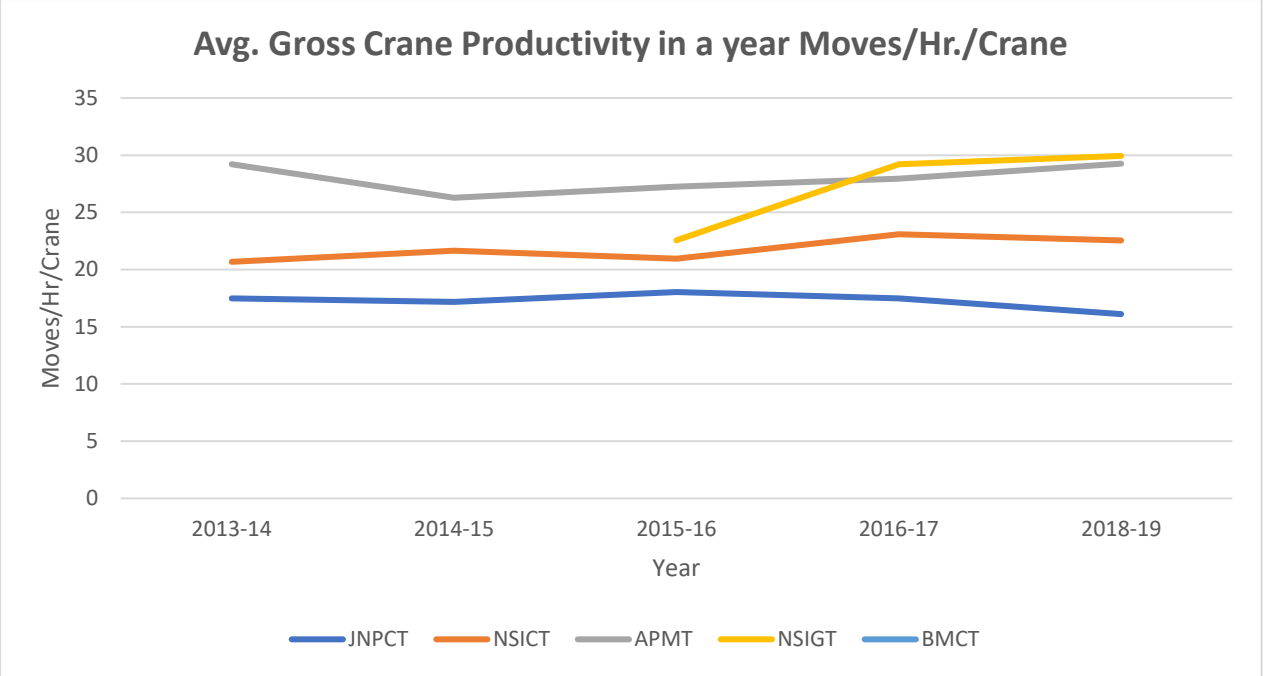

Figure 4: Avg. Gross Crane Productivity in a year Moves/Hr./Crane

Source: Compiled by Author

Interpretation: The average gross crane productivity of all the container terminals is plotted in the chart. From the chart, a significant gap could be seen in between JNPCT and other privatised terminals. That is, JNPCT is having the lowest crane productivity in the port. The terminals is only having least number of Moves/Crane/Hr.

Total Vessel turnaround time

The total vessel turnaround time in ocean shipping refers to the time it takes between a vessel's arrival and departure. Average turnaround time (ATT) is simple to calculate; it is the average difference between the date of departure and date of arrival of a container vessel among all container vessels calling at a port (or country), usually within one month of navigation. The vessel turnaround time is used to evaluate the port's efficiency. The Average vessel turnaround time is calculated in total days.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2012-13	3.62	1.59	1.26		
2013-14	2.09	1.43	1.21		
2014-15	2.04	1.34	1.50		
2015-16	2.04	1.46	1.51	1.33	
2016-17	1.93	1.27	1.14	1.32	

2017-18	2.33	1.09	1.44	1.19	
2018-19	2.15	0.98	1.41	1.10	1.08
2019-20	1.35	0.85	1.22	1.04	0.86
2020-21	1.25	0.89	1.20	0.96	0.98

Table 11: Total average turnaround time of vessels at berths of JNPA

Source: Compiled by Author

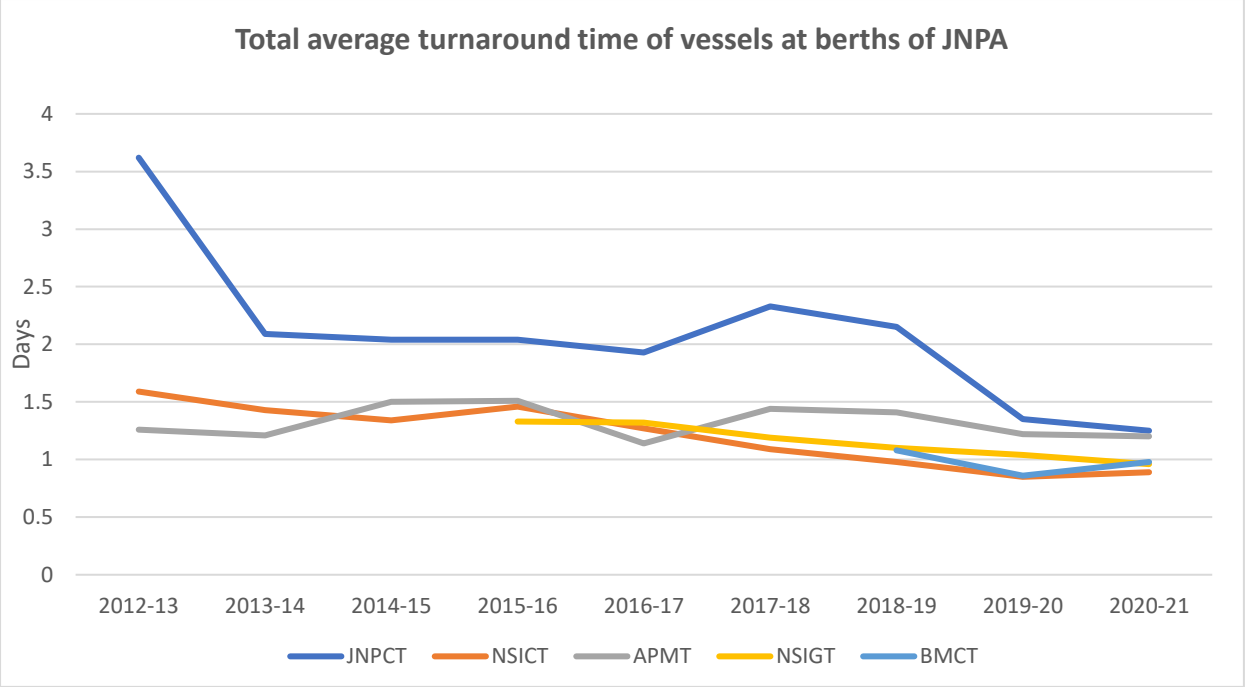

Figure 5: Total average turnaround time of vessels at berths of JNPA

Source: Compiled by Author

Interpretation: The above table shows the average vessel turnaround time at the various container terminals of JNPA. The data which are shown in the table are plotted in the chart. By analysing the chart, we can understand that the average vessel turnaround time at JNPCT is much higher when compared to the other terminals of JNPA, specifically those are under Public Private Partnership. Higher vessel turnaround time indicates the inefficiency of the terminal. So, the shipping lines would not prefer to choose that container terminal. Hence, the terminal's productivity and its efficiency declines.

Output Per Ship Berth Day

It is the total capacity held dispersed over the total number of berth days.it can also be defined as average tonnage or TEUs handled over the total number of berth days.

The average output per ship berth day of JNPA for the past 9 years are given below. The given data are in terms of TEUs.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2012-13	1635	2146	3516		
2013-14	1962	2117	3417		
2014-15	1927	2165	3149		
2015-16	2076	2039	3224	2340	
2016-17	2211	2017	3262	2522	
2017-18	2158	1893	3218	3029	
2018-19	2006	2038	3451	3435	3293
2019-20	1937	1814	3540	3601	4294
2020-21	1783	2251	3164	3106	3268

Table 12: The average output per ship berth day (in TEUs)

Source: Compiled by Author

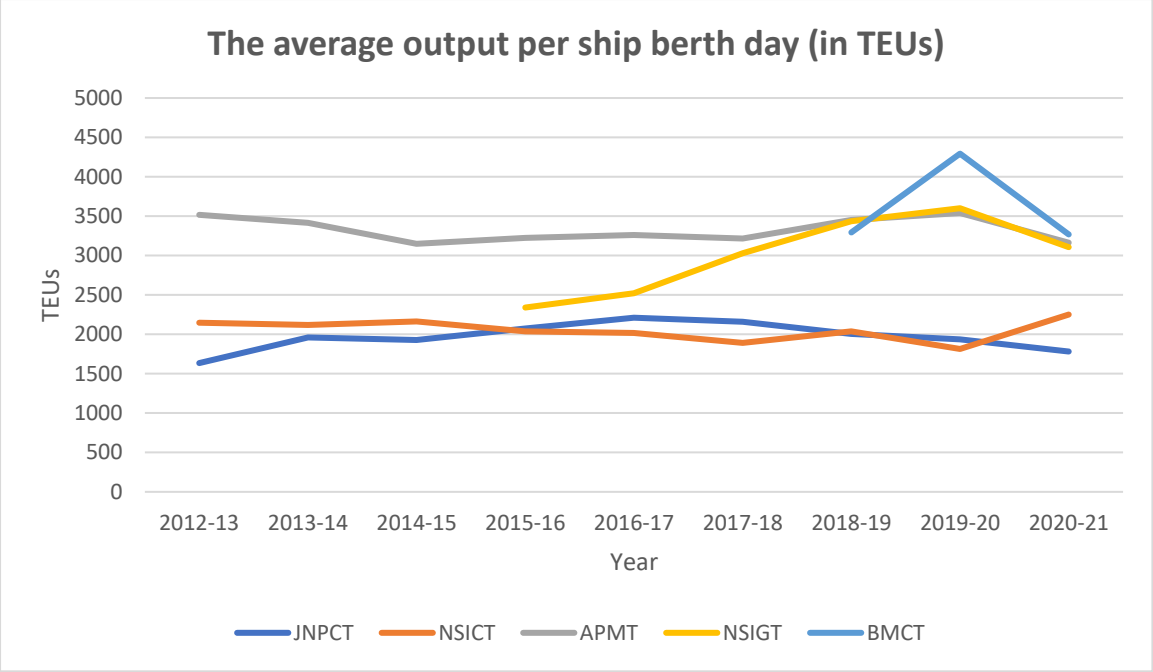

Figure 6: The average output per ship berth day (in TEUs)

Source: Compiled by Author

Interpretation: The above table shows the average output per ship berth day of JNPA for the past 9 years. The table data is plotted in a trend chart to analyse the performance of each container terminal with regarding the parameter. By analysing the chart, we can understand that average output per ship berth day at JNPCT is comparatively lower than the other terminals of JNPA. The terminals which are under Public Private Partnership are having a higher average output per ship berth day indicating their performance efficiency.

The average output per ship berth day has improved in the time period of 2012 to 2016. After 2016 to 2021, a constant decline has been seen in the average output per ship berth day. The average output per ship berth day has declined from 2211 TEUs (2016) to 1783 TEUs (2021). This is a negative growth of 19.35%.

Average Parcel Size

The average parcel size of the cargo handled at various container terminals are also a factor in determining the terminal performance. Parcel size is the average weight to various cargo allocated to its transportation in an economical way. The average parcel size is given in tonnes.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2012-13	25,774	30,184	36,184		
2013-14	39,069	27,369	37,907		
2014-15	37,219	23,439	40,019		
2015-16	37,404	21,682	39,375	28,646	
2016-17	38,694	18,817	35,183	29,077	
2017-18	39,399	39,326	17,983	30,907	15,281
2018-19	38,799	17,938	46,718	39,350	31,106
2019-20	27,014	16,429	47,415	44,208	34,704
2020-21	24,494	21,592	43,631	33,701	32,743

Table 13: Average parcel size of cargo handled in tonnes

Source: Compiled by Author

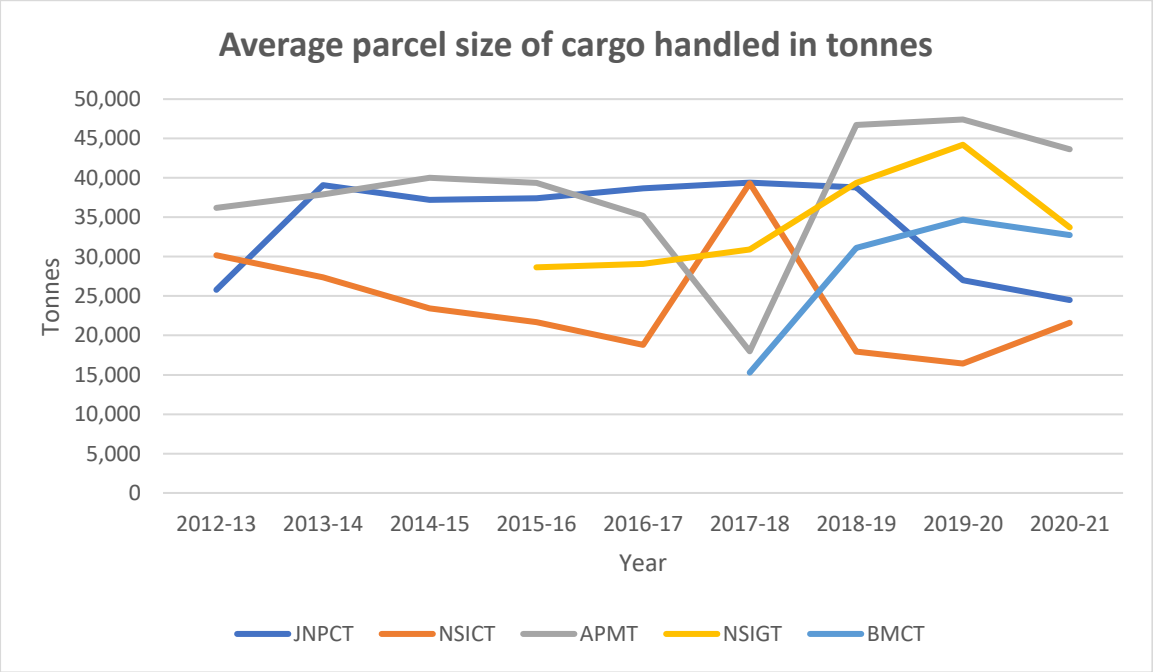

Figure 7: Average parcel size of cargo handled in tonnes

Source: Compiled by Author

Interpretation: The average parcel size of containers handled in various terminals are depicted in the chart. Most of the terminals are not showing a constant growth or decline in terms of parcel size, but they all are having a constant growth in terms of number of TEUs handled in each year. But in

the case of JNPCT, it is having a visible decline in both, i.e., The number of containers handled in terms of TEUs and the Parcel size.

Berth Occupancy

Berth occupancy is a utilisation indicator. Utilization indicators indicate how frequently port facilities are used. Percentage of actual resource utilisation versus maximum feasible resource use for a certain time period. Berth occupancy is the ratio of the time a vessel occupies a berth to the total time available during that period.

High berth occupancy (>70%) indicates congestion and thus a reduction in services, whereas low berth occupancy (50%) indicates underutilization of resources.

Year	JNPCT	NSICT	APMT	NSIGT	BMCT
2012-13	64.74	71.37	52.10		
2013-14	61.73	64.66	50.32		
2014-15	61.46	82.60	87.55		
2015-16	86.99	68.03	78.84	21.04	
2016-17	89.50	56.96	75.27	56.20	
2017-18	89.70	53.59	86.33	71.97	
2018-19	71.47	37.70	76.02	75.59	18.95
2019-20	50.67	41.01	76.63	74.75	17.40
2020-21	41.73	46.76	72.25	71.12	28.13

Table14: Berth occupancy in percentage

Source: Compiled by Author

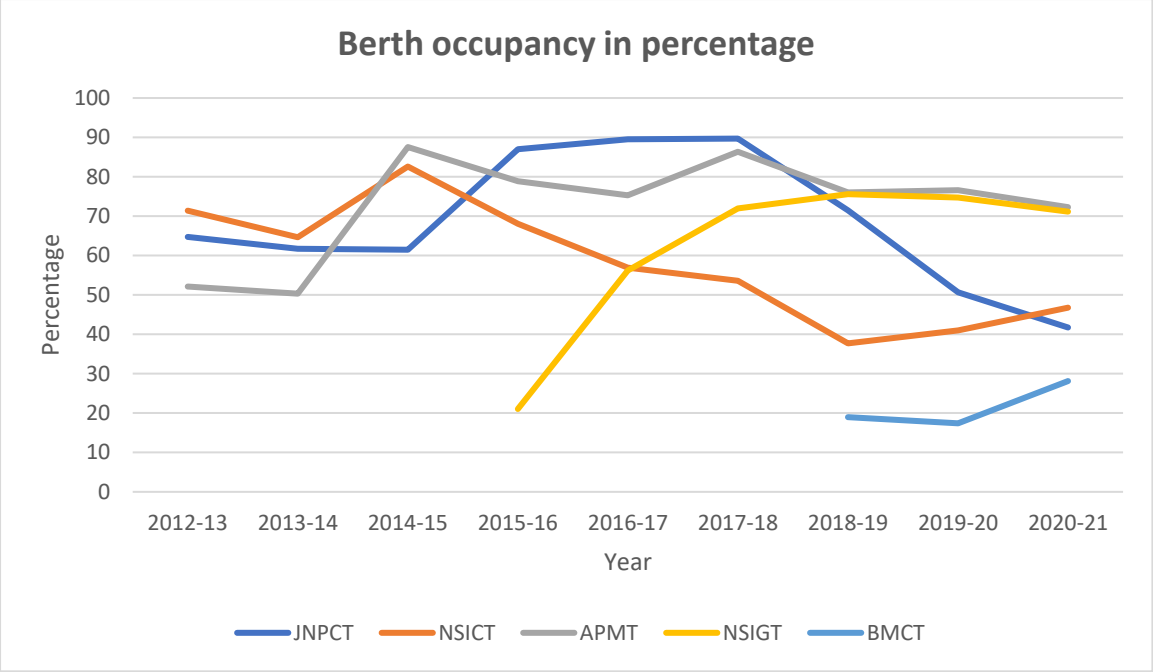

Figure 8: Berth occupancy in percentage

Source: Compiled by Author

Interpretation: Berth occupancy in between 50%-70% is the ideal condition. Berth occupancy below these values shows either congestion or underutilization. In the case of JNPCT, the berth occupancy percentage has declined more than 50% after the year 2018 to 2021. It is also need to be considered that the vessel sizes are increasing year by year, thus they occupy longer time in the berths.

CHAPTER - 5

SUMMARY OF FINDINGS AND CONCLUSION

Findings

- All the container terminals of JNPA are handling container cargo, but there is significant difference in their performance. All the terminals have a gradual growth in terms of number of TEUs handled, while JNPCT showed a continues decline in the past 5 years. It recorded a negative growth of 71.3% in its container cargo comparing to the cargo handled in 2016-17 to 2020-21.
- The average gross berth productivity in terms of average number of container moves per crane per hour is lowest for JNPCT. The other privatised terminals are having a higher berth productivity.
- Crane productivity, the number of equivalent container moves performed by a crane per crane operating hour is lowest of JNPCT. They are having a visible difference with the private terminals. This shows the inefficiency of the terminal.
- The average vessel turnaround time at JNPCT is in a higher position when compared to the other terminals.
- The average output per ship berth day at JNPCT is much lower than the other terminals of JNPA. The lower output per ship berth day indicates the inefficiency of the terminal. The average output per ship berth day has showed a negative growth of 19.35%.
- JNPCT is showing a visible decline in both the number of containers handled in terms of TEUs and the Average Parcel size.
- In terms of berth occupancy percentage parameter, JNPCT is below the ideal condition of 50%-70% occupancy. This shows the inefficiency and underutilization.
- The equipment's and amenities like reefer points, RMQCs, RTGCs, RMGCs which are currently available at JNPCT is comparatively low in number while comparing to the other terminals which are privatised.
- JNPCT is having a container handling capacity of around 2 million TEU but, it works at less than half of its true capacity. This is due to inefficient and outdated equipment.

Conclusion

JNPA, has emerged as the leading port in India after its commission in 1989. JNPA is listed at 39 among the list of world's top 100 ports. JNPA came up as a satellite port of Mumbai port to relieve its congestion. The five container terminals of JNPA have handled a record breaking 5.68 million containers in terms of TEUs in FY 2021-22.

The study conducted here was an investigative study about the JNPA's decision to opt PPP in JNPCT. The study aimed to understand the motive and the circumstances led them to take such a decision and to analyze the existing privatized container terminals and the govt. owned JNPA. The study analyzed the container terminal performance and analysis of the terminals. The comparative analysis has been taken various parameters to analysis the terminals of JNPA with JNPCT. The parameters are No. of containers handled in a year in TEUs, Average gross berth productivity, Crane productivity, Total vessel turnaround time, Output per ship berth day, Average Parcel Size and Berth occupancy. All the studies which have conducted using the above-mentioned parameters has shown an overall negative performance for JNPCT.

The container traffic of JNPCT has declined exponentially in the past 6 years, the ship turn-around time is higher for JNPCT, output per ship berth day is lower, berth occupancy percentage has decreased and all the parameters has been proving the decision taken by the JNPA is being right. So, opting PPP for JNPCT may improve the terminal's performance and bring it back to its glory as of the past days.

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