CHAPTER – V

INDIAN PORTS – EMPHASIS ON CONTAINER HANDLING PORTS

1. INTRODUCTION

The prosperity of all countries depends, to a very large extent, on foreign trade. This is particularly true of developing countries, which need foreign currency to buy capital equipments, materials and technological skills so essential for economic development. At present, over ninety per cent of all international trade moves by sea transport. Seaborne traffic depends on seaports for all its operations, since ports act as *interfaces* between maritime and inland modes of transport (railways, road or inland navigation). The relevance of seaports in the efficient working of an economy cannot be understated since all goods and passengers transported by sea require the use of, at least, two ports. Port always plays a strategic role in the development of domestic and international trade of a country, whether it is a developing or developed country. Ports are one of the primary components of the general transportation sector and are nowadays linked to the expanding world economy. One might say that ports are a means of integration into the global economic system. Thus, in a globalised world where distances are becoming virtually squeezed, ports play an active role in sustaining the economic growth of a country. Also, sea conveyance is the cheapest way of transportation when considered in terms of fuel consumption and investment. It is a well documented fact that when compared to other transportation systems, railway transportation requires double the energy consumption, while road transportation requires ten times as much as sea conveyance. During the past few decades the world has become increasingly environmentally conscious and, with its lower energy consumption, marine transportation is obviously more environmentally friendly than other means.

Ports and port related industries have faced major challenges. Globalisation, containerisation, and technological progress are some of the most significant developments that have formed a new environment. Globalisation is the fundamental

change which has altered the structure of the port industries. Trade liberalisation has also reshaped the port sector in various ways. Firstly, production processes have been progressively delocalised all over the globe increasing the need for transporting raw materials, especially semi-final and final goods, thus boosting the container transport sector in particular and the port sector in general.

Secondly, the ports are increasingly becoming value adders in the production process. A large number of production activities can now take place in the proximity of ports, as they have become value adders in the logistics (World Bank, 1999: module 1, 20).

*After having been at first merely an interface location for cargo and between land and sea transport, next a transport, industrial and commercial service centre, the modern port is a dynamic node in the international production/distribution network (*Juhel, 1999)[1].

Thirdly the competitiveness of a port is strictly interrelated with the location decisions of industrial processes. Finally, trade liberalisation is considered at the basis of the emergence and expansion of global carriers and terminal operators (Juhel, 1999).

Thus, modern and efficient ports are necessary and powerful tools for facilitating and fostering trade and development and more so at a time of globalisation of trade. Nowadays, ports must offer efficient and reliable services to ships and cargo, including communication systems, documentation and customs procedures, to allow the timely flow of goods through the transport chain which has, in fact, become a production chain. Therefore, ports are no longer simply a place for cargo exchange but are a functional element in the dynamic logistics chains through which commodities and goods flow. To assist in this flow, some countries have developed distribution or logistics centres in the port areas which are used for the storage, preparation and transformation of cargo. Port planners are increasingly considering, inside the port areas, adequate spaces for the developments of distriparks and other logistics platforms with the aim of boosting value adding activities. In the modern world of technological era, ports are playing the role of an industry - not just a passive actor in transportation but also in complete supply chain management. That is why, it is said that *Ports are more than piers*, i.e. more than just

infrastructure or a complex infrastructure. Ports not only play as a chain in transportation for interchange, but they function as self-sustaining industry that is linked with domestic and international trade. At some places, they also act as foreign exchange earner not only in form of transhipment or hub port but as part of supply chain management by providing logistics services to the industry.

Trade liberalisation indirectly affects the investment needs of the port. An efficient transport system is also a pre-requisite to attract foreign direct investment. Ports can be a crucial element in developing a competitive advantage for a country and therefore governments and port authorities need to adopt suitable port policies to allow the nation to reap this potential benefit.

1.1 Definition of a Sea Port

The basic objective of a seaport is to provide a fast and safe transit of goods and passengers through its facilities, so that generalized costs for passengers (fare + time) and for shippers (tariffs + storage time) are minimised. Another role that some large seaports play is to serve as *hubs* for connection and transhipment, allowing cargoes on different long-haul routes to be served more efficiently by several ships. The role of a modern seaport can be summarised in the following UNCTAD (United Nations Conference on Trade and Development) definition: "Seaports are interfaces between several modes of transport, and thus they are centres for combined transport. Furthermore, they are multi-functional markets and industrial areas where goods are not only in transit, but they are also sorted, manufactured and distributed. As a matter of fact, seaports are multi-dimensional systems, which must be integrated within logistic chains to fulfil properly their functions. An efficient seaport requires, besides infrastructure, superstructure and equipment, adequate connections to other transport modes, a motivated management, and sufficiently qualified employees."

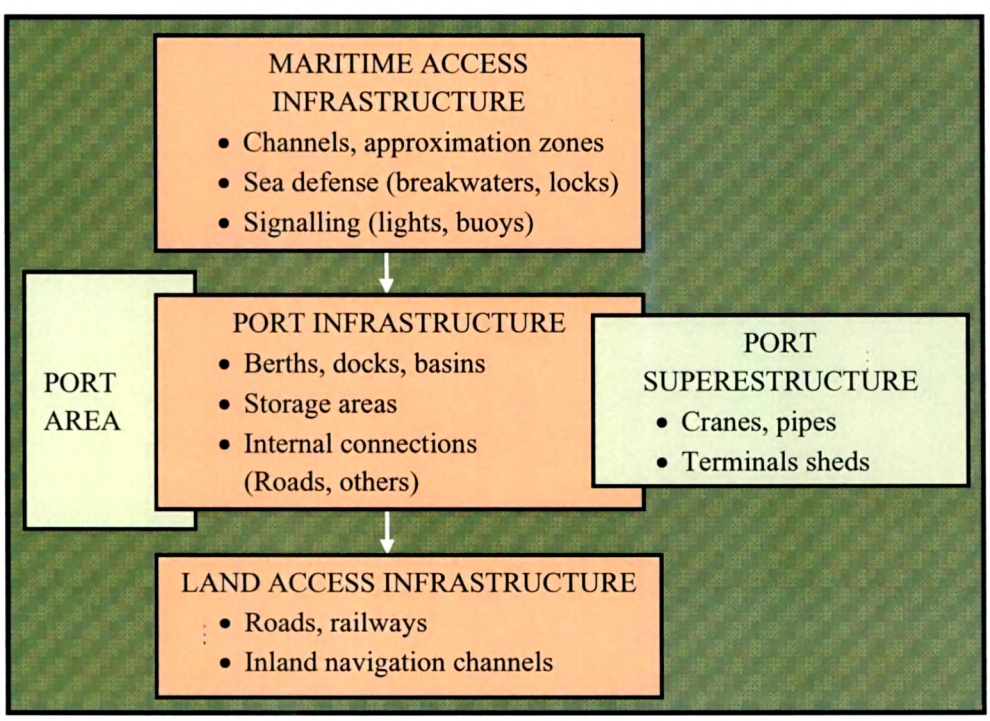
In the above definition, one of the main characteristics of seaports is stressed: a seaport is not merely an organisation that provides a *single* service, but instead, seaports provide multiple activities.

1.2 Economic Analysis of Seaports' Activities[2]

Defined in broad terms, a seaport can be considered a single organisational unit that provides a service to ships. However, when its internal workings are analysed in detail, it is clear that there are *multiple* services being produced and demanded within a port area (services to ships, to cargo, and to passengers). Even for a type of service such as cargo handling, technologies can vary enormously depending on the type of cargo. Seaports offer many different services to ship. Therefore, instead of a single unit, a seaport is considered in economic terms to be a multi-product organisation. A port cannot be enlarged in a continuous manner because its infrastructure - berths, quays, storage areas, etc - is expensive to build and exhibits a problem of indivisibility. Since there are many aspects involved, it is useful to divide seaport activities between:

a) Seaports' Infrastructure

Figure: 5.1. Seaports' Structure



Source: *Adapted from "Privatisation and Regulation of the Seaport Industry" by Lourdes Trujillo and Gustavo Nombela.*

The European Union provides definition of port infrastructure (European Parliament, 1993). First, the *port area* is defined as a complex of berths, docks, and adjacent land where ships and cargoes are served. To reach that area, it is required to have infrastructures related to maritime access (channels, locks, aids to navigation, etc) and to land access (connections to roads, rail network, and inland navigation). Therefore, the area where seaport activities take place encompasses both the infrastructure within the port (berths, quays, docks, storage yards, etc) and the superstructure. Among the elements forming the superstructure, it is possible to distinguish between fixed assets built on the infrastructure (sheds, fuel tanks, office buildings, etc) and fixed and mobile equipment (cranes, van carriers, stackers, straddle carriers, etc). Figure 5.1 shows a scheme of the different types of infrastructures required by a port.

b) Port Services

Besides the provision of basic infrastructure for the transfer of goods and passengers between sea and land, there are multiple services provided by different agents at ports, some of whom may even work outside the port area. These services cover all activities linked to the connection between port users and port, from the moment that a ship approaches a port until it ends all its operations. During this period, there are services provided to the ship, to passengers, to ship's crews and to cargoes (De Rus et al, 1994)[3].

First, there is a group of services related to *berthing*, which include pilotage, towing and tying. All these services can be directly provided by port authorities, or they can be offered by private firms. Pilotage is defined as those operations required for a ship to enter and exit a port safely, and it usually implies the presence in the vessel's bridge (or at least a contact by radio) of an expert with sufficient knowledge of the zone to avoid risks. Pilots can be independent private agents in some ports, licensed by the port authority, while in other cases they are public employees. Towage is the operation of moving a ship using small powerful boats (named tugs) to steer it more easily. Again, it is possible to have private firms providing services for these operations, while in other ports tugs and their operators are directly hired by the port authority.

One of the more important services provided to cargo ships is what is generically labelled as *cargo handling*. This encompasses all activities related to the movement of cargo from/to ships and across port facilities. There are specialised firms that provide all the cargo handling services like stevedoring and loading, using equipment such as cranes and surface transport elements. The process of cargo handling varies according to the type of goods involved. There is a trend toward the specialisation of firms according to the type of cargo, since the equipment required can then be specially designed to be highly cost-efficient. Thus, specialisation leads to the formation of *terminals*, defined as specialised berths where all operations are mainly concentrated on a given type of cargo. Container terminals constitute the best example of this trend, since the handling of containers requires large gantry cranes, and land storage is relatively easy with adequate trucks and lifts, but it is highly space consuming. All these factors make it more convenient for a firm to have a specially designed berth in order to handle containers more efficiently than general cargo berths.

Another type of service demanded by port users are those related to administrative paperwork and permits (sanitary certificates, import/export documents, taxes, etc). These are usually performed by specialised agents or *consignees*, who are hired by shipping companies to arrange in advance the paperwork and all matters related to the use of port facilities by a ship. Even before a ship calls at a port, consignees start working to arrange that all the services required (handling, repairs, supplies, etc) are contracted for the ship and performed in the shortest feasible period.

It is essential for a modern port to have systems to minimize the burden of paperwork for port users so as to avoid large economic losses to shippers on account of inefficiency in administrative procedures. Port's investments in developing electronic data interchange systems (EDI) which speed up administrative paperwork and reducing waiting times for ships and land transport modes (trucks, railways) that deliver goods to/from ports, are being promoted.

Finally, there is a series of other ancillary services like supplies to ships (fuel, water, etc.), services to crew members (medical, etc), and general common services such as cleaning,

refuse collection, safety and the like which are performed by different agents and firms, working within or even outside the port area. Some ports can also offer repair facilities to ships, which may involve the use of some special infrastructures.

In summary, there are many different services offered by a port as shown in Figure: 5.2. The provision of infrastructure and cargo handling are the more relevant services, since efficiency in seaports is dependent on these two services. Other services can be provided by private firms working in more or less competitive conditions.

Figure: 5.2. Port Services

1. Infrastructure provision

2. Berthing services

- Pilotage
- Towing
- Tying

3. Cargo handling

- Stevedoring
- Terminals
- Storage
- Freezing (fish, others)

4. Consignees

- Administrative paperwork for ships and cargo
- Permits (sanitary, customs, etc)
- Service hiring

5. Ancillary services

- Supplies
- Repairs
- Cleaning, refuse collection

Source: *Privatisation and Regulation of the Sea Port Industry by Lourdes Trujillo and Gustavo Nombela.*

c) Coordination Between Seaport's Activities: Port Authorities

There are many different activities being performed simultaneously within the limited space of port areas, with ships constantly entering, being serviced and exiting. Therefore, there is a need for an agent to act as a coordinator to ensure the proper use of common facilities, and to take care of safety and the general design of port facilities. In most seaports, this function is played by an organisation called the *port authority*. These are

generally public institutions, where local interests are represented, but this configuration is not unique, and it is possible to find examples of purely private port authorities. There are several organisational modes for seaports, depending on the role that port authorities assume. These are usually labelled as *landlord port, tool port* and *services port* (Juhel, 1997)[4].

1.3 Types of Ports by Ownership Structure

According to the Port Reform Tool Kit of the World Bank[5], the ports have emerged, on the basis of ownership structure, in four types of model over a period of time. These four types of port structure models and the transformation of port structure in globalised economies are:

a) Public Service Port

Public Service Port has a predominantly public in character. The infrastructure and superstructure are owned by the public authorities – may be central or local government in some countries. Services are provided by the government institutions under the bureaucratic control. The main functions of the ports are cargo-handling services, pilotage and tug services, sometimes agency and forwarding services, operated either by the same company or a separate government owned company. Ports are to be considered as strategic assets of a country and operated by a public authority. Many ports are still managed under this model in many developing countries like India, Sri Lanka etc.

b) Tool Port

Under this model, the Port authority owns, develops and maintains the port infrastructure and superstructure while the cargo handling services are carried by private companies. But the problem in this model is conflicting of interests of the port authority and cargo-handling companies who do not own fixed assets. This model minimizes the risk of the cargo handling company because it has only variable cost with negligible fixed cost. Port Autonomes in France is an example of a container terminal managed and operated as a tool port.

c) Land Lord Port

This model is known as Public Private Partnership (PPP). Under this model the port authority acts as a regulatory body of port operations. The Port authority leases the infrastructure to the port operating companies or industries. The lease to be paid is a fixed amount of money based on time and area to port authority. The private port operating company maintains its own superstructure, including equipments and machinery required to operate the port and terminals. In this model labour is also employed by the private terminal operator. Examples of the landlord port model are Rotterdam, Antwerp and New York. Today most of the medium and large size ports are operated under this model.

d) Private Service Port

These are fully privatised ports. All assets of ports including land, infrastructure, superstructure and services are owned and operated by private companies. They are operated on the commercial basis with the aim to maximise profits. Government only acts as monitoring agency to control the interests of public welfare in this model. Since they are self regulating there is a high risk of converting the land use of port area to non-port activities. This kind of model can be seen in UK and New Zealand. Now in the absence of state aid, this model is getting popular in many developing countries e.g. Pipavav Port, Rewas Port and many others are coming on BOT basis in India. Table: 5.1 explains the ownership and management of port models under private and public responsibilities.

Table: 5.1 Basic Port Management Model

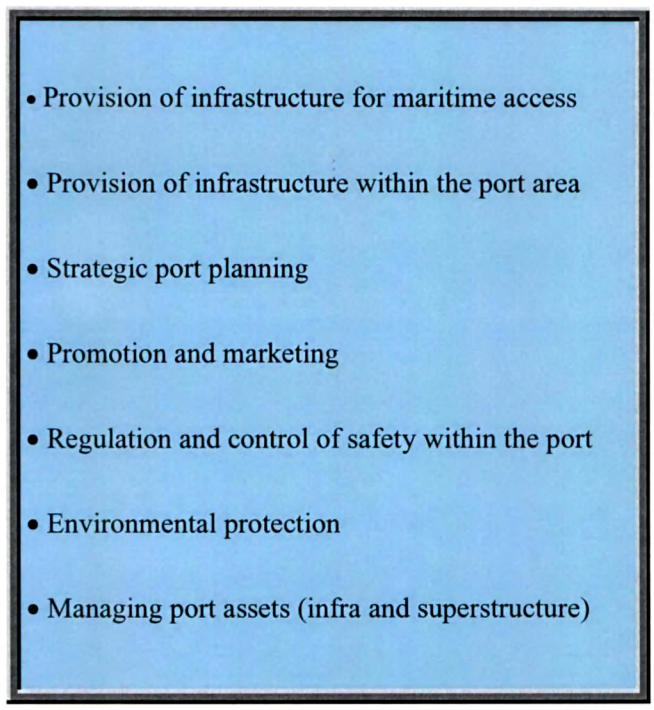
Port Type	Infrastructure	Superstructure	Port Labour	Other Function
Public Service Port	Public	Public	Public	Majority Public
Tool Port	Public	Public	Private	Public/Private
Land Lord Port	Public	Private	Private	Public/Private
Fully Privatised Port	Private	Private	Private	Majority Private

Source: *Port Reform Tool Kit, World Bank. Website: www.worldbank.org*

1.4 Changing Functions of Ports

In principle, the role of port authorities should be exclusively confined to the provision of infrastructure and the coordination of port services.

Figure: 5.3 Traditional functions of port authorities



However, in many countries where there is no regulatory institution for seaports, port authorities perform many other tasks, such as investment planning and financing, or regulation of the tariffs that private operators charge to port users. Figure: 5.3 shows a summary of all activities typically performed in practice by port authorities.

With the increase in competitiveness, globalisation and technological development, the port has changed its role from point of interchange to port industrialisation e.g. port of Rotterdam. Thus, over the period of time the ports undergo changes in its function from traditional services to value added services. The role of value added services in port can be studied from the UNESCAP publication on commercialisation of ports.[6]

The changing functions of port has been explained in Table: 5.2

Table: 5.2 Functions of port

	First Generation	Second Generation	Third Generation	Fourth Generation
Start Period	**Before 1960**	**After 1960**	**After 1980**	**After 2000**
Principal Cargo	Conventional cargo	Conventional and Break-Bulk cargo	Bulk and Unit Cargo; Containerisation	Specialization in specific type of cargo like container handling ports
The Port Development Position and Development Strategy	*Conservative:* junction point of sea and inland transportation	*Expansion:* Transportation and production centre	*Industrial:* Principal international trade based chain connecting transportation	*Itself converting into industry*
Activity Scope	(1) Cargo handling, storage, navigation assistance	(1) + (2) Cargo type change (Distribution processing), ship related industry – enlargement of port region	(1) + (2) + (3) Cargo Information, Cargo Distribution, logistics activity. Formation of terminal and distribution center	(1) + (2) + (3) + (4) Developed as Regional distribution and logistics center e.g. Port of Rotterdam +(5) Consultancy services on port projects e.g. APEC
Structure formation and Specifics	• Everybody acts individually in the port • Port and its users maintain informal relations	• Relation between port and its users became more close • Emergence of slight correction among port activities • Negative Co-operation in relation between port and self governing community	• Formation of port co-operation system • Trade and transportation chain concentration in the port • Relations between port and self governing community more close • Extension of the port structure	• Port corporatiza-tion from port authority • Change from monopoly to oligopoly market structure internally and externally
Character of the productivity	• Invention of Cargo distribution • Individual Supply of the simple services	• Processing Complex cargo services • Increase of the value added	• The flow of cargo and information • Distribution of cargo and information • Combination of diversified services and distribution • Value-Added	• Trade off between Economies of Scale and Economies of Scope
Core factor	Labour/ Capital	Capital	Technical Know-how	Information Sharing

Source: *Based on UNCTAD workport model and UNESCAP commercial development of regional ports as logistics centre.*

From Table: 5.2, it can be deducted that the port functions have changed over the period of time and every port project needs to be evaluated in its own unique setting in the dynamic world.

Containers have allowed large cost reductions in cargo handling, but they have also imposed new needs on ports in terms of equipment (gantry cranes, specialised terminals improved pavements, etc). On the other hand, economies of scale obtained by the transport of large quantities of containers and bulk cargoes have led to the building of increasingly larger specialised ships that require substantial port investments in new infrastructures and equipment. How do the entry of very large container ships and the global concentration in container shipping affect the world ports? Many important container ports in the world seem to have realised that their port development plans should have an in-built capability to accommodate these giant carriers so that they are not left out in a highly competitive port services market. What is the scene with the Indian ports? Against the background provided by the information in the tables and charts above as well as the background provided by the foregoing chapters, we now take a look at the ports in India and where they stand in the global scenario.

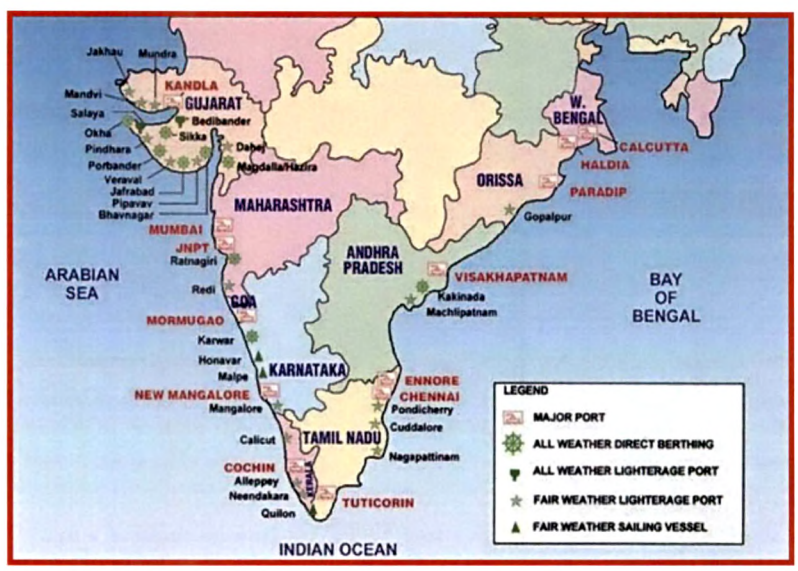
2. INDIAN PORTS

Ports not only play a crucial role in facilitating international trade but also act as fulcrums of economic activity in their surroundings and hinterland. Peninsular India, blessed with a long coastline along with a large natural hinterland is also at a strategic geographical location of being at the crossroads of major shipping lanes, viz. the Middle East, Africa, West Asia and Europe and thus has a natural and favourable advantage to cater to a growing foreign trade.

The country's coastline of 7,517 kms spread over 13 States/UTs studded with 198 ports – 12 major ports and 186 non-major ports on both, the eastern and western shelves of the mainland and also along the islands, are facilitating the traffic. Of the non-major ports, around 60 are handling traffic. The major ports, falling under the purview of the Central government, are **Kandla** (Gujarat), **Mumbai & JNP** (Mumbai), **Marmugao** (Goa), **New Manglore** (Karnataka) and **Cochin** (Kerala) – on the west coast of India and **Tuticorin,**

Chennai & **Ennore** (Tamilnadu), **Visakhapatnam** (Andhra Pradesh), **Paradip** (Orissa) and **Kolkata** including Haldia (West Bengal) – on the east coast of India. The non-major ports, comprising of the intermediate and minor ports, fall under the purview of the respective state governments.

Figure: 5.4 Ports in India



Source: *http://www.mapsofindia.com*

It would help us better understand the situation regarding Indian Ports if we first briefly undertake to know the regulatory framework within which these ports function.

2.1 Regulatory Framework for Indian Ports[7]

The Indian Ports Act 1908 and the Major Ports Trusts Act 1963 are the two major laws governing the Indian ports. The former applies to all ports of India, including the minor and intermediate ports while the latter applies only to the major ports.

- **The Indian Ports Act 1908**

Prior to the enactment of the Indian Ports Act, the Indian port sector was governed by Act XXII of 1855 (for regulation of Ports and Port Dues) and two other subsequent enactments – Indian Ports Act of 1875 and Indian Ports Act of 1889. These enactments

were superseded by The Indian Ports Act 1908, which was enacted along the lines of Harbours Docks and Piers Act 1847, U.K. It governed the administration of all ports in India and covered a wide range of operational and procedural aspects governing the functioning of Indian ports. It clearly delineated the powers and responsibilities of the Central and State governments regarding the port administration.

All Indian ports, both major and non-major, derive their definition and status as a port under the provisions of this Act even now. The role and powers of the State governments regarding the minor and intermediate ports depends crucially on the authority and powers defined under the 1908 Act. Even the Major Ports Trusts Act 1963 derives its continuity and legal sanction from this very Act. The salient features of this Act can be summarised as follows:

1. The basic powers and responsibility of protection and ownership of port lands, sea creeks, estuaries, backwaters, bays, sea locks, rights to development of waterfront development, port entry and navigation channels, protection and preservation of marine environment, etc. rest with executive authority of the Central government.

2. This Act distributes the powers regarding development of various ports and the state rights over collection of port-related dues between the Central and State governments. While the regulatory powers relating to port conservancy functions, enforcement of environmental regulations under Central enactments, FDI in ports, etc. will have to be approved by the Central government, the State governments have the authority to actively promote development of minor and intermediate ports along their demarcated coastline and are empowered to collect various dues from such ports, except for custom-related charges with respect to overseas trade cargo. These last go to the Central government.

3. All residual powers, relating mainly ownership of port land and use of marine coastline are vested with the Central government under the 1908 Act. These powers are of critical importance while framing policy reforms, affecting public-private

sector participation in the port sector – which port assets will continue to be under the ownership of government and which will be privatised.

- **Major Port Trusts Act 1963**

One of the founding Acts of the Major Port Trusts Act 1963 was to define the word "major port", which is currently extended to the twelve major ports of India. This Act, for the first time, laid out the institutional framework for creation of a separate port authority for each major port and defined its powers and functions regarding all aspects of port functioning. The salient features of this Act include:

1. An independent and autonomous board of trustees empowered with considerable financial and administrative authority for port administration and operations.

2. The ownership and control of all port assets and liabilities lie with the various port trusts. It also includes the powers to enter into all contracts regarding various works and services to be provided by the port establishment to port users.

3. The powers and authority of port trusts to raise, borrow or invest resources including budgetary estimations and planning, publication of audit reports and maintenance of reserve funds, have been clearly defined.

Having discussed the basic framework surrounding the working of Indian ports, we now go on the functioning of these ports. India has a rich maritime legacy, dating from ancient times – right from the days of Indus Valley civilisation in fact and is rightly called the cradle of maritime shipping. World's first tidal was also built in India around 2500 B.C. These small nuggets of information make us want to delve into this rich and interesting history of our country.

2.2 Historical Legacy of Indian Ports

Prior to discovery of the Trans-Atlantic and East-West trade routes to America and the Indian-subcontinent, Indian merchants from ancient Indian port cities like Surat, Cochin and Chennai used to sail on their merchant ships across the Bay of Bengal to distant lands

like Java and Sumatra in the Far East and across the Arabian Sea to Persia and East Africa, actively trading in spices, silk and other exotic commodities. Ports of Bharuch, Khambhat and Diu in the Gulf of Kutch and Gulf of Khambhat had been famous as rich and busy centres of maritime trade and commerce in the medieval period. The sea trade was undertaken using locally built ships. India's famed riches inspired many pioneering expeditions by western seafarers, leading to discoveries of America and the East-West trade route. There are references to maritime trade with India even in the Bible, with mentions of King Solomon going for trade with India. Proofs of maritime trade links with the Egyptians as well as the Roman Empire have also been found. Roman writer Pliny speaks of Indian traders carrying away large quantity of gold from Rome, in payment for much sought exports such as precious stones, skins, clothes, spices, sandalwood, perfumes, herbs and indigo.

But, this golden age of India's maritime trade came to an end with India's colonisation. Two hundred years of British rule brought with it both, positive and negative consequences for India's maritime trade. The industrial revolution in Europe brought about far-reaching changes in shipping also. Technological developments like larger ships, replacement of wooden hulls by steel hulls, sail by steam and diesel driven propulsion, etc. resulted in the establishment of modern ports like Mumbai, Kolkatta and Chennai. These ports catered to trade as well as acted as the centres of British administration.

2.3 Post Independence and Pre Liberalisation Period

The post-Independence period was marked by a strong undercurrent of shipping nationalism. It tried to boost the development of ports and encourage the growth of a strong national merchant fleet through policies of cargo support for Indian flagged vessels, cabotage protection for coastal shipping and state canalization of exports and imports through the state-owned agencies like the IOC, STC, MMTC, etc. The rationale behind the government choosing to actively intervene in the development of maritime sector was to meet the expectations of national security and economic well-being, considering India's import dependence on food grains, petroleum and capital goods. It

was also in concomitance with the government policy of undertaking core sector industry development. It was this planned development and active government support which led to a dramatic growth of the port sector in the first four decades of independence. More than two-thirds of the port handling capacity was established during this very period. However, in the later years, the public ports failed to meet the growing efficiency-related demands of the port users. Tardy capacity growth due to paucity of state resources, operational inefficiencies in cargo handling, poor hinterland connectivity, etc were the key bottlenecks in the port sector's growth. These factors resulted into a downslide for the Indian port sector.

Table: 5.3 Port Traffic in the Pre-Liberalisation Period

Year	Traffic (Million Tonnes)	CAGR* (%)
1950-51	20.10	
1959-60	31.50	5.12
1969-70	54.43	6.27
1979-80	77.59	4.02
1989-90	147.58	7.40
1950-1990 (Pre Liberalised Era)	-	**5.11**

*Compound Annual Rate of Growth

Source: *Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India.*

Table: 5.3 shows the growth of port traffic in the first four decades of post-Independence period of India, i.e. from 1950-51 to 1989-1990, the overall Compound Annual Growth Rate of which was 5.11 per cent. Severe congestion at the ports, labour problems, high average turnaround time, high logistics costs etc. plagued the Indian ports during this period and undermined the competitiveness of the Indian exports. This continued unabated till reforms were introduced in the 1990s.

2.4 Post Liberalisation Era

Following reforms introduced in India since 1991-92, the Indian port sector witnessed a revival and is now well on its path of sustained high growth. Acting on the

recommendations of the Rakesh Mohan Committee Report in 1996, the Government of India, in principle, allowed the entry of private sector in the country's infrastructure including ports. The port sector was opened up selectively to private sector participation and investments for the first time in 1996, by the setting up of Nhava Sheva International Container Transhipment Terminal (NSICT) at Jawaharlal Nehru Port, Mumbai. P&O Ports, Australia (which has been subsequently taken over by Dubai Ports ([DP, World]) was awarded the contract. This path-breaking initiative signalled a revolution in India's port sector and left a blazing trail of a consistently high growth trend in national traffic movement, specially the container traffic - the flame of which is burning even brighter now. Another important step undertaken was the introduction of the Port (Laws) Amendment Act 1997 whereby a major amendment to Major Port Trusts Act 1963 was notified in 1997. The amendment brought into being Tariff Authority for Major Ports (TAMP), to independently regulate the fixing of various port-related tariffs to be charged by major ports. The TAMP sought to ensure a level playing field between the upcoming private port developers and the existing major ports.

All the measures taken during the above mentioned period fructified splendidly and the results are there for all to see. The global shipping industry started to notice India, realising its growth and future potential. Not only that, even the local industrialists and entrepreneurs realised the potential of investing in the port sector, with the result that there has been an upsurge on that front. More and more private players are coming into the fray and competing with each other in this sector.

2.4.1 The New Millennium

One of the most important initiatives undertaken by the Indian Government to further encourage the shipping and port sectors was to form a separate ministry and appoint a minister to oversee and implement the various programmes for these sectors. The Ministry of Shipping (holding charge for ports) was formed in the year 2000 through a bifurcation of the erstwhile Ministry of Surface Transport. In the subsequent years, policy measures like a 10-year tax holiday for the development of new ports and 100 per cent FDI under the automatic route for port development projects were announced. A

comprehensive National Maritime Development Policy has been formulated to facilitate private investment, improve service quality and promote competitiveness. These measures, along with the economic reasons like a growing trade and a strong GDP growth, have seen a further surge in activities in the port sector.

A nation's economic progress is gradual and goes through several stages such as pre-industrial to transitional before maturity. The demands of a nation also vary depending on the stage of economic growth. India's economic growth is currently at the transitional stage where the demand for shipping is growing day by day. The Indian ports are emerging as nodal hubs and are gradually integrating into global shipping channels.[8] A sustained rise in the volume of exports with a revival of growth in the manufacturing sector (Chapter III) and improved export competitiveness accompanied by a consistently high GDP growth during the last 5 years has seen traffic at the Indian ports also rise. India handled around 650 million tonnes of cargo traffic in 2006-07. The growth in the total cargo handled at Indian ports has increased at an average annual growth rate of 9.5 per cent from a level of around 241 million tonnes in 1995-96 to around 650 million tonnes (major and non-major ports) by 2006-07. The traffic has shown a tremendous growth in the new millennium and grew at a compound annual growth rate (CAGR) of 8.7 per cent between 2000-01 and 2006-07. The above mentioned facts are depicted in the Table: 5.4.

Table: 5.4 and Chart: 5.1 give the growth trends of total port traffic at the Indian ports, with distribution between major and non-major ports. As seen in the table, traffic at major and non-major ports stood at 463.84 million tonnes and 185.54 million tonnes respectively in 2006-07. The growth of traffic at the former was at an annual average rate of 4.7 per cent and at the latter a whopping 19.3 per cent. The 12 major ports carried about three fourths of the total traffic. The share of the major ports in the total traffic has come down from just under 90 per cent to slightly above 70 per cent, while that of the non–major ports has increased from 11 per cent to 29 per cent in the current year. Inspite of the major ports catering to nearly 75 per cent of the total port traffic of the country they have grown at an average annualised growth rate of 4.7 per cent only. The last 5 years have shown an impressive growth, though. The non-major ports have shown a comparatively higher growth rate of over 19 per cent.

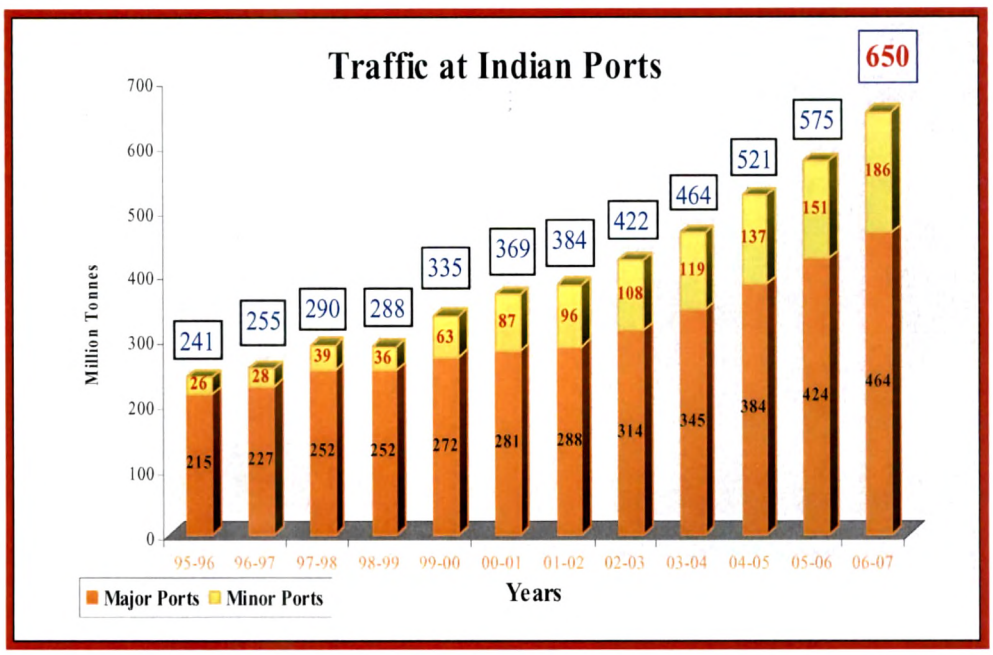
Table: 5.4 Port Traffic in the Post Liberalisation Period

Year	Total Port Traffic		Major Ports			Non-Major Ports		
	Million tonnes	Growth (%)	Million tonnes	Growth (%)	Share (%)	Million tonnes	Growth (%)	Share (%)
1995-96	240.92	9.9	215.21	9.9	89	25.71	15.4	11
1996-97	255.09	5.6	227.26	5.6	89	27.83	8.2	11
1997-98	290.27	10.7	251.66	10.7	87	38.61	38.7	13
1998-99	288.05	0.0	251.74	0.0	87	36.31	-6.0	13
1999-00	335.35	8.0	271.97	8.0	81	63.38	74.6	19
2000-01	368.50	3.4	281.13	3.4	76	87.37	37.9	24
2001-02	383.10	2.3	287.58	2.3	75	95.52	9.3	25
2002-03	421.85	9.0	313.55	9.0	74	108.30	13.4	26
2003-04	463.66	10.0	344.80	10.0	74	118.86	9.8	26
2004-05	520.72	11.3	383.76	11.3	74	136.96	15.2	26
2005-06	574.70	10.4	423.57	10.4	74	151.13	10.3	26
2006-07	649.38	9.5	463.84	9.5	71	185.54	22.8	29
Average Annual Growth Rate (1995-96 to 2006-07)		**9.5**		**4.7**			**19.3**	
CAGR* (Between 2000-01 & 2006-07)		**8.69**		**8.80**			**10.59**	

* Compounded Annual Growth Rate

Source: *Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India.*

Chart: 5.1 Traffic at Indian Ports



A decomposition of the traffic (at major ports) is shown in Table: 5.5. As seen in the table, the major share of the traffic handled consists of POL and its products. This share has been declining constantly through the years and is now 33.3 percent of the total traffic. The growth of POL cargo has been at an average of 5.5 per cent per annum. The share of both, coal and iron ore though showing a cyclical pattern, their average annual growth rates are impressive at 5.7 and 7.4 per cent respectively. The high growth rates of these two commodities reflect an increased industrial and infrastructure activities in the country. Commodities under the heading of others include iron and steel, iron scrap, chemicals, etc. These commodities show an increasing share in the total cargo and also have clocked an impressive average annual growth rate of 9.0 per cent. Fertiliser and fertiliser raw material, though showing the highest growth in the current year, shows a constantly declining share in the total cargo over the years and a low annual average growth as well at 2.1 per cent, reflecting the dismal scenario existing in the agriculture sector of the country. Lastly, the table shows the constantly increasing share of containers in the total traffic at the major ports, with the current year recording nearly 16 per cent share of the total cargo.

Table: 5.5 Decomposition of Cargo: Major Ports

Year	Total Port Traffic		POL		Fert. & FRM		Coal		Iron Ore		Containers		Others	
	'000 tonnes	Growth (%)	Share (%)	Growth (%)	Share (%)	Growth (%)	Share (%)	Growth (%)	Share (%)	Growth (%)	Share (%)	Growth (%)	Share (%)	Growth (%)
1995-96	215208	9.9	42.2	12.6	5.7	12.3	15.7	9.7	16.1	0.6	8.6	15.6	11.7	9.1
1996-97	227257	5.6	43.1	7.6	4.4	-19.6	16.5	11.1	14.6	-3.8	9.1	11.3	12.4	12.0
1997-98	251658	10.7	41.5	6.7	4.9	25.0	16.8	12.7	15.7	19.1	9.3	13.2	11.8	5.5
1998-99	251738	0.0	42.7	3.0	5.0	1.2	17.3	3.1	13.7	-12.8	9.6	3.5	11.7	-1.0
1999-00	271967	8.0	43.5	9.4	5.1	10.3	15.9	-0.9	13.4	5.3	10.2	15.6	12.1	12.5
2000-01	281131	3.4	38.6	-7.9	4.7	-3.7	19.4	26.2	14.4	11.2	11.5	16.1	11.4	-2.8
2001-02	287581	2.3	35.9	-4.7	4.9	4.8	17.8	-6.0	15.9	13.1	13.0	15.2	12.5	12.4
2002-03	313553	9.0	34.9	6.1	4.2	-5.8	16.9	3.5	16.1	10.5	13.9	17.3	13.9	20.7
2003-04	344799	10.0	35.4	11.5	3.4	-10.4	15.9	3.5	17.1	16.4	14.8	16.8	13.4	5.8
2004-05	383755	11.3	32.9	3.5	3.8	23.1	15.8	10.5	19.9	29.5	14.3	7.3	13.3	11.1
2005-06	423567	10.4	33.5	12.4	2.9	-16.0	13.9	-3.1	18.7	3.9	14.6	13.1	16.4	8.2
2006-07	463843	9.5	33.3	8.6	3.0	15.7	13.0	2.5	17.4	1.8	15.8	18.55	17.5	16.9
Avg. Ann. Growth Rate		**7.4**		**5.5**		**2.1**		**5.7**		**7.4**		**12.6**		**9.0**

Source: *Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India.*

The container traffic has been growing at a rate of 12.6 per cent per annum – the highest among all the major commodity groups being loaded and unloaded at the major ports. As seen in chapter IV, the average annualised growth of total containerised cargo in India (with the share of minor ports of Mundra and Pipavav in containerised cargo also being taken into consideration) stands at 12.4 per cent for the period 1995-96 to 2006-07.

Chart: 5.2 Decomposition of Cargo - Major Ports: 2006-07

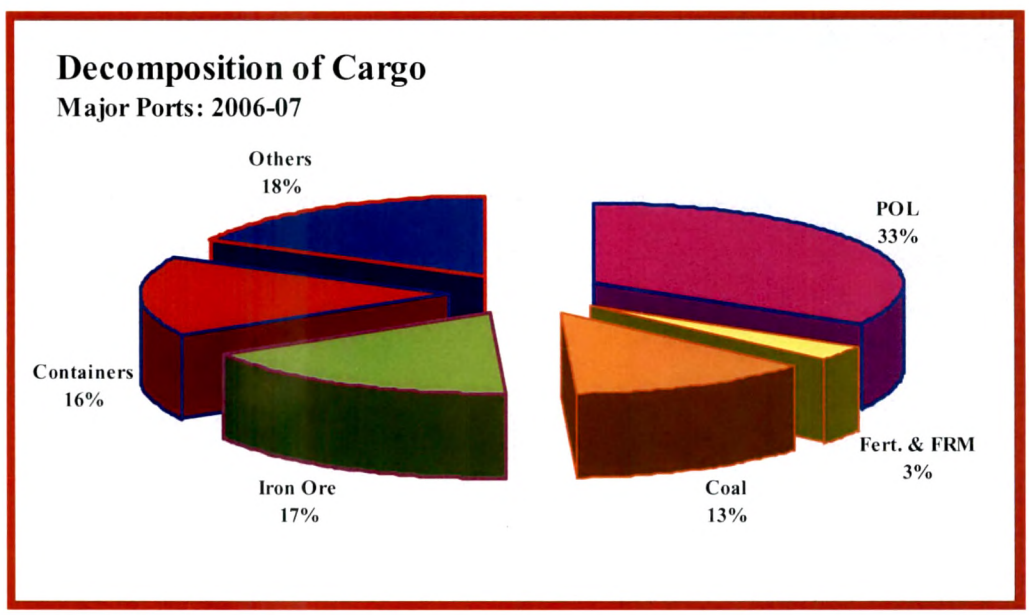


Chart: 5.2 shows the composition of cargo handled by the major ports during the year 2006-07. Petroleum, oil and lubricants (POL) commands the highest share at 33 per cent, followed by iron ore at 17 percent and coal at 13 per cent. Containers stand at 16 per cent of the total cargo handled during the year. Fertilisers and fertiliser raw material (FRM) had a share only 3 per cent in the total cargo. The other commodities commanded an 18 per cent share.

Port-wise traffic analysis for the major ports has come up with Visakhapatnam as the top traffic handler even for the current fiscal 2006-07. In each of the last six years Visakhapatnam has maintained this lead amongst the major ports in the country. The ranking of the major ports for 2006-07 is shown in the Table: 5.6 below. As can be seen, there is very little lead among the ports between the ranks 2nd to 4th. In terms of growth, it

is Mumbai port, followed neck to neck by JNP, which have registered the highest growth during the current fiscal.

Table: 5.6 Traffic at Major Ports: 2006-07

Ranking	Port	Million Tonnes		
		Total	% of Total	% Growth
1	Visakhapatnam	56.39	12.2	1.05
2	Chennai	53.41	11.5	13.05
3	Kandla	52.98	11.4	15.41
4	Mumbai	52.36	11.3	18.50
5	JNP	44.82	9.7	18.45
6	Haldia	42.45	9.2	0.28
7	Paradip	38.52	8.3	16.33
8	Mormugao	34.24	7.4	8.06
9	New Mangalore	32.04	6.9	-6.99
10	Tuticorin	18.0	3.9	5.03
11	Cochin	15.31	3.3	10.28
12	Kolkatta	12.60	2.7	16.56
13	Ennore	10.71	2.3	16.86
	Total	**463.84**	100.0	**9.5**

Source: *www.shipping.nic.in*

If we take into consideration even the non-major ports for the ranking purpose, then it is Sikka, a non-major port of Gujarat, which ranks first in the country at 60.25 million tonnes of cargo handled during 2006-07.

Considering only the container traffic, we find that more than half of the total traffic is being handled by JNP, with Chennai a distant second. Table: 5.7 shows the container traffic handled at the Indian ports (including Mundra and Pipavav) in 2006-07. Nearly 60 million TEUs were handled by the ports in the country during the afore-mentioned period.

Table: 5.7 Port-wise Container Traffic (2006-07)

Rank	Port	000 TEUs	
		Total	% of Total
1	JNPT	3298	55.3
2	Chennai	798	13.4
3	Mundra	393	6.6
4	Tuticorin	377	6.3
5	Kolkata	240	4.0
6	Cochin	227	3.8
7	Kandla	177	3.0
8	Pipavav	135	2.3
9	Mumbai	128	2.1
10	Haldia	110	1.8
11	Visakhapatnam	50	0.8
12	New Mangalore	17	0.3
13	Mormugao	12	0.2
14	Paradip	2	0.0
	Total	5964	100.0

Source: *Indian Ports Association; the port web-site in case of Mundra and Pipavav*

If we further analyse the container traffic, in terms of that handled only by the major ports (Table: 5.8), in terms of both tonnes and TEUs, then it can be seen that the country handled 73.48 million tonnes and 5.44 million TEUs.

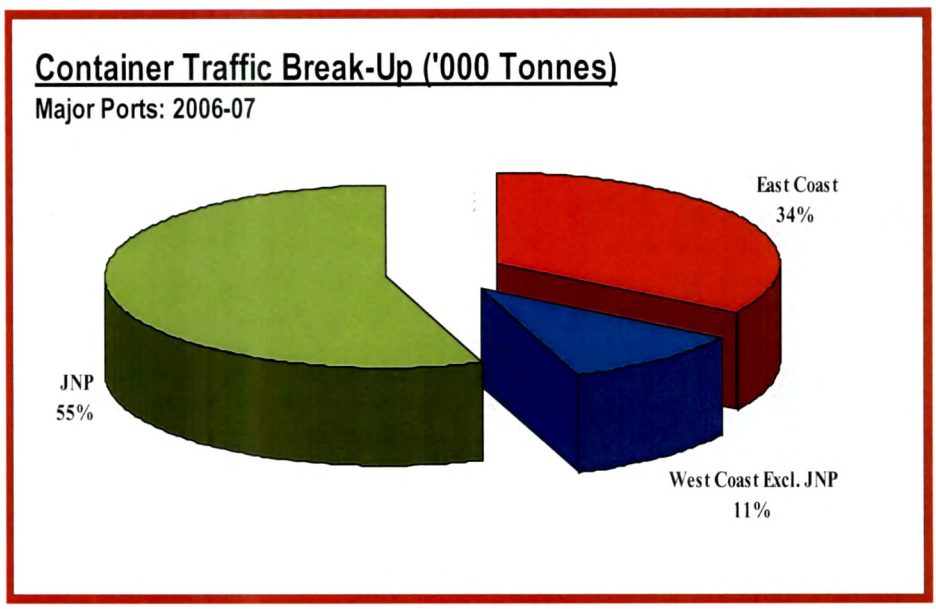
We find that it has been a skewed growth with most traffic concentrated on the western coast of India with 34 per cent of remaining on the eastern coast. India's West Coast ports handled 66 per cent of traffic in 2006-07. This share, though, has come down from 73 per cent in 1995-96. This concentration of cargo on the western coast owes itself to the traffic handled by Jawaharlal Nehru Port (JNP), Mumbai, which alone handled over 55 percent of the total container cargo at the major ports. JNP and Chennai Port together handled around a whopping 89 per cent of the total container cargo. Chart: 5.3 shows the broad break-up of the container traffic handled by the major ports in 2006-07 in terms of thousand tonnes.

Table: 5.8 Container Traffic Breakup: Major Ports

Year	Total All India		West Coast Traffic				JNPT Traffic			
	'000 Tonnes	'000 TEUs	'000 Tonnes	% Share	'000 TEUs	% Share	'000 Tonnes	% Share	'000 TEUs	% Share
1995-96	18503	1449	13477	72.8	1020	70.4	4070	22.0	339	23.4
1996-97	20598	1698	14898	72.3	1198	70.6	5078	24.7	423	24.9
1997-98	23307	1892	16540	71.0	1314	69.5	6050	26.0	504	26.6
1998-99	24116	1932	17390	72.1	1374	71.1	8029	33.3	669	34.6
99-2000	27867	2185	19445	69.8	1577	72.2	10680	38.3	889	40.7
2000-01	32343	2470	21682	67.0	1752	70.9	14278	44.1	1190	48.2
2001-02	37252	2884	25934	69.6	2113	73.3	18484	49.6	1573	54.5
2002-03	43694	3366	30497	69.8	2481	73.7	22864	52.3	1930	57.3
2003-04	51035	3900	35361	69.3	2823	72.4	27785	54.4	2269	58.2
2004-05	54791	4233	36670	66.9	2975	70.3	28747	52.5	2371	56.0
2005-06	61980	4613	40838	66.1	3193	69.2	33777	54.5	2667	57.8
2006-07	73476	5437	48567	66.1	3859	71.0	40812	55.5	3298	60.7

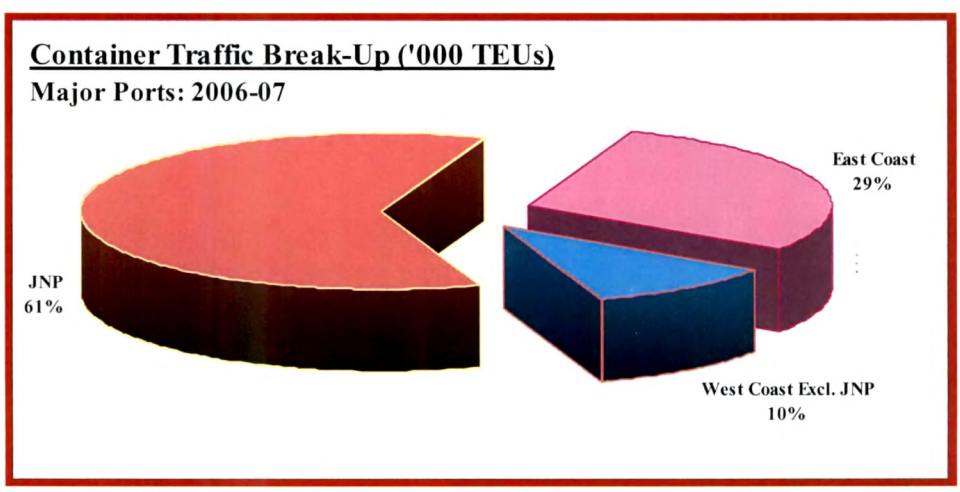
Source: *Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India. www.shipping.gov.in.*

Chart: 5.3 Container Traffic Break-Up ('000 Tonnes) – Major Ports: 2006-07



In terms of TEUs also, we find the same scene as above being repeated, with the only difference being in respective shares. In terms of TEUs, the western coast accounts for a 71 per cent share, with JNPT alone accounting for nearly 61 per cent of the total TEUs handled in the country. The east coast ports handled the remaining 29 per cent of the total TEUs. This is shown in chart:5.4 below.

Chart: 5.4 Container Traffic Break-Up ('000 TEUs) – Major Ports: 2006-07



Although amongst the Indian ports, Jawaharlal Nehru Port (JNP) is by far the largest, handling nearly 61 per cent (in TEUs) of the container traffic at the major Indian ports, it ranked 28th amongst world's top 100 container terminals during 2006[9], handling 3.08 million TEUs, which is roughly just 7 to 8 per cent of the traffic handled by Singapore port. The Table: 5.9 below provide the number of containers processed at 5 busiest container ports in the world in the year 2006. In contrast, JNP, India's largest container port, handled around just 3.03 million TEU in 2006.

Table: 5.9 Container Traffic in Indian vs. World Ports

No.	000 TEUs			
	Top Five Indian Container Ports		Top Five World Container Ports	
	Ports	2006-07	Ports	2006
1	JNPT	3298	Singapore	24792
2	Chennai	798	Hong Kong	23539
3	Tuticorin	377	Shanghai	21710
4	Kolkata/Haldia	350	Shenzhen	18468
5	Cochin	227	Busan	12030
	Total of Above	**5050**	**Total of Above**	**100539**

Source: *Indian Ports Association*

The growth in container traffic in India is largely attributed to the proliferation of manufacturing centres in India, which is fast emerging as a manufacturing hub, next only to China. "Strong economic growth in India backed by rising imports and exports is an important driving factor for the growth of cargo transportation," says Frost & Sullivan Research Analyst Aarthi Nandakumar. As seen in chapter III, India's merchandise exports have almost doubled in just three years to Rs. 571.6 crores in fiscal 2006-07. The economy is much more export-oriented. India's export mix is also moving up the value chain to include increasing volumes of higher-value products that need containerisation – export mix changing with higher value goods (High-Tech, Pharmaceuticals, Engineering & Auto Components) growing at a faster pace than resource & agricultural products. The main containerized cargoes are garments, electronic goods, agro products, cotton yarn,

machinery/parts, granite products, coir products, leather products and jute products. Post Multi Fibre Agreement (MFA) has rejuvenated India's textile sector, which is expected to grow over 25 per cent in the next five years. That, in turn, will increase containerisation in India.

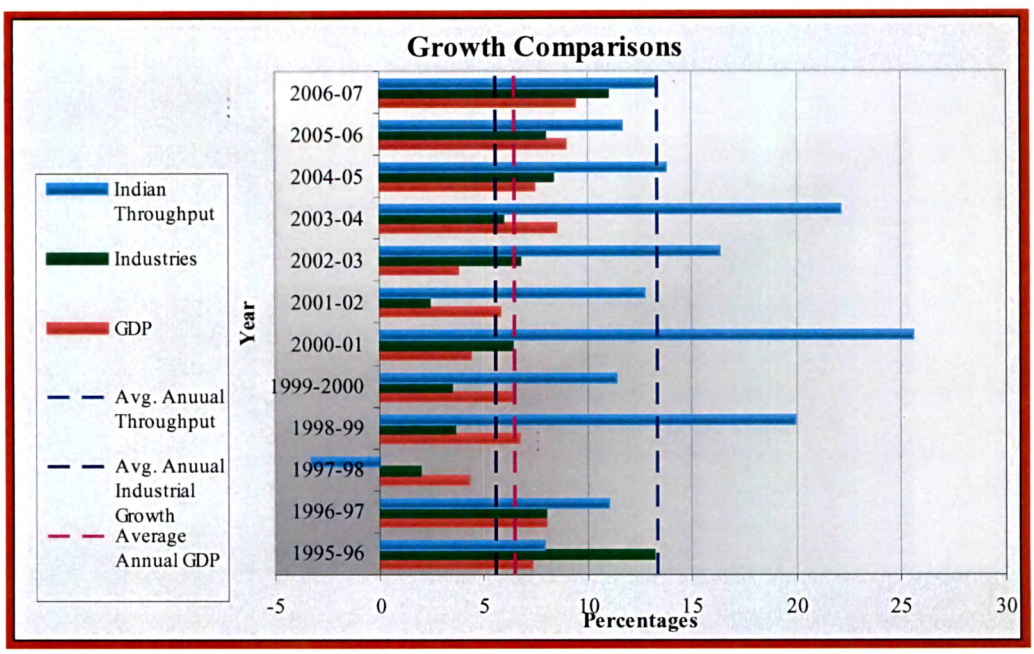
If we compare the annual growth rates of Indian GDP, industries and throughput, we find that Indian GDP grew by an average of 6.5 per cent and industry grew by 5.6 per cent in the past twelve years while containerisation logged a growth of 13.3 per cent. This is shown in Table: 5.10 and Chart: 5.5. Thus, the growth rate of container traffic is outstripping the national GDP growth rate. In short, during the last twelve years, for every one per cent growth in national output, containerisation has grown by 2-2.5 per cent. With 2 to 2.5 times the relationship with GDP growth, the container trade volumes will continue to grow exponentially. This growth will arise both due to increase in the volumes of the currently containerised commodities and containerisation of newer commodities.

Table: 5.10 Comparison of Growth Rates

Year	Annual Percentages		
	GDP	Industries	Indian Throughput
1995-96	7.3	13.2	7.9
1996-97	8.0	8.0	11.0
1997-98	4.3	2.0	-3.3
1998-99	6.7	3.6	19.9
1999-2000	6.4	3.5	11.4
2000-01	4.4	6.4	25.6
2001-02	5.8	2.4	12.7
2002-03	3.8	6.8	16.3
2003-04	8.5	6.0	22.1
2004-05	7.5	8.4	13.8
2005-06	9.0	8.0	11.7
2006-07	9.4	11.0	13.3
Avg. Annual Growth Rate (1995- 96 to 2006-07)	**6.5**	**5.6**	**13.3**

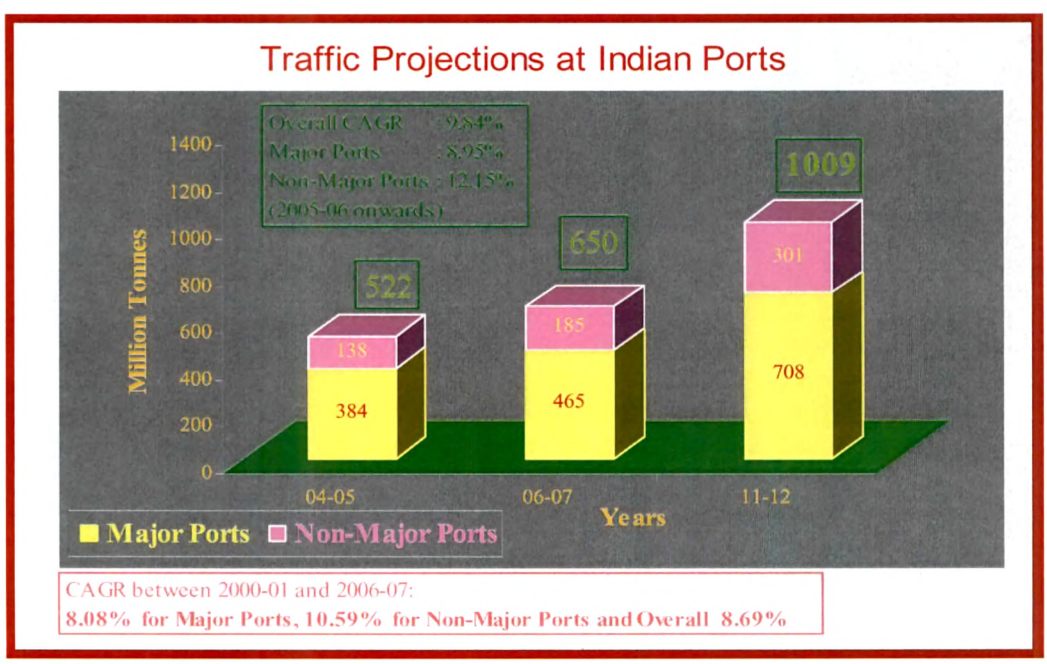
Source: *Annual Report, RBI; various issues and Review of Maritime Transport, UNCTAD.*

Chart: 5.5 Growth Comparisons of the Indian GDP, Industries and Throughput



2.5 Traffic Projections

Chart: 5.6 Traffic Projections at Indian Ports



Based on detailed analysis of the traffic projections for various cargoes, the Working Group for Ports for the Eleventh Five Year Plan has projected the commodity-wise traffic as shown in the Table: 5.15 under, commodity-wise traffic projections as shown in table: 5.11 predict POL to register a growth of 8.71 per cent from 2006-07 onwards to reach 378.5 million tonnes (it would still be accounting for the highest share in the total cargo), iron ore at 7.01 per cent, coal at 13.11 per cent, containers at 15.48 per cent and other cargo at 12.98 per cent. Thus, container traffic is set to register the highest growth among all commodity groups.

Table: 5.11 All Ports Traffic Projections: 2011-12

Commodity	Traffic (million tonnes)	Projected Growth	Major Ports' Share	
		%	(million tonnes)	%
POL	378.45	8.71	215.33	56.9
Coal	138.94	13.11	109.00	85.0
Iron Ore	128.04	7.01	98.6	78.5
Containers - Tonnage	169.93	15.48	144.42	8.50
Containers - million TEUs	14.23		12.04	
Others*	193.59	12.98	140.74	72.7
Total	1008.95		708.09	70

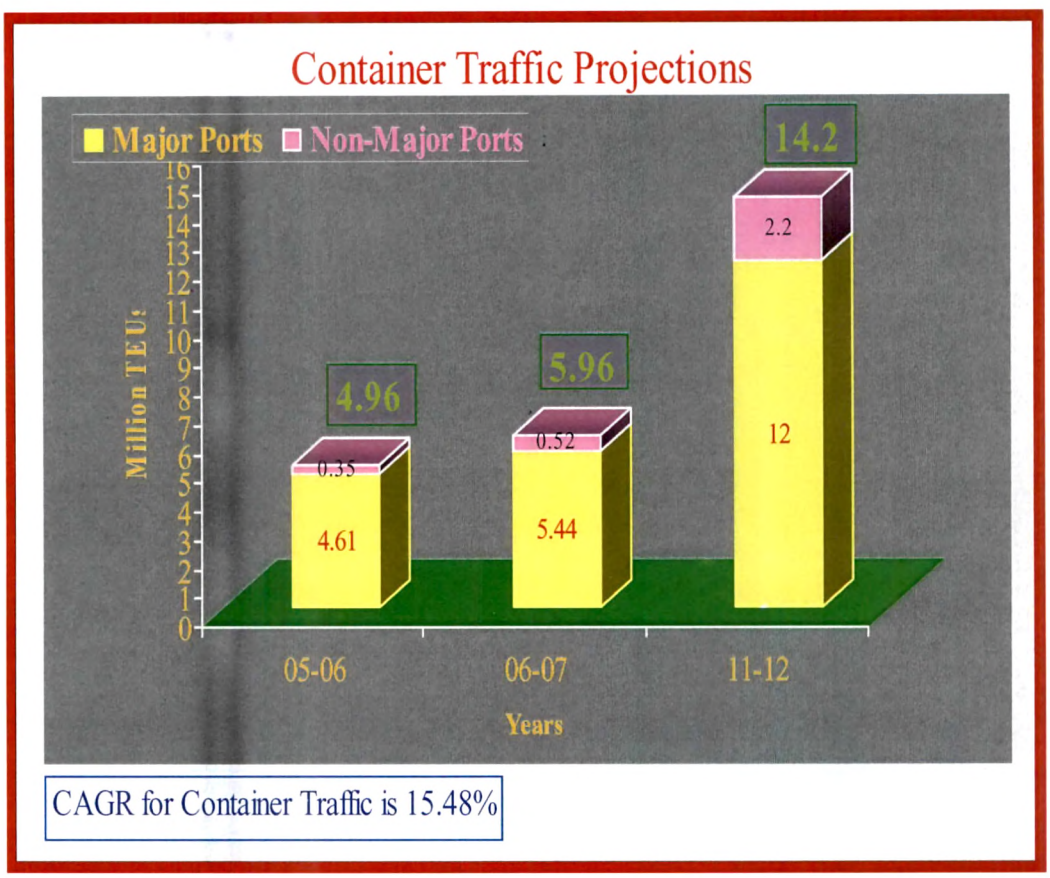
* Includes Iron and Steel, Fertilisers and FRM, other liquids, food grains, Alumina, etc.

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

According to the Working Group, overall cargo at all ports is projected to grow at a compound annual growth rate (CAGR) of 9.84 per cent between 2007-08 and 2011-12 and would be around 1009 million tonnes, of which the major ports would account for around 708 million tonnes – 70 per cent of the total cargo. The shares of cargo at major and non-major ports in the total cargo are assumed to remain the same as that in the present, 70 and 30 per cent respectively. Traffic at major ports is likely to increase at the rate of 8.95 per cent whereas that at non-major ports will be at the rate of 12.15 per cent – around 301 million tonnes. These details are depicted in chart: 5.6. The above projections are based on a CAGR of 9.84 per cent for all ports, 8.95 per cent for major ports and 12.15 per cent for non-major ports, between 2005-06 and 2011-12.

With the Indian economy booming and with no signs of China's growth abating, huge movement of containers is being foreseen in South Asia. In India too, the share of containerised cargo in general cargo has been increasing. The level of containerisation for purely break-bulk cargo handled at major ports has been over 70 per cent during the 10th Plan period. But when, besides purely break-bulk cargo, other cargoes like machinery, salt, sugar, iron and steel material, etc. are also taken into consideration, the level of containerisation at major ports works out to be 64 per cent during the plan period – the percentage level remaining more or less static during the whole plan period. A substantial portion of low volume commodities like electrical and electronic goods, consumer goods, machinery and machine parts, automobile components, iron and steel scrap, food grains, newsprint, handicrafts, processed food products, etc. is still open to containerisation. This should bring about an increase in the penetration of containerisation in the country and result in increased container cargoes. The National Maritime Development Programme of the Centre assumes the level of containerisation to grow at the rate of 2 per cent per annum and stabilise at 75 per cent of the projected general cargo from the present 64 per cent.[10] As per the Working Group Report, India's container throughput will grow at a compounded annual growth rate (CAGR) of 15.48 per cent to more than double at 14.23 million TEUs by 2011-12 from the 6.0 million TEUs in 2006-07. As seen from the chart: 5.7, of the total 14.23 million TEUs, major ports are expected to account for a 85 per cent share with 12.04 million TEUs, with the rest being handled by the non-major ports.

Chart: 5. 7 Container Traffic Projections



Extrapolation of the growth trend leads to estimates of over 20 million TEUs by 2015-16 and even less time if India achieves the international benchmark of 75 to 80 per cent penetration.

Does India have enough capacity to handle the projected traffic? The container traffic in India is growing at a faster pace than the growth in the world container movement. There is already a strain on the country's major ports. Jawaharlal Nehru Port, the country's biggest, is overstretched. With the Indian ports having difficulty meeting demand for containerised cargo, there is constant pressure even under normal operating conditions and there is an immediate need for additional facilities. The Planning Commission had projected container throughput for 2007-08 at 5.5 million TEUs. This figure has been over-reached in 2006-07 itself by over 0.4 million TEUs, as seen in Table: 5.12.

Table: 5.12 Container Traffic during 10th Plan

Year	'000 TEUs						
	As per 10th Plan			Actual			Difference
	Major Ports	Other Ports	Total	Major Ports	Other Ports	Total	
2002-03	3338	0	3338	3366	0	3366	+28
2003-04	3675	167	3842	3900	70	3970	+128
2004-05	4075	292	4367	4233	280	4513	+146
2005-06	4517	333	4850	4613	350	4963	+113
2006-07	5092	417	5509	5437	527	5964	+437

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

The concentration and constant increase of cargo is putting a tremendous pressure on the available resources at the major ports, resulting into oft-repeated congestions, which in turn are translating into huge foreign exchange losses. The question is not whether there will be enough cargo, but whether there will be enough infrastructures to handle the country's cargo.

2.6 Port Capacity

According to Oxford dictionary the word capacity is derived from Latin word – *Capacious* which is derived from *Capio* and it means "take" or "hold". It means the maximum amount that something can hold or produce. **Capacity** as defined in the economics dictionary by Donald Rutherford[11], "It is the maximum output that a firm (in this case it can be a port) or an economy can produce from its existing supply of factor of production. Thus, to increase its capacity, a firm must enlarge its labour stock or its capital stock". While "*capacity utilisation* is the ratio of the actual output of a firm,

industry or national economy to its maximum output at a point in time. This ratio will fluctuate cyclically and high degree of utilization will be a signal of more net investment".

An earlier **UNCTAD** publication gives the following definition of port capacity (1969)[12]: "Port capacity is the application of a port to assure the throughput of a certain quantity of goods (cargoes) during a given period". In later UNCTAD publications, some variation is introduced and G. Monie states in his study on the "Determination of port capacity", Lagos, 17 November 1980: "In principle the capacity of a port is the suggested capacity of various homogenous port zones. Port capacity can only be determined based on a set of parameters which describe a clear situation and thus it becomes obvious that port capacity is not a constant value but one that will alter with the changing port operating conditions. In short the capacity of a port (or given set of port facilities) is a variable value which tends to fluctuate in relation to the type, volume and timing of the demand service"[13].

The National Ports Council of Great Britain[14] has defined the port capacity as "The annual throughput capacity was defined as the maximum throughput of cargo which the operator believes can be achieved on a continuing basis without incurring several delays and disruptions".

2.6.1 Capacity at Indian Ports

Traffic at the Indian ports has been growing at a very fast rate since the beginning of the millennium – at a CAGR of 8.7 per cent annually. It is further projected to grow at a CAGR of 9.8 per cent. This recent high growth and future projections have raised concerns about whether the Indian ports would be in a position to handle this growth in traffic. In this context, we now study the both, the traffic and capacity together, at the Indian ports

2.6.1.1 Major Ports

If we analyse the traffic and capacity at major ports (Table: 5.13 and Chart 5.8 (i)), we can see that the concerns regarding the ability of Indian ports to handle increasing cargo are legitimate. The capacity utilisation at the major ports has been extremely high - as high as 97 per cent. In the recent fiscal 2006-07, it was 91 per cent.

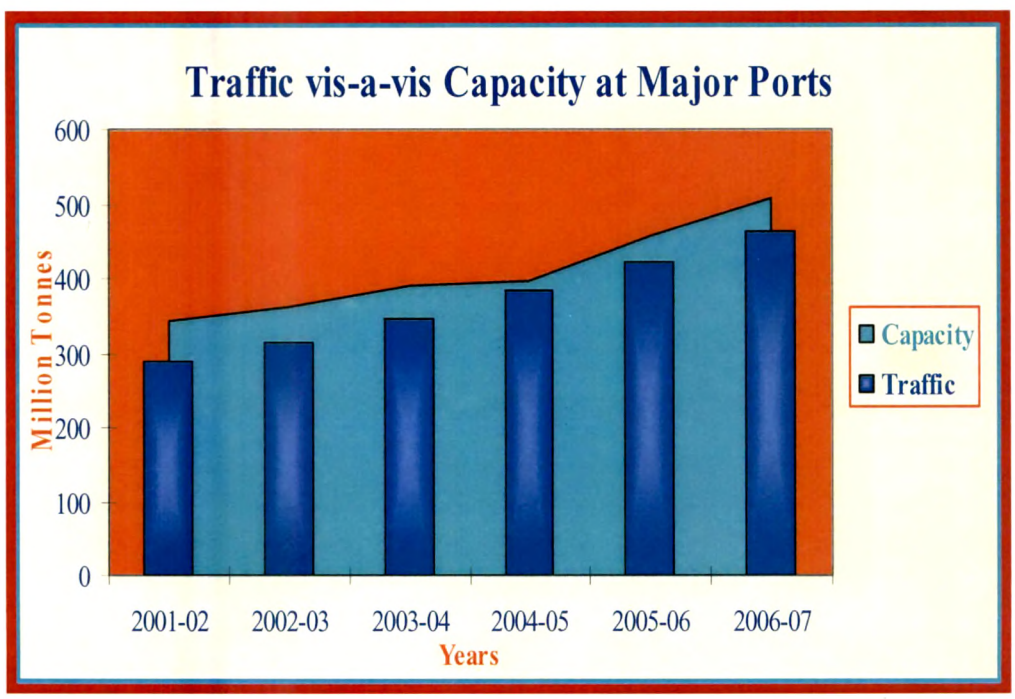
Table: 5.13 Traffic and Capacity at Major Ports

Year	Traffic (Million Tonnes)	Growth (%)	Capacity (Million Tonnes)	Growth (%)	Utilisation (%)
2001-02	287.59	-	343.95	-	84
2002-03	313.55	9.03	362.75	5.47	86
2003-04	344.8	9.97	389.5	7.37	89
2004-05	383.75	11.30	397.5	2.05	97
2005-06	423.57	10.38	456.2	14.77	93
2006-07	463.84	9.51	508.6	11.49	91

Source: *(1) Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

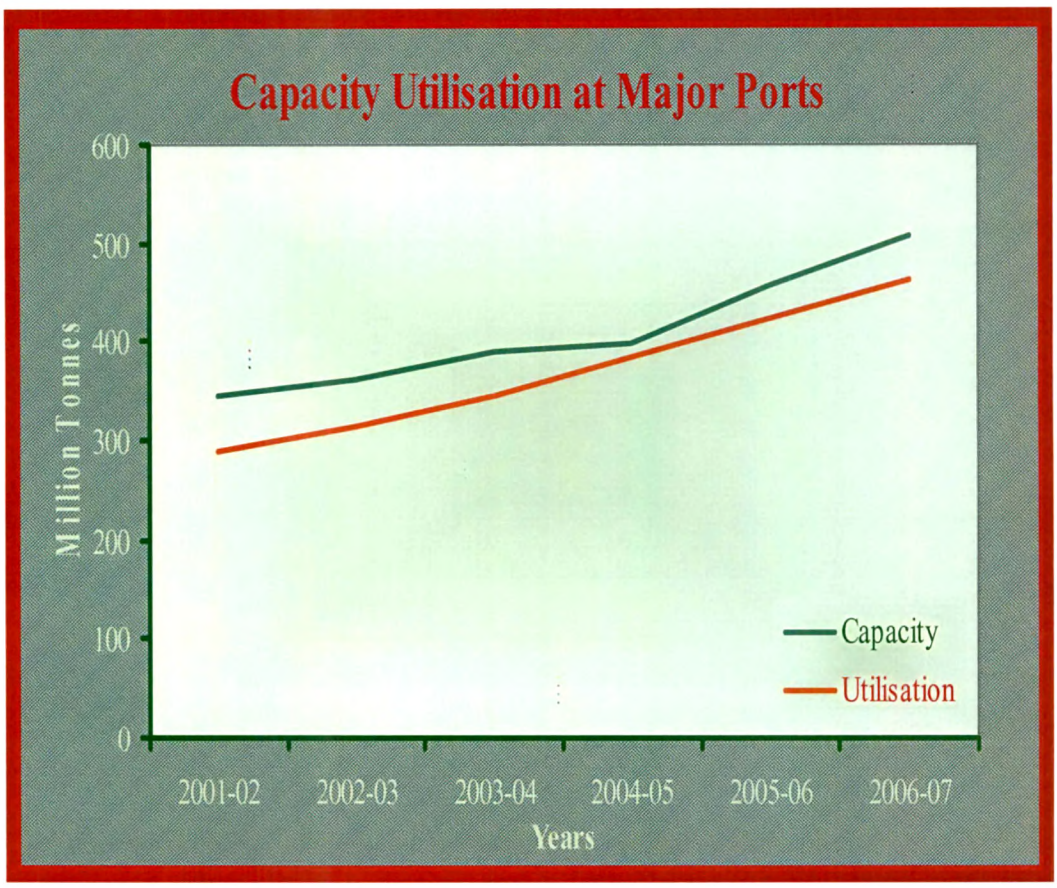
(2) Basic Port Statistics of India , Transport Research Wing, Ministry of Shipping, Road Transport and Highways, Government of India.

Chart: 5.8 (i) Traffic vis-à-vis Capacity at Major Ports



Capacities at the major ports are marginally ahead of demand, as can be seen from Chart: 5.8 (ii). The average capacity utilisation of the major ports is around 92 per cent.

Chart: 5.8 (ii) Capacity Utilisation at Major Ports



Analysing the capacity at the Indian ports commodity-wise in table: 5.14, we find that the current capacity at the major ports of 508.6 million tonnes comprises of 84.90 million tonnes (6.54 million TEUs) for containers, 189.25 million tonnes for petroleum, oil and lubricants (POL), 55.8 million tonnes for iron ore, 46.25 million tonnes for coal and 124.8 MT for other cargo. Comparing the capacity vis-à-vis the traffic at the major ports shows that the capacity utilisation was over 100 per cent in case of iron ore and coal and over 80 per cent for POL and containers. For other general cargo, it was over 70 per cent. The total capacity utilisation at major ports was 91 per cent. The above mentioned details are depicted in Table: 5.14.

Table: 5.14 Commodity-wise Traffic and Capacity at Major Ports, 2006-07

Commodity	Traffic (Million Tonnes)	Capacity		Capacity Utilisation (%)
		Million Tonnes Per Annum	No. of Berths	
POL	154.35	189.25	46*	82
Iron Ore	80.56	55.80	6@	144
Coal	60.22	46.25	8	130
Containers	73.48	84.90	26	87
Other	95.24	132.40	155$	72
Total	**463.84**	**508.60**	**241**	**91**

*Includes 3 Single Buoy Mooring + 2 Barge Jetties; @ + Transhipper; $ + Small vessels handled at Zone B, Tuticorin.

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

The cargo handling capacity is estimated to be to the tune of 508.60 million tonnes as on 31st March, 2007. Keeping in view the projected traffic and the need to provide for buffer capacity to meet the surge in requirements, as also the possibility of bunching of traffic, the capacity addition proposed to be undertaken during the period 2007-12 is to the tune of 485.44 million tonnes, taking the total capacity at the major ports to 1001.80 million tonnes by the end of the afore-said period. An analysis of commodity-wise traffic projections and capacity additions at major ports during 2007-2012 shows the estimated capacity of major ports to be 1001.80 million tonnes as against the projected traffic of 708.09 million tonnes. The Table: 5.15 below shows the commodity-wise existing traffic at major ports, traffic projections by 2012, the capacity addition during the period 2007-2012 and the estimated capacity by 2012.

Table: 5.15 Traffic Projections and Capacity Addition at Major Ports: 2011-12

Commodity	Existing Capacity (MTPA)	Traffic projections (million tonnes)	Capacity Addition during 2007-2012 (MTPA)	Total capacity by 2011-12 (MTPA)
POL	189.25	215.33	104.78	294.03
Iron Ore	55.80	98.60	65.70	121.50
Coal	46.25	109.00	69.08	115.33
Containers	84.90	144.42	138.64	223.54
Others	132.40	140.74	115.00	247.40
Total	**508.40**	**708.09**	**493.20**	**1001.80**

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

2.6.1.2 Non - major Ports

The traffic at non-major ports for the period 2006-07 was recorded at 185 million tonnes as against an overall capacity at a level of 228.31 million tonnes as of 31st March 2007. The commodity-wise traffic projections at non-major ports, as can be seen from the table: 5.16, show the total traffic to be reaching 300.86 million tonnes during the period 2007-12.

According to the Working Group Report, the estimated capacity addition during the period 2007-12 is expected to be to the tune of 345.19 million tonnes, which would take the overall capacity at the non-major ports to a total of 573.50 million tonnes.

Table: 5.16 Commodity-wise Traffic Projections for Non-Major Ports: 2011-12

Commodity	Million Tonnes
	Projected Traffic
POL	163.12
Iron Ore	29.44
Coal	29.94
Containers	25.51 (2.19 million TEUs)
Other	52.85
Total	**300.86**

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

The overall picture that emerges regarding the total capacity addition at the ports in the country and the total capacity at the end of the period 2007-12 can be summarised as in the table: 5.17.

Table: 5.17 Traffic Projections and Capacity Addition

	Million Tonnes			
	Present Capacity (As of March 2007)	**Traffic Projections (2007-12)**	**Expected Additional Capacity (2007-12)**	**Capacity by March 2012**
Major Ports	508.6	708.09	493.2	1001.8
Non-Major Ports	228.31	300.86	345.19	573.5
Total	736.91	1008.95	838.39	1575.3

Source: *Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.*

2.6.1.3 Container Handling Capacity and Proposed Addition

In 2006-07 the ports handled 73.48 million tonnes as against the capacity of 84.90 million tonnes. As can be seen from the table: 5.18, right from the turn of the century, capacity utilisation has been over 100 per cent at the major ports and it was only the year 2006-07 that the ports had a capacity greater that the traffic at the ports.. It is clear that there had been insufficient container terminal capacity to handle projected volumes and this was the main reason why most container terminals had experienced congestion.

Table: 5.18 Container Handling Capacity and Utilisation at Major Ports

Year	Capacity			Traffic (million tonnes)	Utilisation (%)
	Tonnage (million Tonnes)	TEUs (millions)	No. of Berths		
2000-01	28.90	2.41	25	32.34	112
2001-02	37.00	3.08	26	37.25	101
2002-03	39.15	3.26	28	43.69	112
2003-04	49.55	4.13	27	51.04	103
2004-05	48.30	4.02	25	54.79	113
2005-06	62.10	5.18	23	61.98	100
2006-07	84.90	6.54	26	73.48	87

Source: *(1)Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India.*

(2) Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007.

The Working Group Report says that by 2011-12, Indian ports will have to handle around 170 million tonnes (14.23 million TEUs). With 26 container berths available in the

country, huge additional capacity for handling containers needs to be developed in major and non-major ports. In order to maintain 30 per cent additional capacity over the projected traffic of 169.93 million tonnes, the capacity addition required would be 260 per cent. This means, an additional capacity of 136 million tonnes needs to be created in the next six years, the report says. Capacity utilisation of more than 70 per cent leads to either ships waiting at anchorage or choked backyards on ports, which is what we have in fact been witnessing increasingly at most ports. JNP, which handled 3.3m TEUs last year, is operating at overcapacity, meaning it takes only one hitch to cause significant delays. Ports in India, on an average, operate at 91 to 92 per cent capacity. Being a seasonal business, ports should operate at closer to 70 per cent so that they do not become overloaded during peak times.

Owing to burgeoning congestion and the resulting inefficiency, the average pre-berthing detention and turnaround time remain high by global standards and as such building of additional capacity is unavoidable for rapid improvement in the sector. The turnaround time at Indian ports improved from 8.5 days in 1996-97 to about 3.5 days in 2006-07. Internationally, a good average turnaround time is considered to be 1.0 day, thus making ships visiting the Indian shores wait an extra 2.5 days at the Indian ports leading to additional costs for the shippers. It undermines the competitiveness of Indian ports. India risks missing out on an additional 1-2 per cent of annual GDP growth led by its emerging manufacturing sector unless the country can improve transport connections to meet the 'just-in-time' requirements of complex international supply chains. That is a key finding of a research report 'Connecting India: Transport Challenges and Opportunities', prepared by Drewry Shipping Consultants for cargo transportation and logistics company, NOL Group, and its operating businesses in India, APL and APL Logistics.

It is not only in India but also on a global scale that concerns are being raised regarding capacity shortages and congestion. Against a backdrop of looming container terminal capacity shortages, Drewry Shipping Consultants' latest port sector report, "Annual Review of Global Container Terminal Operators 2007", analyses and demonstrates the importance of the investment programmes as world terminal handling capacity struggles to keep pace with booming demand.

Despite the massive investments being made in terminal expansion and development projects by global operators, Drewry's report suggests strongly that a substantial amount of additional capacity enhancements need to be confirmed very soon if a serious terminal capacity shortage is to be avoided. Congestion and delays to shipping are likely to increase in severity, unless further capacity can be brought on stream within the next five years, over and above that already confirmed.

Taking into account only confirmed terminal expansion projects; Drewry believes that average container terminal utilisation rates across the globe will rise from around 72 per cent in 2006, to 97.5 per cent by 2012. This situation will be brought about by a forecast surge in global throughput of over 300 million TEUs by 2012, whilst the amount of additional container capacity certain to be added to the market will only increase by around 160 million TEUs in the 2005-2012 period. Drewry anticipates that the imbalance between known capacity and forecast demand will be greatest in Eastern Europe. However the Far East, Middle East, South Asia and South America will also be affected.

"The situation facing the container shipping industry remains serious, with a deteriorating balance between supply and demand in the container terminal sector in prospect unless more new capacity enhancement projects are rapidly brought on stream" says Neil Davidson. "The report demonstrates that the substantial known and confirmed investment programmes being undertaken by the leading global terminal operators and other industry players aren't enough to prevent an increase in utilisation levels to a critical point."

"Containerised trade and liner shipping remain the most dynamic sector. In 1980, containers estimated to account for 3 per cent of international seaborne trade by weight, while 18 years later reached 9.1 per cent. Despite its low proportions in terms of weight, in terms of value containers accounted for over 56 per cent of international seaborne trade in 1998. That is mainly due to the commodities that liner shipping is carrying (i.e. both intermediate and final consumption products. During 2005 the demand for containerised services continued to expand. The container carrying capacity rose by one million to reach 10.4 million TEUs (UNCTAD, 2006) while today is reaching 11.1 million TEUs" - BRS-Alphaliner, 2007.

In the last decades, we have witnessed profound changes in maritime transport, which have modified the balance between capital and labour at seaports. Ports are now increasingly becoming capital-intensive industries, while in the past they used to be labour-intensive. The development of containerised transport is another factor that has significantly modified port's operations. Containerisation has lot of advantages, but need special cranes at berth and container yards, container freight station, internal container depots, trained personnel for equipment handling, etc. The diffusion and the increasing importance of the container business have required large investments. Over and above international trade, containerisation has also facilitated the introduction and widespread use of logistics. Reference to technological developments should start from changes in shipping. Containerisation of world trade is accompanied by an increase in the size of vessels. The number of post-panamax Ultra Large Container Vessels (ULCVs) increased continuously, with several of them transporting more than 10,000 TEUs since mid-2006. The average ship size passed from 5,000 gross tonnes in the early 1990s to 8,600 gross tonnes within a decade. There has been a phenomenal rise in ship size and speed as the lines are not only trying to meet the trade requirement for Just-In –Time deliveries, but are also trying to achieve economies of scale to be competitive. These large ships are the key to port development. The larger vessel size calls for investments in greater depth of port waters, increased infrastructure and better equipment in quays and terminals.

Taking into consideration the volume of traffic that would be generated in India over the next few years, India would need to develop its own hub operations. Transhipment translates into additional costs for the shippers. Table: 5.24, which is a part of a study carried out by CRISIL on the preparedness of Indian ports to handle the large container behemoths that are now very much a part of the world trade, provides a comparative analysis of various ports in terms of their physical and efficiency parameters for hub operations.

As noted by the CRISIL study and shown in the table: 5.19, India still lacks deep draft in many of its ports. The inadequate draught at ports and in channels is the main culprit.

Table: 5.19 Physical and Efficiency Parameters at Indian Ports

East Coast							
		Benchmark	**Kolkata**	**Haldia**	**Paradip**	**Vizag**	**Ennore**
Physical Parameters	Draft	15m	x	x	x	x	x
	MVS	355-360 m	✓	✓	✓	✓	✓
	HSE	50 Mvs/Hr/Crn	x	x	x	x	x
Efficiency Parameters	ATT	12 Hrs	x	x	x	x	x
	APT	2-3 Hrs	x	x	✓	✓	x
	APS	20,000-25,000 t	x	x	x	x	x
West Coast							
		Benchmark	**Mumbai**	**JNPT**	**Kandla**	**Pipavav**	**Mundra**
Physical Parameters	Draft	15m	x	x	x	x	✓
	MVS	355-360 m	✓	✓	✓	✓	✓
	HSE	50 Mvs/Hr/Crn	x	x	x	x	x
Efficiency Parameters	ATT	12 Hrs	x	x	x	x	x
	APT	2-3 Hrs	x	x	x	✓	✓
	APS	20,000-25,000 t	x	x	x	x	x
South Coast							
		Benchmark	**Chennai**	**Tuticorin**	**Kochi**	**New M**	**M Goa**
Physical Parameters	Draft	15m	x	x	x	x	x
	MVS	355-360 m	✓	x	✓	x	x
	HSE	50 Mvs/Hr/Crn	x	x	x	x	x
Efficiency Parameters	ATT	12 Hrs	x	x	x	x	x
	APT	2-3 Hrs	x	x	x	✓	✓
	APS	20,000-25,000 t	x	x	x	x	x

MVS - Maximum Vessel Size at berth; HSE - High Speed Equipment; ATT - Average Turnaround Time; APT - Average Pre-berthing Time; APS - Average Parcel Size

Source: *CRISIL Infrastructure Advisory Study – January 2006.*

Category	East	West	South
A	Vishakhapatnam	JNPT, Mundra, Pipavav	Kochi, Ennore
B	-	Kandla, Hazira, Mmbai	Chennai, Tuticorin
C	Kolkata, Haldia, Paradip	-	New Mangalore, Mormugao

Category A – Highest Readiness level; Category C – Lowest Readiness Level

Source: *CRISIL Infrastructure Advisory Study – January 2006.*

With a few exceptions such as Kandla, Mundra and Ennore, Indian ports have an average draught ranging from 8-12 meters. In comparison, the draught available at international ports ranges from 12-23, which enables them to handle even new generation container vessels of over 10,000-TEU capacity and large crude carriers and tankers. Today Mundra Port is the only port having a draft required to handle the containership behemoths (10,000 – 12,000 TEU ships) that are being delivered from the leading shipbuilding yards of the world. High-speed equipment, a necessity for faster loading and unloading, is also lacking at the Indian ports. This, in turn, results in a higher turn around time at the ports. As noted above, the average turn-around time at the Indian ports is 3.5 days as compared to the international standard. The lower part of the table shows the level of readiness of the Indian ports. According to that, the best bet for a hub port would be either JNP or Mundra on the west coast (though, Mundra would be a better option, given its draft of 17.5 meters) or Visakhapatnam on the east coast.

Today, the size of container ships matters a lot and global shipping lines are going for larger ships (more than 5,000 TEUs). But Indian ports are nowhere near being able to handle such large ships. On the other hand, China's growth has been mainly due to its capability to handle large (mother) vessels that connect its major ports with international ports. The Yangshan deep-water port which is being developed near Shanghai will accommodate super-sized tankers and could help Shanghai overtake Hong Kong and Singapore as the world's biggest container port. By 2020 the estimated volume through the port would be 20 million TEUs, which is a tripling of traffic through Shanghai. All

these international ports have built infrastructure to handle large ships long ago. In India, among the major ports, except for Jawaharlal Nehru Port (JNP), none of the other terminals can handle ships of around 5,000 TEUs in the next couple of years. Even in JNP the declared draft is 12.5m. On completion of a proposed project to deepen and widen the port's channel, the JNP will be able to handle vessels up to 14m draft (container vessels with capacity of 6,000 TEUs). The first phase is expected to be completed by April 2009. Till then, vessels with 12.5m draft will be handled at JN Port. JNP can handle bigger vessels, but only after off-loading some of their cargo elsewhere to reduce the weight and meet the draught requirement. This under-utilisation of capacity is a loss to shipping lines.

Table: 5.20 gives the current maximum draft available at container terminals in India. Mundra has the highest draft at 17.5 meters.

Table: 5.20 Draft Available at the Container Terminals in India

	Container Terminals	Maximum permissible Draft (meters)
1	JNPT	12.5
	NSICT	12.5
	GTIPL	12.5
2	Chennai	12.0
3	Tuticorin	10.8
4	Mundra	17.5
5	Kolkata	7.5
6	Cochin	12.5
7	Mumbai	10.0
8	Kandla	12.5
9	Haldia	8.5
10	Pipavav	12.5
11	Visakhapatnam	14.9
12	New Mangalore	14.0
13	Mormugao	11.0
14	Paradip	12.5

Source: *Web-site of the respective ports.*

India's ports need to be deeper to accommodate larger vessels and more efficient to cope with the substantial increase in cargo. Bigger vessels that can carry more volumes of cargo are exerting pressure on the port infrastructure. Cost-efficacy will be essential to prevent Indian cargo from being dependent on foreign ports. The need of the hour is more cost-effective ports. Long-term growth can only be supported by deployment of bigger vessels maintaining economies of scale. Parcel sizes will get bigger, putting pressure on the existing port infrastructure. India does not need to build more ports but make existing ports bigger and more efficient to accommodate the new generation mammoth vessels coming on stream to achieve economies of scale.

An inter-ministerial group set up by the prime minister's committee on infrastructure has recommended that as a national policy, a minimum draught of 14m be developed in all the berths of major ports. The group headed by the shipping secretary A K Mohapatra has suggested that the government bear the cost of developing the minimum draught. "Restrictions of draught at various ports seriously impede the ability to handle vessels of standardised international scale. A minimum draft of 14 meters will give the major ports the ability to handle post-Panamax size ships for carrying dry bulk cargo such as iron ore and coal as well as mainline mother vessels for containers," the group said.

The existing major ports are under tremendous pressure to handle the increasing cargo traffic, resulting into demurrages and huge loss in foreign exchange, requiring development of ports on a large scale. Such huge losses of money have made it imperative to think of alternative gateways. One such alternative which the policy makers are focusing on is diversion of more traffic to non-major ports which account for only one-fourth of the total port traffic. Thus, non-major ports are emerging as the drivers of growth and leading them are the ports of **Gujarat.**

3. PORT DEVELOPMENT IN GUJARAT

Industrial activity in the state during the recent years has shown the manifestation of a particular trend – that of industries converging in and around the port sites. The logic behind this is simple. Ports provide an easy and cheap transport access to the overseas international markets (and domestic markets too, though, inland water transport is

woefully neglected in India) for import of raw material as well as for the export of the final finished product for the large industrial houses. Water transport costs less and is thus financially more viable as against the surface or air transport.

Ports	Name of the industrial plants
Hazira	Oil and Natural Gas Corporation (ONGC) Gas Authority of India (GAIL) Indian Oil Corporation (IOC) National Thermal Power Corporation (NTPC) Krishak Bharati Co-operative Limited *(KRIBHCO)* ESSAR Steel ESSAR Power Larson and Toubro (L&T) Reliance Industries Shell Gas and Power
Pipavav	Larson and Toubro (L&T) Fair Deal Suppliers Pvt Ltd
Sikka	Gujarat State Fertiliser Ltd Reliance Petroleum Ltd Shree Digvijay Cement Co Ltd
Dahej	Indo Gulf IPCL Gujarat Alkalies Petronet India Ltd.
Mundra	Adani Wilmar Ltd Saw Pipes Ltd
Okha	Tata Chemicals
Muldwarka	Gujarat Ambuja Cement
Source: *PODEG CSS Study, www.gmbports.org*	

The order of the magnitude of the ratios between water, rail and road transportation is within the ranges of 1-2-5 in cost, i.e. rail transport costs double and road transport costs five times as much as water transport, and 1-1.5-4 in energy consumption, i.e. in terms of fuel consumption, rail consumes one and half times more and road transport consumes four times more energy as compared to water transport.[15] As shown in table: 5.21, water transport costs just 35 paise per tonne kilometre as compared to rail and road which cost 72 paise and 100-150 paise per tonne kilometre respectively.

Table: 5.21 Cost of Carriage by Various Modes

	Average Lead (km)	Rate (per tkm)
Ship (2002-03)	6400	35 ps
Rail (2003-04)	689	72 ps
Road	NA	100-150 ps

Source: *G. Raghuram, IIMA; various presentations*

Aiding the industries are the advantages that Gujarat has with regards to its geographical location and natural endowments. Gujarat, situated on the western coast of India, has 1659 kms long coastline - the longest among all the coastal states. It accounts for nearly one-third of the total coastline in the country. 41 ports are located on this coastline – one major and 40 non-major ports, which are under the control of Gujarat Maritime Board. Of these 40 non-major ports, 11 are intermediate ports and 29 are minor ports. Gujarat also has a locational advantage in that it is placed on the major international shipping routes to the Middle East, Europe, Africa and Latin America. It is the nearest maritime outlet from India to the above mentioned destinations. Moreover the Gulfs of Kutch and Khambat also provide sheltered locations with deeper waters comparatively nearer to the shores.

Figure: 5.5 Gujarat Ports

Source: *http://www.gmbports.org*

- **Catchment Area of Gujarat Ports**

Figure 5.6 Overview of Gujarat's Hinterland

Source: *www.mapsofindia.com*

Another major advantage that Gujarat has is that it has a vast cargo generating hinterland comprising of developed and fast developing Northern, Northwestern and parts of Central Indian States. It is thus closest to 30 per cent of the Indian population and 35 percent of the Indian land mass. These Indian states of Rajasthan, Western Madhya Pradesh, Western Uttar Pradesh, Delhi, Haryana, Punjab, Himachal Pradesh and Jammu & Kashmir are not only the major grain producing states but are also major industrial hubs and they together generate a huge amount of cargo. Gujarat has the potential to capture and service all this cargo. Furthermore, the catchment area of the Gujarat ports also consists of the industrially developed Gujarat region which can be considered to be an influential part of the area for the Gujarat ports.

Recognizing the above advantages and the immense potential that Gujarat has to become the 'port state' of India, the various governments of Gujarat have been proactively following port led development strategy, thereby facilitating port-based industries in the state. Several path-breaking initiatives have been undertaken, some of which have been the first of their kind in the country.

As the first step towards realizing the above, **GUJARAT MARITIME BOARD (GMB)** was set up as a statutory board formed under the GMB Act 1981 to develop, operate, administer and regulate the state's port sector. Gujarat has the distinction of being the first state to have an autonomous maritime board. The Government of Gujarat has been successfully implementing various policies through the GMB for the development of its port sector and augmenting and sustaining industrial development leveraging ports.

3.1 Policies

Gujarat, the first state to announce a separate port policy, viz. **Port Policy 1995,** undertook port development in an integrated approach such that port facilities were created along with industrial development, power generation as well as infrastructure facilities like roads and railways connecting the hinterland with the ports. The vision behind this was that there would be synchronization between expansion of industrial activity in the state together with port development so that the ports would have an

assured cargo right from the beginning and industries would have port facilities immediately. Under this policy, 10 greenfield sites have been identified for development as direct berthing deepwater ports. Of these, 4 ports will be developed as joint sector ports by GMB in which the government will be an investor and co-promoter whereas the remaining 6 sites will be developed by exclusive private sector investments through a global tender bid.

In 1997, the **BOOT (Build Own Operate & Transfer) Policy** was introduced to minimize the role of the Sate Government in development and provides maximum operational flexibility with tariff to the private port developers. The guiding principles behind this policy were timeliness of infrastructure creation, efficiency of operations at international standards, synchronization with hinterland development, i.e. creation of facilities and capacity for the right type of cargo and right quantum such that these new ports become the hubs of industrial activity and serve as catalysts for economic growth in the region. Under BOOT, the role of the government was undertaken to be limited only to security, defence and environment. Also, the government's financial liabilities are least, with the developer being responsible for financing and operating the port without government support.

Gujarat also became the first state in India providing legislative protection to private entrepreneurs for infrastructure project participation by announcing the **Gujarat Infrastructure Development (GID) Act, 1999** which further boosted the growth of the ports sector.

3.2 Cargo Through Gujarat Ports

Contribution of Gujarat ports in movement of the national cargo has been quite substantial, hovering around 27 to 30 per cent since the turn of the new millennium, emphasizing the importance of the state in maritime transport of the country. Gujarat ports traffic has grown at the same annual average rate of over 9 per cent as the total national ports traffic over the twelve-year span from 1995-96 to 2006-07, as seen from the table: 5.22.

Table: 5.22 Gujarat Ports Traffic

Year	Total Gujarat Ports Traffic		Kandla			GMB Ports			
	% Growth	% of Total Indian Ports	% Growth	% of Total Indian Ports	% of Total Major Ports	% Growth	% of total Non-Major	% of total Gujarat	% of Total Indian Ports
1995-96	9.4	19.7	14.3	12.6	14.1	1.8	66.9	36.2	7.1
1996-97	11.4	20.7	11.2	13.2	14.8	11.6	69.0	36.3	7.5
1997-98	22.1	22.3	15.4	13.4	15.5	33.9	66.6	39.8	8.9
1998-99	1.7	22.8	4.4	14.1	16.1	-2.3	69.1	38.2	8.7
1999-00	44.7	28.4	14.0	13.8	17.0	94.4	77.0	51.3	14.6
2000-01	15.6	29.8	-20.7	10.0	13.1	50.0	83.8	66.6	19.9
2001-02	9.4	31.4	2.7	9.8	13.1	12.7	86.4	68.6	21.5
2002-03	3.7	29.6	7.7	9.6	12.9	1.9	77.7	67.4	19.9
2003-04	5.1	28.3	2.2	9.0	12.0	6.4	75.3	68.3	19.3
2004-05	6.2	26.7	0.2	8.0	10.8	8.9	71.2	70.1	18.7
2005-06	7.8	26.1	10.3	8.0	10.8	6.8	68.9	69.4	18.1
2006-07	18.5	27.4	15.5	8.2	11.4	19.9	67.3	70.2	19.2
Average Annual Growth Rate (1995-96 to 2006-07)	**9.4**	**-**	**5.9**	-	-	**18.1**	-	-	-

Source: (1) *Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India*; (2) *Indian Ports Association; (3) www.gmbports.org.*

The traffic through Gujarat ports in 2006-07 was 178 million tonnes. Around 70 per cent of the total Gujarat ports traffic in the recent years has moved through the GMB Ports and the rest through Kandla.

3.2.1 GMB Ports

GMB Ports handled nearly 125 million tonnes of traffic in 2006-07, including 0.76 million tonnes at Alang. As seen from the table: 5.22 above, these ports have shown a tremendous growth at an annualised average of 18 per cent, with the growth in current fiscal being as high as nearly 20 per cent and handling 124 million tonnes of commodity traffic in 2006-07. The target set in 1995 at the time of the formulation of the Port Policy was to capture 25 per cent of the total Indian port traffic by 2005, approximately 100 million tonnes of traffic. Although, the target has not been achieved, GMB ports, at a share of between 18 and 19 percent, still account for a substantial portion of the national traffic. The non-major ports 'revolution' is being headed by GMB ports, with them accounting for a share ranging between 67 to as high as 86 per cent over the years. During 2006-07, they accounted for over 67 per cent of all traffic handled by the non-major ports.

3.2.2 Kandla Port

Kandla port is the fourth largest port in India and the third largest major port – competing neck-to-neck with Chennai port for the second slot, handling 53 million tonnes of cargo in 2006-07. This port's development through the years has been a little disappointing with its share in the total Indian traffic, in Gujarat port traffic and also the major ports traffic continuously declining, as seen from the table: 5.22 above. There has been a revival in its growth in the last two years with the current year showing a high growth of 15.5 per cent, which hopefully will continue with the support of many new policy initiatives that have been taken up, viz. development of a container terminal, capital dredging to increase the draft up to 14 meters in a phased manner, additional dry cargo berths, storage capacity etc. The port's traffic has grown at an average of nearly 6 per cent per annum during 1995-96 to 2006-07.

Amongst the Gujarat ports, the ports that have emerged as the top 5 in their cargo handling during 2006-07 are Sikka, Kandla, Magdalla, GAPL and Dahej in that order. During the current fiscal, around 85 per cent of the total Gujarat cargo moved through just these 5 ports. Of these, Sikka alone accounts for 34 per cent of the total Gujarat cargo, with Kandla at the second position at 30 per cent of the cargo. Sikka is at the first position among all the Indian ports in cargo handling. These facts are shown in Table: 5.23.

Table: 5.23 Top Five Ports of Gujarat

Port	2006-07	2005-06	2004-05	2003-04	2002-03
Sikka	60.3	52.2	51.7	49.8	45.9
Kandla	53	45.9	41.6	41.5	40.6
Magdalla	14.3	13.4	11.9	10.8	9.6
GAPL	13.5	8.1	6.0	4.5	4.1
Dahej	10.1	8.8	6.6	4.0	3.9
Total	151.2	128.5	117.7	110.7	104.1
Total Gujarat Ports traffic	177.8	150	139.1	131	124.7
Share of the Top 5 Ports in Total Gujarat Ports Traffic	85	86	85	84	83
Share of Sikka in Total Gujarat Ports Traffic	34	35	37	38	37
Share of Kandla in Total Gujarat Ports Traffic	30	31	30	32	33

Source: (1)*Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India*;
(2) *Indian Ports Association*;
(3) *www.gmbports.org*

The capacity utilisation at GMB ports has increased from just below 60 per cent to nearly 98 per cent during 2006-07, as seen from the Table: 5.24.

Table: 5.24 Capacity Utilisation at GMB Ports

Year	Capacity (MT)	Increase in Capacity (%)	Cargo Handled (MT)	Increase in Cargo (%)	Utilisation (%)
2001-02	135.5	-	79.6		59
2002-03	139.3	2.8	81.6	2.5	59
2003-04	147.3	5.7	87.3	7.0	59
2004-05	152.2	3.3	96.1	10.1	63
2005-06	163.2	7.2	108.1	12.5	66
2006-07	182.0	11.5	177.8	64.5	98

Source: *(1)Basic Port Statistics of India, Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Govt. of India;*
(2) Report of the Working Group for Port Sector for the Eleventh Five Year Plan (2007-2012), Ministry of Shipping, Road Transport and Highways, Government of India, March 2007;
(3) Indian Ports Association.

The Government of Gujarat has been extremely proactive and successful in bringing more industries and increasing industrial activities in the State as witnessed in the current Vibrant Gujarat Summit. These industries are clustering around port sites, leading to more cargo moving through the Gujarat ports. This has translated into a higher capacity utilization of the cargo handling facilities, giving better returns on the investments made, as seen from the table above. The increase in cargo handling has been much higher as compared to capacity augmentation, resulting into extremely high capacity utilisation of the GMB ports. This could result into a severe congestion if steps are not taken for massive expansion of port capacity.

Thus, Gujarat is witnessing a booming port sector as witnessed from the section above. There has been a phenomenal increase in investments in Gujarat, both from Mega-

Industrial sectors within the country and also from top Multi-Nationals abroad. These investments are mostly coming up in and around potential port sites. Also, export of surplus food grains from the major grain-producing states, viz. Madhya Pradesh, Western Uttar Pradesh, Delhi, Haryana, Punjab, Himachal Pradesh and import of fertilizers to these major consumers, offer great potential of growth of cargo in near future. Any economic development, taking place in these hinterland States thus has a direct bearing on Gujarat ports.

4. CONCLUSION

Modern and efficient ports are necessary and powerful tools for facilitating and fostering trade and development and more so at a time of globalisation of trade. In the global scenario, during the last decade, new technology development has taken place, especially in the container handling equipment and new port layout to accommodate container traffic. The technology development demands new institutional set-up and major investments that help to solve major problems of port modernisation. With the global shipping industry introducing super-sized vessels, the 'Port of Future' will be totally integrated. With some countries developing distribution or logistics centres in the port area which are used for the storage, preparation and transformation of cargo to assist in and ensure a smooth flow, it can very well be claimed that ports are no longer simply a place for cargo exchange but are a functional element in the dynamic logistics chains through which commodities and goods flow. Nowadays, ports must offer efficient and reliable services to ships and cargo, including communication systems, documentation and customs procedures, speedy evacuation of cargo, etc. to allow the timely flow of goods through the transport chain which has, in fact, become a production chain.

An efficient transport system is also a pre-requisite to attract foreign direct investment. Ports can be a crucial element in developing a competitive advantage for a country and therefore governments and port authorities need to adopt suitable port policies to allow the nation to reap this potential benefit. India's ability to attract foreign direct investment (FDI) for its manufacturing sector is also highly dependent on a transport sector capable of getting a higher-value range of manufactures to global markets on-time and at an

acceptable cost. "Costs and productivity issues are largely the result of an inadequate physical infrastructure to support India's greater participation in the global supply chain. The costs associated with moving cargo are some of the highest in the world at 11 per cent of landed cost, compared with a global average of 6 per cent," according to the Drewry/NOL report.

With the rising containerisation trend driving the transportation market, the poor infrastructure in India is a cause of concern for all modes of transportation as it directly affects cost efficiency and productivity. The biggest impediment in India to container terminal projects and also to existing terminals is timely evacuation of containers. In India, container evacuation is primarily done through rail unlike in the West where road transport is the principal mode of evacuation. Container terminal efficiency can improve only when ports can ensure availability of rail corridors and rolling stock. Currently, passenger traffic gets overriding preference over cargo movement including containers. By this reckoning, the government's proposal of setting up a dedicated rail freight corridor along the Golden Quadrilateral holds promise. The Rs 60,000 crore project, cleared by the Committee on Infrastructure in May 2005, would cover Delhi-Kolkata and Delhi-Mumbai corridors to begin with, and would be expanded to the Mumbai-Chennai and Chennai-Kolkata corridors. The dedicated freight corridor would take five years to complete and would involve development of tracks for 2,000 freight trains.

While India is clearly taking the right steps to bolster its container handling capacity, it is an uphill task to bring it on par with international standards. Japan International Consulting Agency has estimated that Indian container traffic would reach 10 million TEUs by 2010 and to 17 million TEUs by 2015. Timely implementation of container terminal projects and their successful operation is therefore the key to meet the projected traffic volume.

The joint efforts of the Government and service providers can tackle the issues of infrastructure. Governmental initiatives to promote private participation and attract foreign investment can go a long way in overcoming this challenge. Service providers can

employ the advancements in information technology to provide better service and achieve customer satisfaction. The next three-four years would be the bellwether for future private sector participation. By then, JNP, Kandla Port and Mumbai Port would have additional terminals, if plans progress as envisaged. If major ports do not match the augmentation of container handling capacity by better evacuation infrastructure, there would be a serious compromise on not only port efficiency but also on private entrepreneurship in future projects. Despite impressive technical parameters, Indian ports need to continually bench-mark themselves against the best ports worldwide and engage in policy efforts to attain prices per container of port services which are the lowest in the world.

Endnotes

---

[1] Juhel, M. (1999), *"The Role of Logistics in Stimulating Economic Development"*, Logistics Seminar, Beijing, November 28-29.

[2] This section draws heavily from Privatisation and Regulation of the Seaport Industry by Lourdes Trujillo and Gustavo Nombela.

[3] De Rus, G., C. Roman, and L. Trujillo, (1994), *Actividad Econ.mica y Estructura de Costes del Puerto de La Luz y de Las Palma,*. Ed. C.Vitas. Madrid.

[4] Juhel, M., (1997), "Government Regulation of Port Activities: What Balance Between Public and Private Sectors?", *International Course on Privatisation and Regulation of Transport Services,* World Bank. Washington DC.

[5] World Bank, (2003), *Alternative Port Structure and ownership model, Port reform tool kit, Public Private Infrastructure advisory facility*, pp.16-19.

[6] UNESCAP, (2002), *Commercial development of regional ports as logistics centers*, United Nations, New York.

[7] This section draws from *India Port Reform 2004*, i-maritime Consultancy Pvt. Ltd.

[8] Mukherjee, A. and R. Sachdeva, (2003).

[9] The International ranking of container handling ports are done on the basis of throughput handled during a particular calendar year.

[10] NMDP (Ports Sector), pp. 29.

[11] Ruhterford, D., (1995), *Routledge dictionary of Economics*, Routledge, London.

[12] Winkelmans W., (2004), *Port capacity a theoretical and practical approach*, Lectures on Advanced Transport Economics at ITMMA, Antwerp.

[13] De Monie, G., (1980), *The determination of Port Capacity for Nigerian Ports Authority*, UNCTAD, Lagos-Nigeria.

[14] Winkelmans W., (2004), *Port capacity a theoretical and practical approach*, Lectures on Advanced Transport Economics at ITMMA, Antwerp.

[15] M.P. Pinto, *The Hindu Business Line*, March 12, 2001.