Volume - 5, Issue- 7, July 2017 IC Value : 56.46 e-ISSN : 2347 - 9671| p- ISSN : 2349 - 0187
EPRA International Journal of Economic and Business Review SJIF Impact Factor(2016) : 6.484
ISI Impact Factor (2013): 1.259(Dubai)
UGC-Approved Journal No: 47335
Research Paper

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THE PERFORMANCE OF INDIAN PORTS THAT HANDLE BULK CARGO – A COMPARATIVE STUDY

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ABSTRACT

Port proficiency is an imperative pointer of port execution; more proficient ports bring down transportation costs and encourage imports and fares of a nation. Regardless of the significance of the subject, the existing port effectiveness examines have solely centered around holder ports. This Working Paper means to fill that hole by ascertaining effectiveness scores of world ports per load sort (holders, oil, coal, press metal and grain). These calculations have been made utilizing a database developed for this reason. A few discoveries can be gotten from these figuring. Huge changes can be made when the specialized productivity of ports is expanded. Among the example, gaps between terminal effectiveness for the most part reflected holes in immaculate specialized productivity. When looking at the level of proficiency accomplished by ports crosswise over products, specialized gaps were more set apart for compartment and oil terminals. Elevating strategies to bring throughput step up with a specific end goal to limit generation scale wasteful aspects is another imperative zone for development.

KEYWORDS: *port efficiency, ports, transportation*

INTRODUCTION

The shipping industry is at present going through a phase of rapid technological change Hence investment decisions are risky and may prove uneconomic. The outcome of such decisions may be serious as port facilities are expensive and do not have any alternatives. This would be A comparative study on the performance of Indian ports that handle bulk cargo. Our country has a broad coastline that extends to 7500km. Maritime trade has a long history which dates back to several years and since sea transport is the most viable means of transport. EXIM trade through sea route plays a vital role in country's economic growth. India has 12 major ports among 1 corporatized Port(Ennore), there are 187 non major ports spread across various states. Gujrat has the most non-major ports and West Bengal has the least. The ports where bulk commodities are handled are Chennai, Ennore ,Tuticorin, vizag, paradip, New Mangalore, Kandla, Mumbai &JNPT. As information systems increase operational efficiency they contribute to the competitive power of the port contributing to its marketing and commercial activity. To effectively manage various evolving port activities, which involve optimum resource utilization supported by timely and accurate information, it is important to deploy state-of-the-art technology practices at port and community level.

THE RESEARCH PROBLEM

The issues that would be addressed here are

- **Reasons for ports unable to meet the expected throughput levels**:- When the port is unable to meet the expected throughput levels its efficiency and effectiveness goes down. It is technically inefficient. This is often

due to congestion that is due to insufficient infrastructure, fixed and mobile assets. Due to congestion the average pre-berthing time increases leading to greater turnaround time of vessels

- **Pollution from Dry bulk commodities viz. coal and Iron Ore**: - Some of the dry bulk are major pollutants and to protect environment their handling is banned if the traffic inflow reaches higher levels. Coal and Iron ore release suspended granules that are hazard to health of dock workers and to the environment
- **Dry bulk posing greater handling difficulties as compared to container**: - The reason why some ports are lagging behind others is due to non-availabilty of adequate handling equipment for quick loading/ unloading. Bulk cargo requires conveyors, hoppers, travelling cranes, grab type unloaders, loading booms for pouring the commodity into the vessel's hold. Many ports do not possess all types of equipment or special-purpose machines and hence the handling is slow. This results in limitations of the port in handling commodities.
- **Insufficient Storage space: -** Very Few ports in the country have capacity to store high volumes of traffic. Since the bulk ports are located far from the production centers the transport services required are more, the transport leg to and from the port should be efficient. There is need warehouses inside the port premises so that ports can attract higher volumes of cargo.
- **Insufficient Draft: -** In the past decades ship have become bigger and shipping technology has improved, hence there is a greater need for port to increase the draught for improving the throughput. The draught of Indian ports is very low some of the new ports have 16 mts while old ports have 8mts which is insufficient to serve bigger bulk carriers. For transport of bulk commodities the bigger the ship the better, considering economies of scale, as transport costs/ton for larger carriers is less.

OBJECTIVES

- To analyze and compare the throughput of ports that handle different bulk commodities
- To address the port performance bottlenecks their causes and reasons
- To compare port performance indicators

HYPOTHESIS

This can be defined in the accompanying explanations which expect that

1. Western ports pull in more mass transporters because of more prominent draft.
2. Eastern ports are more proficient in dealing with mass than Western ports in the nation

REVIEW OF LITERATURE

As indicated by the working gathering's report of National Transport Development Committee on the vehicle of Bulk items. The surge in monetary development seen as of late in India has stressed the limit of its vehicle framework and additionally vitality supply, especially electric power. The administration's goal-oriented advancement targets and plans in tending to such restricting foundation requirements in a definitive way throughout the following couple of decades keeping in mind the end goal to manage elevated amounts of monetary development and to make it more comprehensive. The future postures more significant difficulties. Regardless of the possibility that goal-oriented plans to enhance vitality force of the Indian economy are accomplished, managing financial development at 8-10 percent for every annum throughout the following two decades will require huge increments in power era and transportation of mass wares, for example, coal, iron and steel. The errand ahead is rendered more troublesome by the developing monetary topography and basic changes in the vitality framework, for example, the expanding part of gaseous petrol and developing imports of coal that will force new requests on the vehicle systems. Current projections for coal imports in 2031-32 and LNG imports in 2029-30 for instance, are 355 million tons (Mt) and 162 million standard cubic meters for every day (MMSCMD) individually.

DATA COLLECTION AND ANALYSIS

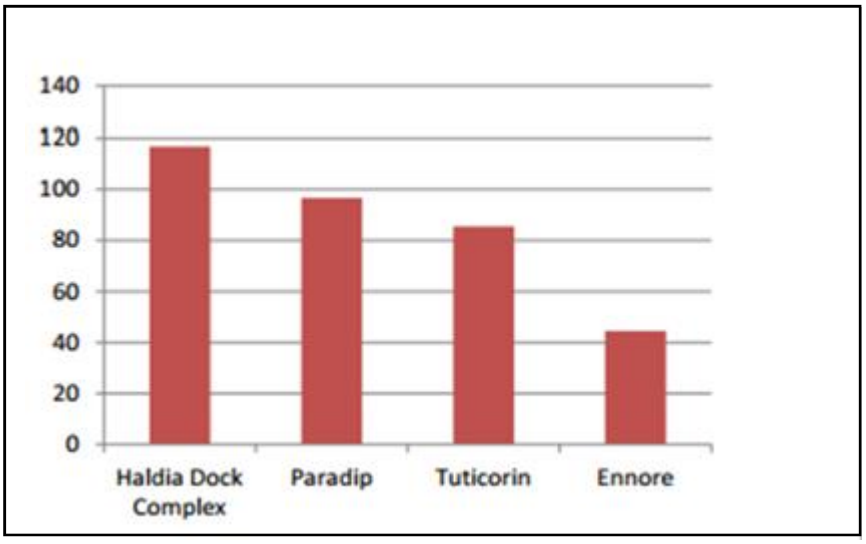
The factual information about the current evaluated throughputs of dry and fluid mass items.

Endeavors are being made to enhance the execution of India's ports. Be that as it may, notwithstanding port-wise advancement arranges, a complete procedure should be developed for the port division. There are additionally issues of how ineffectively our ports contrast and worldwide benchmarks of execution. Maybe most vital, the level of network of the ports to the hinterland should be considered in light of the fact that even the most present

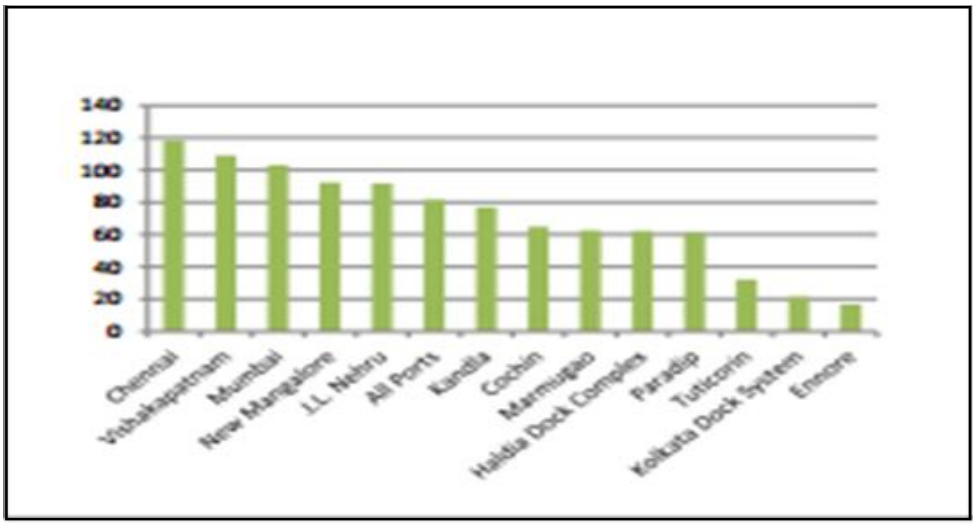
day and best performing port would be pointless on the off chance that it needed adequate availability to the goal of materials to be foreign made.

Commodity	2011-12	2016-17	2021-22	2026-27	2031-32
Thermal Coal	73	88	138	266	355
Coking Coal	32	65	108	173	238
POL	329	475	572	702	864
TOTAL	434	628	818	1,141	1,457

Table 1 Estimation of Port POL and coal traffic (Million Tons)



Percentage capacity utilization for coal at major ports



Percentage utilization of POL at major ports

The aggregate sum of oil based goods that should be created in the nation is equivalent to the Residential request in addition to net fares. In Table 1 this sum is appeared as "Aggregate to be Produced."

In light of information given by to the twelfth Plan, a huge amount of raw petroleum yields around 0.93 tons of oil based goods. This gauge of yield is utilized to compute the prerequisites for unrefined petroleum in the nation. By 2031-32, this prerequisite is assessed to achieve 556 Mt. Some of this necessity will be met by local creation. Late projections for the twelfth Plan Period demonstrate a little decrease underway over the arrangement time frame. Henceforth it is advantageous to accept that local generation will stay

at current levels. Subtracting local generation from aggregate prerequisites for raw petroleum give us the measure of unrefined petroleum that should be foreign made. It is relied upon to achieve 515 Mt by 2031-32. The entirety of POL imports (raw petroleum and oil based commodities) and fares (oil based commodities) is appeared in Table 1 and is normal toreach 631 Mt by 2031-32. Port activity incorporates this sum as well as some local crudethat is delivered seaward and raw petroleum and oil based commodities moved by seaside ships. Evaluating this sum straightforwardly is exceptionally troublesome. Rather, we took a gander at POL movement throughout the previous quite a while and contrasted it and the aggregate imports and fares of POL. It was discovered that the proportion of POL activity to POL imports and fares throughout the most recent quite a long while has shifted between 1.25 - 1.53 that is a normal of 1.37.

The average of 1.37 to arrive at POL traffic has been used to estimate POL traffic at ports as estimated by the last line of Table 1

		2011-12	2016-17	2021-22	2026-27	2031-32
1	Domestic Demand for Petroleum Products	147	186	245	322	424
2	Gross Exports of Petroleum Products	58	91	94	100	104
3	Gross Imports of Petroleum Products	10	11	11	11	11
4	Net Exports of Petroleum Products (2-3)	48	80	83	89	93
5	Petroleum Products to be Produced in India (1+4)	195	266	328	412	517
6	Requirements for Crude Oil (5/0.93)	210	286	353	443	556
7	Domestic Production of Crude Oil	38	41	41	41	41
8	Required Imports of Crude Oil (6-7)	172	245	312	401	515
9	Total Imports and Exports of POL (2+3+8)	240	347	417	513	631
10	Total POL Traffic at Ports (9 x 1.37)	329	475	572	702	864

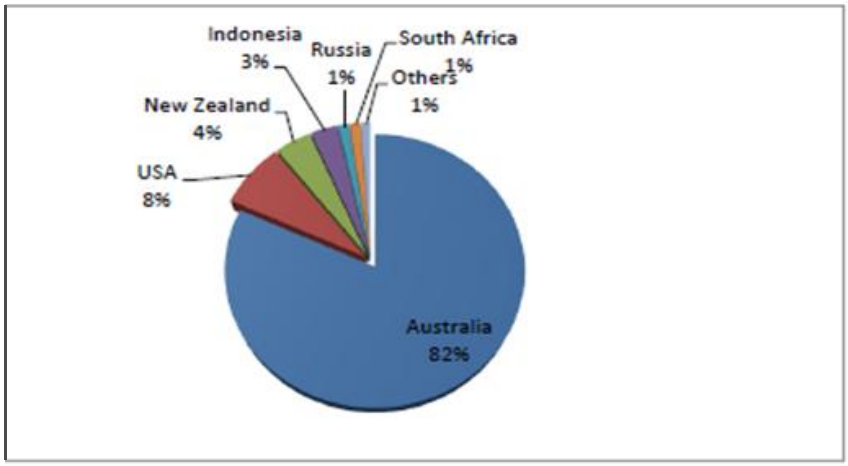
Table 2 Estimation of POL Traffic at Ports (MT)

Import of coking coal

The steel business depends vigorously on imports of coking coal. As of now, around 70 percent of the coking coal required by the steel business is foreign made. Since the local generation of coking coal is required to stay stale or may even decrease, the offer of imports of coal is relied upon to increment to 75, 80 and 85 percent in 2016-17, 2021-22 and 2026-27 individually, and to stay at that level. Utilizing these presumptions, the imports of coking coal for the steel business have been evaluated and are given in Table 3

	2011-12	2016-17	2021-22	2026-27	2031-32
Odisha	7.8	15.8	26.4	42.2	58.2
Chattisgarh	4.2	8.5	14.1	22.6	31.2
Jharkhand	4.5	9.2	15.3	24.6	33.9
West Bengal	2.2	4.4	7.4	11.9	16.4
Karnataka	2.9	5.8	9.7	15.5	21.4
Tamil Nadu	1.0	2.1	3.5	5.5	7.6
Maharashtra	1.7	3.5	5.9	9.5	13.1
Andhra Pradesh	2.0	4.1	6.8	10.9	15.0
Gujarat	2.4	4.9	8.2	13.1	18.1
Other Locations	3.1	6.2	10.4	16.7	23.0
Total India	31.8	64.5	107.7	172.5	237.8

Table 3 Imports of coking coal for steel industry by state (MT)



A comparison of POL trade

Mumbai Port: - It has been a national entryway to Indian and has assumed a critical part being developed of national economy, exchange and business. It has diversified in sorts of freight dealt with from break-mass to compartment. It has created particular compartments for POL and chemicals. Mumbai Port is confronting challenges because of Intra-Port rivalry, changing activity designs, innate physical limitations and proceeding with work serious operations, and so forth. In any case, Mumbai Port is taking different measures to render financially savvy and quality administrations to the exchange.

Kandla Port: - The storage facilities are

a) Twelve Dry Cargo berths are available with Quay Length of 2532 mtrs.
b) Six Oil Jetties.
c) Total Custom Bonded Port Area inside the custom fencing is 253 hectares.
d) One deep draft mooring and Four Cargo moorings in the inner Harbour area for stream handling.

Oil offshore Terminal at Vadinar

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YEAR	Cargo Traffic (in tonnes)		POL Traffic (in tonnes)		% of POL in Total Cargo	
	KANDLA	MUMBAI	KANDLA	MUMBAI	KANDLA	MUMBAI
2007-08	64920	52364	38225	37074	58.88	65.07
2008-09	72224	57038	45538	34571	63.05	67.23
2009-10	79500	51876	46970	34538	59.08	67.12
2010-11	81880	54586	48426	32990	59.1	60.47
2011-12	41568	56186	24047	16459	56.9	29.29
2012-13(P)	44687	28788	25931	17161	58.02	59.61

Table 4 Percentage of POL as compared to other cargo

Import and Export of Natural Gas

Natural gas constitutes 24 percent of the aggregate vitality blend in the World and in correlation, the natural gas share in Indian vitality crate involves around 11 percent amid 2010. It is anticipated that the development of Natural gas request in India in the following two decades will change the essential vitality blend of India, by method for substitution, from oil to gas and reach upto 20 percent. MoP&NG gauges that

gas request will increment to 473 MMSCMD by 2016-17 and 606 MMSCMD by 2021-22, and would be around 790 MMSCMD by 2031-32.

The accessibility of transport foundation for gas needs to keep pace with accessibility of gas and Appointing of client businesses. With this target, the gas transportation needs have been assessed until 2031-32 (countig local and trunk pipelines) as takes after

Year	Gas Demand (MMSCMD)
2010-11	170
2011-12	193
2016-17	473
2021-22	606
2026-27	703
2031-32	791

Table 5 Estimates of Demand for Gas

A COMPARATIVE ANALYSIS

Performance Indicators

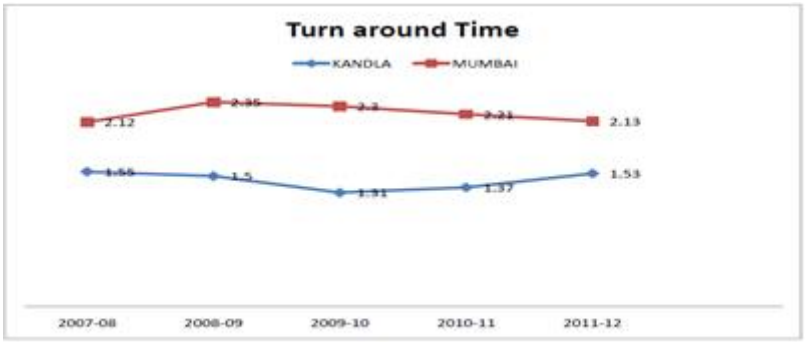
Ship time in Port(Turnaround Time:-

The total time a ship's spends in port form its arrival to departure. It includes the pre-berthing time(detention days), i.e. time spent waiting for the operational berth, waiting time at berth, operational time(ship working hr) and free time

Null Hypothesis Ho: There is no significant difference in vessel turnaround time between Kandla and Mumbai Port.

Year	KANDLA	MUMBAI
2007-08	1.55	2.12
2008-09	1.5	2.35
2009-10	1.31	2.3
2010-11	1.37	2.21
2011-12	1.53	2.13

Table 6 Comparison of ship's avg time in port



P(T<=t) one-tail (Calculated value)	11.7178
t Critical one-tail (Table value)	1.8595

Inference

The researcher has observed that the calculated value 11.7178 is greater than the table value 1.859548038, the critical value at 5% level of significance. The null hypothesis is rejected. Thus we may conclude that there is significant difference in vessel turnaround time between Kandla port and Mumbai ports.

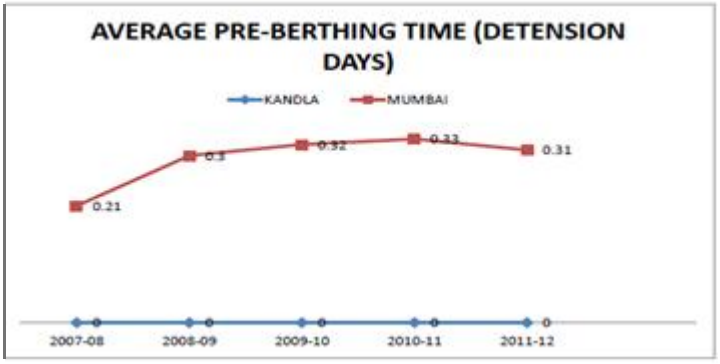
Avg Pre-berthing time (Detention time):- The time spent by the ship waiting for the operational berth from the time it gets anchored.

Null Hypothesis Ho: There is no significant difference pre-berthing time (detention) between Kandla and Mumbai Port.

Year	KANDLA	MUMBAI
2007-08	0	0.21
2008-09	0	0.30
2009-10	0	0.32
2010-11	0	0.33
2011-12	0	0.31

Table 7 Comparison: Average detention days (in days)

P(T<=t) one-tail (Calculated value)	13.6192
t Critical one-tail (Table value)	1.8595



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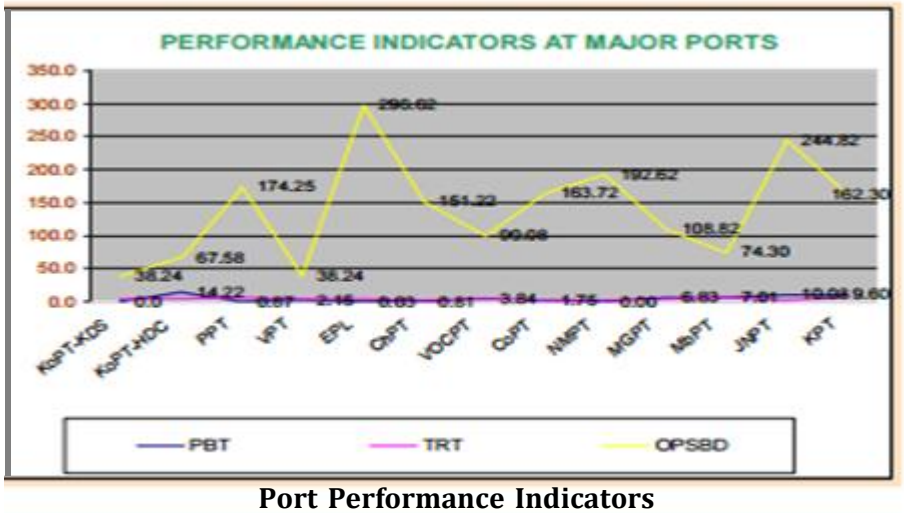
FINDINGS

- Port traffic was at its all-time high in March 2014 on the back strong thermal coal, Iron & Steel and other cargo traffic and also because of rise in Iron Ore traffic. However, it had declined at the level of 43.75 million tons in February 2014 and again showing an upward trend thereafter.
- Seven out of twelve major ports reported growth in cargo traffic for the month of Jan. 2015. Mormugao port reported highest increase of 47.92% year on year , followed by Kolkata (34.73% year on year), Chennai (16.17% yoy), Paradip (11.90% yoy), Cochin (9.14%), Tuticorin (8.44% yoy) and Kandla (4.35% yoy).
- In our comparative analysis between Mumbai and Kandla port , Mumbai port has developed specialised berths for POL and chemicals. Mumbai Port is facing challenges due to Intra-Port competition, changing traffic patterns, inherent physical constraints and continuing labour intensive operations, etc
- It has been found from the comparative study that there is significant variation in the performance indicators of Kandla and Mumbai Port i.e. vessel Turn around time, working hour etc.

- All the null hypotheses were rejected so the kandla is performing far better in all the parameters
- There would be increase in the ship working hour, reduction in turn around time which can be seen from the comparison.

Port Performance indicators April 2014 to January 2015



Port Performance Indicators

SUGGESTIONS AND RECOMMENDATIONS

- Deployment of special purpose equipment for specific cargoes that speeds up handling thereby increasing the operational time and reducing the ship's time in port.
- Increasing the no of Bulk Terminals which is a remedial measure for insufficient storage space. This is a capital investment decision which require analysis about the viability of the project. Various capital budgeting techniques can be used.
- Many ports that handle bulk commodities cannot accommodate cape size and other bigger vessels due to draft restrictions. Dredging should be done but it involves high cost especially in riverine ports where there is heavy siltation. The best solution is the port should be strategically planned so that it has a natural harbor, open sea connectivity with naturally deeper draft.
- Proper maintenance schedule of equipment should be followed so that there is no breakdown during operations.
- Port congestion is the reason of lower throughputs in port and can be reduced by

a) Constructing more berth, purchasing more equipment so that more cranes are employed and increasing the storage space for cargo inside the port premises. These are long term solutions in short term the remedy can be

b) providing better training to labor , reducing dwell time of cargoes, Speeding up customs clearance ,Improving handling Techniques, providing incentives to labor increasing ship working hr.

Bringing ports under PPP projects and privatization of port facilities like superstructure will improve the performance. When the port is governed by a private firm it much more aware of changing market dynamics than the port trust and since its motive is to earn profit it will ensure better utilization of resources

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