



INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION AND MANAGEMENT

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JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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SHORT SEA SHIPPING - POTENTIALS, BENEFITS AND CHALLENGES IN INDIA

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ABSTRACT

In recent years, it has been a global phenomenon that there is an increasing freight transport demand, where the primary modes of transport such as road and rail were struggling to cope up with the situation. An alternative mode of transportation is inevitable to curb the problems of pollution and congestions backed with fuel efficiency and measures to reduce transport costs. The concept of Short Sea Shipping could be favorable solution for the problems aroused. India is one of the fastest growing economies in the world with a balanced GDP growth rate. The transport demand in the country is rising day to day and the poor transport infrastructure is resisting the expected economic development. India has a vast coastline of 7500 km having access to the sea on the three sides with 12 major and 187 minor ports. The geographical advantages envisage the country with a wide scope for the development of Short Sea Shipping. But the utilization of Short Sea Shipping in the country is minuscule compared to other developed and growing economies such EU, Russia, China etc. As a result it is essential to explore the potentials of Short Sea Shipping in India in relation with the cost, environment and congestion compared to road and rail transport. The challenges of implementing the project in the country have to be analyzed with Inland water ways, Port development and legal restrictions existing in India.

KEYWORDS

European Union, Multi modal Transportation, Gross Domestic Product, Twenty Feet Equivalent Units, Inland Water Transport

INTRODUCTION

Short Sea Shipping has been subject to diverse interpretation in different contexts. The round table conference of European commission in 1992 provided a suitable trendy term -'short sea shipping'. Coastal Shipping or Short sea shipping means the movement of people and cargo by sea in between the domestic ports of a country.

There does not exist any concise definition for short sea shipping. In the words of Lombardo, "short sea shipping is a commercial waterborne transportation that does not transit on ocean. It is an alternative form of commercial transportation that utilizes inland and coastal waterways to move commercial freight from major domestic ports to its destination".

Short Sea Shipping encourages the regional trade and transport. It facilitates the delivery of cargoes distributed to regional centers such Hong Kong, Rotterdam, Antwerp etc. This is very different from deep sea shipping where the vessels used for it is smaller in size compared to the deep sea vessels size from 400 DWT to 6000 DWT. The short sea routes are too small and it visits so many ports than a deep sea vessels visit in a year. The major cargo involves grain, fertilizers, coal, steel, containers, lumber, clay, aggregates etc. (Stapford, 2009)

Short Sea Shipping is seen as an effective alternative to reduce road congestions and air pollutions all over the world. (Lowe, 2005).

EMERGENCE OF SHORT SEA SHIPPING

The concept of Short Sea Shipping became significant from last two centuries. As a result of industrial revolution, the Shipping industry made fundamental growth by utilizing larger vessels to carry increased cargo volumes and developed more fixed schedules. The technological developments improved the safety of vessels and the crews which enabled the shipping industry to be an integral part of world economy.

During the period from 1950's, the advent of automobiles and trucks led to the development of national highway systems in many countries which discouraged the use of Short Sea Shipping. The reduced transit times and the flexibility of road transport have replaced the Short Sea Shipping.

Today, the extreme use of road transport resulted in road congestions, heavy capital investment for construction works, environmental impacts, increased fuel costs, where the experts give the impression of being with Short Sea Shipping as a perfect complement for road and rail transport.

The European Union made initial steps in the promotion of short sea shipping concept. Yonge (2004) clearly defines the EU measures for the development of short sea shipping.

The EU has geographical advantages on short sea shipping where the efficient handling of water routes will reflect the economic development of the region. EU is enriched with 67,000 km of coastline and an addition of 25,000 km of navigable rivers and canals.

Freight transport demand in EU is estimates to grow at a higher rate in the next 10 years. Over the last decade 50% of the freight transport demand in EU was met by road transport. But at this stage it will be almost impossible for road transport to satisfy the growing demand. A modal shift from road to water or rail is inevitable for meeting the future demands.

The Short Sea Shipping provides various advantages over other modes of transport. Over the next 15-20 years the volume of cargo transferred between the major cities are supposed to get doubled in quantity where the primary modes of transport (road and rail) will affects badly by huge congestions and there by environmental degradation. The Short Sea Shipping offers a better complement for other major modes of transport with cost and energy efficient, safer and environmental friendly movement of cargo.

COST BENEFITS

The cost for development of Short Sea Shipping is low compared to road and rail transport. Port investments and maintenance costs are very low where the road and rail require huge investments on its construction works on road lines, rail networks, tunnels and bridges. Short Sea Shipping has the comparative advantage in minimizing the overall freight costs in the feasible sea routes.

There are similar studies on the cost benefits of Short Sea Shipping over other modes of transport. The Four Corridor Case Studies of Short Sea Shipping services by MARAD in 2006 reveal the cost benefits of Short Sea Shipping over road and rail transport modes. The study was conducted on the 4 different trade corridors in United States.

TABLE 1: COST ADVANTAGES OF SHORT SEA SHIPPING IN FOUR CORRIDORS, USA

Routes	Truck	Rail	Short Sea Shipping
Gulf / North Atlantic	\$1.77	\$1.06	\$1.03
South Atlantic / North Atlantic	\$1.73	\$1.09	\$1.00
South Pacific / North Pacific			
San Deigo / Astoria	\$1.58	\$1.01	\$1.14
Oakland / Astoria	\$1.59	\$1.35	\$0.86
Oakland / San Deigo	\$1.56	\$1.90	\$1.75
Intra Great Lakes	\$1.51	NA	\$1.24

Source: MARAD, 2006

It could be easily identified that the Short Sea Shipping has the cost efficiency in all the four corridors with a perfect margin over road haulage. The study reveals the potentials for further development of Short Sea Shipping in the four corridors with several recommendations for improvement.

ENVIRONMENTAL BENEFITS

The Short Sea Shipping proves to be environmental friendly mode of transport. Road traffic emissions in the form of carbon monoxide, carbon dioxide, nitrous dioxide etc are harmful to human health, nature and buildings. Critical steps have to be taken to substitute the road with other modes of transport and thereby reducing the harmful emissions.

Even though the maritime vessels produces similar forms of pollutants to that of road freight , the quantity level of emission is much lower where the emissions occurs in different eco systems. The road freight emissions directly affect the land based ecosystem which will be harmful to mankind and other living beings around us.

The concerns on air pollution and global warming are increasing day by day. The global focus has become the reduction of Carbon dioxide (CO₂) and Methane (CH₄) which are the major greenhouse gases intensifying the temperature of the atmosphere. Sulphur dioxide and Nitrogen oxides cause severe problems for nature and living habitat.

The report of Organization of Economic Co-operation and Development (OECD) states that the maritime transport or short sea shipping form less emissions compared to other major modes transport. (OECD, 2008).

Table 2 shows an exact comparison of emission level of short sea shipping over other modes of transport:

TABLE 2: EMISSIONS FROM DIFFERENT TRANSPORT MODES

Emissions	Truck	Rail	Maritime / Short Sea Shipping
Co	0.2 - 2.4	0.02 - 0.2	0.02 - 0.2
CO ₂	50 - 133	9 - 102	7.7 - 31
NO _x	0.24 - 3.6	0.07 - 1.9	0.11 - 0.72
SO ₂	0.03 - 0.4	0.04 - 0.4	0.05 - 0.51
CH ₄	0.2 - 0.9	0.02 - 0.9	0.04 - 0.08
Nm-VOC	0.025	0.01 - 0.1	0.01 - 0.02
PM10	0.005 - 0.20	0.01 - 0.08	0.002 - 0.04

Source: Jacob, 2009

Short sea shipping is seen as environmental friendly mode of transport as the level of emissions are less compared to road and rail with an exception of SO₂ and NO_x, which is vaguely higher. So at this stage, it will be sensible to have a look at a modal shift from road freight to short sea shipping of goods.

Energy efficiency is one of the major factors for the maintenance of environmental friendly atmosphere. The increased usage and wastage of fuel which are non – renewable resources such as fossil fuels will finally result in total depletion. Water transport is found as most cheapest and energy efficient mode of transport.

ALLEVIATE CONGESTION PROBLEMS

Traffic congestion in major cities and high ways are one of the major concerns on optimal delivery of the goods. It will result in delays, increased costs and unreliable journey times for both individuals and firms. The potentials of Short Sea Shipping in reducing the congestions in other modes of transport have to be analyzed.

Traffic congestion plays a significant role in increased emissions, fuel consumption, delayed delivery and incurs huge losses. The effects of congestions are rising day by day as the demand for freight increasing rapidly. In US, the estimation states that 60% of trucks carry domestic cargo tonnage which is the major reason for highway congestions in the country. In 2007, the US economy had a drain of \$78 billion resulting from traffic congestions as per the estimation of The Texas Transportation Institute (Jacob 2009)

INLAND WATER WAYS

Inland water ways is essential for the potential development of Short Sea Shipping. India is enriched with 25000 km of navigable water ways, where 60% - 70% of the manufacturing process locates within 150 -200 km of the coastline. This geographical advantage enables India to facilitate door to door delivery of cargoes to utilize the inland water ways which could be a boost for Short Sea Shipping in the region.

India has problems with road congestions, increased tolls in highways and recommendations for greening the supply chain. The Inland water transport plays a crucial role for the solutions for these concerns. The major ports of JNPT, Kolkata, Kandla and Cochin have around 30% of their transshipment cargoes on to the inland waterway with a consistent growth in the market.

CHALLENGES OF SHORT SEA SHIPPING

The Short Sea Shipping concept provides several advantages over other modes of transport. At the same time, there are several challenges that hinder the development of Short Sea Shipping in the countries with vast potentials for it. The obstacles from operational, financial, administrative and legal grounds are a sort of concern for Short Sea Shipping development.

The prime challenge for Short Sea Shipping is in providing the door to door transport service. The Short Sea Shipping is a part of broken chain where it has to depend on road and rail services to do the pre carriage and on carriage of goods (to the terminal and from the terminal). It is essential for Short Sea Shipping to integrate with the multi modal transport system resourcefully. The modal transfer may results in high cost and time if they are efficiently implemented in inter modal transport.

The shipping route where the Short Sea Shipping has the advantage on delivery time is minuscule. Traditionally, the water transport is the slow and unreliable mode where the shippers will be reluctant to this mode. The lack of integration with multimodal transport and the inefficiency of ports add up the delayed delivery time and additional costs.

It is clear that the delivery time could be improved only by the development of port or infrastructure and efficiency to facilitate the multi modal transport. Short Sea Shipping has to face several challenges from a port environment. One of the major concerns is the port capacity where the number of berths is limited for loading and unloading process. The ships are expected to wait for long time in a queue until they get served. There are also chances for technological inefficiencies in a port with its outdated and inadequate cargo handling equipments. These all factors will hinder the easy movement of goods with additional handling costs which is followed by high port charges.

The port charges for the short trades are comparatively high which constitutes around 70 - 80% of the overall transport costs. The lack of transparency in the port charges is also forming problems for the shippers to identify the real port costs.

There are several cost components which are dealt with multi modal transport. The terminal handling costs are payable at load and discharge ports. It can be divided in to two: Cargo related costs and Vessel related costs. The various cargo and vessels related costs in a port are as follows:

Cargo related Costs	Vessel related Costs
Stevedoring	Port Dues
Crane hires	Pilot age
Carting / stacking	Berth hire
Wharf age	Agency costs

Apart from the terminal handling costs, the short sea shipping has to take care of the cost incurred for the sea freight. It involves the vessel costs, fuel costs (bunkers), and port costs.. It could be stated that the Short Sea Shipping involves complex procedures where efficiency is very important in all grounds. Any difficulties will form additional costs and delay of cargo.

The Short Sea Shipping involves a complex process involved of pre carriage and on carriage of goods. This is the point where unimodal transport viz, road haulage have the advantage. Shippers have the higher flexibility level in a unimodal transport and they will be reluctant to a modal shift.

SHORT SEA SHIPPING - INDIA

India has vast coast line of about 7517 km with 12 major ports and 187 minor ports on the eastern and western coasts of the country. The utilization of Short Sea Shipping in the country will reduce the pressure on road and rail freight movements which are badly affected by congestions, capacity constrains and environmental pollution. It is estimated that a model shift of 5 % of cargo from road to Short Sea Shipping will gain the country with Rs 15 – 20 billion excluding the fuel efficiency and facilitates a sustainable environment.

Short Sea Shipping concept is lesser utilized in the country where it constitutes only 7 % of the total cargo movements. The government policies for development are also scarce where the share of the public sector investment in shipping is only 5% against 51% and 32 % for rail and road.

The country has tremendous potentials for a healthy Short Sea Shipping industry which could meet a substantial portion of transportation demand aroused. An optimal mix of road, rail, inland water transport and Short Sea Shipping is essential to build up a sustainable transport infrastructure with mobility, flexibility, cost and energy efficiency.

The Director General of Shipping in India explains the major factors that hinder the development of short sea shipping in the country: (dgshipping, 2010)

- Absence of basic infrastructure terminals.
- Poor road connectivity
- High tariff for cargo handling in ports
- Awkward cargo clearance procedure
- Lack of active policies
- Competition from road and rail transportation
- High import duties on bunker oil and spares
- Lengthy customs procedure

INDIA: ECONOMIC DEVELOPMENT AND TRANSPORT DEMAND

India has noticed a remarkable development after the economic reforms of 1991. The BRIC report (2003) predicts that the country’s GDP growth rate between 2015 and 2050 will exceeds major economies in the world. The country has seen a significant growth rate which reached up to a record of 9.4 % in 2007. The growth rate has diminished in the last couple of years as a part of recession and it is expected to grow in the coming years.

The economic developments resulted in the increased physical transactions and the transport demand started to surpass the infrastructure obtainable. The transport demand increased at a rate of 10% from 2004 with a carriage of 800 million tonne km of freight every year. In India, road is the primary mode of transport for the carriage of cargo which sum ups around 65% of the whole. The transport demand is rising at higher rate where the road and rail transport is affected by congestions, increased emissions and there by additional costs.

The following figure shows the estimated rise of GDP and there by freight transport demand in a global perspective over the next 4 decades

TABLE 3: GLOBAL MARKET SHIFTS

2000	2010	2020	2030	2040	2050
USA	USA	USA	USA	USA	China
Japan	Japan	China	China	China	USA
Germany	Germany	Japan	Japan	India	India
UK	UK	Germany	India	Japan	Japan
France	China	UK	Russia	Russia	Brazil
Italy	France	India	UK	Brazil	Russia
China	Italy	France	Germany	UK	UK
Brazil	India	Russia	France	Germany	Germany
India	Russia	Italy	Brazil	France	France
Russia	Brazil	Brazil	Italy	Italy	Italy

MAJOR CHALLENGES IN INDIAN TRANSPORT SECTOR

At this stage of economic development, the country is faced by major infrastructure problems in freight transports with congestions, poor accessibility and quality.

ROADS

India has the second largest road network in the world with a length of 3,516,452 km. It is the primary transport mode for freight movement as most of the production and consumption centers are being land locked and also provide door to door delivery of goods. But the increased demand for road haulage resulted in economic losses from congestions, capacity constraints, road accidents, and energy consumption and adverse environmental costs.

The national highways in the country are limited two lanes or less and it is stated that only one-third of the maintenance needs are met. This will leads to deterioration of roads and increased transportation cost for users. The country is eagerly looking at the Eleventh Five year plan involved of National highway development program which is to be completed by 2012.

TABLE 4: TRANSPORT STATISTICS: INDIA

India: Transport Sector – Key Statistics		
	Units	As of 2009
Length of Roads	Km.	3,516,452
Main Roads	Km.	666,452
Paved Roads	%	47.3
Access to all Season Roads	%	61
Road Density	Km/1,000 Sq Km	1115
Rail Track Length	Km.	63,327
No. of Ports		199
Turnaround time	Days	3
Airports		125
International		11

Source: World Bank, 2010

RAILWAY

India has the largest railway system in Asia due to the vastness of the country. The thing of interest is that the whole network is under a single management. But the rate of freight transportation through rail is seen diminishing over the years.

Chaudhury (2005) state that the road took major part of freight movements from railway as it is adapted to the Indian market conditions. There are several reasons for the superiority for the road transport such as the door to door delivery and easy tracking facilities. But the major problem faced by the rail industry is because of underinvestment made by the government and lack of customer oriented approaches.

The rail infrastructure is affected by severe capacity constraints. The railway does not have enough infrastructures to cope with the increasing demand of freight and passenger movements. The transportation costs for the freight movement in the country is also high compared to other countries. (**World Bank, 2010**)

PORTS

The Indian port traffic has doubled since 1990's to reach 521 million tonnes in 2004-05 and it is expected to reach 900 million tonnes by 2011-12. But the ports are inefficient to meet the growth of port traffic which may hinder the economic development of the country (World Bank, 2010).

Indian ports have various weaknesses in the form of outdated infrastructure, limited water depth, high tariffs, poor hinterland connectivity, labor problems, lack of capacity and extension possibilities and also faces threats from private ports and bureaucracy. (Indian Ports Association, 2007)

COMPARATIVE ADVANTAGES OF SHORT SEA SHIPPING IN INDIA

TRANSPORT COST

The cost of carriage of goods through coastal vessels is much economical compared to road and rail transport in India. The Tata Consultancy services (TCS) study in 2003 states that the cost of carriage of good by Short Sea Shipping is only 21% of the cost by road and 42 % by rail. This study does not include the external costs involved of accidents, air pollution, congestions etc. In the addition of these external costs makes the cost of carriage even lower in Short Sea Shipping compared to road and rail.

The following table shows the cost of carriage per tonne km in 3 modes of transport. (TCS, 2003)

TABLE 5: COST OF CARRIAGE PER TONNE KM IN 3 MODES OF TRANSPORT

Mode	Cost of Carriage / t km (1000 km lead)
Road	Rs1.20
Rail	Rs.0.60
Short Sea Shipping	Rs.0.25

SOURCE: TCS, 2003

Ernst & Young (2010) states that Gujarat is India's key carbon and cost cutting trade hub by the integration of multi modal trade between north and south Indian states. The Coimbatore textile manufacturers are depending on road freight for the transfer of goods to New Delhi.

There is an alternative of multi modal transport by utilising Short Sea Shipping in the carriage of these goods. The goods could be transferred to Cochin by road transport and then utilise Short Sea Shipping to deliver goods to Kandla in Gujarat. Again, through road haulage the goods could be delivered to the retailers in New Delhi. It seems to be a complex process. But looking at the cost rates seems to be interesting part. The Coimbatore – New Delhi road freight transport is estimated to be Rs 4,442 per tonne where as the multi modal transport involves only Rs 4,256 per tonne. This provides a cost advantage of Rs 186 per tonne. (Ernst & Young, 2001)

The time taken in the shipment of the goods is one of the problems faced by the coastal trade. Ernst & Young recommends that the removal long documentation procedures could improve the transit times and thus it forms a sustainable mode of transport.

The report of TCS and Ernst & Young (2010) reveals the potential for Indian Short Sea Shipping with favorable cost advantages. The cost of carriage in Short Sea Shipping is less than half of the road and rail transport. Inter modal connections with feasible routes (Coimbatore - Cochin – Kandla – New Delhi) of industrial regions will encourage bulk cargo movements through Indian coastal vessels.

FUEL EFFICIENCY AND EMISSIONS

The Short Sea Shipping is economical in terms of fuel consumption and rate of emissions compared to road and rail transport. The TCS report shows that the fuel consumption in Short Sea Shipping forms only 15% of the consumption level of road and 54% of rail which is calculated by ton kilometre. The Short Sea Shipping has the comparative advantage in relation to the amount of emissions with an exception to SO₂.

Table 6 gives a clear picture of fuel consumption and emission levels of Short Sea Shipping and other modes of transport in India. (TCS, 2003)

TABLE 6: FUEL CONSUMPTION AND EMISSION LEVELS OF SHORT SEA SHIPPING AND OTHER MODES OF TRANSPORT IN INDIA

Mode	Fuel consumption	Emission (gm / t km)					
		Co ₂	Co	Hc	Nox	So ₂	Particula
Road	31.330	98.30	0.47	0.23	0.98	0.03	0.08
Rail	8.911	28.33	0.20	0.10	0.47	0.03	0.03
Short Sea Shipping	4.828	15.45	0.03	0.01	0.31	0.29	0.006

Source: TCS, 2003

The report shows that the Short Sea Shipping has perfect advantages in terms of fuel efficiency and rate of emissions. The CO₂ factors form the major portion of the emissions where the Short Sea Shipping is far ahead of road with 15.45 gm / t km against 98.30 gm / t km. This difference reveals the urgency for the development of Short Sea Shipping in the lights of global warming and highly polluted cities in the country.

An analysis of CO₂ emissions in the last decade shows the similar results where the road and rail stands higher than that of water transport. The table shows the CO₂ emissions from different transport modes in the country during the last decade:

Table 7 reveals the CO₂ emission from all transport modes in India (million tonnes of carbon equivalent)

TABLE 7: CO₂ EMISSION FROM ALL TRANSPORT MODES IN INDIA (MILLION TONES OF CARBON EQUIVALENT)

Year	Road & other	Rail	Air	Shipping	Total
2000-01	17.85	5.28	1.58	0.53	25.24
2001-02	18.34	5.00	1.49	0.49	25.32
2003-04	22.31	3.53	1.55	0.49	27.88
2004-05	29.63	2.76	1.91	0.47	34.77

The above data shows that the Shipping constitutes only a small portion of CO₂ emissions compared to road and rail. In Indian Short Sea Shipping also similar results are arising as per the report of TCS which reveals a need for development of Short Sea Shipping in the country with optimum utilization of energy and encourages environmental friendly mode of transport.

CONGESTIONS

The primary modes of freight transport in India are undoubtedly the road and rail haulage. The pressure imposed on to these modes resulted in heavy congestions backed with capacity constraints and increased chances for accidents and mishaps. The World Bank (2009) says that the road transport alone carries 65 % of freight in and 90 % of passengers in the country. The most of the country's highways are narrow and only around a one – third of the maintenance work are met. The congestions will reduce the fuel efficiency of the trucks which leads to higher operating costs and increased pollution. The Indian Railway is second largest in the world under a single management. It carries 2 million tonnes of freight and 17 million passengers as per the data on 2007. There have been problems with capacity constraints in the major corridors which seek for enhancement plans. (World Bank, 2009).

These congestions will affect the distribution chain with delay in delivery times. The major industries in the country will be affected by congestion problems as they do not receive the raw materials and timely delivery of finished goods. The road freight is over pressured with limited infrastructure provisions. The national highway of the country is only 2 % of the whole road network but it forms 40 % of total road traffic in the country. This forms congestions in major highways which results in delayed transit times and accidents. (National Highway Authority of India, 2010)

The national highways are highly congested that a truck could move only at an average speed of 30 - 40 km per hour where the expected speed demanded is almost double of that. It is estimated that a truck trip from New Delhi to Kolkata (1500 km) takes around 5 days to reach the destination. As a solution to these problems Govt of India is implementing a National Highway Development Project (NHDP) called "Golden Quadrilateral" interlinking four major cities of Mumbai, New Delhi, Kolkata and Chennai. This will have good effects on Indian road freight movements. But it alone would not be enough for a country with a freight transport growth of 10% per annum. An integration of multi modal transport utilizing the potentials of Short Sea Shipping in the country would be a favorable solution to reduce the congestions problems.

INDIA: COASTAL CARGO MOVEMENTS

The coastal cargo movement in India constitutes only 7% of the total cargo movement in the country. The Short Sea Shipping tonnage by the end of the year 2009 is 991715 GT and 10109370 DWT with 657 vessels. The Short Sea Shipping in India is highly fragmented industry where the 9 companies in the coastal trade form 60% of the total fleet in terms of DWT (Dead weight tonnes). The major players in cargo movements are Shipping Corporation of India Ltd, Seasa Goa Ltd, and Poompuhar Shipping Corporation. The average fleet size of the Indian Short Sea Shipping companies are limited to 80000 DWT where as the international shipping fleet is involved of average sizes excess of 100000 DWT.

Dry cargo vessels form the majority in terms of DWT along with tugs and offshore vessels which are in a large number. The other categories include passenger vessels and port trusts vessels. The annual report from ministry of shipping, India gives a clear picture of coastal vessels in the country. (Ministry of shipping, India, 2010)

TABLE 8: COASTAL TRADE IN INDIA (31ST DEC 2009)

S.No	Type of Vessel	No of Vessel	G.T	D.W.T
01	Dry Cargo Liner	72	121821	179301
02	Tug	212	61392	20658
03	Dry cargo Bulk Carrier	12	237220	364928
04	Tankers (product carriers)	14	54995	66723
05	Tankers (crude oil carriers)	2	50080	82246
06	Passenger cum Cargo	30	82912	27232
07	Passenger services	50	16423	1925
08	Ethylene Gas Carriers	3	8727	6558
09	Ro – Ro	1	956	1386
10	Dredgers	25	113761	72652
11	Offshore Supply Vessels	106	110737	129876
12	Specialized vessels for offshore services	37	87492	50183
13	Port trusts & Maritime Boards	93	45199	15702
	Total (vessels) coastal trade	657	991715	1019370

Source: Ministry of shipping, India, 2010

The TCS (Tata Consultancy Services) research (2003) studies the coastal trade projections with the reference to major commodities involved. The Table: gives a picture of major commodities in Indian coastal trade and its expected growth rate until 2011- 12.

TABLE 9: COASTAL CARGO MOVEMENTS IN INDIA

Commodity	In million tones		
	2001-02	2006-07	2011-12
Crude	16.00	16.00	16.00
POL	12.70	25.00	32.50
Coal	15.90	20.00	25.00
Iron ore	4.66	9.75	13.30
Iron & steel	0.28	0.76	1.04
Cement	3.16	8.65	13.00
Sub total	52.70	80.16	100.84
Others	0.26	0.52	1.04
Sub total	52.96	80.68	101.88
Containers	1.04	2.60	5.20
Total	54.00	83.28	107.08

Source: Jaiswal, 2004

It is seen that the cargo quantity may be almost doubled from the period of 2001-02 to 2011-12. So there should be more faster initiative to deal with this demand in terms of infrastructure and vessel capacity.

ISSUES IN PORT DEVELOPMENT

The developments of Sea/ Inland ports are essential to encourage Short Sea Shipping in a country. The efficiency of ports in terms of berth and terminal facilities, technological cargo handling equipments and flexible hinterland connectivity through primary modes transport are essential to encourage Short Sea Shipping with better transit times.

In India, the ports are lacking efficient infrastructure inputs. Most of the Indian ports have outdated berth layouts and terminal facilities. The storage facilities are not capable to handle the regular flow of cargo. The cargo handling equipments such as mobile cranes, trailers, fork lifting trucks, quay cranes are insufficient

to the amount of cargo being handled. Inter modal connectivity of road and rail transport is limited in the minor ports of the country. All these mentioned barriers discourage easy flow of goods backed by increased transport cost. The poor infrastructure in Indian ports has resulted in maritime trade loss of around Rs 1400 per annum. (Dredging today, 2010)

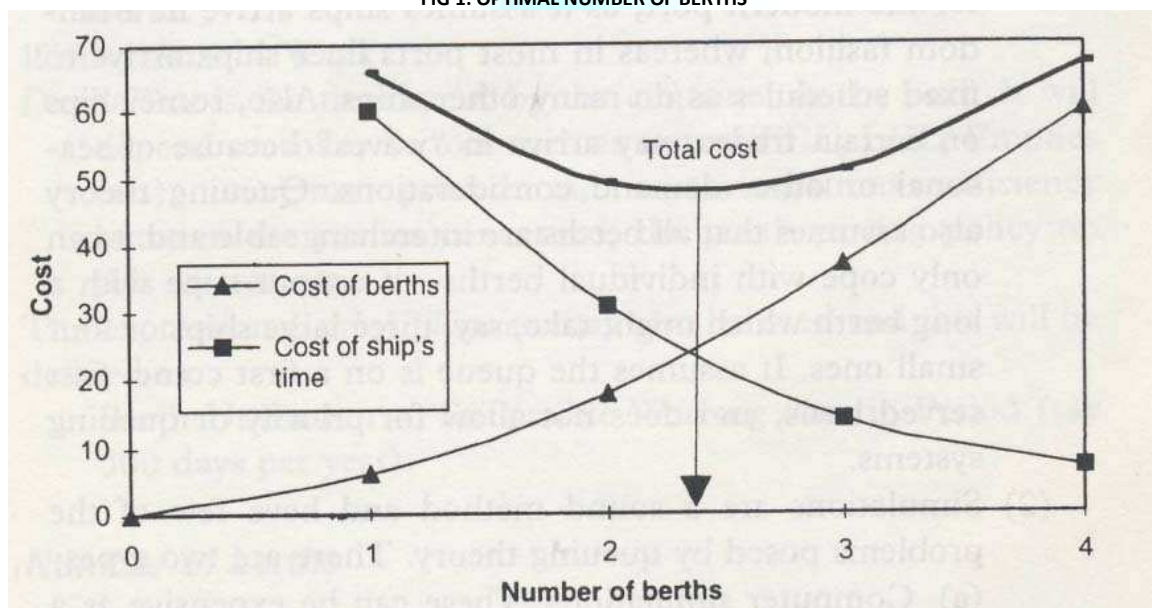
The TCS research identifies 14 minor ports in the country to encourage Short Sea Shipping. It is also essential to efficient hinterland connectivity with road and rail transport with these minor ports. The Short Sea Shipping requires efficient hinterland connectivity which will enable the flexible deliveries with improved transit times.

The port of Pipavav in Gujarat was languished because of inefficient connectivity problems. The hinterland connection via Surendranagar by double stacked container trains with a capacity of 180 TEUs gave improved throughput to the port interlinking the North West states. Similar forms of hinterland connection have to be implemented in the other minor ports of the country which is essential for an improved multi modal transport. (Pipavav, 2010) Similarly, the road connectivity to the ports has to be improved. The country is looking at the five Phases of National Highway Development Programme (NHDP) which is promised to provide better hinterland connectivity from the major and minor ports in India.

The capacity utilization in major ports are above 100% which is not efficient as ports like Singapore and Colombo have spare capacity available. The low productivity along with frequent breakdown of cargo handling equipments and the inefficient utilization of port resources are the major challenges in Indian ports (Lloyd's list, 2007). The capacity utilization in major Indian ports involves Chennai (135%), Vishakapatnam (128%), Kolkata (124 %), Kandla (119%), and Paradeep (106 %). Measures have been taken by port authorities to minimize these problems but they have a long way to go.

The efficiency of the terminals and berths in the ports has to be developed for improving the capacity of the ports. According to Alterton (1999), the optimum number of berths required in a port will be at the equilibrium point of cost of berths and cost of ship's time as shown in Fig 1:

FIG 1: OPTIMAL NUMBER OF BERTHS



Source: Alterton, 1999

These theories could be implemented in the Indian ports to identify the optimal number of berths required to handle the ship traffic. Unless the port authorities take a systematic approach there are chances for regular congestions and delayed delivery.

The privatization efforts on to the major and minor ports could be a feasible solution for the infrastructure bottlenecks. The experience of JNPT (Jawaharlal Nehru Port Trust) better resemble the privatization success stories in Indian industry. JNPT is India's first privatization program.

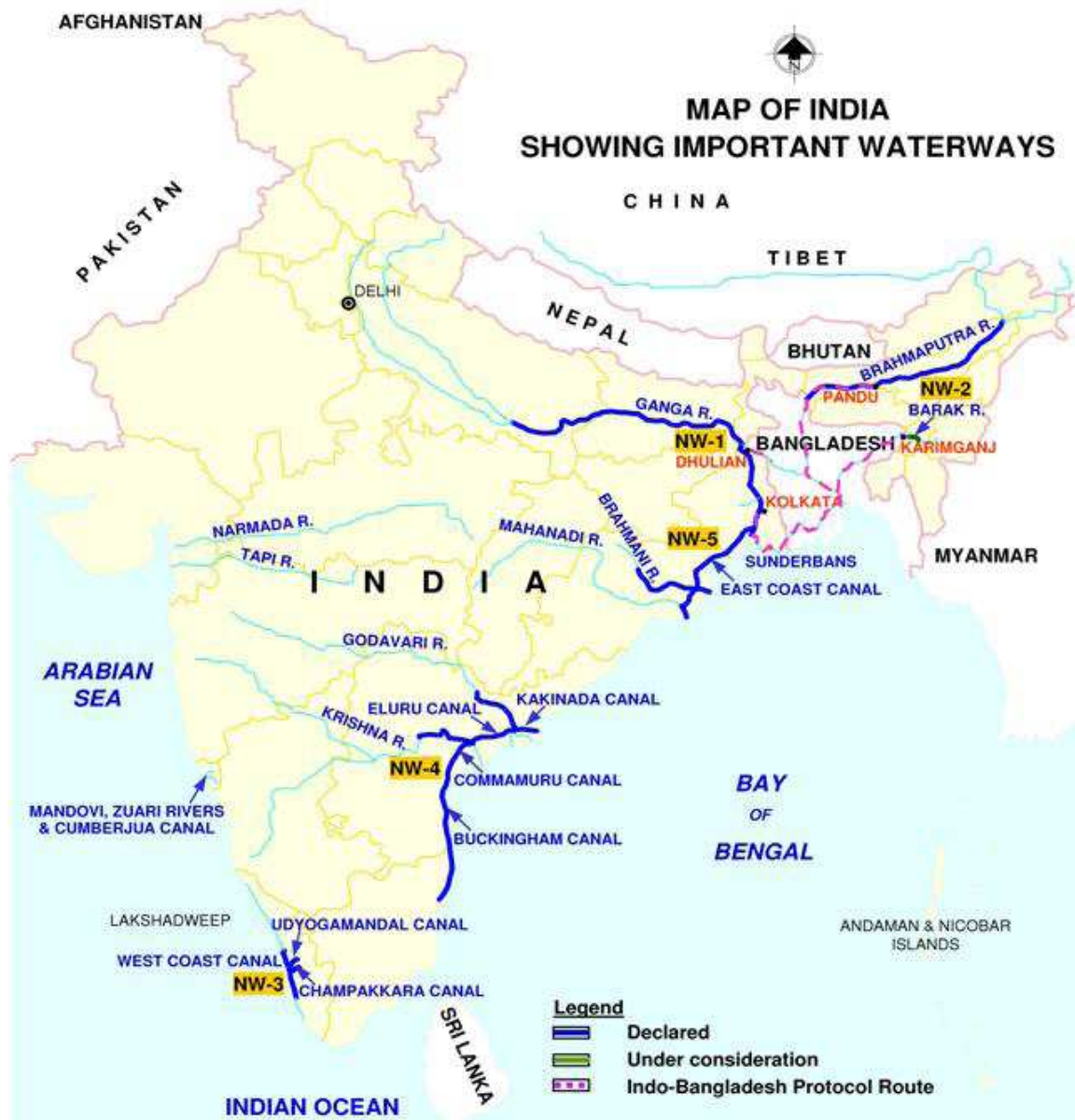
Presently, the port is in top 25 container ports in the world which is most efficient port in the country with a turn over time of 1.72 days. The need for privatizing the minor ports of the country is essential to improve port efficiency, productivity and to provide better quality of service for the coastal trade. The main challenge is to find private investors under BOT contracts where many of the minor ports such as Cochin, Kandla failed in their attempts. (Port Technology International, 2004).

The development of transshipment hubs with private partnership such as the upcoming projects of Vizhinjam, Vallarpadam will eliminate the dependence on foreign ports for transshipments. It gains an annual loss of \$200 million for the country and most importantly it encourages Short Sea Shipping in India. (Dgshipping, 2003)

INLAND WATER TRANSPORT (IWT)

India has a vast 14500 km of navigable water ways. The utilization of these waterways is miniscule compared to other developed and developing nations in the world. The cargo movements through inland water ways is only 0.36% in the country. An integration of inland waterways and Short Sea Shipping will be beneficial enough to supply potential cargo to the industrial and commercial regions situated in the river coasts. The country is enriched with five major waterways which are named as NW - 1, NW - 2, NW - 3, NW - 4 and NW - 5 (See Fig - 2). The NW - 4 and NW - 5 has been included very recently by 2008 and 2009 respectively. (IWAI, 2009)

FIG 2: INLAND WATERWAYS OF INDIA (IWA)



Source: Inland Waterway authority of India, 2010

As the road and rail transport are congested and overburdened backed with high capital investments for its further development. An effective utilization of existing waterways and measures to explore the scope for finding new feasible routes could be favorable solution.

The Vallarpadam International Transshipment Terminal (VITT) in Cochin (Kerala) will pave the way for the development of NW -3. The Cochin port is developing Ro – Ro terminals in Bolgatty and Wellington Islands in association with IWA. There is scope for barging between major trading provinces in the region such as Cochin, Alappuzha, Kottayam, Kollam and Kannur. It is estimated that out of the total volume of 18500 TEU, 6000 containers will be shifted from road to water transport in the initial stages itself. This will reduce the container transport cost by 40 – 50 % using the cost effective barge movement of cargo. (Economic times, 2010).

The country has the scope of integrating the Inland Water ways with Short Sea Shipping. The TCS report on the development of Short Sea Shipping states that the integration could be initiated at the ports of Haldia and Cochin. The integration is also possible in the Neendakara and TT Sheds at Kolkata of NW- 2 if additional infrastructure has been acquired. In this respect "Kaladan Multimodal transit transport and project could be implemented to explore a new route to north eastern states utilising Short Sea Shipping, IWT and road. It interlinks Kolkata to Mizoram which consists of 539 km of Short Sea Shipping to reach Sitwae (Myanmar), 224 km of IWT and 62 km of road transport to reach the state of Mizoram.(IWA, 2009)

For the integration of IWT and Short Sea Shipping there is a better scope in utilizing the Coastal - Cum - River vessels (CR) in the waterways having increased depth. In NW-1, Haldia – Farakka route is having 3 metre water depth for 9 months in a year. It is possible for a carriage of CR vessels from 2500 to 3000 tonnes with a minimum of 2.5 metre draft. In NW - 2, the Indo – Bangladesh protocol route could be used for CR vessel voyage during the monsoon season from June to October. In NW - 3, the CR vessel voyage is possible for few kilometres from Cochin to Udyogmandal canal. But it could be efficiently utilized for the movement of Salt, Coal, Sulphur and other raw materials to the industries located in the region. (IWA, 2009)

The major challenge to IWT in the country is the navigational hazards faced by the shallow and narrow water resources. There is supposed to be a 2 metre draft for the easy movement of vessels. But most of the Indian rivers do not have that naturally. The cost for dredging purpose to maintain the IWT routes is very high. To site an example, the cost for dredging activities in the banks of Sabaramathi River in India constituted \$ 300000, which is a huge amount to handle. (Narayan.et.al, 2005) The scarcity of good infrastructure is another problem. The number of IWT vessels in the country is very low. There should be better provisions for the procurement of vessels with needed capacity in a quick succession. Meanwhile, the infrastructure at the banks of these waterways such as terminals, improved connectivity etc. should be made capable of handling the increased amount of cargo. CIWTC (Central Inland Water Transport Corporation) could be sited as a perfect example in terms of infrastructure provided. (S.Sriraman, 2010)

There are limitations in the budgetary support to provide funds for the development of basic infrastructure. At this stage, it would be preferable to allow the private players to take part in the IWT. There should be projects for building IWT vessels within the country. The government has to provide subsidies to ship yards specifically working on the construction of IWT vessels. At the same time, there should be better training inputs to the manpower concerned with IWT operations. (Narayan.et.al, 2005)

LEGAL RESTRICTIONS

The following discusses the legal restrictions that hinder the development of Short Sea Shipping in India:

CABOTAGE LAW

Cabotage means the port to port navigation of vessels within a country. The Cabotage law reserves the country's own flag vessels to carry out the coastal trade. As a result the foreign vessels cannot undertake the coastal cargo movement which avoids them from tax rebate on that particular country. China was the first country to introduce Cabotage law which was followed by various nations.

In India, the Cabotage laws are restrictive in nature as per the Merchant Shipping Act, 1958. Only the Indian flag ships are allowed to conduct coastal trade in the country. It is done as a part of protecting the domestic shipping industry. If the Cabotage laws are liberal there are opportunities for international ships to take over the coastal trade where they are not liable for taxes and duties. It is viewed that the Cabotage rules in India discourage the scope for Short Sea Shipping in the country where the Indian tonnage is inadequate. The involvement of foreign vessels will improve the efficiency level of coastal cargo movements.

IMPORT DUTIES

In India, the coastal ships are liable to pay duties on the bunker oil which is supposed to increase the overall cost of transportation. The cost for usage of bunker fuels in a coastal ship is much higher compared to international vessels. The cost will be higher at a rate of 28% for bunker fuel and 26% for High Flash High Speed Diesel. Short Sea Shipping has the weakness in comparison to road transport where they are provided subsidies for the use of Diesel. At the same time, the import of spares and capital goods for the vessel maintenance is also liable for import duties. This will form a big burden for ship owners.

CUSTOMS FORMALITIES

Indian coastal cargoes are entitled to complex customs formalities. The coastal cargoes are treated as similar to ocean going vessels where they have cumbersome customs procedures. It will result in increased transit time of goods and costs for dealing with customs formalities. Neighboring ports like Colombo take only half a day to unload a container vessel and to load the cargo in to a feeder vessel. But in India it is an intricate process. There should be a simpler form of customs and documentation procedure to reduce delays and increased costs.

TAXATION

The Indian shipping companies were supposed to pay the corporate tax of 35 % on their net profits or minimum alternative tax at 7.5 %. The Union Budget of 2004/05 initiated tonnage tax where the annual taxation will be based on the net registered tonnage. But the tonnage tax was not exempted for coastal cargo movements. This has discouraged the Shipping companies to take coastal cargo movements which adversely affected the Short Sea Shipping in the country. (Union Budget, 2004)

Service tax is another concern. The coastal vessels are subject to double taxation. To cite an example, a vessel carrying cargo from Mumbai to Goa is liable to pay service tax at Mumbai port at the time of loading and payable at Goa port at the time of discharge. (India Maritime Summit, 2008)

The personal income tax is restrictive for coastal sea farers in India. As per the income tax rules, whoever is outside the country for 183 days or more in a year will be considered as non – resident and pay no taxes. It is applicable for the sea farers in ocean going vessels as they cross the geographical boundary of the country for sailing. This discourages the officers and seafarers in the coastal ships and seems to be reluctant to accept the voyage in Short sea vessels.

LEGISLATION

The Merchant Shipping Act of 1958 exists in the country which deals with both coastal vessels and international vessels. This has resulted in similar standards and norms for both these vessels. The coastal vessels are subject to have inconvenience as its result. A recommendation was made by Pinto committee to have separate legislation for Short sea Shipping. A committee has been organized by 1998 to draft the legislation. But the government does not take the initial steps to enact the law in favor of Short Sea Shipping in the country. The legislation should be enacted in a quick succession to avail the benefits to Short Sea Shipping removing the inefficiencies in the rule.

CONCLUSION

A comparative analysis of Short Sea Shipping with other transport modes in Indian context was reviewed in relation to cost, energy efficiency, environmental friendliness and congestion problems. The Indian Short Sea Shipping also showed favorable advantages over road / rail transport existing in the country. The analysis of coastal cargo movements in India shows that the utilization of Short Sea Shipping in India is minuscule compared to EU or neighboring countries like China.

It gives a clear picture of inefficient handling of Indian ports which not only discourages the Short Sea Shipping but also the whole maritime trade. The legal and documentary bottlenecks of Indian Short Sea Shipping have been analyzed and recommendations were made from reviews of experts in the industry.

RECOMMENDATIONS

It is recommended that the implementation of Short Sea Shipping could be successful only if there emerges longstanding policies and researches from the Government of India. There should be researches to find feasible routes in the Indian Short Sea Shipping / IWT which have potentials for development in future. There should be further researches on the potential cargoes which could be shifted to Short Sea Shipping. A detailed study of environmental issues of Short Sea Shipping should also be conducted to analyze its impacts. The number of researches on Short Sea Shipping in India is very limited compared to other countries. The government must focus on innovative researches to explore the potentials of Short Sea Shipping in the country.

REFERENCES

- Alderton.P (1999), *Port management and operations*, London: LLP reference publishers, PP – 133
- Beri.G.C (2008), *Marketing Research*, New Delhi: Tata McGraw-Hill Publishing limited, PP 62.
- Cohen.L, Manion.L, Morrison.K (2007), *Research methods in education (6th edition)*, New York: Routedge Ltd, PP 491.
- Chary.M.T (2009), *India: Nation on the move*, Bloomington: i- Universe, PP 340
- Chaudhury P. D.(2005), *Modal Split between Rail and Road Modes of Transport in India*, [Online] Available from: http://www.vikalpa.com/pdf/articles/2005/2005_jan_jun17_33.pdf, (Accessed on: 17th June 2010)
- Director General (DG) of Shipping (2010), *TCS report on Indian Coastal Shipping* [Online], Available from <http://www.dgshipping.com/dgship/final/tcsrep/Default.htm> (Accessed on 2nd July 2010)
- Department of Transport (2006), *Monitoring and understanding CO2 emissions from Road freight* [Online], Available from www.freightbestpractice.org.uk/.../3705_4738_monitoring-and-understanding-co2-emissions---.aspx (Accessed on 2nd June 2010)
- Dredgingtoday (2010), *India: Poor port infrastructure results in annual losses of Rs 1400Crores*, [Online] Available from <http://www.dredgingtoday.com/2010/03/14/india-poor-port-infrastructure-results-in-annual-losses-of-rs-1400-crore/> (Accessed on 7th Aug,2010)
- Ernst and Young (2001), *Coastal Shipping in India: From Challenges to Opportunities* [Online] Available from http://www.dnaindia.com/india/report_gujarat-is-india-s-key-carbon-and-cost-cutting-trade-hub_1350206 (Accessed on 20th June, 2010)

- Economic times (2009), *Vallarpadam transshipment project spurs investor interest in Kerala*, Available from <http://economictimes.indiatimes.com/articleshow/4480338.cms> (Accessed on 27th July 2010)
- Gupta.S.P.(2004). *India Vision 2020*. New Delhi: Planning Commission of India, PP 703-709.
- Inland Waterways Authority of India (2010), *National Waterways*, Available from <http://iwai.nic.in/Waterways.htm>, (Accessed on 7th July 2010)
- Indian Port Association. (2007). *Co-ordination of business plans for major ports in India*. [Online] Available from ipa.nic.in/Definitief%20Volume%201.pdf. (Accessed on 9th June, 2010)
- Inland Waterways Authority of India (2009), *Paper presented in the seminar conducted by institute of marine engineers at Cochin, India*. Available from iwai.nic.in/paperonsecumrivervesseltdt161209hq.pdf (Accessed on 20th July 2010)
- India Maritime Summit (2008), *Strategies of Coastal shipping/ IWT ship owners* [Online], Available from http://www.marinersnetwork.com/index2.php?option=com_content&do_pdf=1&id=81 (Accessed on 2nd Aug, 2010)
- Jaiswal (2004), *Infrastructural and institutional bottlenecks in the development of coastal Shipping* [Online], Available at <http://www.adb.org/Documents/Reports/Consultant/TAR-IND-4066/Transport/sundar-jaiswal.pdf> (Accessed on 15th June, 2010)
- Karthigarani and Sacratees. (2008). *Environment impact assessment*. New Delhi: A.P.H. Publishing Corporation.
- Lloyd's List. (2007). *India : Dawn of a new era*. London: Informa plc. Nov,2007,PP 24
- Lombardo.G.A (2004), *Short Sea Shipping: Practices, opportunities and challenges* [online] Available from http://www.insourceaudit.com/Whitepapers/Short_Sea_Shipping.asp#_ftn3 (Accessed on 12th June, 2010)
- Mantrana. (2010), *Indian coastal Shipping: overview* [Online], Available from <http://www.mantrana.in/Coastal-Shipping.html>. (Accessed on 27th June 2010)
- MARAD (2006), *Four corridor case studies of Short Sea Shipping* [Online], Available from [http://www.marad.dot.gov/documents/USDOT_-_Four_Corridors_Case_Study_\(15-Aug-06\).pdf](http://www.marad.dot.gov/documents/USDOT_-_Four_Corridors_Case_Study_(15-Aug-06).pdf) (Accessed on 2nd June,2010)
- Mehta.P.S (2006), *A functional competition policy for India*, New Delhi: Academic foundation, PP 242-244.
- Ministry of Shipping (2006), *National Maritime Development Programme*, Available from shipping.nic.in/writereaddata/linkimages/NMDP9290454966.doc (Accessed on 24th July, 2010)
- Ministry of shipping, India. (2010), *Coastal & Overseas Tonnage in India* [Online] Available from <http://shipping.nic.in/index1.asp?linkid=147&langid=1> (Accessed on 2nd July 2010)
- National Highway Authority of India (NHAI) (2010), *Financing of NHDP*, Available from www.nhai.org/nhdppfinance.htm (Accessed on 2nd June)
- OECD (2008), *OECD environment outlook to 2030*, Paris : OECD Publication, PP- 180-185
- Panagariya, A. (2008). *India: The emerging giant*. Newyork: Oxford University Press, PP
- Pipavav (2010), *Connectivity to key markets*, [Online] Available from <http://www.pipavav.com/connectivity.php> (Accessed on 2nd Aug 2010)
- Port Technology International. (2004). *Indian Ports: Development and Privatisation issues*. London: Henley Publishing Ltd Pg 15-16.
- Prakash.B.A(2009). *The Indian Economy since 1991: Economic reforms and performance*. New Delhi: Dorling Kindersley(India) Pvt Ltd.
- Rajaram.T and Das.A (2006), *Need for participatory and sustainable principles in India's EIA System: lessons from Sethusamudram Ship Channel Project*, [Online] Available from <http://www.ingentaconnect.com/content/beeche/iapa/2006/00000024/00000002/art00004> (Accessed on 23rd June,2010)
- Ramanathan.R (2004) , *Indian Transport towards new millennium*, New Delhi : Concept publishing company. PP 65
- Samanda.P.K. & Mohanti. A.K. (2005). *Ports Infrastructure and Economic development*. NewDelhi: Kalpaz Publication Pg 108-109,270
- Sekaran.U (2000),*Research methods for business (3rd edition)*,New York: John Wiley and Sons, Inc, PP 4,122
- Sriraman,S. D. (2010). *Long Term Perspectives on Inland Transport in India*. *MITES Journal* , 18.2-18.3,18.6.
- Sunder and Jaiswal (2007), *Bottlenecks in growth of coastal shipping*, New Delhi: Asian Development Bank PP 1- 7
- TCS (2003), *Research report of Tata Consultancy services on Indian coastal shipping*, [online] Available from <http://www.dgshipping.com/dgship/final/tcsrep/Default.htm> (Accessed on 2nd June 2010)
- The Hindu (2010), *Coastal shipping rules may be relaxed for Vallarpadam terminal*, [online], Available from <http://www.thehindubusinessline.com/2010/07/18/stories/2010071852260300.htm> (Accessed on 25th July, 2010)
- Union Budget (2004), *Speech of P. Chidambaram, Ministry of finance* [Online], Available from <http://indiabudget.nic.in/ub2004-05/bs/speecha.htm> (Accessed on 20th June, 2010)
- World Bank. (2010). *India Transport Sector*. [Online] Available from <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/EXTSARREGTOPTRANSPORT/0,,contentMDK:20703625~menuPK:868822~pagePK:34004173~piPK:34003707~theSitePK:579598,00.html>. (Accessed on 1st July 2010)

LIST OF ABBREVIATIONS

BOT	:	Build Operate Transfer
DWT	:	Dead Weight Tonnes
EU	:	European Union
IWT	:	Inland Water Transport
NW	:	National Waterways
POL	:	Petroleum, Oil and Lubricants
SSS	:	Short Sea Shipping
TCS	:	Tata Consultancy Services

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