



cutting through complexity



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TRANSPORTATION AND LOGISTICS

Logistics game changers

Transforming India's
logistics industry

Foreword

The Indian transportation and logistics industry is poised at a crossroads along its growth trajectory. This is particularly important at this juncture in light of the ongoing global economic uncertainty that has been impacting the Indian market to an extent. However, driven by strong fundamentals and consistent demand, the resilient Indian economy in general and, the logistics sector in particular, are seemingly well-positioned to sail through turbulent global waters.

Rising investment, rapidly evolving regulatory policies, mega infrastructure projects and several other developments in recent times have driven the Indian logistics market, simultaneously gradually overcoming infrastructure-related constraints and logistics-centric inefficiency. While traversing this road to development, multiple projects and services have been either at the planning or implementation stage. Such developments have spanned across all modes of transportation and logistics services and have involved the active participation of all stakeholders, ranging from logistics service providers and policy makers to end users and industry think tanks. To analyze such path-breaking ideas – which may be termed as logistics game changers – is the objective of this research paper, which attempts to identify and dive deep into key developments and trends across six sub-sectors and their likely impact on the wider industry.



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PREFACE

A SOPHISTICATED LOGISTICS SECTOR SHOULD CONSTITUTE THE BACKBONE OF A LARGE, MATURE ECONOMY. IN THIS CONTEXT, ALTHOUGH INDIA'S LOGISTICS SECTOR HAS WITNESSED INCREASED INVESTMENT, EVOLVING REGULATORY POLICIES, MEGA INFRASTRUCTURE PROJECTS AND SEVERAL OTHER INITIATIVES, THERE IS A NEED TO SIGNIFICANTLY ACCELERATE THE PACE OF SUCH DEVELOPMENTS.

A glimpse into various industrial sectors highlights the anticipated upsurge in trade and commerce and the consequent growth in the need for a strong logistics industry^{1,2}:

- India's nominal GDP could grow from USD 1.8 trillion currently to USD 3.6 trillion by 2020 at an annual growth rate of 9 percent.
- By 2030, India's crude steel production is expected to increase by a factor of 4.
- The demand for cement in the country is expected to double by 2030.
- Agricultural output, although reduced in size as a percentage of the economy, is expected to increase from 207 million metric tonnes (MMT) to 295 MMT by 2020.
- The Indian textiles industry is expected to triple from USD 78 billion currently to US\$220 billion by 2020.
- The share of organized retail is expected to increase from 5 percent currently to 24 percent by 2020.
- India's industrial energy consumption is expected to double by 2020. In this scenario, the country will need to mine 2 billion tonnes of coal by 2030 and transport 75 percent of mined coal. Further, around 30 percent of total transported coal will have to be imported through ports.
- Overall export-import (EXIM) cargo at Indian ports is projected to increase to around 2,800 MMT by 2020 from approximately 890 MMT currently.
- Finished consumer goods, both imported and those produced in India, will have to be transported to the country's middle-class consumers, which, by 2030, are expected to increase fourfold from the current middle class population of 160 million.

Thus, to sustain and drive economic growth, the movement of goods associated with a mature economy will require a vastly superior service sector as well as physical logistics infrastructure. The transformation of India's logistics landscape needs a clear, long-term and sustainable vision encompassing initiatives that are proactive rather than reactive to leverage India's economic potential in future.

Much has been authored around the various opportunities that the Indian logistics industry offers and the challenges it faces. Yet, it is perhaps an opportune time to dive deep into certain specific developments — those in the pipeline as well as those that must be focused upon in the near future — that could potentially overhaul the way India moves, stores and delivers.

This paper features analysis on the key developments and opportunities across various modes of transportation — including road, rail, air, ports and water, as well as the storage segment — which could rightly be termed as game changers for the logistics industry. In this context, we have researched the potential of certain key projects and trends imperative to realize an efficient, effective, lean and reliable Indian logistics network.

¹ Integrated Logistics Strategy, National Transport Development Policy Committee, September 2011

² Indian Textile Industry – The Golden Decade 2011–2020, May 2012, KPMG in India analysis

EMERGING MEGA TRENDS IN LOGISTICS

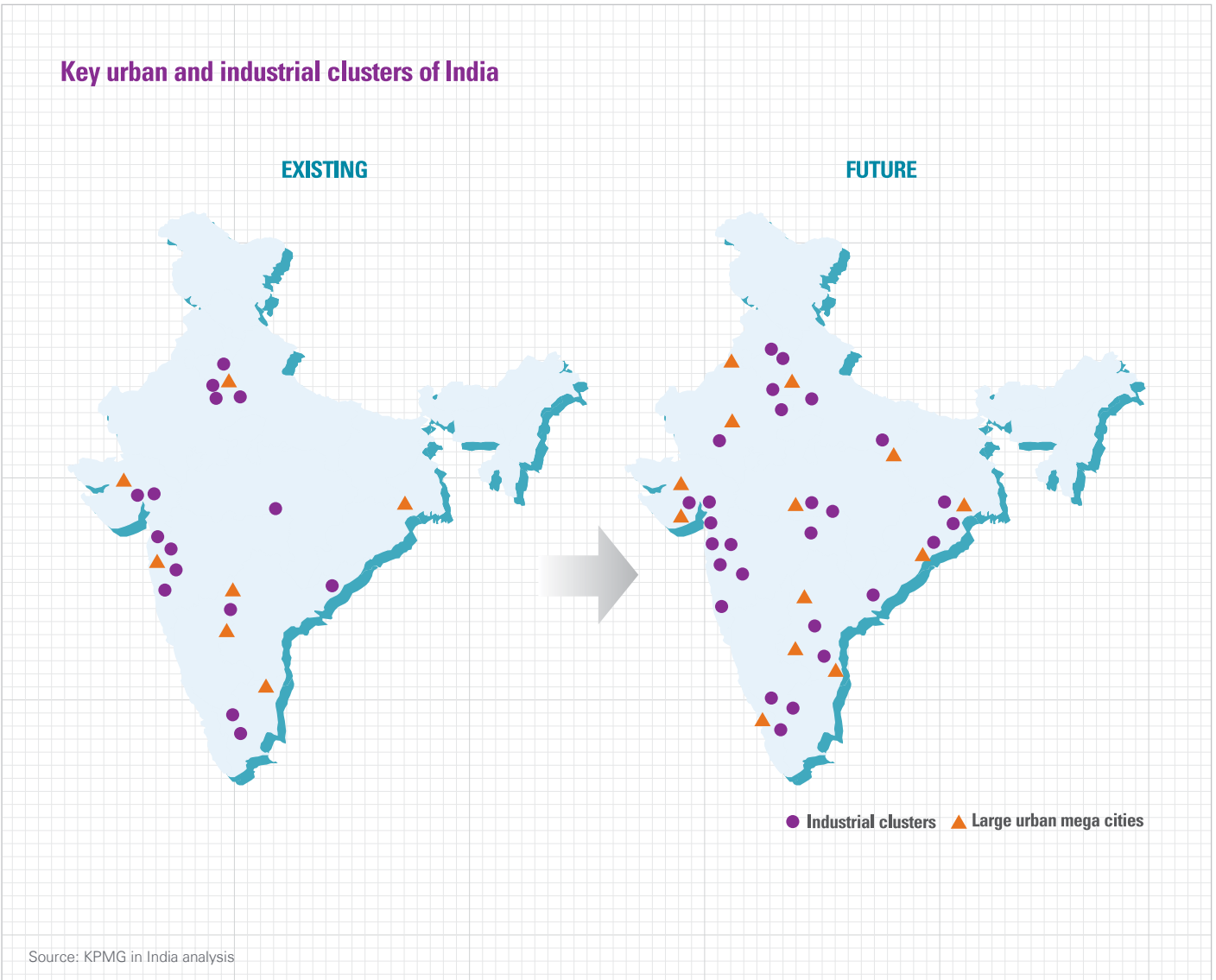
FROM A LOGISTICS PERSPECTIVE, THREE KEY
MEGA TRENDS ARE EXPECTED TO AFFECT THE
NATURE OF LOGISTICS INFRASTRUCTURE AND
SERVICES IN THE COUNTRY.

A. Changing demographics

As India continues its transformation into a manufacturing and services-led economy, growing migration toward urban areas is expected. It is anticipated that more than 60 percent of India’s urban population will be concentrated in 20–25 urban clusters by 2030.³

Against this backdrop, logistics support infrastructure in India’s metros is inadequate for serving existing trade needs. Challenges range from the availability of assets to congestion, regulation and monitoring. In future, industrial clusters will need dedicated freight corridors (DFCs) such as the Delhi-Mumbai Industrial Corridor with high-speed connectivity to key ports and urban centers. These corridors and access routes will likely help keep the cost of supplying goods and services to these urban centers either low or manageable.

The growth of urban centers in size and number would necessitate the need for a proactive approach in logistics planning to sustain growth. Further, it will be imperative to oversee that the provision of logistics infrastructure for upcoming infrastructure clusters is not at the expense of fulfilling the transport needs of India’s expanding urban clusters.



³ Integrated Logistics Strategy, National Transport Development Policy Committee, September 2011

B. Evolving requirements of trade

It is anticipated that the surge in trade will demand enhanced sophistication in logistics infrastructure and services across modes. As international standards are introduced in a competitive, service-oriented environment, existing infrastructure will likely become obsolete:

- Growth in the domestic manufacturing and retail segments has given impetus to the demand for efficient warehouse-management services. However, warehousing continues to see little investment. Current spending on organized warehousing in India constitutes 9 percent of total logistics spending, as against 25 percent in the US⁴.

- Existing small warehouses need to be replaced by large, modern warehouses that incorporate global standards such as tall designs, modular racking systems, palletization, and the use of automation and IT.
- The growth of niche industries will likely necessitate value-added services such as cold-chain warehousing, packaging and track-and-trace services.
- Existing infrastructure needs to be upgraded to increase throughput. For example, average containers handled per ship per hour is 18 in India as compared to 28 internationally. Further, the average distance traveled per truck per day is 200 kilometers, which is half the international standard.⁴

Trade would require commodity- and geography-specific storage and transportation assets. Without these, the industry's investment potential in other parts of the economy is likely to face roadblocks.

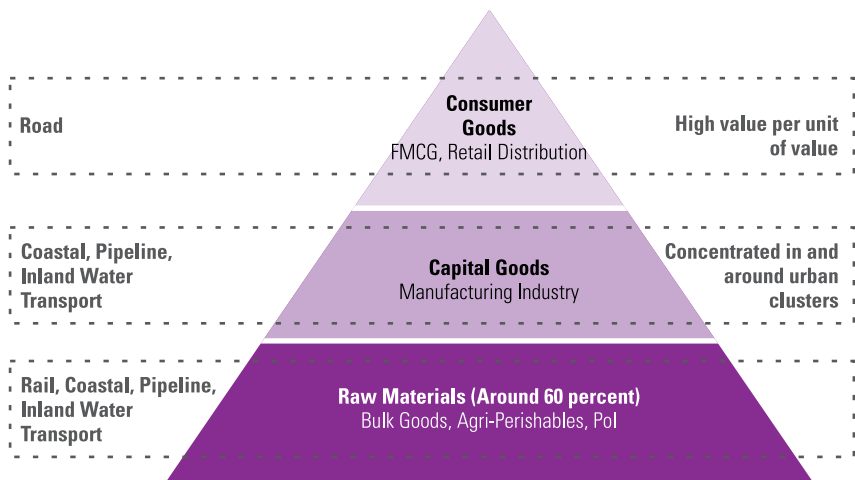
C. Increasingly skewed modal mix

India's logistics sector is currently not only constrained by lack of infrastructure; it is perhaps even more restricted by the misuse of transportation modes for certain types of commodity, as well as limits on the free use of transportation modes for others.

In terms of volumes involved, cargo in India can be classified in a pyramid-like fashion, with each category entailing distinct logistical considerations:

The optimal movement of freight by matching cargo categories with transportation modes will be crucial for expanding volumes across categories. The lopsided utilization of transportation infrastructure such as roads and railways (as is the case currently) stresses networks and adds to inflating costs and turnaround times. Deriving the best possible selection of modes to lower congestion and facilitate the smooth movement of cargo is the need of the hour.

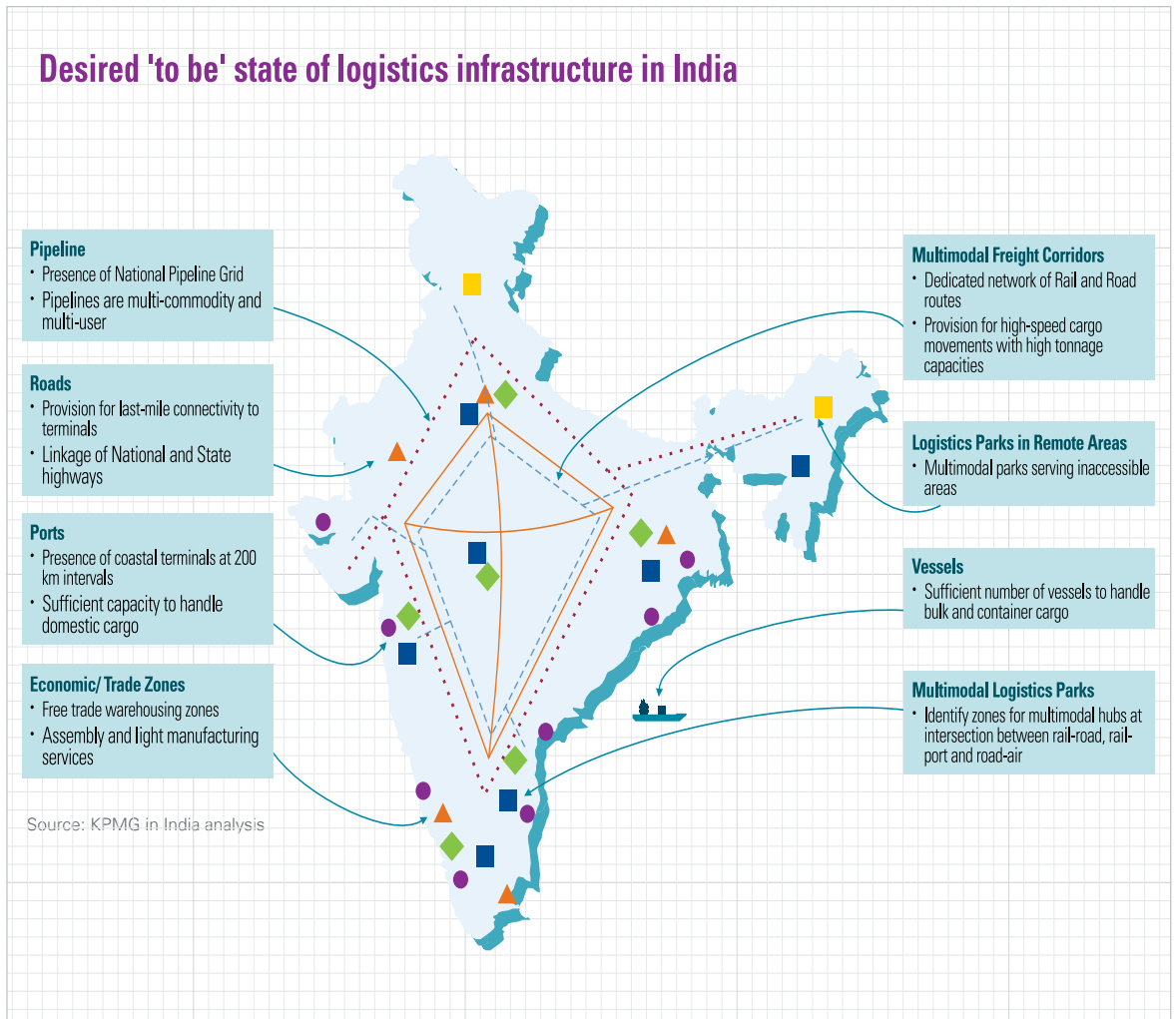
Cargo class/Volume pyramid and optimal modes of transport



Source: Integrated Logistics Strategy, National Transport Development Policy Committee, September 2011

⁴ Integrated Logistics Strategy, National Transport Development Policy Committee, September 2011

The desired ‘to be’ state would be an overlay of transportation networks, allowing for the efficient transportation of each commodity type as well as a natural handover point — where networks intersect and where large quantities are broken down into smaller volumes for last-mile transportation into urban centers.



THE LOGISTICS GAME CHANGERS

AIR



09

- EMERGENCE OF NEW CARGO CENTERS
- INCREASING PARTICIPATION OF SERVICE PROVIDERS
- IMPROVED AIR CARGO INFRASTRUCTURE AT AIRPORTS

PORTS



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- MARITIME AGENDA 2020
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- EMERGENCE OF MODERN WAREHOUSING FORMATS
- FREE-TRADE WAREHOUSING ZONES

WITH A FUTURE THAT IS SEEMINGLY BRIGHT, THE INDIAN LOGISTICS INDUSTRY IS CERTAINLY ON THE CUSP OF CHANGE. YET, MUCH OF ITS SUCCESS WILL LIKELY DEPEND ON THE VARIOUS ASPECTS THAT DIRECTLY INFLUENCE IT. CURRENTLY, THE INDUSTRY MAY BE VIEWED AS ONE THAT IS BEING DEFINED BY DYNAMIC TRENDS, BUOYED BY RAPID INDUSTRIAL AND ECONOMIC GROWTH. IN THIS CONTEXT, OUR ANALYSIS OF GAME CHANGERS ACROSS THE INDIAN LOGISTICS LANDSCAPE FOCUSES ON INITIATIVES AND DEVELOPMENTS ACROSS FOUR UNIVERSAL MODES OF GOODS TRANSPORTATION – AIR, ROAD, RAIL AND WATER. FURTHER, PORTS AS GATEWAYS TO MARITIME TRADE AND WAREHOUSING, A KEY ENabler FOR EFFICIENT LOGISTICS, HAVE BEEN CONSIDERED FOR A HOLISTIC EVALUATION OF THE INDUSTRY.

IT MAY BE RIGHTLY ARGUED THAT OTHER CRITICAL ELEMENTS COULD BE IMPERATIVE TO THE NATION’S LOGISTICS DEVELOPMENT – BOTH IN TERMS OF ADDITIONAL SEGMENTS OR SPECIFIC DEVELOPMENTS WITHIN THE SIX SEGMENTS STUDIED. YET, FOR PURPOSES OF EFFECTIVE ANALYSIS, WE HAVE FOCUSED ON SPECIFIC DEVELOPMENTS EXPECTED TO SIGNIFICANTLY REVOLUTIONIZE EACH SEGMENT’S CONTRIBUTION TO THE INDUSTRY.


RAIL



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- DEDICATED FREIGHT CORRIDORS

ROADS



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- DEVELOPMENT OF NATIONAL HIGHWAYS
- EVOLUTION OF TRUCKING COMMUNITY

WATER



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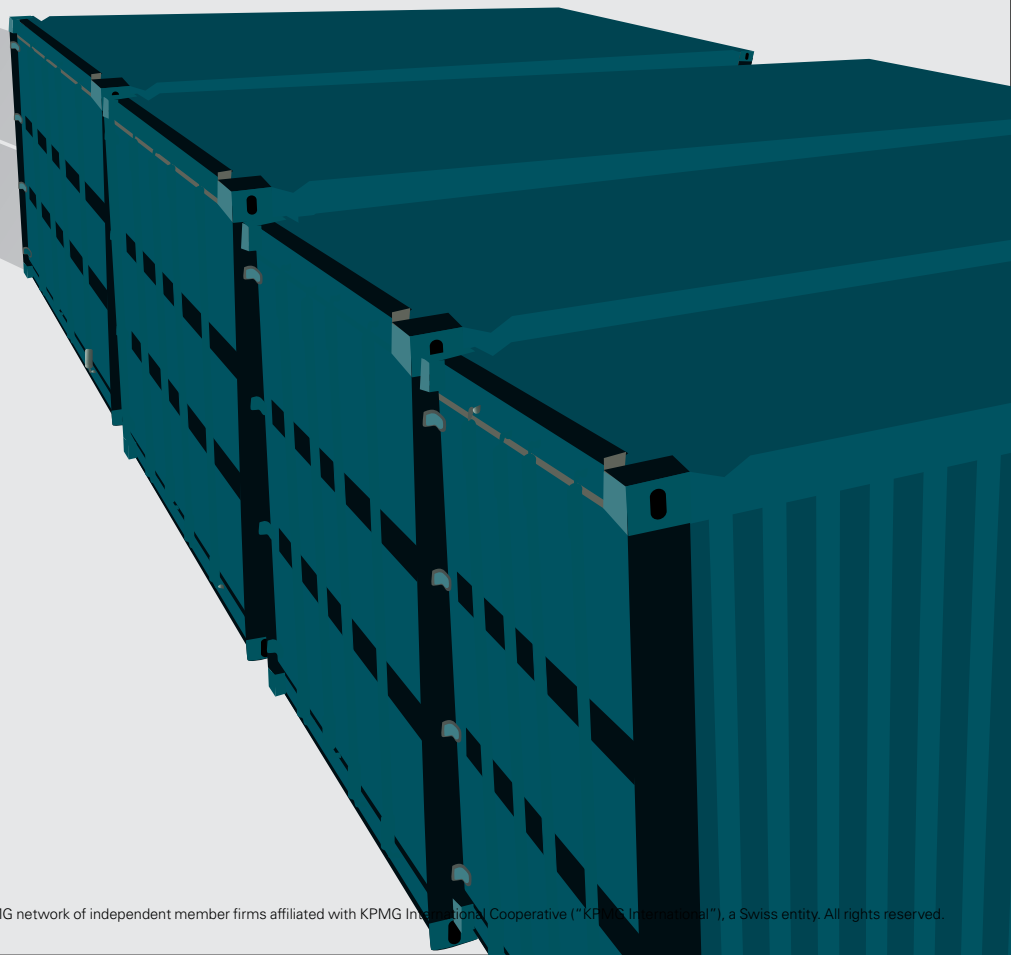
- INLAND WATERWAYS
- COASTAL SHIPPING



AIR



Air cargo serves as a vital link between domestic and international markets. The contribution of air cargo, thus, needs to be adequately and appropriately focused upon, so that India's fast growing international and domestic trade by air is facilitated, integrated and expanded. While the total volume of air cargo traffic currently constitutes about 1 percent of total trade, it accounts for close to 29 percent of total trade value.

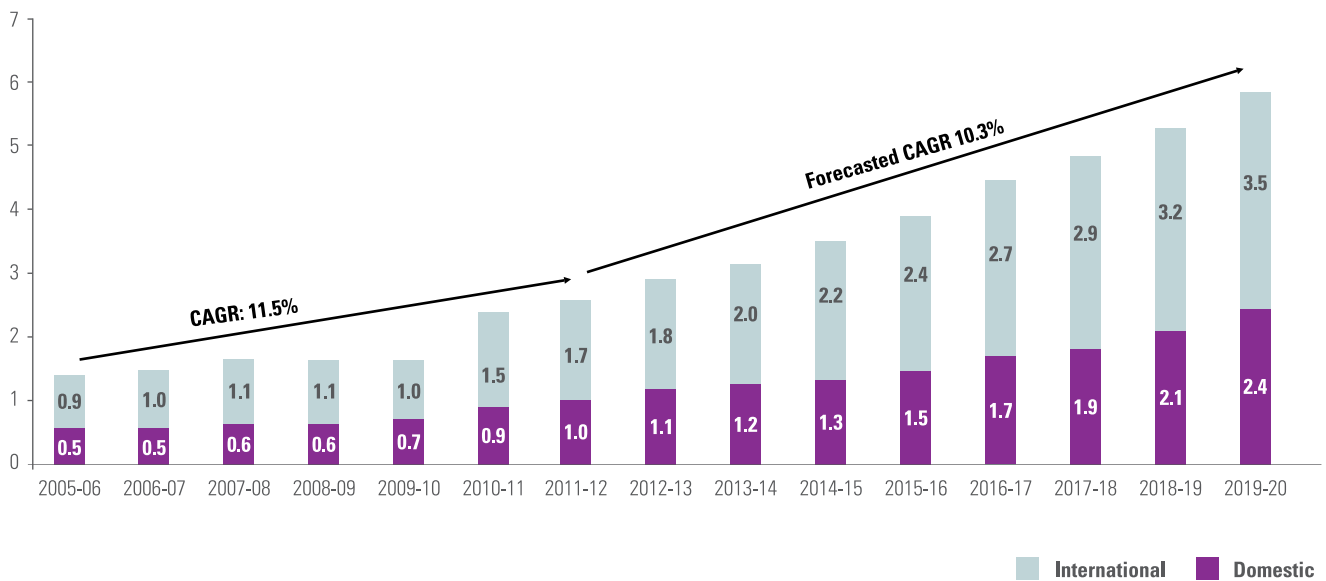


In the early 1990s, the GoI adopted the Open Sky policy for the air cargo sector, under which Indian or foreign carriers were allowed to operate both scheduled and non-scheduled cargo services between all airports in India. Since, the sector has witnessed significant growth from 0.7 MMT in 1995–96 to 2.7 MMT in 2011–12⁵.

Between 2006 and 2012, air cargo traffic handled at Indian airports increased at a CAGR of 11.5 percent, with domestic cargo growing at 12.3 percent, faster than international cargo (11.2 percent). Over the next decade, total air cargo traffic is expected to grow at a CAGR of 10.3 percent to reach 5.9 MMT, with domestic and international cargo expected to grow at CAGRs of 11.6 percent and 9.5 percent, respectively, and contributing 2.4 MMT and 3.5 MMT, respectively by 2020.⁶

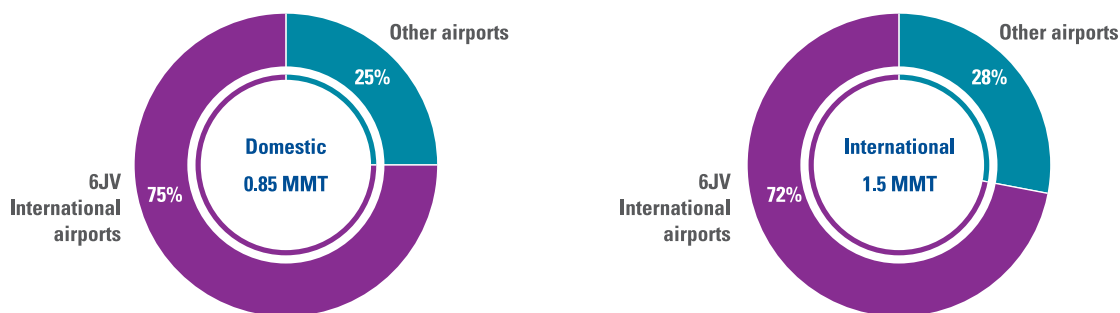
International cargo, which accounts for two-thirds of total cargo, is largely concentrated in the metro airports of Mumbai, Delhi, Chennai, Bengaluru and Hyderabad. The Delhi and Mumbai airports collectively handle around 50 percent on India’s domestic and international cargo.⁷

Air cargo throughput for all Indian airports



Source: AAI, MoCA, KPMG in India analysis

Domestic and international cargo traffic (2011) – by airport category



Note: 6JV International airports are Mumbai, Delhi, Hyderabad, Bengaluru, Nagpur and Kochi
Source: AAI, KPMG in India analysis

⁵ Airports Authority of India, KPMG in India analysis
⁶ Ministry of Civil Aviation, KPMG in India analysis
⁷ KPMG in India analysis

The significant untapped potential of air cargo in India is apparent from the fact that the total cargo volume of 2.3 MMT, which all Indian airports handled in 2011, lagged behind traffic handled at other airports in Asia such as Hong Kong (4.6 MMT), Dubai (3.0 MMT), Incheon (2.7 MMT) and Shanghai (2.6 MMT).⁸

In future, the emergence of new cargo hubs and the growing ecosystem of service providers to facilitate efficient air cargo services will likely drive demand and related investments in the air cargo segment.

Emergence of new cargo centers

While the metros have led the initial charge, opportunities in the air cargo sector now extend to tier-II cities, which constitute the majority of the country's population. Against a CAGR of 10.5 percent at metro (tier-I) hubs between 2006 and 2011 — when volumes increased from 1.3 MMT to 2.1 MMT — the tier-II (non-metro) hubs witnessed increased growth of 14.5 percent during the same period, with volumes increasing from 0.13 MMT to 0.26 MMT.⁹

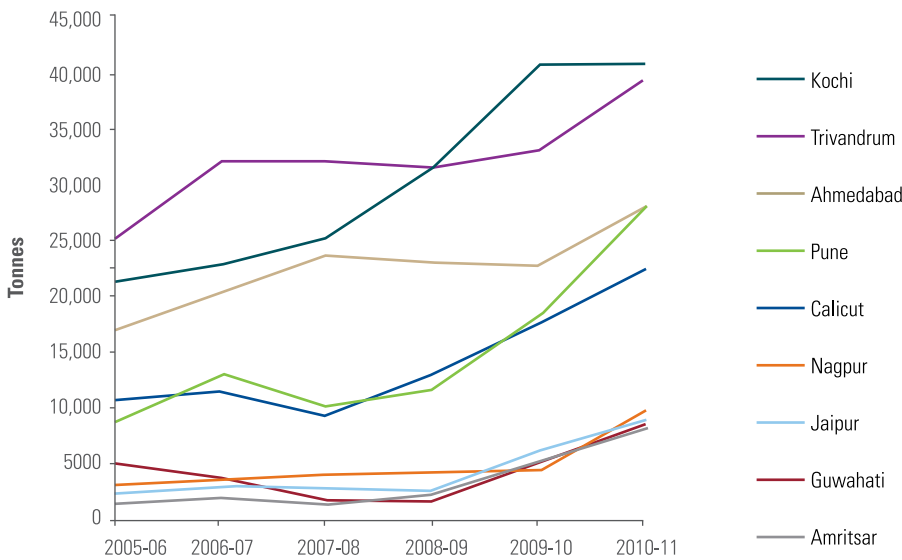
- Among the relatively large micro-markets that handled more than 20,000 tonnes in 2011, Pune almost

trebled its volumes during 2006–11, thus increasing volumes from 8,666 tonnes to 27,828 tonnes. Kozhikode and Kochi have also demonstrated healthy growth in the 14–16 percent range.¹⁰

- In markets that handled sub-10,000 tonne cargo, three trends are significant:
 1. Amritsar and Nagpur displayed CAGRs of more than 25 percent during 2006–11, catering to rising cargo demand in India's regional pockets.¹⁰

2. Jaipur, with a growth rate of 27.3 percent, is expected to be the next crucial destination catering to increasing freight demand in northwestern India.
3. In the North-East region, Guwahati (CAGR: 13.1 percent) and Agartala (CAGR: 19.2 percent), the traditional leaders, are closely chased by Imphal (CAGR: 30.3 percent)¹⁰. Although these high growth rates can be attributed to low base volumes, the trend indeed indicates an encouraging outlook for this region of the country.

Air freight in major tier-II cities



Note: air freight volumes include both domestic and international freight, and analyzed airports include those with either >15,000 tonnes freight or >20 percent growth rate (except Guwahati – included for North-eastern comparison). Source: CRISIL database, accessed 12 July 2012; KPMG in India analysis

Rising local demand, improved international connectivity and resulting consolidation activity, and expanding cargo-handling infrastructure are the key drivers of increased freight handling at airports such as Cochin, Trivandrum and Ahmedabad. Other emerging hubs such as Pune and Jaipur are also witnessing high growth, primarily driven by rising domestic volumes, freight handling services by low-cost airlines, and enhanced connectivity.¹¹

8 Airports Authority of India, KPMG in India analysis
 9 CRISIL database, accessed 13 July 2012; KPMG India analysis; Metro (tier-I) hubs include Mumbai, Delhi, Chennai, Bengaluru, Kolkata and Hyderabad

10 CRISIL database, accessed 13 July 2012; KPMG in India analysis
 11 KPMG in India analysis

Increasing participation of service providers

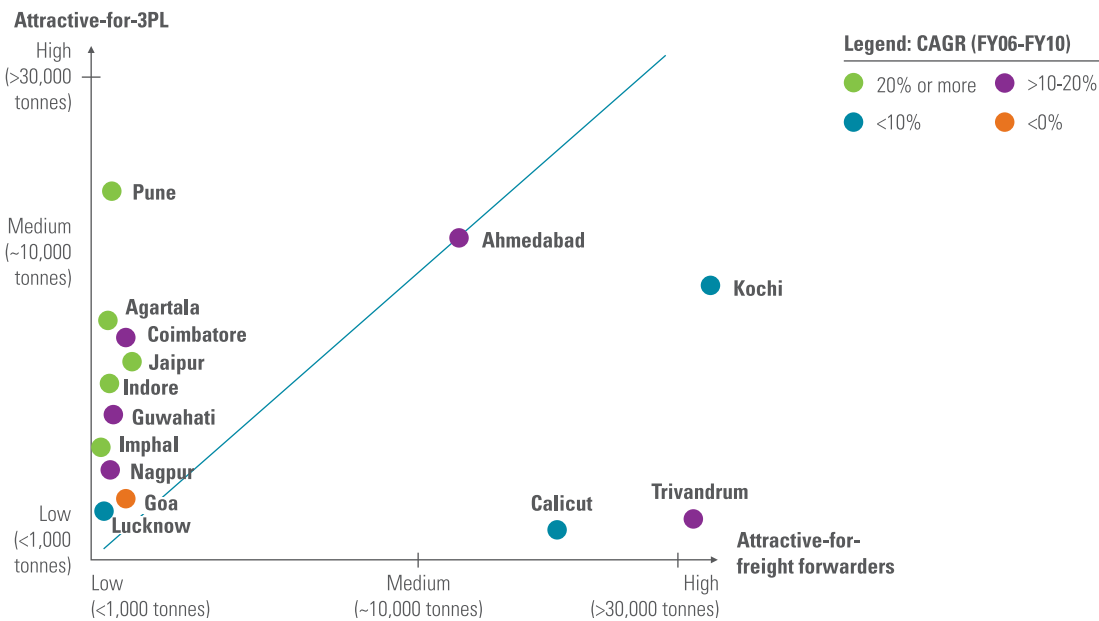
Analysis of trends at tier-II city airports indicates a clear segregation between upcoming hubs. They may be broadly classified into two categories based on their domestic versus export-import (EXIM) focus:

1. Attractive for third-party logistics (3PL) players
2. Attractive for freight forwarders

From a relative perspective, Trivandrum, Cochin and Calicut appear to be favorable for freight-forwarding companies; Pune, Nagpur, Guwahati and other cities seem to be inclined toward 3PL service providers. Ahmedabad is equally attractive for both classes of services, or a step ahead, for larger companies that provide a much wider spectrum of logistics offerings.

The analysis below suggests that sustainable strong growth is possible, both in conventional metro hubs as well as emerging tier-II cities. This would, in turn, drive investment requirements for airport infrastructure. Specifically, to lower cargo-related congestion at several airports, investments at dedicated air cargo terminals are more critical now than ever before.

Opportunity attractiveness of 3PL players and freight forwarders



Note: This representation is based on international freight (X axis) and domestic freight (Y axis) for 2011. Assumption: 3PL players and freight forwarders are domestic and EXIM cargo-focused, respectively. Source: CRISIL database, accessed 12 July 2012; KPMG in India analysis



Improved air cargo infrastructure at airports

Inadequate cargo handling and storage infrastructure at airports across India has been a longstanding challenge. Historically, India's airports have been primarily developed to cater to passenger traffic; thus, the requirement of air cargo traffic has not been given significant importance to date. Infrastructure related to effective cargo handling — including satellite freight cities with multi-modal

transport, cargo terminals, cold storage, automatic storage and retrieval systems, and the mechanized transportation of cargo — needs attention not only at metro airports but across the country.

A comparison of air cargo infrastructure at Indian airports with global practices highlights the prevailing lack of focus on air cargo infrastructure:

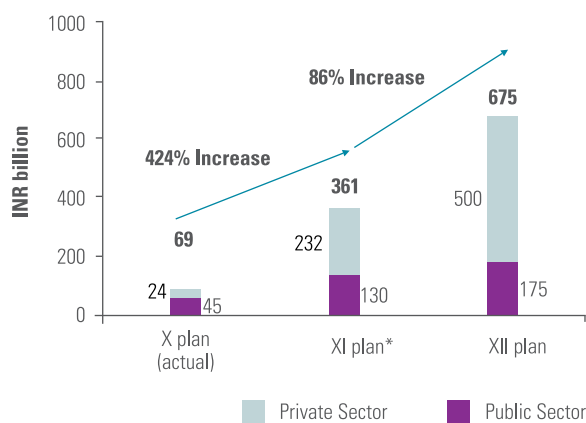
Global best practices	Cargo operations in India
Segregated facilities for different types of cargo	Most terminals do not offer separate facilities, except cold rooms
Dedicated perishable handling facilities that cater supply chain requirements	Investment in cold chain infrastructure (trucks and warehouses) to handle agricultural, pharma and other perishable commodities is inadequate.
Promotes transshipment handling/hub operations	Cargo terminal operators need to have separate license-handling areas for transshipment handling
Suitable waiting areas for trucks	Cargo terminal landsides are used as parking/holding areas for trucks, which leads to congestion.
Agent warehouses, office areas and other facilities situated near terminals	Agent warehouses are often located within the city
Dedicated facilities for air express operations with air-side and city-side access, multiple freighter parking bays	There is no fixed model, and cargo handlers are dependent on the decisions of individual airport operators. Very few dedicated freighter parking bays also exist at present.

Source: Presentation to Working Group by AI-SATS, 2011, 'Air Cargo Logistics in India', MoCA

However, increased spending in airport infrastructure through various airport projects is expected to improve air cargo infrastructure across the country.

Investment in airport infrastructure has grown substantially over the last three Five-Year plans, with INR361.4 billion of investment set aside in the Eleventh Plan (2007–12), reflecting a rise of 424 percent over investment of INR68.9 billion made during the Tenth Plan (2002–07).¹² The Twelfth Five-Year Plan (2012–17) outlines investments worth INR675 billion, an increase of 86 percent over the Eleventh Plan allocation.¹³ Further, the percentage contribution of private investments has multiplied 2.2 times, from 34.4 percent (INR23.7 billion) during the Tenth Plan to 74.1 percent (INR500 billion) during the Twelfth Plan.¹⁴

Investments in the airport sector



Note: *for the Eleventh Five-Year Plan, projections were revised in January 2011.

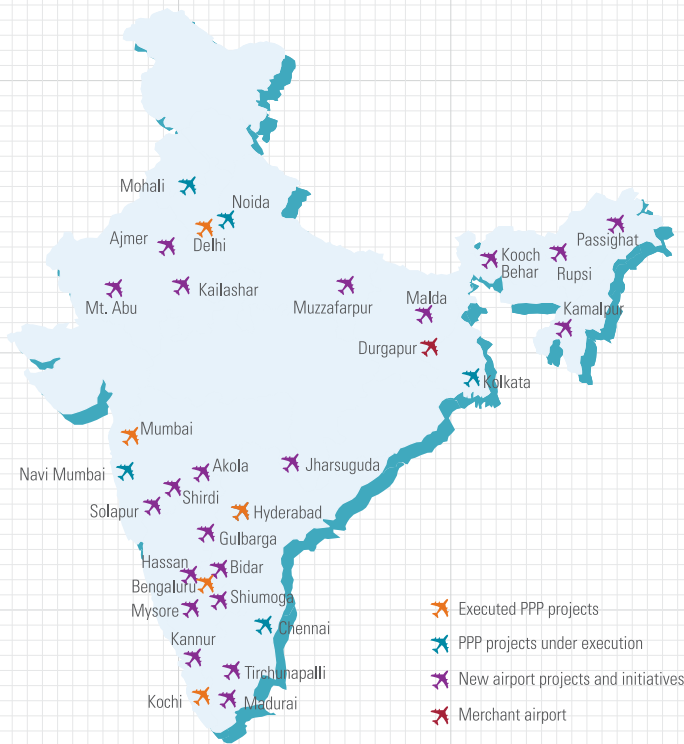
Source: 'Investment in infrastructure during XI five-year plan,' Planning Commission of India, January 2011 (for Tenth and Eleventh Five-Year Plan data), for Twelfth Five-Year Plan, report of sub-group on air traffic forecast, Planning Commission of India, 2011; KPMG in India analysis

12 For X and XI plan data – Report on 'Investment in Infrastructure during the Eleventh Five Year Plan,' Planning Commission of India, January 2011; KPMG in India analysis

13 Report of Sub-Group on Air Traffic Forecast, Planning Commission of India, 2011; KPMG in India analysis

14 For X Plan data – Report on 'Investment in Infrastructure during the Eleventh Five Year Plan', Planning Commission of India, January 2011; for XII Five Year Plan - Report of Sub-Group on Air Traffic Forecast, Planning Commission of India, 2011; KPMG in India analysis

Major airport projects



Source: KPMG in India analysis

Government's initiatives for the development of airport infrastructure in India

- Successful upgrade of the following airports:
 - Kochi International airport
 - Bengaluru International airport
 - Hyderabad international airport
 - Mumbai International airport
 - Delhi International airport
- Ongoing airport projects
 - Modernization of Kolkata and Chennai airports
 - Greenfield international airport at Navi Mumbai
 - Greenfield airport at Noida
 - Greenfield airport at Mohali in Punjab
 - Modernization of 35 non-major airports
 - Development of 25 greenfield airports are in tier-II and tier-III cities.

Heightened focus on developing cargo terminals and related infrastructure has driven initiatives in recent times. These include successful upgrades at airports in Cochin, Bengaluru, Hyderabad, Delhi and Mumbai, as well as the ongoing modernization of the Kolkata and Chennai airports. Further, the ongoing modernization of 35 non-metro airports, of which 20 are complete, is expected to enhance cargo handling and storage significantly.¹⁵



Actions required

Short- and medium-term initiatives required to facilitate India’s emergence as an international cargo hub include the following:¹⁶

- **Development of air freight stations (AFS):** Permitting the transfer of cargo to designate/customs-notified freight stations — AFS or ICDs — could help reduce congestion at airport premises. AFS, although notified by the Ministry of Finance, have yet to become operational. The barriers preventing the establishment of AFS should be removed, and Customs should be directed to issue concerned regulatory clearances.
- **Establishment of an Air Cargo Promotion Board (ACPB):** The establishment of an ACPB, comprising members from the finance, commerce, industry and civil aviation industries, can facilitate organized growth in this sector by driving policies and the planned development of air cargo hubs in the country. Some of the initiatives it can lead are the introduction of a cargo village concept at all hub airports, the development of an air cargo vision 2020 and a time-bound roadmap, the development of air cargo hub airports in India, and the formulation of quality of service (QoS) parameters for all stakeholders
- **Expansion of freighter fleet:** There is an urgent need for policy support and robust infrastructure to drive efficiency in freighter operations in the country. In this context, a consistent policy for the allotment of dedicated facilities at any of the airports for dedicated freighter aircraft should be developed. Further, dedicated terminal space and facilities for express airlines should be provided to streamline operations. Restrictions on night operations and high lease rentals also need to be relaxed from a profitability standpoint.
- **Execution of 24X7 customs operations in phases:** Customs authorities should consider the immediate introduction of round-the-clock operations that will expedite clearances, which include the processing of documents, assessments, and the examination and release of cargo. This model can be implemented initially at airports in the metros and gradually introduced in other cities.

Airport	Cargo handled (MMT), in 2010	Custom operating hours
Delhi	0.6	1 shift
Mumbai	0.7	1 shift
Hong Kong	4.6	24x7
Dubai	3.0	24x7
Incheon	2.7	24x7
Shanghai Pudong	2.6	24x7
CDG, Paris	2.0	2 shifts
Changi, Singapore	1.7	24x7
Schiphol, Amsterdam	1.6	2 shifts
Suvarnabhumi, Bangkok	1.3	24x7

Source: AAI, KPMG in India analysis

- **Professional training programs for air cargo:** The GoI may consider setting up a top-notch cargo training institute in collaboration with the industry. The institute could offer courses encompassing policy, regulations, finance, operations, technology and human resource development, to name a few.
- **Circular flow of information between airports, airlines and operators:** Inter-linkages and circular flow between airlines, airport operations and air freight stations, customs, banks, custom house agents (CHAs), and other allied agencies should be established to reduce unproductive delays.

16 KPMG in India analysis



Outlook

The air cargo sector continues to demonstrate high growth, with air cargo traffic expected to stabilize around a GDP multiple of 1.5, which would translate into growth of 10–11 percent. Increased trade activity — especially of physical goods — between India and the Asia-Pacific region and the relocation of trade epicenters to China, Southeast Asia and Africa could open up new opportunities for air cargo in India. Trade agreements would spur changes in cargo flow and lead to an eastward shift in the logistical center of gravity. The growth of the end-consumer sector is expected to drive air cargo growth for the next five years. The expected growth of electronic components by 25 percent, garment exports of 12–15 percent, the pharmaceutical sector at over twice the global growth of 14 percent, and high EXIM volumes in agro-processing products are likely to contribute to the air cargo sector in future. The development of tier-I and tier-II cities, driven by the shift of manufacturing to these cities, along with investments in supporting airport and logistics infrastructure,

can also be expected to drive domestic air cargo. The demand for time-definite service, which is best guaranteed by air, within the domestic economy, is expected to rise. Key enablers that are likely to help realize the potential of air cargo are infrastructure development and process efficiency. It is not surprising then that time-bound plans to smartly expand, invest and operate the air cargo sector could indeed constitute the hi-speed lever of the Indian logistics landscape.¹⁷

17 KPMG in India analysis

Flight Number	Class	Carrier	Origin	Destination	Time	Status
12**	1	A	050-461	B6		
12**	1	A	050-461	B61		
12**	1	A	050-461	A20		
12**	13**	1	A	050-461	B27	
12**	1	A	050-461	A14		
12**	1	A	050-461	A23		
13**	1	A	050-461	A21		
13**	1	A	050-461	B12		
13**	1	A	050-461	A11		
13**	1	A	050-461	A1		
13**	1	A	050-461	A4		
13**	1	A	050-461	A55		
13**	1	A	050-461			
13**	1	A	050-461	T6		
13**	1	A	050-461	A22		
13**	1	A	050-461	A19		
13**	1	A	050-461	A16		
13**	1	A	050-461	A60		
13**	1	A	050-461	A13		
13**	1	A	050-461	B23		
13**	1	A	050-461	A32		
13**	1	A	050-461	A63		
13**	2	A	050-461	C14		
13**	1	A	650-461	A15		
13**	1	A	050-461	B20		
470			TORONTO		13**	
126			MADRID		13**	
4220			PARIS-CH. DE GAULLE		13**	
3186			VIENNA-SCHENGEN		13**	
575			LISSABO		13**	
1104			LEIPZIG HALLE		13**	
710			TOKIO		13**	
580			KAIRO		13**	
3728			ZUERICH		13**	
4752			OSLO		13**	
3218			SANKT PETERSBURG		13**	
442			DETROIT		13**	
626			BAHRAIN-DAMMAN		13**	
288			HONGKONG		13**	
820			DOHA-RIAD		13**	
047			HOUSTON		13**	
3382			ATHEN		13**	
498			MEXICO CITY		13**	
720			TEHERAN-IMANKHANEINI		13**	
3178			TALLINN		13**	
901			SAN FRANCISCO		14**	
845			CALGARY		14**	
014			HAMBURG		14**	
6934			HAMBURG		14**	
3104			HELSINKI		14**	



PORTS

India's ports serve as gateways to India's international trade and facilitate 90 percent by volume and 70 percent by value of India's external trade via maritime traffic. The country's long coastline spans across 7,500 kilometers (kms) with 13 major ports governed by the Centre and about 176 non-major ports, of which only 60 are operational, governed by respective state governments and union territories. Of its major and non-major ports combined, 139 are along the west coast, while the remaining 50 ports are along the east coast.¹⁸

¹⁸ Maritime Agenda, 2010–2020, Ministry of Shipping website, <http://shipping.nic.in/>, accessed 15 November 2012

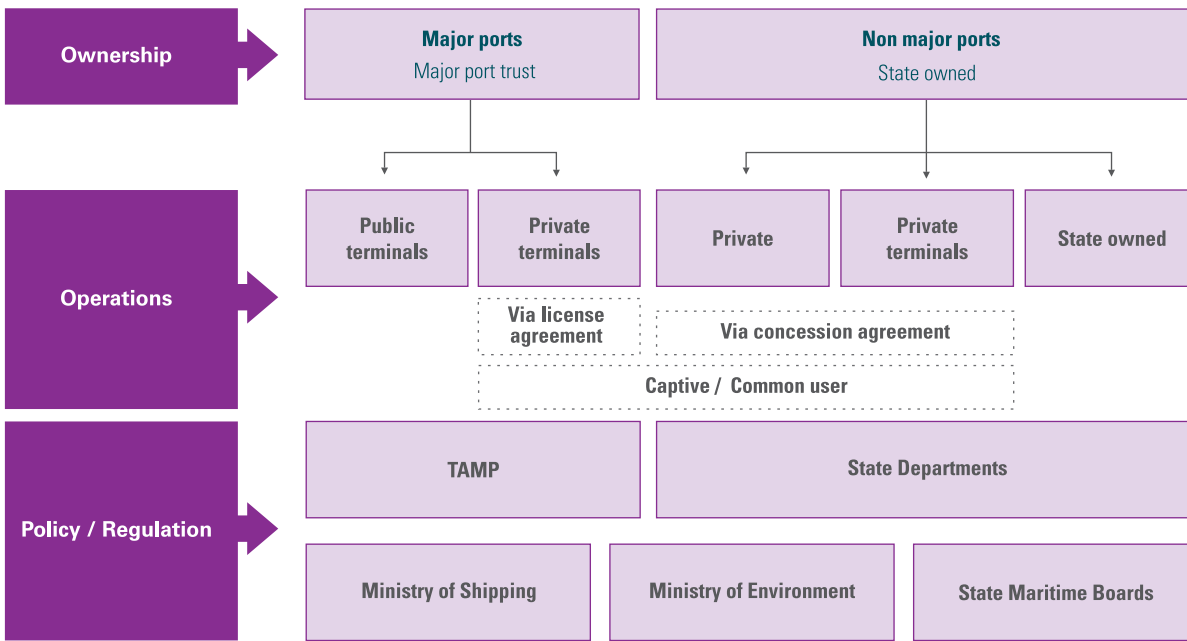


The Indian port market has witnessed significant growth over the last decade, growing from 368 MMT in 2000–01 to 898 MMT in 2011–12 at a CAGR of 8.5 percent. Following a temporary deceleration in cargo traffic (at a CAGR of 6 percent) — due to the global economic slowdown between 2007–08 and 2011–12 — cargo traffic across India’s ports is expected to touch 1,304 MMT by 2016–17 at an accelerated CAGR of 8 percent.¹⁹

Gujarat continues to be the leading maritime State, contributing 33 percent of total port cargo traffic and 71 percent of the total non-major port cargo traffic. Maharashtra, Andhra Pradesh and Tamil Nadu contributed 15 percent, 13 percent and 11 percent respectively to total port cargo traffic and rely mainly on traffic from major ports. Among the maritime states, Karnataka and Andhra Pradesh witnessed the highest CAGRs in cargo traffic of 32 percent and 28 percent respectively during the last decade.²⁰

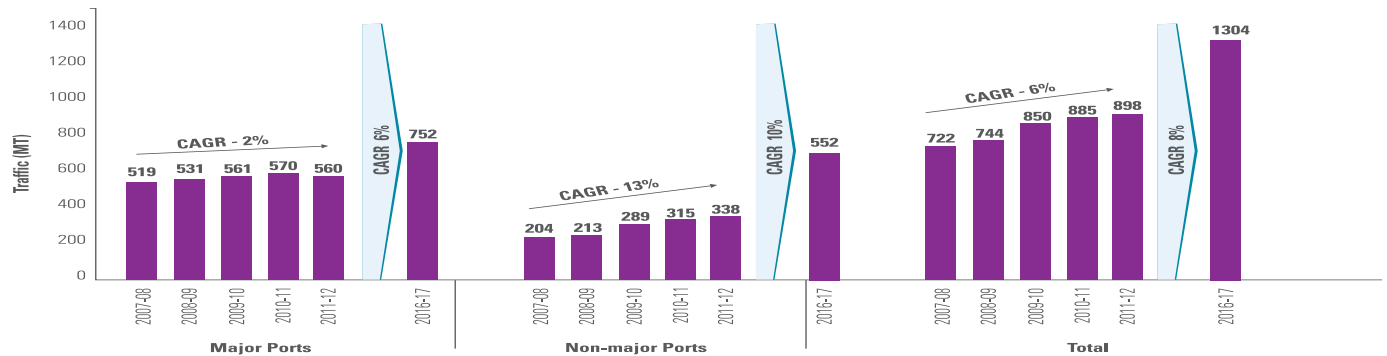
Given the pivotal role it plays in the economy, the Indian ports sector appears to be well-poised for a long-term growth wave. Looking ahead, the key game changers expected to drive growth in the port sector include fulfillment of Maritime Agenda 2010–2020, growth of non-major ports, increased containerization, and east coast ports.

India port sector: Institutional framework



Source: Ministry of Shipping and Indian port association, KPMG in India analysis

Outlook on traffic at Indian Ports



Source: KPMG in India analysis

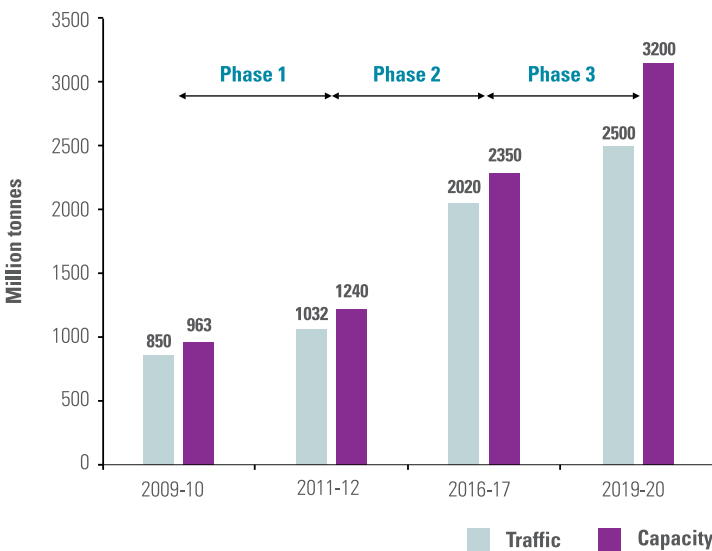
¹⁹ KPMG in India analysis
²⁰ Maritime Agenda 2010–2020, KPMG in India analysis

Maritime agenda: Vision 2020

The Government of India (GoI)’s ambition to replace the National Maritime Development Programme (NMDP) with the more comprehensive Maritime Agenda 2010–2020 is in line with its objective to increase port capacity. It intends to encourage private investment in both major and non-major ports and bring port performance at par with international standards. Through this program, the GoI plans to invest INR2,870 billion in generating total port capacity of 3,200 MMT and cater to expected cargo traffic of 2,500 MMT by the end of 2020.²¹

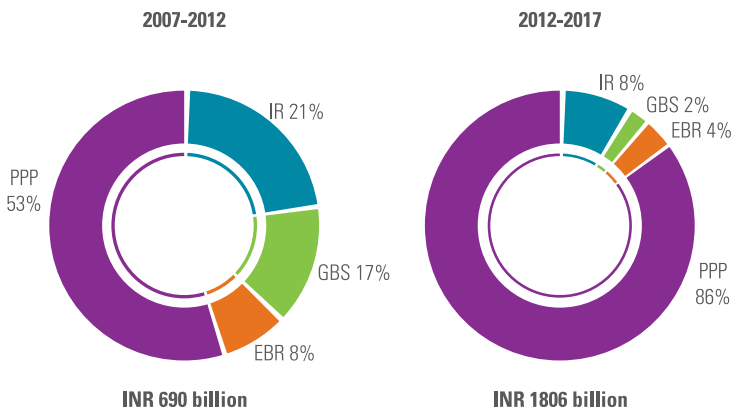
The public-private partnership (PPP) is expected to play an important role in the ports sector, particularly in the development of non-major ports — private investment is expected to contribute 66 percent and 98 percent of total investments in major and non-major ports, respectively. The development of two new major ports, one each on east and west coasts, are expected to reduce the above optimum capacity levels at existing ports.²¹

Capacity creation targets under Maritime agenda



Source: Maritime Agenda, 2010–2020, Ministry of Shipping website

Sources of income for ports



The contribution of private sector investments is expected to increase significantly

Note: Figure mentioned are investments envisaged for each duration as mentioned in the Working Group Report by PC

- IR: Internal Resources
- EBR: Extra Budgetary Resources
- GBS: Budgetary Support
- PPP: Public-private Partnership

Source: Maritime Agenda 2010–2020

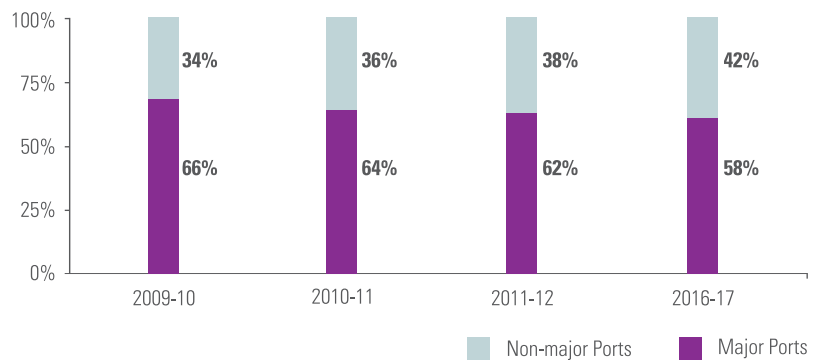
21 Maritime Agenda 2010–2020, KPMG in India analysis

Growth of non-major ports

Between 2007–08 and 2011–12, cargo traffic at non-major ports increased at a CAGR of 13 percent over a CAGR of 2 percent at major ports; its share increased from 28 percent to 39 percent, clocking 338 MMT in total traffic versus 560 MMT at major ports. During this period, cargo-handling capacity at non-major ports also witnessed higher growth than that at major ports. Capacity overruns at major ports, aided by a substantial increase in the cargo traffic of fertilizers, building material and coal, have resulted in significant investments in the development of non-major ports.²² Under the Maritime Agenda, maritime States have set ambitious targets to create additional capacity of 1,290 MMT at an estimated investment of INR1,680 billion between 2010–11 and 2019–20.

Growth of traffic at non-major ports over the past few years has been primarily led by the development of ports in Gujarat, mainly the Mundra, Pipavav and Hazira ports. These non-major ports are expected to cater to the northern region’s cargo traffic, thereby reducing the load on the JNPT and Mumbai ports. With the emergence of ports at Dhamra, Gopalpur, Gangavaram, Kakinada, Machilipatanam, Krishnapatnam, Kattupalli and Karaikal, the east coast is also expected to contribute to the development of non-major ports.²²

Market share of major vs non-major ports



Source: KPMG in India analysis

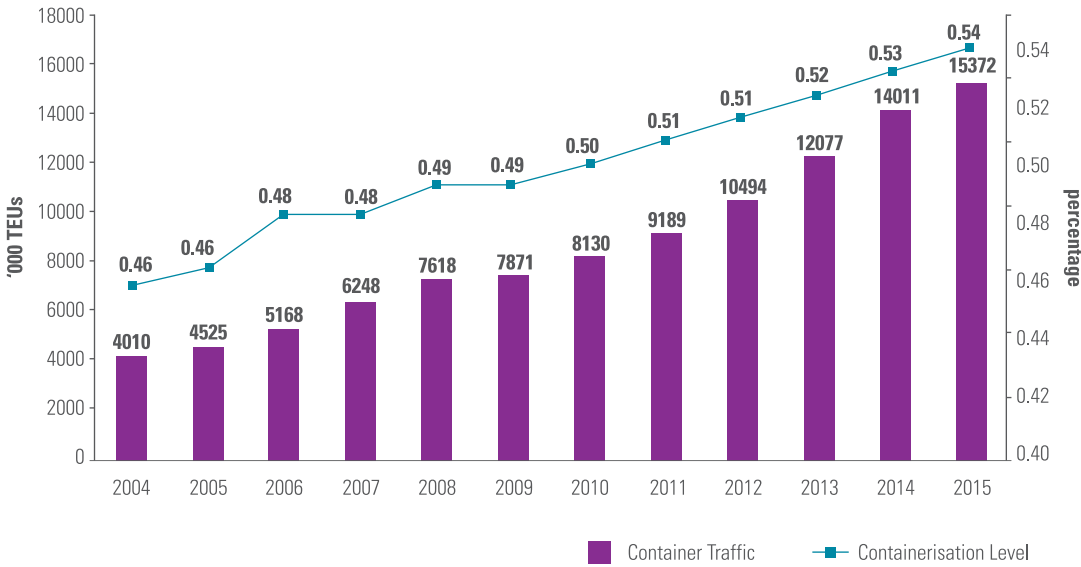


22 KPMG in India analysis

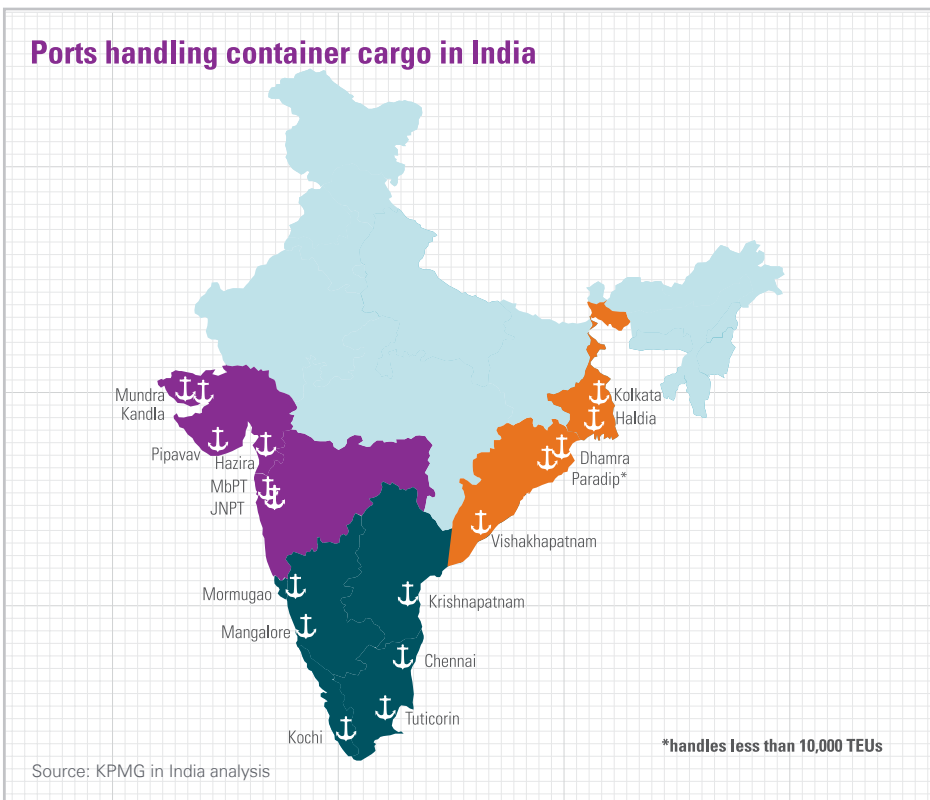
Containerization

The EXIM container market in India has grown at a CAGR of 12 percent in the past five years, as compared to the 8–10 percent growth that other commodities such as POL, Iron ore and coal experienced during the same period. Growth in the container market is expected to continue in the medium term as a result of rising containerization levels and growth in trade. At 51 percent, the containerization level in India continue to fall short of that in developed countries, which have achieved significant levels of 70–80 percent.²³

Container traffic and containerization levels



Source: Commerce Ministry website, Indian port association database, KPMG in India analysis

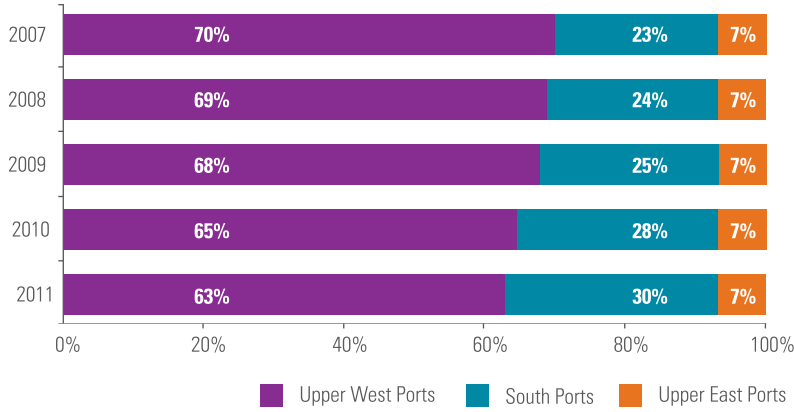


The following trends are expected to drive growth in containerized cargo:

- Increasing containerization level for erstwhile break-bulk commodities (e.g. steel, cement, rice, sugar).
- Healthy growth prospects for industries contributing to container cargo (e.g. textiles, food products, machinery, paper, scrap).
- Development of dedicated freight corridors (DFC) and Delhi-Mumbai industrial corridor (DMIC) along the North West corridor: expected to drive the demand for container logistics infrastructure.
- Growing thrust on developing container terminals on the east and west coasts of India.
- Development of dedicated logistics parks for handling container and bulk cargo.
- Development of new terminals with facilities to handle deep draft vessels that are operated by MLOs (Main Line Operators).

The share of upper west ports in total container traffic has declined over the years from 70 percent in 2007 to 63 percent in 2011 with development of Chennai cluster. The reduction in share of upper west ports is expected to continue further.

Share of container traffic handled by ports



Source: KPMG in India analysis

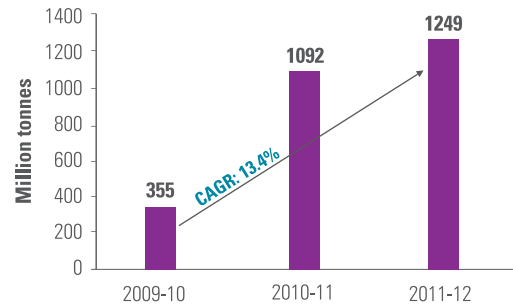
East coast ports

With their contribution to India’s total trade expected to increase from 23 percent in 2010 to 34 percent in 2014, east coast’s ports — situated along the 2,630-km-long eastern coastline that stretches from West Bengal to Tamil Nadu — are expected to significantly drive growth in the ports sector. Through the Maritime Agenda 2010–2020, the Gol plans to create additional port capacity of 900 MMT and invest INR1,126 billion to boost cargo-handling capacity at ports along the east coast. Non-major ports are expected to contribute 57 percent of total investments in east-coast ports and 46 percent to total capacity added in east-coast ports.²⁴

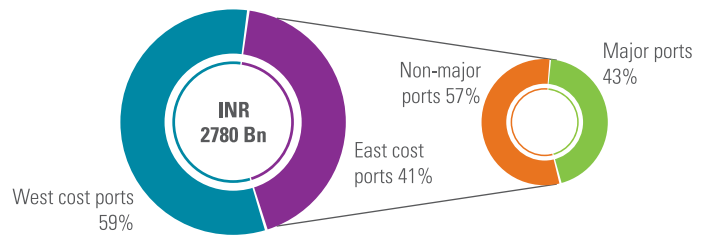
East coast ports which are closer to iron ore/coal deposits and power, steel or fertilizer plants have traditionally handled bulk commodities, as opposed to west coast ports, which mainly handle POL and container cargo. Container handling capacity along east coast ports in India is expected to increase from 2 million TEUs in 2009 (20 percent of India’s total container handling capacity) to 10.8 million TEU by 2020 (33 percent of India’s total container handling capacity).²⁵

Historically, ports along west coast have dominated cargo traffic due to their proximity to India’s major consumption centers and industrial belt of northwest India. With China’s emergence as India’s leading trade partner, India’s ‘Look East’ policy and overcapacity at west coast ports, east coast ports present significant development opportunities.

Capacity and investment scenario at east coast ports



Investment scenario (2010-2020)



Source: Maritime Agenda 2010–2020; KPMG in India analysis

²⁴ KPMG in India analysis
²⁵ Crisil Infrastructure Advisory, Developing Container Capacity: Progress, Issues and Way Forward

Actions required

While India's ports sector has the potential for significant progress in future, certain challenges may impede its journey to growth. Both the Centre and the States should address such challenges to facilitate sector growth.

- **Inter-sector coordination:** An integrated transport approach that promotes inter-sector coordination of road, railways and shipping departments should be developed. This will facilitate the rapid and efficient evacuation of cargo at ports due to seamless hinterland connectivity via road and rail.
- **Development of mega-ports:** Ports with supportive, high-potential surroundings need to be developed into mega ports that can derive the benefits of economies of scale. The GoI needs to facilitate such projects through appropriate policies, incentives and fast-tracking measures.
- **Improve capacity utilization:** For ports that are potentially limited by the hinterland, the focus needs to be on operational efficiency, which can help such ports remain competitive vis-à-vis larger ports and have a compelling proposition for customers. This would also enable them to remain profitable at low traffic volumes.
- **Reduce focus on sub-optimal ports:** While multiple ports can provide customers with variety and create competition in terms of pricing and customer service, the proliferation of ports of sub-optimal scale must be avoided. Projects that are unviable ultimately erode investor confidence, customer experience and the economy. Thus, coordinated coastline planning and diligent approval of projects, not only from an environmental but also a commercial/business standpoint, is the need of the hour.
- **Enhancing port infrastructure:** Increased emphasis on upgrading both, seaside and landside infrastructure to enhance draft and evacuation procedures would enable universal smoother cargo flows from larger vessels. Improved level of mechanization via upgrading material-handling equipments and enhanced proper IT infrastructure should be build to ensure electronic flow of information among various stakeholders.

- **Improving efficiency at Indian ports:** Significant investments for modernization and efficiency improvement are required to bring Indian ports at par with its global counterparts across key operational parameters. The following table provides a brief comparison of Indian and international ports, highlighting significant scope for improvement.

Parameters	Indian ports	International ports
Average number of containers handled per ship per hour	15–23	<ul style="list-style-type: none"> • Colombo: 25 • Singapore: 30
Annual container throughput capacity	JNPT: 4.3 million TEUs	<ul style="list-style-type: none"> • Singapore: 30million TEUs • Hong Kong: 25million TEUs
Maximum crane productivity – per quay crane per annum	NSICT: 188,000 TEUs	<ul style="list-style-type: none"> • Hong Kong terminal: 272,700 TEUs • Hamburg: 252,200 TEUs
Maximum quay productivity	JNPT: 2,000 TEUs per meter	Hong Kong terminal: 3,050 TEUs per meter

Source: World shipping council website , KPMG in India analysis

- **Manpower skill enhancement:** Investing in more institutes through the Indian Maritime University (IMU) that provide focused training to key personnel would help improve talent-pool shortages and develop skills required in the shipping sector. Collaboration with foreign universities should be established to facilitate knowledge sharing of best practices followed globally.



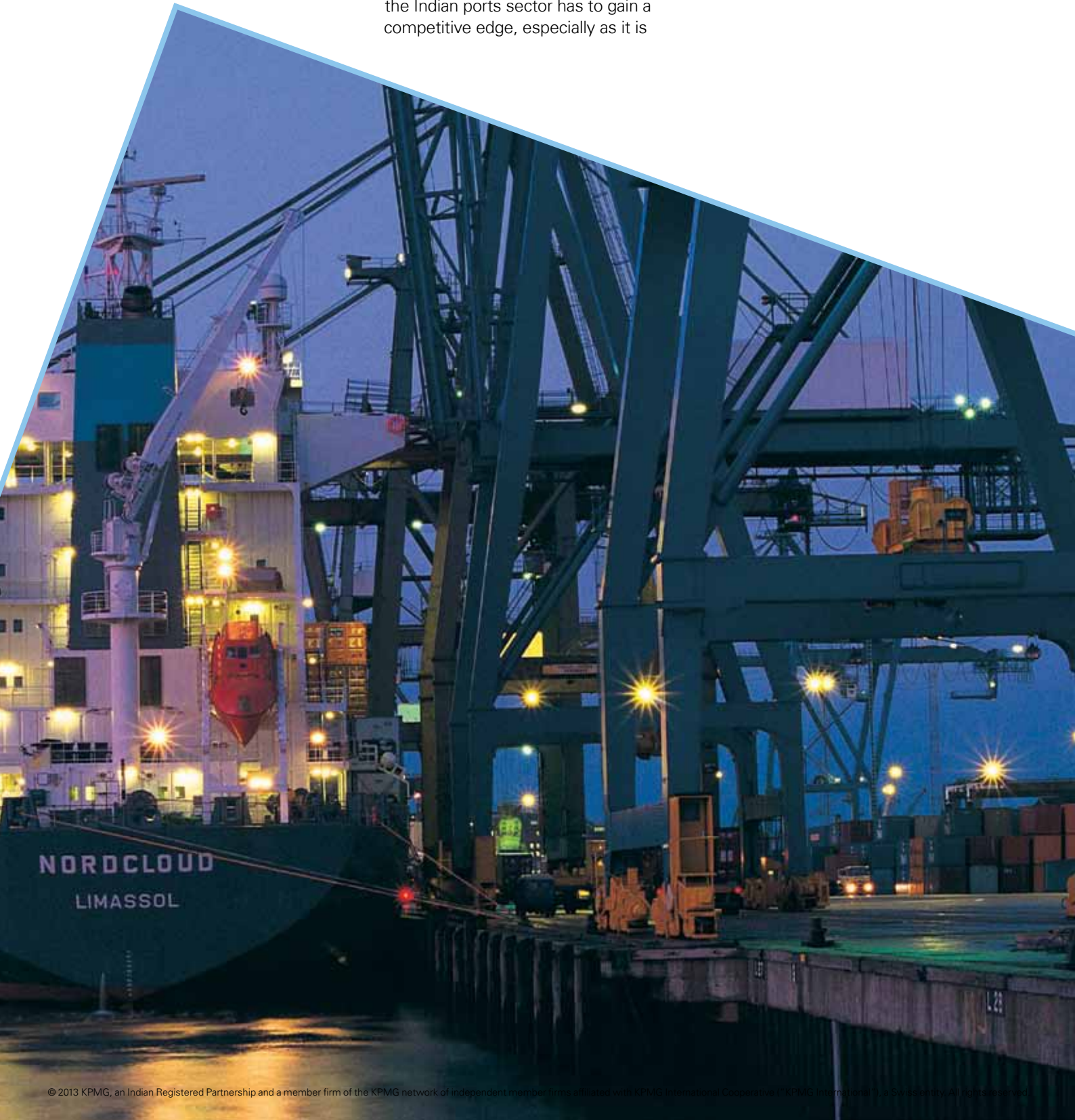
Outlook

Higher investments, private sector participation and stringent regulations are key drivers that would lead to the development of world-class ports in India. In parallel, development of hinterland connectivity options, enhancing levels of IT, and facilitating quality manpower training would drive operational efficiency of Indian ports.

Implementation of the Port Regulatory Authority Bill is expected to be a step in the right direction, as it is likely to increase confidence among private investors. The introduction of single-window clearance procedures at the central- and state-government level would encourage greenfield projects, thereby reducing long gestation periods.

Thus, innovative solutions and a proactive approach are the need of the hour if the Indian ports sector has to gain a competitive edge, especially as it is

far more vulnerable to international competition than other infrastructure sub-sectors. Measures are being adopted and implemented, and the outlook for the sector appears to be positive. With the government responding to multiple factors such as infrastructure constraints, financial bottlenecks and administrative hurdles, the future of the ports sector is seemingly bright.



RAIL

Spanning 64,456 km with more than 7,133 railway stations, India's rail network is the largest in Asia and the second largest in the world (behind the US).²⁶ The Indian Railways operates 19,000 trains daily, transporting 2.65 MMT of freight and 23 million passengers across the country. However India's rail infrastructure suffers from chronic under-investment, due to which its potential for freight movement remains largely untapped.

Rail freight has grown at around 7 percent over the past five years. It is expected to touch the 1 billion ton mark in 2013, with a 31 percent share of total freight movement across all modes of transport. This is in stark contrast to its share of 89 percent in 1951.

²⁶ Indian Railways, www.indianrailways.gov.in



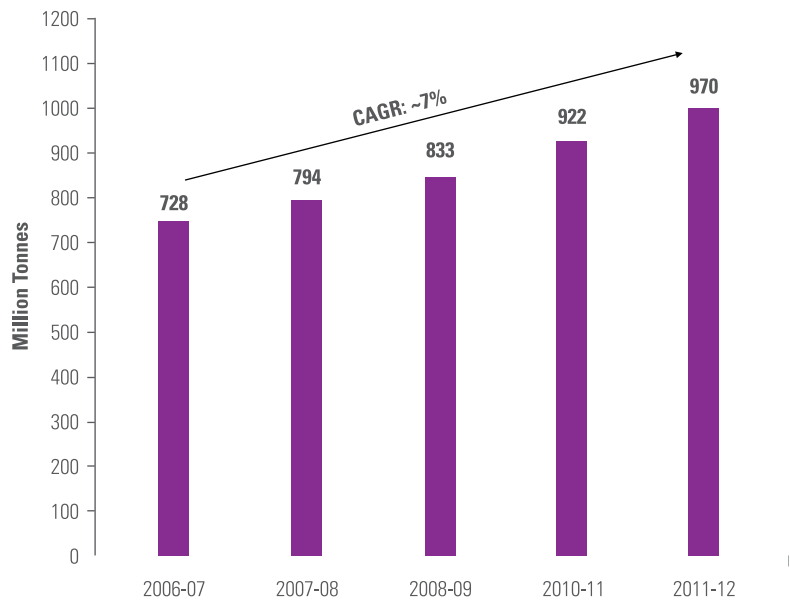
As such, rail has consistently lost out to road, as the preferred mode for goods movement across the country. While traffic on rail has grown more than tenfold between 1951 and 2007, rail track length has only grown 1.4 times during the same period. Moreover, trunk routes constitute merely 16 percent of the network and transport more than 50 percent of total traffic, resulting in major congestion and a low average speed of 25 km/hr for freight trains.²⁷ As compared to global standards, India's track length per sq. km. is unfavorable at 44 km of track per 1,000 sq. km. of arable land, as against 137 km in the US and 417 km in Germany.

Further, passenger traffic continues to enjoy significant priority over rail freight. In addition to first right of movement, passenger rates are highly subsidized by freight operations utilizing up to 60 percent of network capacity but contributing only 30 percent to revenue.

Despite these apparent limitations, rail continues to be among the fastest and most economical modes of transport for freight in India. Two-thirds of freight in India is transported over medium and long distances, for which rail transportation offers significant time and cost savings. The capital cost of setting up rail capacity is around 40 percent lower than that of comparable modes such as expressways, when measured on a ton-kilometer basis. Further, costs of rail transportation, specifically on high-traffic density corridors, are considerably lower than for other modes. Additionally, rail offers speed and capacity-related benefits.

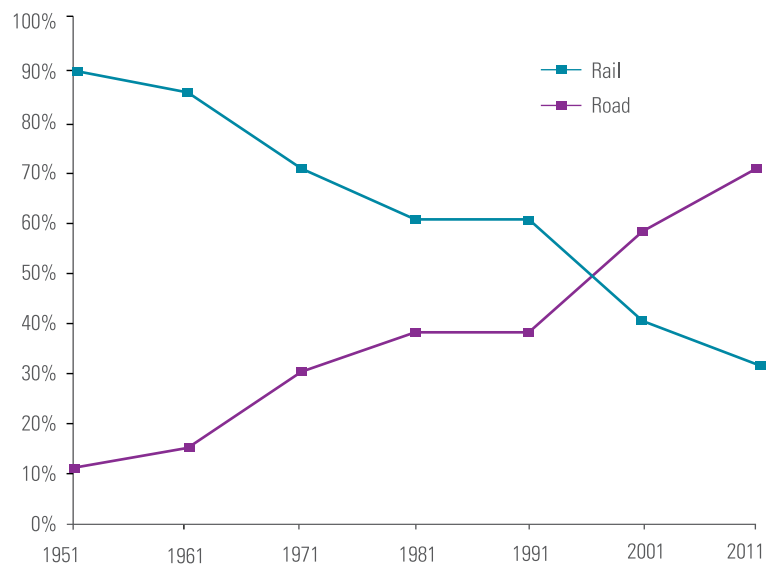
To drive a fundamental shift in the modal mix from less efficient, usually uneconomic and environmentally unfriendly road-based transportation to rail, projects similar to the envisioned DFC would play an important role in the future.

Freight Traffic



Source: KPMG in India analysis

Percentage share of rail - road in freight traffic movement



Source: World Bank. www.databank.worldbank.org

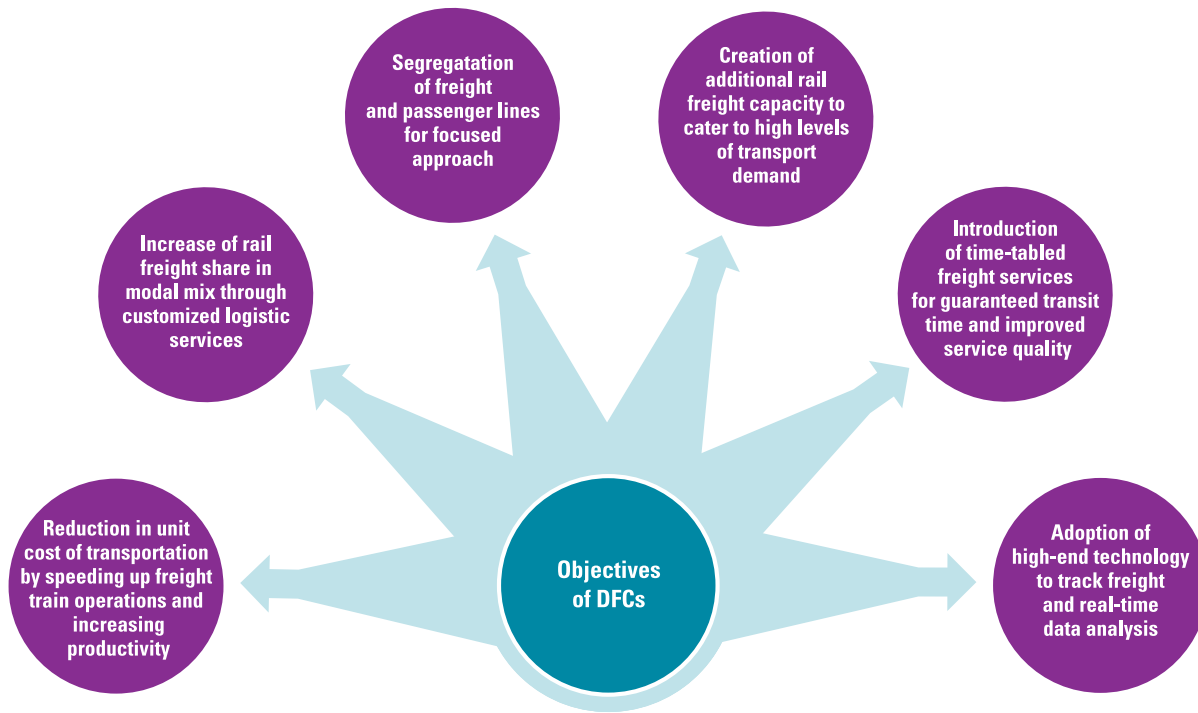
Dedicated Freight Corridor (DFC)

It is now apparent that the DFC project — the Indian Railways' marquee initiative — is significantly behind its original timelines; however, it is expected to mark a paradigm shift in the transportation scenario, resulting from the segregation of freight on trunk routes, improving service delivery and

generating additional freight-carrying capacity.

The project envisages the construction of two corridors, one each on the west and east routes, spanning a total length of about 3,300 km. The Eastern Corridor, starting from Ludhiana in

Punjab, will pass through the states of Haryana, Uttar Pradesh and Bihar and terminate at Dankuni in West Bengal. The Western Corridor will run from Dadri to Mumbai, passing through the states of Delhi, Haryana, Rajasthan, Gujarat and Maharashtra.



Source: Dedicated Freight Corridor Corporation of India, <http://dfccil.org/DFCC/Projects/Background>

Proposed timelines for DFC construction

Western Corridor	Stretch	Timeline
Phase I	Rewari-Vadodara (920 km)	2009–16
Phase II	Vadodara-JNPT (430 km)	2010–17
Phase III	Rewari-Dadri (140 km)	2010–17
Eastern Corridor	Stretch	Timeline
Phase I – APL 1	Khurja-Kanpur (343 km)	2009–16
Phase II – APL 2	Kanpur-Mughalsarai (390 km)	2010–16
Phase III – APL 3	Khurja-Ludhiana (397 km)	2011–16
Phase IV	Dankuni-Sonnagar (550 km)	2011–16
Phase Ia	Sonnagar-Mugal Sarai (125 km)	2010–16

Source: Dedicated Freight Corridor Corporation of India (DFCCIL), http://dfccil.org/DFCC/PDF/Newsletter_Janu-Mar-2012.pdf

Analysis of the DFC design features highlights the significant change it heralds for rail freight transportation.

Parameters	Conventional rail	DFC	
Height (m)	4.3	WDFC – 7.1 m EDFC – 5.1 m	Double stacking possible on WDFC; benefit for containerized cargo loads
Width (mm)	3,200	3,600	
Train length (m)	700	1,500	Larger lot evacuation on single shipment resulting in reduced congestion at ports and on track
Train load (tonnes)	4,000	15,000	Increase by 3.8 times in load factor suitable for evacuation of large bulk shipments
Axle load (tonnes)	22.9/25	32.5/25	
Track-loading density (t/m)	8.67	12	
Max speed (kmph)	75	100	Real time speed expected to increase by over 100 percent given average realized speed of 25 km/hr currently. Facilitating speedy turnaround
Grade (Up to)	1 in 100	1 in 200	
Curvature	Up to 10 degrees	Up to 2.5 degrees	Straight line transit to improve speed realization
Traction (electrical)	25KV	2 X 25KV	
Station spacing	7–10 km	40 km	Reduced transit break to drive overall schedule integrity

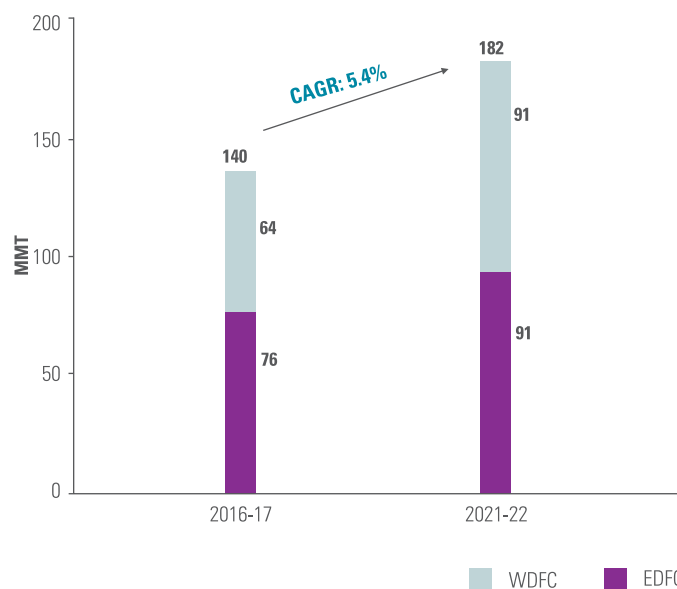
Source: DFCCIL website

DFC freight volume analysis

Freight via the DFC would increase from 140 MMT in 2016–17 to 182 MMT in 2021–22 at a CAGR of 5.4 percent.²⁸ Container traffic, which is likely to be an important constituent of total traffic on the Western DFC, is expected to grow from 3.8 million TEUs in 2016–17 to 5.3 million TEUs in 2021–22.²⁸

Timely completion of the WDFC and EDFC will result in an increase in total rail freight volume movement along the particular routes. However given that the project is significantly behind its original timeline, the potential increase in freight volume has been analyzed in two distinct scenarios, the ‘DFC scenario’ and the ‘No-DFC scenario’.

Traffic projections on DFC



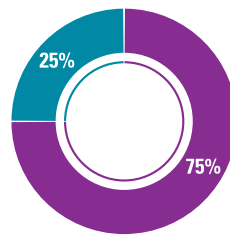
Source: DFCCIL website, <http://dfccil.org/DFCC/Projects/Background>, KPMG in India analysis
 Note: TEU to tonnes conversion ratio used is 14 for calculating total traffic at WDFC

In the 'DFC scenario' the DFC's are operational as per the original completion date of 2016–17 resulting in an immediate shift in freight volumes to the DFC.

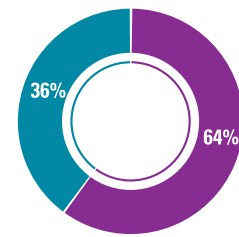
In a 'No-DFC scenario' freight would continue to move along existing rail and road network resulting in gradual saturation of the rail network over a period of time. This would increase the modal share of road transport from 25 percent in 2016–17 to 36 percent in 2021–22.²⁹

In the DFC scenario, the share of rail would significantly increase due to the added capacity and efficiency of the new infrastructure. This will mark a shift in the modal mix increasing the share of rail from 84 percent in 2016–17 up to 87 percent in 2021–22 along these routes.²⁹

No-DFC modal mix 2016-17

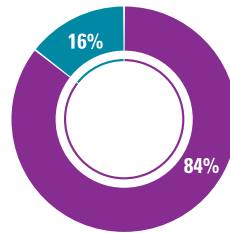


No-DFC modal mix 2021-22

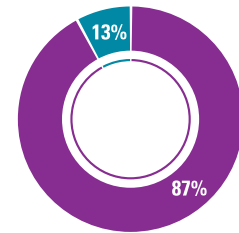


■ Road Share ■ Rail Share

DFC modal mix 2016-17



DFC modal mix 2021-22



Source: DFCCIL – Green house gas emissions reduction analysis for dedicated freight corridor, Ernst and Young, http://dfccil.org/DFCC/PDF/Final_Report_DFCC_30_06_2011.pdf

While the potential of the DFC is well-recognized, the project has encountered several challenges, including the acquisition of key land parcels, design changes, the retendering of contracts and funding failures. Approximately 35 percent of total land required has yet to be acquired, with key segments missing on both routes; the Sonnagar-Dhankuni section on the east route, which accounts for 29 percent of the total length of the Eastern DFC, has witnessed zero percent progress; further, the Phase II Vadodara-JNPT and Rewari-Dadri link along the Western DFC, which constitutes 38 percent of the total length, has witnessed only 30 percent progress.³⁰ In addition, pending sign-off from the Ministry of Finance has adversely affected the disbursement of funds for the project from the World Bank. Environmental clearances, as well as approvals from state governments and various agencies also continue to impede the project. As a result, delays in execution and time and cost overruns are apparent.

²⁹ DFCCIL – Green house gas emissions reduction analysis for dedicated freight corridor, Ernst and Young, http://dfccil.org/DFCC/PDF/Final_Report_DFCC_30_06_2011.pdf

³⁰ DFCCIL - http://dfccil.org/DFCC/PDF/Newsletter_Janu-Mar-2012.pdf

Actions required

- **Capacity creation:** In addition to the Western and Eastern DFCs, there is a need to create adequate freight-carrying capacity within the Indian rail network. The proposed creation of four additional DFCs — North-South (Delhi to Chennai) East-West (Howrah to Mumbai), Southern (Chennai to Goa), and East-Coast (Kharagpur to Vijaywada) — would meet increased freight demand and also elevate the quality of service to global standards. The Indian Railways also needs to establish and improve connectivity with ports and road networks to form an inclusive intermodal strategy for first- and last-mile connectivity.
- **Rail-side warehousing:** The need of the hour is to create warehousing facilities alongside railway lines so that direct unloading can be facilitated from wagons to warehouses. This would allow traders to avoid multiple handling costs, which are generally quite expensive. Our analysis indicates that rail-side terminals such as those being created by the Central

Railside Warehouse Corporation (CRWC) — a subsidiary of Central Warehousing Corporation (CWC) — could offer a win-win proposition for all relevant stakeholders. Railside terminals can further be expected to lower logistics costs, which also include inventory carrying costs, transit time and holding time for the warehouses.

- **Private investments:** The PPP model should be encouraged for the development of the route network, as well as for the modernization of coaches through the transfer of technology. This will likely drive India toward the status of an export hub for modern passenger coaches and stations to provide multifarious facilities such as offices, retail, entertainment, restaurants, theaters, hotels, and health and education services. Private freight terminals should also be set up for bulk and container handling.

Outlook

Rail has consistently lagged behind other modes of freight transport in India, both from an infrastructure and initiative perspective. While the Indian Railways straddles various challenges, there is an urgent need to take stock of the growing support the industry seeks from this network.

The DFC represents a significant opportunity for rail; however, measures must be taken to mitigate further delays in the project. Further, the DFC project must be viewed as part of a larger freight transport system; thus, connectivity with supporting intermodal facilities and the service of the system must be developed for the project to be effectively utilized.



ROADS

Roads continue to constitute the most significant component of India's logistics industry, accounting for 60 percent of total freight movement in the country.³¹ As the demand for goods — either for mass consumption or industrial development — grows beyond the conventional demand-supply hubs of metropolitan cities to a number of widely dispersed tier-I and tier-II cities, the share of road transport can expect additional growth, given its ability to facilitate last-mile reach and limited supporting rail infrastructure.

³¹ Annual report 2011–12, Ministry of Road Transport and Highways (MoRTH); KPMG in India analysis



Historically, road freight in India has increased since its 1950–51 level of 6 billion tonne kilometers (BTKMs) to an estimated 1,250 BTKMs in 2011–12, witnessing a CAGR of 9.14³² percent during this period. Over the next five-year period, from 2012–13 to 2016–17, assuming GDP growth of 8 percent, road freight is expected to grow at a CAGR of 9.6 percent taking the total road freight opportunity to 1,700 BTKMs.³³

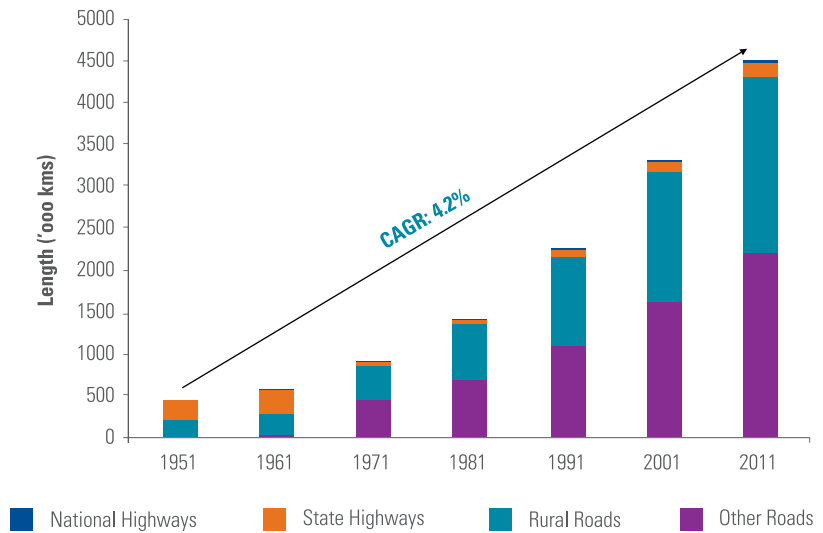
The corresponding development of roads has witnessed limited traction, recording a CAGR of 2 percent from about 3.7 million km in 2001 to about 4.7 million km in 2012³⁴. Of this, the length of district, rural and other roads is 4,455,511 km, followed by 163,898 km of State highways and only 70,934 km of National Highways.³⁵ Of this, only approximately half of the total road length is paved.³⁶ Consequently, road networks continue to lag behind world

averages, with road density at 2.83 km per 1,000 people and 770 km of road length per 1,000 sq. km as compared to 6.7 km and 840 km, respectively, globally.³⁷

India’s low average trucking speed of 30–40 km per hour (kmph) as against the global average of 60–80 kmph can, thus, be attributed to the constrained and poor quality of the country’s road network.³⁸

However, the completion of the National Highways Development Programme (NHDP), which is aimed at developing 50,000 km of National Highways by 2015 in seven phases with an investment of INR 3,000 billion³⁹ and modernization of the road cargo transport community will be game changers for the road transport sector.

Road network by category ('000 KM): 1951 to 2011



Source: NHAI website

32 Road Cargo Year Book 2006–07, Ministry of Road Transport & Highways (MORTH); Domestic Freight Transportation, Crisil, July 2011; 2012 turnover volume is estimated considering CAGR of 7.3% during 2002–2011; KPMG in India analysis
 33 Report of the Sub-Group on Passenger and Freight Traffic Assessment in the Twelfth Five Year Plan, Sept 2011, MORTH; KPMG in India analysis

34 Annual report 2011–12, MORTH
 35 NHAI, www.nhai.org/roadnetwork.htm, website accessed on 23 July 2012
 36 Basic Road Statistics of India, MORTH
 37 The World Bank, http://data.worldbank.org
 38 Adding Wheels Paper, KPMG, December 2010
 39 Road and Highways Sector, Crisil Research 2012

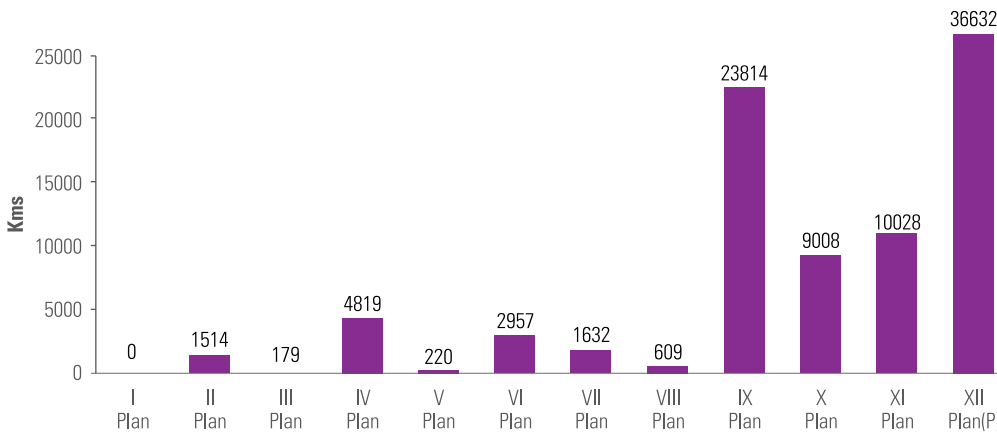
Development of National Highways

National Highways constitutes about 2 percent of total road network and accounts for more than 40 percent of total road freight.⁴⁰ Fortunately these arterial roads have witnessed a major jump in the last decade.

During the first eight Five-Year plans (spread over 40 years from the First Plan in 1951–56 to the Eighth Plan in 1992–97), the total length of the developed

National Highways stood at 11,930 km; in contrast, over the last three plans (spread over 15 years from the Ninth Plan in 1997–2002 to the Eleventh Plan in 2007–12) stood at 43,050 km — almost 3.6 times in length in 0.4 times the time period. A comparison of the Twelfth Plan versus Eleventh plan suggests a 3.6-fold increment in proposed construction and upgrades⁴¹ of the National Highways.

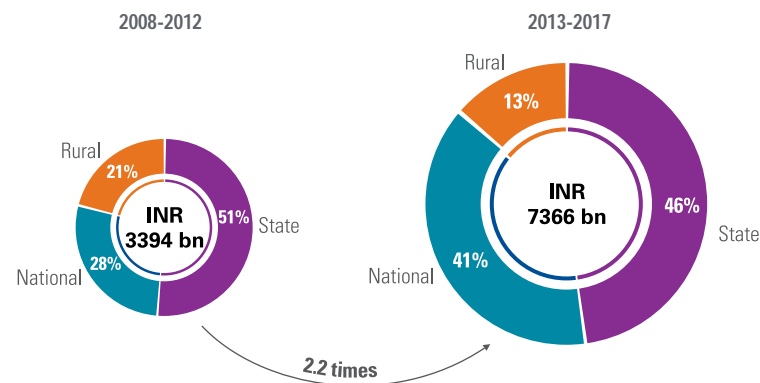
National Highways to be constructed under various Five-Year plans



Note: The chart above does not indicate data for the following: length as on 1 April 1947: 21,378 Kms, pre plan period (1947–51: 815 Kms, inter-plan periods 1966–69: 52 Kms, 1979–80: 46 Kms, 1990–92: 77 Kms, denotified length of 530 KMs during X Plan.

From the investment perspective, a comparison of estimated investments in the road sector in the Eleventh Plan (2007–12) vis-à-vis projected investments for the Twelfth Plan (2012–17) indicates a significant jump, approximately 2.2-fold. To encourage private players, the Government has announced several incentives such as declaring the road sector as an industry, providing 100 percent tax exemptions in any consecutive 10 years out of 20 years, duty free imports of certain identified construction plants and equipment, FDI of up to 100 percent, and increased concession periods (up to 30 years). Given these incentives, the private sector is expected to fund 33 percent of the total investment in the Twelfth Five-Year Plan.⁴²

Investment split – Changing focus



Source: Crisil report 'Private participation in National Highways to drive investment in roads, 22 May 2012

⁴⁰ NHA website, <http://nhai.org/roadnetwork.htm>

⁴¹ Figures for XII Plan are projected; Ministry of Road Transport and Highways, Basic Road Statistics of India, July 2010; Crisil report on Investment in National Highways, June 06, 2012; KPMG in India analysis

⁴² Road and Highways Sector, Crisil Research 2012

Launched in 1998, the NHDP program represents the largest road construction project ever undertaken to boost the development of the National Highways in the country. The program is aimed at the development of 50,000 km of National Highways by 2015 in seven phases, at an investment of INR 3,000 billion⁴³.

Phase	Salient features	Length (km)
I	Golden Quadrilateral, port connectivity and other stretches; almost all projects through cash contracts	7,524
II	North-South, East-West Corridors; majority projects cash contracts	6,622
III	Four laning of two-laned roads mainly connecting state capitals and important places to the Golden Quadrilateral (GQ) and corridors; most projects to be awarded on BOT basis (Toll/Annuity)	12,109
IV	Improvement of National Highways to two lanes with paved shoulders; expected to be awarded under cash contracts	14,799
V	Six laning of existing four-lane NHs; majority projects to be awarded under BOT-Toll	6,500
VI	Development of expressways; expected to be awarded on BOT-Toll	1,000
VII	Ring roads, flyovers and bypasses; expected to be awarded on BOT-Toll	700

Source: NHAI website

By November 2012, around 37 percent of projects were completed, with approximately 28 percent under implementation and about 35 percent yet to be awarded. The GQ, which provides four-lane connectivity between four metros, is complete, while the North-South-East-West (NSEW) corridor is about 85 percent complete. Phases III and V are under implementation, while Phases IV, VI, VII are at their initial stages of implementation.

	Phases						
	GQ	Ph I & II	Ph III	Ph IV	Ph V	Ph VII	Port connectivity
Length (km)	5,846	7,142	12,109	14,799	6,500	700	380
Already 4/6-laned	100%	85%	37%	Negligible	19%	3%	96%
Under implementation	-	10%	48%	27%	44%	3%	4%
To be awarded	-	5%	15%	73%	37%	94%	-

Source: NHAI, Ministry of Road Transport & Highways, Government of India

Note: 'GQ' represents Golden Quadrilateral; 'Ph' represents Phase; NS-EW represents North South - East West | *As on 30 November 2012

In addition, the NHDP seeks to improve and sustain the integration of less-developed areas by enhancing their road connectivity with the National Highways network. Work entailing the four laning of two-lane roads, mainly connecting state capitals and important tier-II and tier-III cities to the GQ and NSEW corridor, is expected to enhance existing networks. Projects to upgrade the National Highways to two lanes with paved shoulders are also expected to be awarded over the next three years.

Many States have followed in NHAI's footsteps and have started awarding important state highways on a BOT basis. The States that have taken the lead in awarding state highways on a BOT model include Gujarat, Rajasthan, Madhya Pradesh and Maharashtra. While the state highway programmes currently are not as well structured and formalized as the NHDP program, they are expected to evolve and improve over the next few years and will provide the second wave of development in the road sector in India.

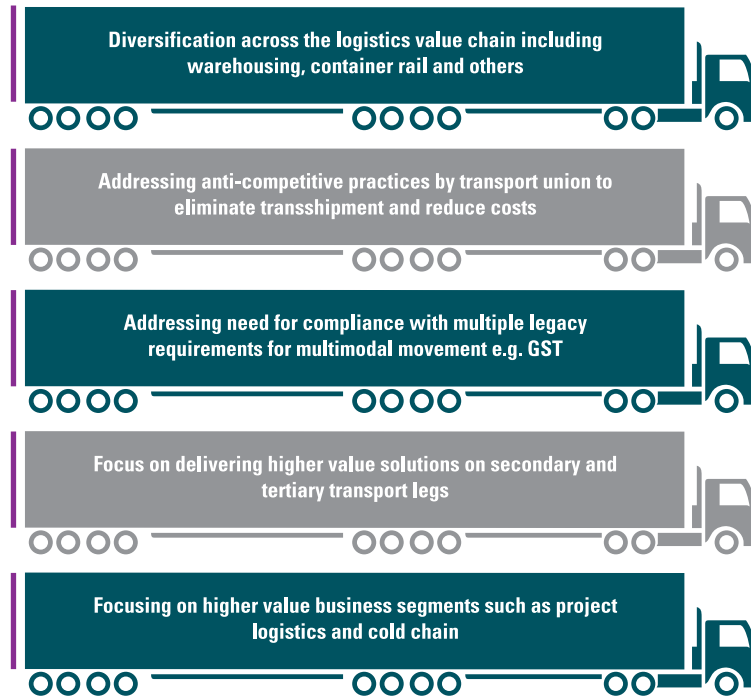
⁴³ Road and Highways Sector, Crisil Research 2012

Evolution of trucking community

The existing Indian road freight transport industry is highly fragmented, with 70–75 percent of truck owners operating a maximum of five trucks each, while operators owning more than 20 trucks constitute about 9–11 percent of the ownership pie; the remaining share of 15–20 percent belongs to operators owning 6–20 trucks.⁴⁴ Of the total trucking capacity, it is estimated that 47 percent is constituted by a fleet of 2.6 million light commercial vehicles (LCV) (up to 3.5 tonnes), the rest largely belonging to medium and heavy CV (more than 3.5 tonnes) category constituting 2.8 million vehicles. This disaggregated ownership has resulted in fierce competition amongst operators resulting in truck owners resorting to overloading to recover investments,

which in turn impacts service quality and overall economics of road transportation as a result of increased incidents of accidents, break downs, spoilage and pilferage. Also due to the limited investment capacity, operators have been unable to upgrade trucks resulting in high average age of trucks at 10 years and limited adoption of technology for tracking and fleet management.

Transformation of the trucking industry



Source: KPMG in India analysis

These measures will enable road transporters to adopt various de-risking strategies, and create an opportunity for investors and operators to invest in and/or partner with leading road transportation companies on this transformational journey.

⁴⁴ Crisil's Roads and Highways Annual Review (2009); KPMG in India analysis

Actions required

- **Promotion of Fleet Exchanges:** Creation of an efficient marketplace similar to Stock Exchange or Commodity Exchange to bring together transport customers and transport vendors for the largely unorganized transport sector could revolutionize the trucking landscape. Collaboration of Fleet Exchanges with the existing Road Traffic Offices (RTO) could be a win-win with Fleet Exchanges providing an Online Real Time Technology platform while RTOs providing the on field support. Such exchanges will not only reduce the element of cost that a middleman makes but will also give visibility of loads to the vehicle owner on pan India basis. This shall help in spreading the vehicle type mix which is currently concentrated in a few pockets in India to a broader area.
- **Electronic Toll Collection (ETC):** Given that there are about 525⁴⁵ toll plazas across India, the smooth application of ETC would amount to estimated fuel savings worth INR 10 billion⁴⁵ annually. Although this may command significant investment from

road developers/operators against a small contribution of about INR100 from vehicle operators, the benefits are expected to result in a win-win scenario for all stakeholders. While developers/operators shall benefit from plugging revenue leakages — which are currently estimated at INR12 billion, guaranteed savings in fuel would outweigh the initial cost of INR100.⁴⁵ Above all, this would save significant avoidable logistics costs for the wider industry and the Indian economy.

- **Encourage use of larger trucks:** Larger trucks are cheaper to operate as compared to smaller and medium trucks by over 25 percent and the incremental cost of a larger vehicle can be recovered in less than three years. Measures to encourage the use of larger trucks could be considered including excise duty reductions for larger vehicles, stringent monitoring of overloaded trucks and enforcing pollution and safety norms, which could result in the retirement of old trucks.

Outlook

While the demand for road connectivity is on the incline, so is the focus on improving basic road infrastructure as well as technology adoption. The numbers of expressways and highways have increased, many roads have been widened, ETC is becoming increasingly common, the 'green channel' concept is gaining ground, and inter-state check posts are becoming automated. Other examples of key progressive measures include the development of the Indian Road Transportation Exchange (IRTEX), gradual fleet modernization and consolidation of the trucking community.

While the quality of road infrastructure is certainly likely to improve, the pace of infrastructure development is critical to minimize losses, both economic and environmental. In particular, delays in meeting project timelines should be reduced, given that only about 52 percent of the daily target of average road length to be constructed has been met to date (10.39 km as against the target of 20 km in 2011–12).

⁴⁵ CRISIL research press release titled 'Electronic toll collection to save Rs10 billion annually', November 23, 2011



WAREHOUSING

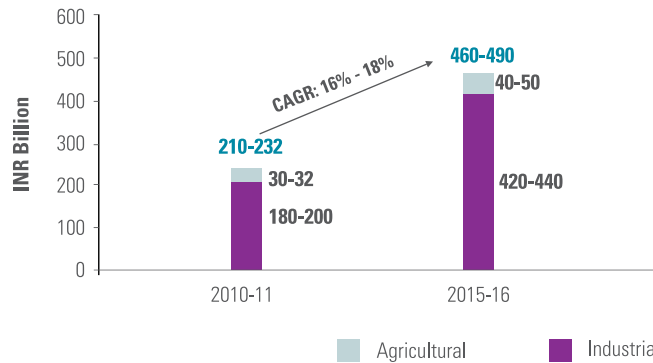
Any analysis of game changers across India's logistics landscape would perhaps be incomplete without considering 'storage,' or 'warehousing.'

In recent times, the Indian warehousing segment in India has evolved significantly, resulting in a gradual metamorphosis from the traditional concept of godowns to modern formats. Further, interest and traction in the potential advantages that free-trade warehousing zones (FTWZs) offer has increased.

From the opportunity perspective, the demand for warehousing services in India was estimated at approximately INR245–270 billion in 2011–12⁴⁶. The market consists of industrial and agricultural warehousing, with both segments expected to witness a significant evolution in their shares (by value) over the next five years. The share of the industrial segment, which includes both bulk and non-bulk commodities, is expected to increase from about 86 percent in 2010–11 to around 90 percent in 2015–16.⁴⁷ This is likely to be at the cost of a corresponding decrease in the share of agricultural warehousing.

In contrast to the industrial warehousing segment, which is highly fragmented, the agricultural warehousing segment is dominated to the extent of two-thirds by government entities. These include the Food Corporation of India, the Central Warehousing Corporation and all State Warehousing Corporations. This trend is likely to vary relatively less in the next few years.

Warehousing market size

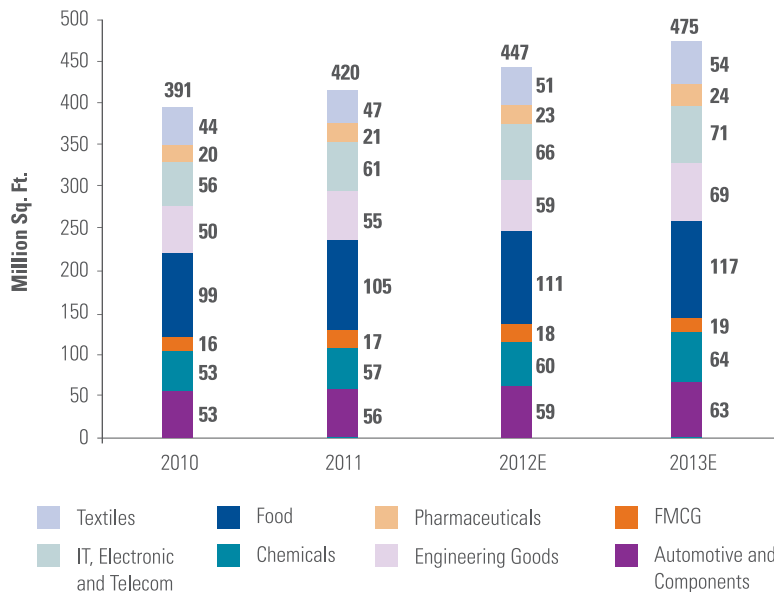


Note: Agricultural warehousing does not include temperature-controlled warehousing; industrial warehousing includes liquid/gas warehousing and storage of both bulk and non-bulk commodities
 Source: CRISIL report on warehousing industry, November 29, 2011; KPMG in India analysis

Emergence of modern warehousing formats

The demand for industrial warehousing space is estimated to have grown from around 391 million sq. ft. in 2010 to 476 million sq. ft. in 2013, at a CAGR of 6.8 percent.

Warehousing demand in India



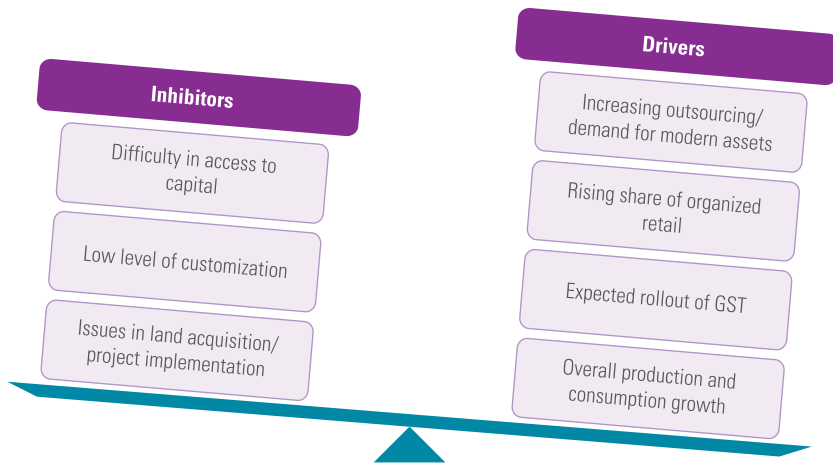
Note: Warehousing demand excludes CFS warehousing space, warehousing space within factories and public agriculture warehouses
 Source: Industry discussions, KPMG in India analysis

⁴⁶ Note: Agricultural warehousing does not include temperature-controlled warehousing; industrial warehousing includes liquid/gas warehousing and storage of both bulk and non-bulk commodities;
 Source: CRISIL report on warehousing industry, November 29, 2011; KPMG in India analysis
⁴⁷ KPMG in India analysis

Among the analyzed sectors, the highest growth is expected from engineering goods, and IT, electronics and telecommunications sectors, estimated to grow at CAGRs of about 8.6 and 8.2 percent, respectively, during 2010–13. The other analyzed sectors are estimated to witness growth in the range of 5.7 to 7.1 percent⁴⁸.

The share of modern warehousing is anticipated to grow from 15 percent (62 million sq. ft.) in 2010 to 30 percent (178 million sq. ft.) by 2015⁴⁸. This sharp growth is expected to be driven by rising domestic and EXIM freight volumes, increased outsourcing to 3PL players, strengthened investment in infrastructure, organized retail and the impending implementation of Goods and Services Tax (GST).

Factors influencing warehousing market



Source: KPMG in India analysis

Characteristics of modern warehouses

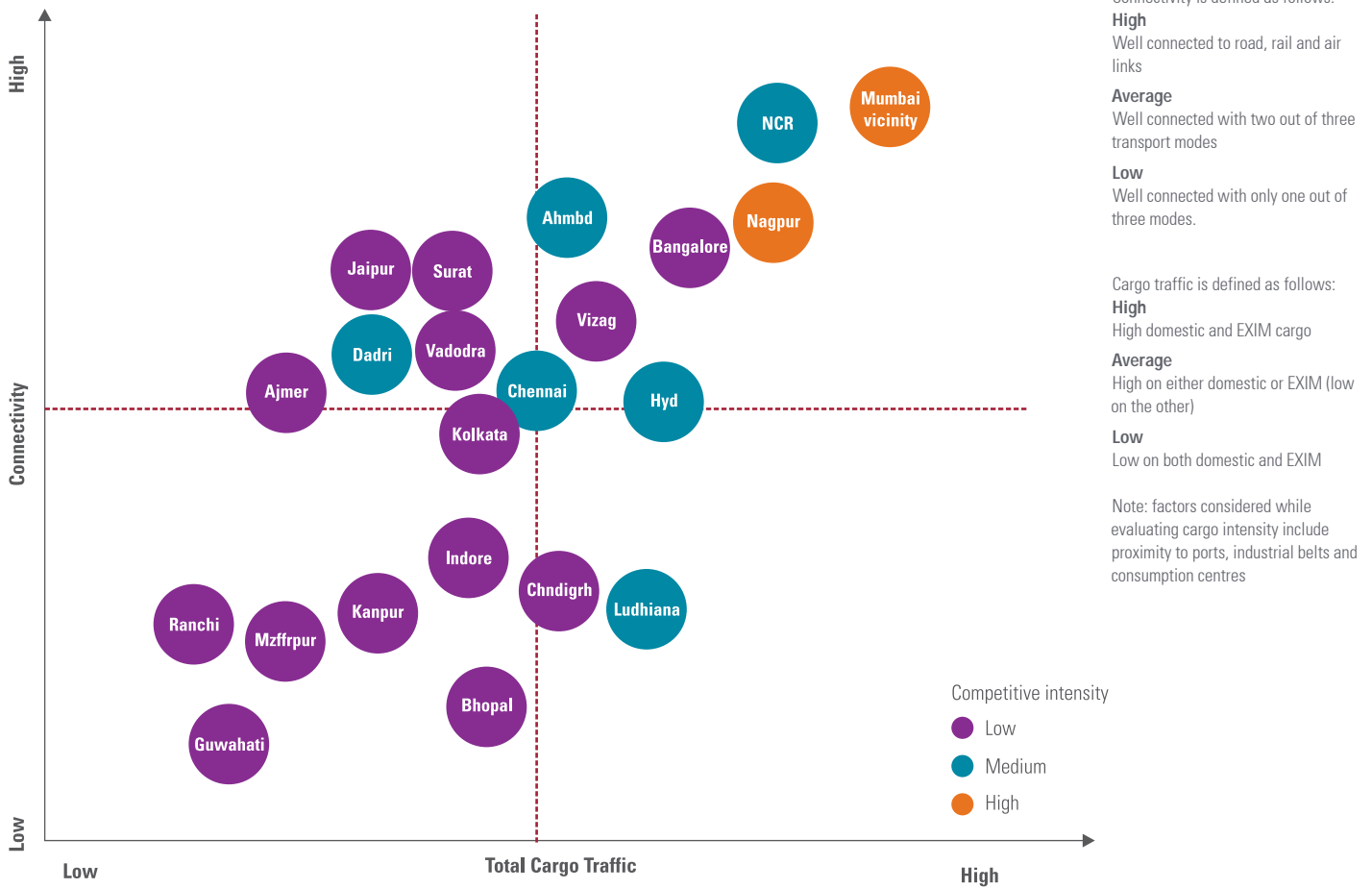
Key parameters	Traditional godowns	Modern warehouses
Size (footprint)	Usually up to 5,000 square feet (sq. ft.)	<12,000 (sq. ft.)
Height	~12 ft	<20 ft.
Storage	Floor stacked on pallets	Floor + racking option available
Flooring	Standard paved	Reinforced hi-grade concrete
Structure	Standard brick structure	Reinforced walls + prefab sheets and bespoke roof design
Material discharge/ loading	Single-point entry/exit	Multiple docks/ bays with levelers
IT	Limited	Full-fledged warehouse management system
Material handling	Limited material handling equipment usage	Extensive usage of material handling equipment
Value-added services (VAS) capability	Limited	Significant scope for palletization, bar coding, MRP labeling, pick and pack, and shrink wrapping
Cargo safety/security	Basic	Fire extinguishers, ventilators and CCTV surveillance standard

Source: KPMG in India analysis, Industry discussions

⁴⁸ Industry discussions, KPMG in India analysis

From a location perspective, while Mumbai, the National Capital Region (NCR) and Nagpur are most attractive locations for modern formats, other attractive locations lie in major western and southern cities.

Location attractiveness for warehousing

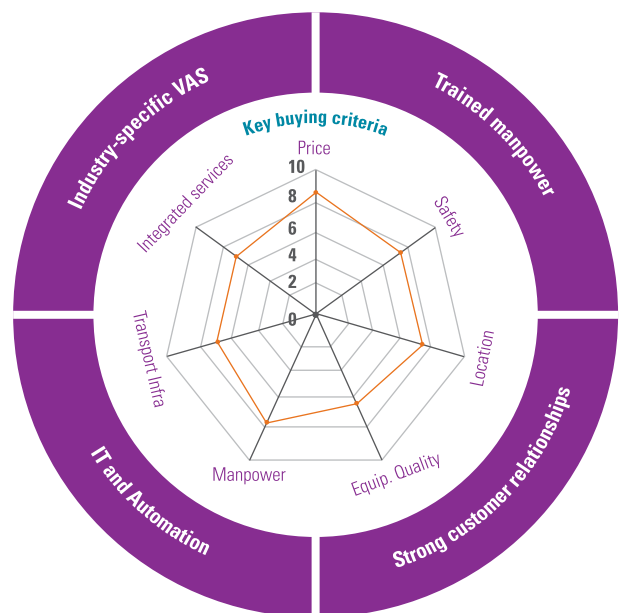


Source: KPMG in India analysis

However, several challenges may hamper the warehousing sector’s wider growth potential. High price sensitivity among customers and infrastructure issues tend to limit the ability of service providers to offer world-class services; their usually underdeveloped capabilities to offer industry-specific solutions, the asset-heavy nature of their business, the need for substantial capital and concerns related to land acquisition make operations increasingly difficult.

Apart from the significance of location in the modern warehousing era, industry stakeholders need to be wary of two crucial aspects — customers’ key buying criteria and critical service factors. Price sensitivity, strategic location and manpower availability rank as leading buying criteria; however, service providers need to offer high-quality, industry-specific value-added solutions, skilled manpower — both management and operational — and IT/technology solutions such as ERP, put-to-light, and GPS. Focus must also be on developing strong relationships with customers, as well as facilitating long-term contracts and, thus, regular and predictable volumes.

Critical success factors and key buying criteria



Note: Location refers to proximity to user groups
 Source: KPMG in India analysis

FTWZs

While the full potential of FTWZs in the Indian context is still at a premature stage and remains largely unexplored, the concept has been time-tested across multiple geographies with significant success. As a concept, FTWZs offers significant value-addition opportunities to multiple industries by virtue of being deemed foreign territory.

For example, the Jebel Ali Free Zone Area (JAFZA) in Dubai became operational in the mid-1980s; in three

decades, it has evolved to become home to about 6,500 companies, with its customer base increasing by 60 percent between 2006 and 2010. Following the growth of Jebel Ali Port and the Jebel Ali Free Zone Area, Jebel Ali has evolved to become a gateway to the Middle East, Africa and the Indian subcontinent⁴⁹.

Along similar lines, the Shanghai Waigaoqiao FTZ in China, established in 1990, is now recognized as the 'Golden Bridge of International Trade.' Its growing

role is reflected in the rise in its number of firms, from 1,800 in 1999 to more than 9,500 in 2011, indicating a fivefold increase⁵⁰. In contrast, as depicted in the table below, India is about 5–10 years away from the development of a supporting ecosystem for the larger FTWZ market — if the current status is benchmarked against globally successful examples in Dubai, China and Singapore.

Key parameters	Dubai	Singapore	China	India	Timeframe for evolution (Years)	Brief insights
Well-developed port infrastructure	✓	✓	✓	✗	5–10	Port infrastructure in the country is expected to improve in the next five years: <ul style="list-style-type: none"> • Development of mega terminals at major ports (JNPT, Chennai) • Additional capacities at major ports such as Ennore and Vizag • Development of large private ports (Gangavaram, Dhamra, Krishnapatnam) • Development of transshipment hubs such as Vallarpadam.
Strong hinterland connectivity	✓	✗	✓	✗	10	Hinterland connectivity in India is expected to significantly improve in the next 10 years: <ul style="list-style-type: none"> • Development of DFCs • Development of expressways and NHAI-led highways (GQ, EW-NS fed routes).
Favorable positioning on trade lanes	✓	✓	✗	✗	NA	Indian ports are not on key international trade lanes
Strong manufacturing support	✓	✗	✓	✗	NA	India scores low on manufacturing support for FTWZ demand, e.g., SEZ-based manufacturing
High export potential	✗	✓	✓	✓	5–10	Over the next 5–10 years, India is expected to evolve as a moderate-sized export hub for key sectors such as automotive, engineering goods, pharmaceuticals and processed foods
High import potential	✗	✗	✓	✓	2-3	Consumption-led economic growth is likely to continue supporting imports
Well-defined regulations	✓	✓	✓	✗	2-3	Policies in India are still evolving to support FTWZs, e.g., 2011 Budget treatment of MAT
Processing cost arbitrage/pricing flexibility	✗	✗	✓	✓	2-3	Like China, India offers a significant cost arbitrage opportunity when compared with other regions

Source: Shanghai Free Trade Zone, JAFZA, Singapore FTZ, KPMG in India analysis

⁴⁹ United Nations Review of Maritime Transport, Dubai World AE, JAFZA, KPMG India analysis

⁵⁰ United Nations Review of Maritime Transport, Shanghai International Port Company Limited, Ministry of Transportation and Communication, Taiwan, KPMG India analysis

According to the following table on competitive positioning, despite the major game-changing potential of the FTWZ concept, much remains to be accomplished, especially in comparison to what its peers have already achieved.

	JAFZA	Singapore	China	India
Location	Located on the international trade lane	Located on the international trade lane	Ports addressing export demand	Ports as well as hinterland for EXIM
Scale	Large: 49 sq. km	Large: 10 sq. km	Large: 10 sq. km	Small: 0.5 sq. km
Supportive infrastructure	Multi-modal connectivity, situated between container port and largest cargo airport	Large port infrastructure with capacity of around 30 million TEUs annually	Large port infrastructure with capacity of about 32 million TEUs annually at Shanghai	JNPT saturated at 4.3 million TEUs Few scalable container ports
Regulations	Well-defined, favorable and stable	Well-defined, favorable and stable	Well-defined, favorable and stable	Defined but still evolving
Type of activities	Light manufacturing and assembly	Manufacturing and assembly	Manufacturing and assembly	Limited processing and sub-assembly
Demand profile	Largely re-export	Largely re-export	Export-linked warehousing	Import- and export-linked demand

Source: SEZ act 2005, Union Budget 2011, Shanghai Free Trade Zone Policies, JAFZA, Singapore FTZ, KPMG in India analysis

The FTWZ model offers significant potential to overhaul the supply chain. Given the high level of fragmentation associated with the transportation and logistics segments, the quality of warehousing in particular and, service levels in general, are grossly sub-optimal. These hindrances ultimately lead to unreasonably high logistics costs. Against this backdrop, the FTWZ concept plays a pivotal role by offering a world-class, single-window solution for multiple logistics activities, with special focus on EXIM flow. It is widely believed by industry experts that with excellent infrastructure, mechanization and regulatory incentives, the FTWZ model offers significant potential to save costs in the overall supply chain.



Actions required

- Implementation of GST:** The existing landscape of fragmented, unorganized small godowns will likely undergo significant reorganization with the rollout of the much overdue uniform GST. The development of large hubs in key locations, coupled with smaller spoke warehouses closer to production and consumption centers, are expected emerge following the rollout. This change in legacy tax structure is expected to be the largest driver of modern warehousing infrastructure in the nation. While several companies have initiated the consolidation and rationalization of existing warehouse networks, confirmed rollout dates have yet to be declared.
- Skill development:** The availability of skilled manpower — both management and operational — will likely be a constraint as the sector continues to evolve rapidly amid changing regulation and the entry of global retailers and service providers. By 2015, it is estimated that India will need approximately 30,000–35,000 warehouse managers alone. Government, policy makers and private sectors players must take cognizance of this and develop a collaborative approach to set up training infrastructure and incentives in the form of job opportunities for qualified personnel.⁵¹
- Development of new storage models and networks:** The emergence of next-generation storage models such as multi-modal logistics parks (MMLPs), mega food parks (MFPs) and FTWZs must be aligned with the development of key infrastructure projects related to port, highway, and rail projects — such as the GQ project, the NSEW project and the DFC project — to facilitate cohesive network development.
- IT adoption:** The rapid transformation of physical infrastructure for storage would be incomplete without the adoption of supporting IT. Technology is expected to constitute the backbone of a strong and efficient modern warehouse that encourages accuracy, inventory tracking and lowered operational costs. Today, the market offers multiple forms of warehouse-management systems, and service providers can select off-the-shelf solutions that best suit their level of complexity.

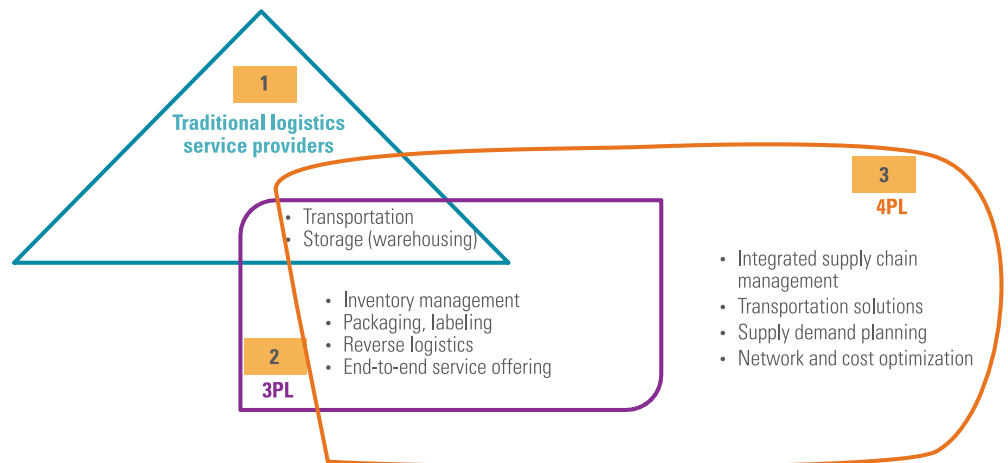
⁵¹ National Skill Development Corporation, <http://www.nsdindia.org/>



Outlook

In recent years, the Indian warehousing segment has progressed significantly. Value-added services now being offered within the larger periphery of warehouses have overhauled the conventional definition of 'storage.' Applications of inventory management on a just-in-time (JIT) basis, concepts like vendor managed inventory (VMI), value addition in the reverse logistics leg of products for repair, remanufacture or recycling, bonded warehousing and processes such as sorting, grading, bar coding, MRP tagging, packaging, repackaging, quality checking and cross-docking are becoming increasingly common.

Changing landscape for warehousing service providers



Source: KPMG in India analysis

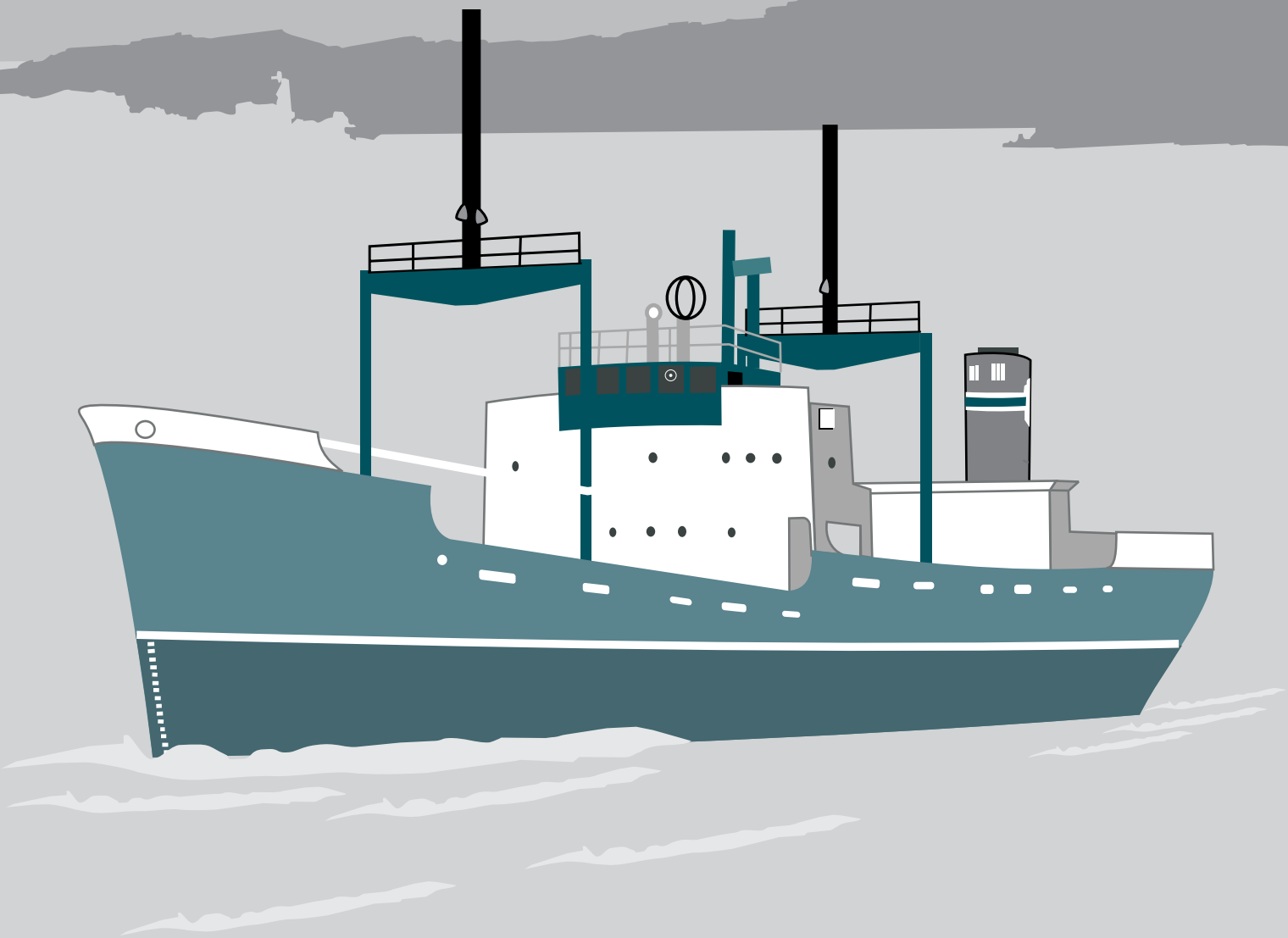
From a service provider perspective, warehousing has begun to evolve from a pure-play traditional service provider's domain (category '1' in above figure) to a range of hi-end 3PL and 4PL players (category '2' and '3' in above figure). With this evolution, the variety and quality of service offerings have scaled up from simple four-wall-and-a-roof 'storage' to multiple sophisticated applications under a single roof.

However, there still remains scope for the wider industry to re-visit their warehousing approach. Perhaps, the onset of GST, with its potential to revamp the national warehousing network, could be considered the single largest industry-wide opportunity to consider smart warehousing as a cost-saving opportunity across the supply chain rather than a standalone necessity for goods storage.

WATER

Water as a mode of transportation holds significant importance in any economy's progress. Water as a mode of cargo movement contributes only 8⁵² percent by volume of the India's cargo movement. Despite its potential as a cost-effective and environment-friendly mode of transport, its share in the modal mix continues to lag behind other developed countries.

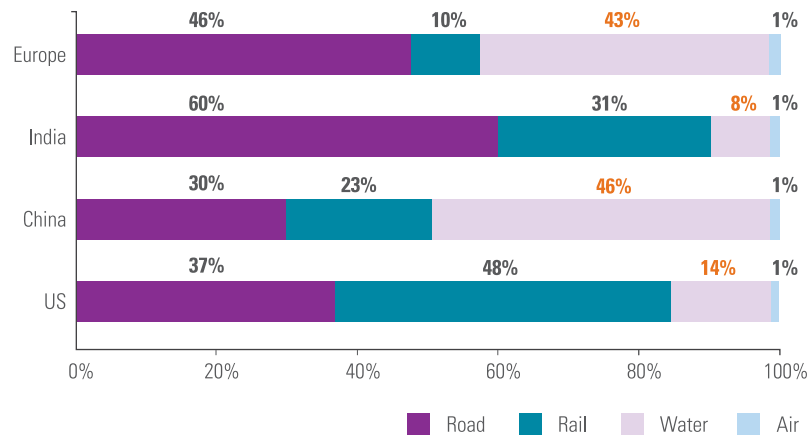
52 KPMG in India analysis



Domestic shipping offers significant advantages over road and rail transport in terms of fuel and cost savings. Fuel consumption for every ton-kilometer of freight shipped is only 15 percent of that by road and 54 percent of that by rail. Emissions are also far lower than that in rail or road transport. From a cost perspective, shipping costs 21 percent of that by road and 42 percent of that by rail.⁵³

Coastal shipping and inland waterways transportation (IWT), the two significant modes of domestic shipping, both offer game-changing opportunities in the Indian context especially to meet the demand for bulk transportation to nearby areas and along the coast vis-à-vis other modes of transport.

Share of Waterways in modal mix: A global comparison



Note: Europe: 2010 statistics, US: 2007 statistics, China: 2008 statistics and India: 2012 statistics; modal split is for freight transport turnover (BTKM); pipelines transportation is not considered in above analysis
Sources: Europa Stat, US Department of Transportation, China Ministry of Transport, KPMG in India analysis

Inland Waterways Transportation (IWT)

Growing at 7.2 percent over the past five years, IWT cargo traffic was estimated at 79 MMT in 2011–12. India falls short in the share of IWT at 0.5 percent as compared to China at 8.7 percent, the US at 8.3 percent and Europe at 7 percent.⁵⁴

The development of the Indian IWT landscape holds immense potential due to its characteristic advantages over other modes of transportation, especially for bulk movement.

Advantages of IWT: A modal comparison

Parameters	IWT	Rail	Road
Energy efficiency: 1 horsepower (HP) can move what weight of cargo (kg)?	4,000	500	150
Fuel efficiency: 1 liter of fuel can move how much freight (ton-km)?	105	85	24
Equivalent single unit carrying capacity	1 barge	15 rail wagons	60 trucks
Air pollution	Low	Medium	High
Land acquisition	Low	High	High
Capital required	Low	High	High

Note: the information is for indicative comparison only

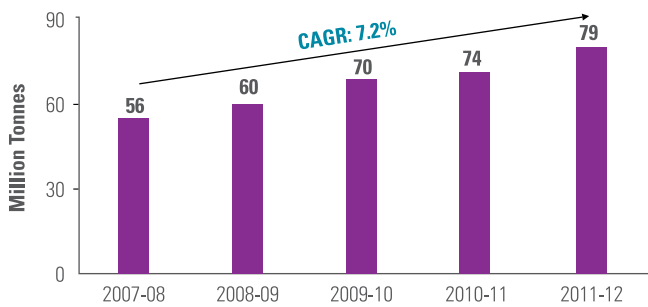
Source: Inland Waterways Authority of India (IWAI), 'Inland Water Transport – Potential for use in movement of fertilizers' report, 28 January 2010, <http://iwai.gov.in/misc/PPTtoMinofFertilizers28110.pdf>; KPMG in India analysis

⁵³ Integrated Logistics Strategy, National Transport Development Policy Committee, September 2011

⁵⁴ Presentation on Indian Inland Waterways, 13 March 2012, IWAI; KPMG in India analysis

India is home to 14,500 km of navigable inland waterways, of which 5,200 km (36 percent) of major rivers and 485 km (3 percent) of canals are conducive to the movement of mechanized vessels. Among these navigable waterways, five National Waterways (NWs) — NWs 1, 2, 3, 4 and 5 — spanning approximately 4,400 km have been outlined as potential inland waterways at the Ganges and Brahmaputra rivers, the West Coast Canal, the Godavari and Krishna rivers, and the East Coast Canal, respectively. NW 6, which stretches across 121 km, has been proposed at Barak River.⁵⁵

Cargo movement by IWT



Sources: Presentation on Indian inland waterways, 13 March 2012, IWAI, KPMG in India analysis

The key characteristics and operational aspects of NW 1, 2 and 3 which contribute majorly to the IWT are discussed in the table below:

NW	Length (km)	Stretch	Key operational aspects
NW-1	1,620	Allahabad to Kolkata on the Ganges River	<ul style="list-style-type: none"> River port being developed at Kolkata and Haldia, capable of handling containers, rail link to be provided by 2014 River port at Patna operational River ports at Varanasi and Allahabad proposed in Twelfth Five-Year Plan Floating terminal at other locations Night-navigation facilities available Sufficient LAD — 2.5 m up to Patna and 2.0 m up to Varanasi planned.
NW-2	891	Sadiya to Dhubri on the Brahmaputra	<ul style="list-style-type: none"> Pandu to emerge as multimodal transport hub, catering to the North-East, , broad gauge rail link also planned Dhubri River port planned by 2014 Night-navigation facilities available Sufficient LAD – 2.5 m upto Neamati and 2.0 m upto Dibrugarh.
NW-3	205	West Coast Canal from Kottapuram to Kollam, including the Champakara and Udyogamandal canals	<ul style="list-style-type: none"> Eight river ports already commissioned, one more at Alappuzha under construction Ro-Ro jetties at Willingdon and Bolghatty operational Night-navigation facilities available Sufficient LAD — 2.5 m planned across entire stretch by 2013.

LAD: Least Available Depth

Source: India Maritime Week, Presentation 'IWT Infrastructure in India, January 2012', DG Shipping India, KPMG in India analysis

⁵⁵ Presentation on Indian Inland Waterways, 13 March 2012, IWAI; KPMG in India analysis

NWs 4 and 5, declared in 2008, will span 1,078 km and 588 km, respectively and are expected to be developed at INR15 billion and INR42 billion, respectively — such that commercially viable stretches would be developed through the PPP route with viability gap funding.

IWT is gradually showcasing its advantage over road and rail especially for bulk transportation (coal and cement) and project-related over dimension cargo (ODC). The following are among some flagship examples that partially or fully employ IWT as a cost-effective transport option⁵⁶:

- Coal for thermal power plants on Ganga and Brahmaputra
- Food grains from Kolkata to Tripura via Ashuganj and within Assam
- Fertilizer movement on the Ganges
- Iron-ore shipments in the Goa region
- Transportation of coal for National Thermal Power Station (NTPC) — Farakka project
- Transportation of fly ash from West Bengal to Bangladesh
- Cement from Farakka to Nabadweep, Bhagalpur and Patna
- Hot-rolled (HR) coils from Kolkata to Tripura via Ashuganj
- Project cargo for planned hydel power projects in Arunachal Pradesh



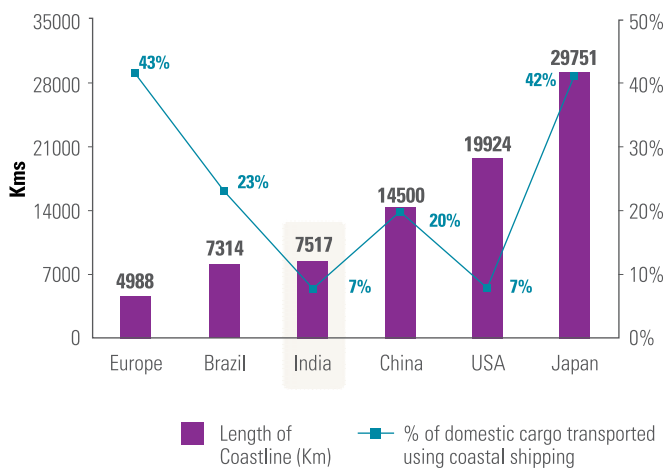
⁵⁶ Presentation – 'Prospects of IWT in Multimodal Transport', India Maritime Week, January 2012

Coastal shipping

Coastal shipping is an important component in the development of domestic industry and trade due to its environment-friendly, cost-effective and fuel-efficient services. Increasing delays due to high road and rail congestion is driving companies to transport their goods via coastal shipping. However, as compared to other emerging and developed countries, India's coastal shipping potential remains significantly underutilized.

An assessment of coastal cargo traffic by commodity indicates that petroleum, oil and lubricants (POL), coal, and iron ore are the three major commodity categories that account for the bulk of coastal cargo movement. In major ports, POL and coal collectively comprise around 80 percent of the total coastal traffic handled. In the non-major ports category, POL and iron ore collectively comprise roughly 70 percent of the total coastal traffic handled.⁵⁸

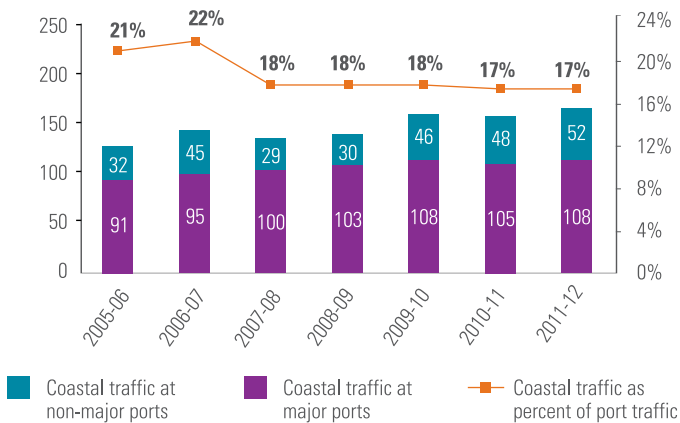
Global comparison: India's share of coastal shipping in domestic cargo movement



Sources: KPMG in India analysis

In 2011–12, coastal cargo constituted 17 percent of total cargo at Indian ports and increased at a nominal CAGR of 4.5 percent to 160 MMT in 2011–12 over the past five years. In 2011–12, coastal traffic at major ports accounted for 70 percent of total coastal cargo traffic and 18–20 percent of the total cargo handled at major ports. Coastal traffic at non-major ports comprised 14 percent of total cargo handled for the same period⁵⁷.

Coastal traffic at ports



Sources: KPMG in India analysis

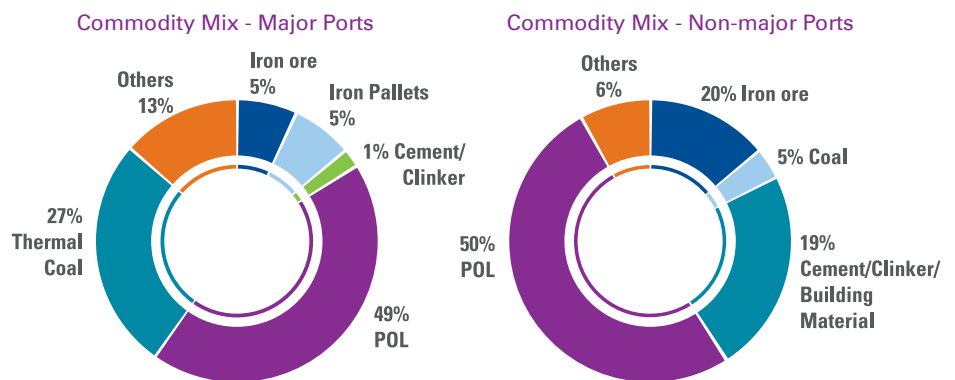
⁵⁷ IPA, Ministry of Shipping; KPMG in India analysis
⁵⁸ KPMG in India analysis

Development of coastal industries will provide port access, leading to usage of coastal shipping for raw material and finished goods transportation. Options for cargo movement by coastal shipping mode is mentioned in the table below:

Commodity	Origin	Destination
POL	JNPT, Kandla, Mundra	Mormugao, New Mangalore, Cochin
Iron ore and steel	Mormugao	New Mangalore, Cochin, Tuticorin, Mundra, Kandla
Fertilizer and fertilizer raw material	Paradip, Haldia	Ennore, Chennai, Tuticorin, Vizag
	Kandla, Mundra, JNPT	Mormugao, New Mangalore, Cochin
Structure	Standard brick structure	Reinforced walls + prefab sheets and bespoke roof design
Coal	Haldia, Kolkata	Paradip
Cement	Paradip	Tuticorin

While the coastal shipping of containerized cargo plays a relatively small role and is limited to tiles, marble, white goods and chemicals, there is an increasing opportunity to convert agricultural goods currently moving via bulk, break bulk or rail to coastal mode, especially along the west coast.

Coastal shipping seems to be a feasible option for movement between most ports on the west and east coasts. Some prominent coastal shipping routes include Chennai to Chittagong/Yangon through Haldia/Kolkata, southbound cargo from Pipavav/Mundra to Kochi and other ports, and inland and coastal movement in and around Goa.



Sources: IPA, Ministry of Shipping

Actions required

The enhancement of IWT and coastal shipping as an alternative mode for the transportation of goods, especially bulk and ODC, would require concentrated efforts at various levels:

- **Infrastructure and capacity**
 - Incentivize ports to develop additional small berths for domestic cargo — domestic ships currently waste 55 percent of total voyage time due to port delays.
 - Increase vessel capacity to facilitate fewer vessel voyages and, thus, help reduce port congestion.
 - Maintain draft along important inland waterways.
 - The development of domestic cargo corridors for last- and first-mile connectivity with ports.
- **Policy initiatives**
 - Allow the co-loading of domestic and EXIM cargo on coastal vessels; currently excess capacity moves on international vessels between Indian ports. While already allowed for Indian flag vessels, the decision on foreign flag vessels is awaited.
 - Policies around subsidies for capital investments in coastal shipping may be revisited, as has been done for the road, rail and airline sectors.
 - The governance of IWT under a single body (e.g., IWAI), must be centralized. Governance is currently under multiple authorities such as the CIWTC, port authorities and state governments.

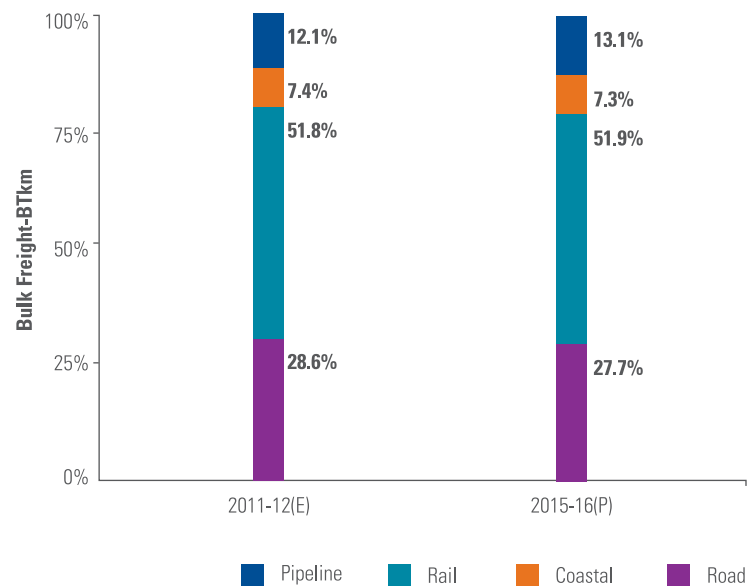
Outlook

Despite its high-growth potential, India's waterways segment remains largely untapped and underutilized. However, in recent times, policymakers have enhanced their focus on developing the infrastructure of this segment. Consequently, coastal shipping and IWT have witnessed significant traction. Yet, while their absolute share in total freight moved is expected to increase in future, their share in overall modal mix (in BTKM) is likely to decrease. This can be attributed to a significant increase in the share of other modes of transportation.

For instance, the share of coastal shipping in the overall bulk transportation modal mix (in BTKM), is likely to reduce marginally by 0.1 percent, from an estimated 7.4 percent in 2011–12 to a projected 7.3 percent in 2015–16, while the share of IWT is likely to remain negligible.

However, despite this likely scenario, at least in absolute terms, both segments of domestic shipping are likely to assume growing significance.

The share of waterways



Sources: Crisil Report "Domestic Freight Transportation Services", July 2012



CONCLUSION

THE OBJECTIVE OF THIS REPORT HAS BEEN TO IDENTIFY CRITICAL INITIATIVES AND MEASURES THAT ARE LIKELY TO SERVE AS PREREQUISITES TO GROWTH ACROSS SIX INDIVIDUAL SEGMENTS OF THE INDIAN LOGISTICS LANDSCAPE. RATHER THAN FOCUSING ON THE REAL AND PERCEIVED SHORTCOMINGS OF THE INDIA'S LOGISTICS LANDSCAPE, THE REPORT AIMS TO HIGHLIGHT THE NEED TO BRIDGE VARIOUS GAPS THAT PREVAIL IN EACH SEGMENT OF THE INDUSTRY, THUS POSING AS HURDLES ALONG ITS GROWTH CURVE.

THE VARIOUS GAME CHANGERS IDENTIFIED IN THIS THOUGHT PAPER ARE NOT INTENDED TO SYMBOLIZE THE DESIRED END STATE OF LOGISTICS IN INDIA; RATHER, THEY REPRESENT JUST A FEW OF THE MANY INITIATIVES THAT MUST BE IMPLEMENTED IF INDIA'S ECONOMIC POTENTIAL OVER THIS DECADE IS TO BE FULFILLED. THE REPORT HIGHLIGHTS POTENTIAL GAME CHANGERS SPANNING MARQUEE INFRASTRUCTURE INITIATIVES SUCH AS THE DFC PROJECT, NATIONAL HIGHWAY DEVELOPMENT PROGRAM AND THE MARITIME AGENDA. ADDITIONALLY, IT INTENDS TO HIGHLIGHT VARIOUS LEGACY TRENDS SUCH AS FRAGMENTED TRUCKING AND UNORGANIZED WAREHOUSING LANDSCAPE, WHICH NEED TO EVOLVE RAPIDLY.

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RECOMMENDATION

AT A TIME WHEN AWARENESS AROUND SPECIFIC INITIATIVES IS WIDELY RECOGNIZED, THE OBJECTIVE HAS BEEN TO CAPTURE DISTINCT ASPECTS THAT COULD POTENTIALLY REVOLUTIONIZE EACH SEGMENT. THAT SAID, THE COLLECTIVE EVOLUTION OF INDIA'S LOGISTICS INDUSTRY CAN ONLY BE REALIZED THROUGH UNIFORM PROGRESS ACROSS SEGMENTS. FOR INDIA'S LOGISTICS SECTOR TO FULFILL ITS ROLE IN SUPPORTING THE COUNTRY'S RISE AS A COMPLEX, MULTI-LAYER AND MATURE ECONOMY IN FUTURE DECADES, THE FOLLOWING RECOMMENDATIONS SHOULD BE CONSIDERED TO DEVELOP A UNIVERSAL ROADMAP FOR THE INDUSTRY:

- **CREATE APPROPRIATE POLICY CHANGES PER MODE OF TRANSPORTATION (ROAD, RAIL, WATER AND AIR), INCREASING INVESTMENT IN THE VARIOUS MODES OF TRANSPORTATION AND OPENING UP CAPACITY, ESPECIALLY FOR RAIL AND WATERWAYS.**
- **HARMONIZE AND STREAMLINE PROCESSES ACROSS GOVERNMENT BODIES THAT HAVE A ROLE TO PLAY IN THE LOGISTICS SECTOR, THEREBY REDUCING STOPPAGES AND TOUCH POINTS OF CARGO MOVEMENTS, AS WELL AS INCREASING THE SPEED WITH WHICH GOODS ARE TRANSPORTED WITHIN, INTO AND OUT OF THE COUNTRY.**

- **ENGINEER THE OVERLAP OF CARGO NETWORKS, SO THAT INTERSECTIONS OF MODES OF TRANSPORT ARE CLOSE TO THE PRODUCTION CENTERS OF BULK, INDUSTRIAL, CONSUMER GOODS AND FARM PRODUCE.**
- **SET BENCHMARKS AND STANDARDS FOR THE INDUSTRY, THEREBY DRIVING THE UNIFORMITY OF WAREHOUSES, STORAGE AND TRANSPORTATION EQUIPMENT.**
- **CHANNEL THE MOVEMENT OF COMMODITIES TO SUITABLE MODES OF TRANSPORTATION. DIVERT THE TRANSPORTATION OF BULK COMMODITIES FROM ROAD TO INCREASINGLY APPROPRIATE MODES SUCH AS RAIL AND WATERWAYS, THEREBY FREEING UP CAPACITY FOR CONSUMER GOODS AND ALSO REDUCING THE RISK OF ACCIDENTS.**
- **DECONGEST AIRPORTS AND SEAPORTS, SHIFTING CARGO-CLEARANCE ACTIVITIES AWAY FROM EXPENSIVE REAL ESTATE TO INLAND OR PORT OR AIRPORT LOCATIONS.**
- **ESTABLISH SAFETY, HEALTH AND ENVIRONMENT (SHE) RELATED STANDARDS CENTRALLY TO FACILITATE UNIFORMITY ACROSS INDUSTRY SUB SECTORS AND COMPANIES WHILE INCREASING SAFETY AND LIMITING THE ADVERSE ENVIRONMENTAL EFFECTS OF THE SECTOR ON SOCIETY.**



Acknowledgement

For the purposes of this study, we relied on KPMG in India industry knowledge and prior engagement experience.

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