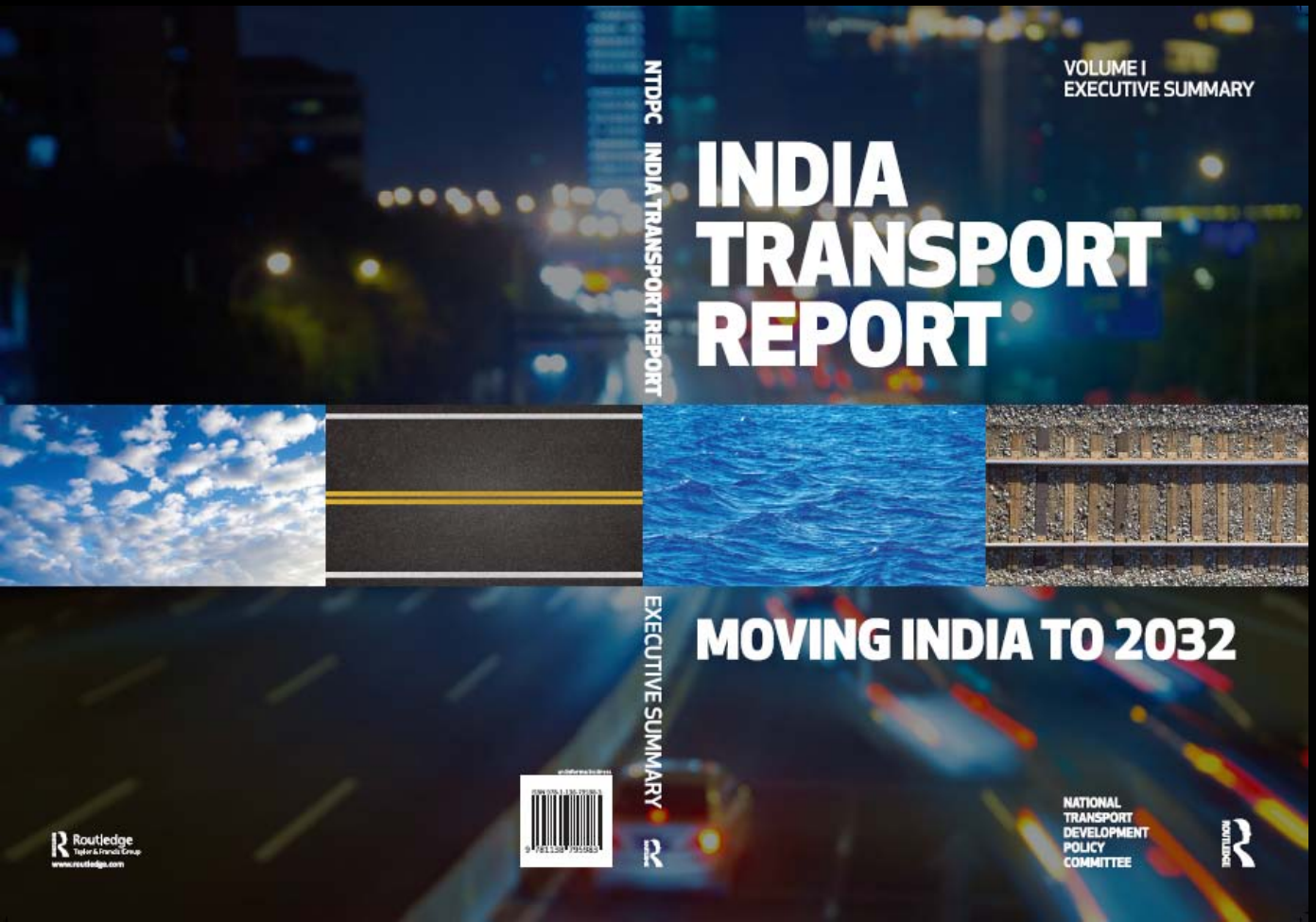
Moving INDIA to 2032

National Transport Development Policy Committee (NTDPC)

Sector Report – RAILWAYS



Highlights by

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Background

The Government of India set up a High Level National Transport Development Policy Committee (NTDPC) on 11 February 2010.

The main objective of setting up this Committee was to develop long term national transport policy (with a twenty year horizon) which facilitates overall growth and efficiency in the economy, while minimising energy use and effects on climate change.

http://planningcommission.nic.in/sectors/NTDPC/TOR_CabSec_NTDPC.pdf

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National Transport Development Policy Committee (NTDPC)

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- Preface
- NTDPC's Approach to Transport Policy
- Trends in Growth and Development of Transport
- Macroeconomic Growth Backdrop: Transport Investment Requirements 2012-2032
- Integrated Transport: Strategy and Logistics
- Institutions for Transport System Governance
- Regulatory Issues: An Overall Approach
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- Energy and Environment
- Transportation of Energy Commodities
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- Potential of Information and Communication Technology to Enhance Transport Efficiency
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- Presentation made by National Transport Development Policy Committee
- OFFICE MEMORANDUM dated 11th February, 2010
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BACK TO TOP

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Sector Reports Part II

Ports and Shipping
Urban Transport
Transport Development in the North East
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Sector Report: Railways

TABLE OF CONTENTS

Some issues

Dominance of Road in Freight

Table 1.1
Mode Share in Freight Traffic (2007-08)

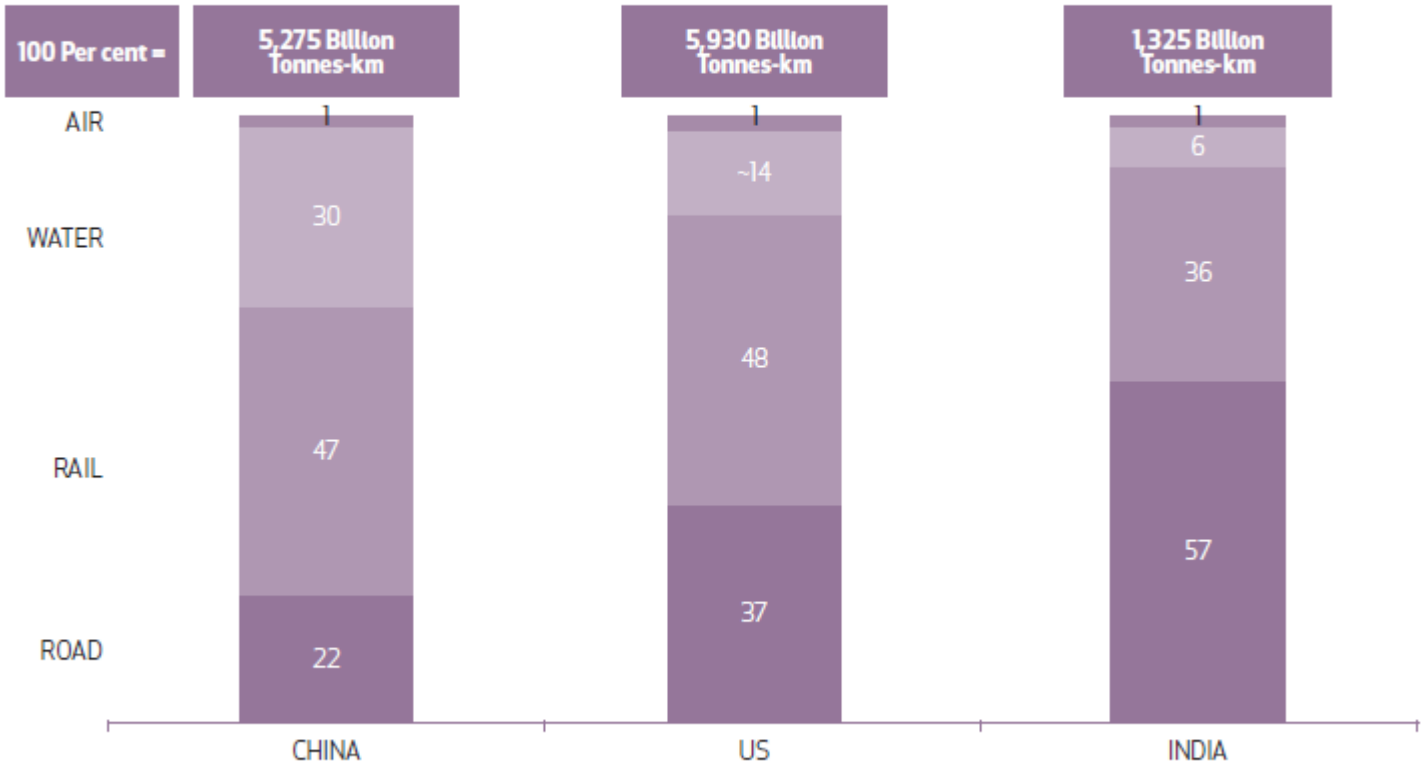
MODE	MODAL SHARE IN TOTAL ORIGINATING TRAFFIC		PERCENTAGE SHARE IN TOTAL TRANSPORT OUTPUT (PER CENT)	
	TONNES(MILLION)	NTKMs (BILLION)	TONNES	NTKMs
Rail*@	769	508	30	36
Highways (Road)@	1,559	706	61	50
Coastal Shipping	59	86	2.3	6
Airways	0.28	0.29	0.01	0.02
IWT	55	3.5	2.1	0.24
Pipelines	113	105	4.5	7.5
TOTAL	**2,555**	**1,409**	**100**	**100**

Source: Total Transport System Study (TTSS) by RITES Ltd. (for Planning Commission, GoI).
Note:
* Includes IR & KRC 'non-revenue' inter-regional traffic as well as NTPC's MGR traffic aggregating to 1.86 million tonnes and 26.1 million tonnes respectively.
@ Excluding intra-regional traffic of 96.6 MT by rail and 4640 MT assessed separately.

The dominance of the road sector in freight transport in India is corroborated by two independent studies carried out by RITES and McKinsey. Both the studies estimate the share of Railways in freight transport in Net Tonne Kilometres (NTKMs) in India to be around 36 per cent

Dominance of Road in Freight

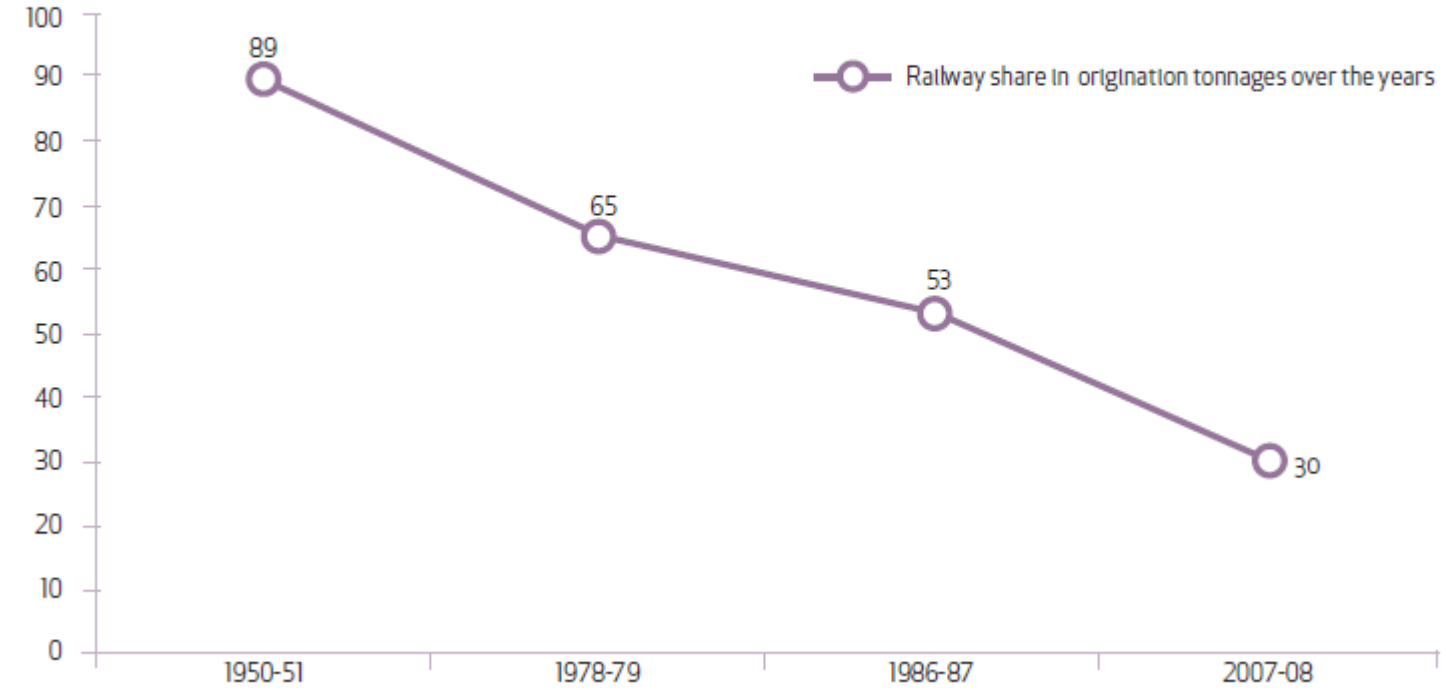
Table 1.2
Mode Share in Freight Traffic
(Per cent of NTKM)



Source: McKinsey's Building India: Transforming the nation's Logistics Infrastructure, 2010.
Note: Mode share estimated for 2007, excluding pipelines.

IR’s share in originating tonnage

Figure 1.1
Railways’ Share in Originating Tonnage
[Per cent]

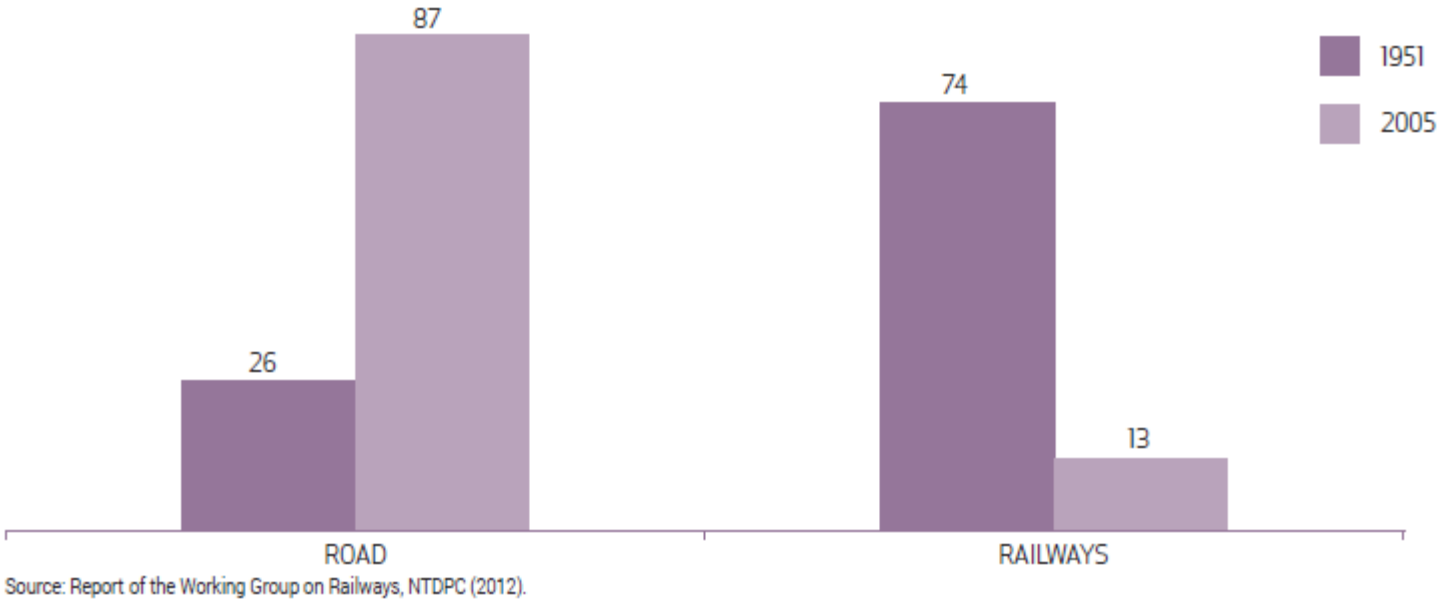


Source: Total Transport System Study (TTSS) by RITES Ltd. (for Planning Commission, GoI)

The RITES study also shows that over the years IR’s share (in originating tonnage) has come down from 89 per cent in 1951 to 30 per cent in 2007-08

IR's share in PKMs

Figure 1.2
Relative Share: Passenger Transport
[Per cent]



Source: Report of the Working Group on Railways, NTDPC (2012).

A similar trend is observed in passenger transport, where the share of IR (in PKMs) has declined from 74.3 per cent in 1951 to 12.9 per cent in 2004-05, while the share of road has increased from 25.7 per cent to 86.7 per cent during the period

Actual vs Optimal Modal Mix

RITES Total Transport System Study (TTSS) has estimated the total resource costs associated with different modes of transport.

The assessment of actual and optimal modal mix computed on the basis of this methodology is summarized

Table 1.3
Actual vs Optimal Modal Mix (2007-08)

MODE	ACTUAL MODAL MIX			OPTIMAL MODAL MIX		
	FLOWS	COST	THROUGHPUT	FLOWS	COST	THROUGHPUT
	Million Tonnes	Billion Rs	Billion NTKM	Million Tonnes	Billion Rs	Billion NTKM
Rail	736	497	499	1,704	1,423	1,169
Road	1,559	1,556	692	591	245	66
Coastal	60	34	90	60	34	90
Total	**2,355**	**2,087**	**1,281**	**2,355**	**1,702**	**1,325**

Source: Total Transport System Study (TTSS) by RITES Ltd. (for Planning Commission, GoI).
Note: Coastal flows not subjected to the optimal analysis.

Comparison of Rail and Road

Table 1.4

Comparison of Environmental and Social Sustainability of Rail and Road Transport

Energy Consumption	• As compared to road, rail consumes 75 per cent to 90 per cent less energy for freight traffic and 5 per cent to 21 per cent less energy for passenger traffic
Financial Costs	• Unit cost of rail transport was lower than road transport by about Rs 2 per NTKM and Rs 1.6 per PKM (in the base year 2000)
Environmental Damage	• Rail transport emits 17 gram CO_2 equivalent per PKM as compared to 84 gram per PKM in case of road transport • Rail transport emits 28 gram CO_2 equivalent per NTKM as compared to 64 gram per NTKM in case of road transport
Accident Costs	• Accident costs on road are significantly higher than those on rail • For passenger transport, road accident costs are 45 times higher than rail • For freight transport, road accident costs are 8 times that of rail
Social Costs (All-Inclusive Costs)	• In terms of all-inclusive costs or social costs, railways have a huge advantage over road transport (the advantage is more in case of freight traffic) • For urban areas, the cost advantage of rail (in the base year 2000) was as much as Rs 2.8 per NTKM and Rs 1.7 per PKM • For non-urban areas, the cost advantage of rail (in the base year 2000) was as much as Rs 2.5 per NTKM and Rs 1.7 per PKM

Source: AITD report on 'Environmental and Social Sustainability of Transport- Comparative Study of Rail and Road' (2000); International Union of Railways (UIC); McKinsey's Building India: Transforming the nation's Logistics Infrastructure, 2010; Report of the Working Group on Railways (NTDPC).

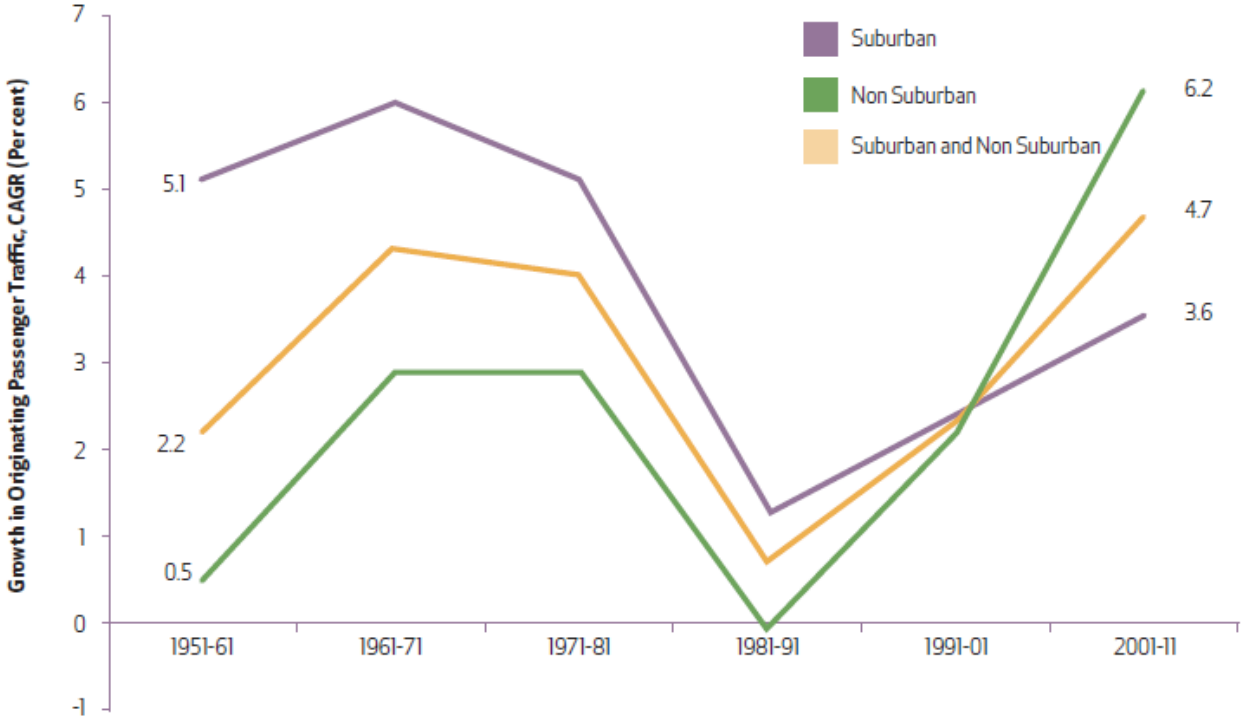
Restore the balance in intermodal mix

Figure 1.3
Mode Share in Freight: 2010 to 2020

Source: McKinsey's Building India: Transforming the Nation's Logistics Infrastructure, 2010.

Growth in total originating passengers

Figure 1.4
Growth in Originating Passenger Traffic, CAGR
[Per cent]

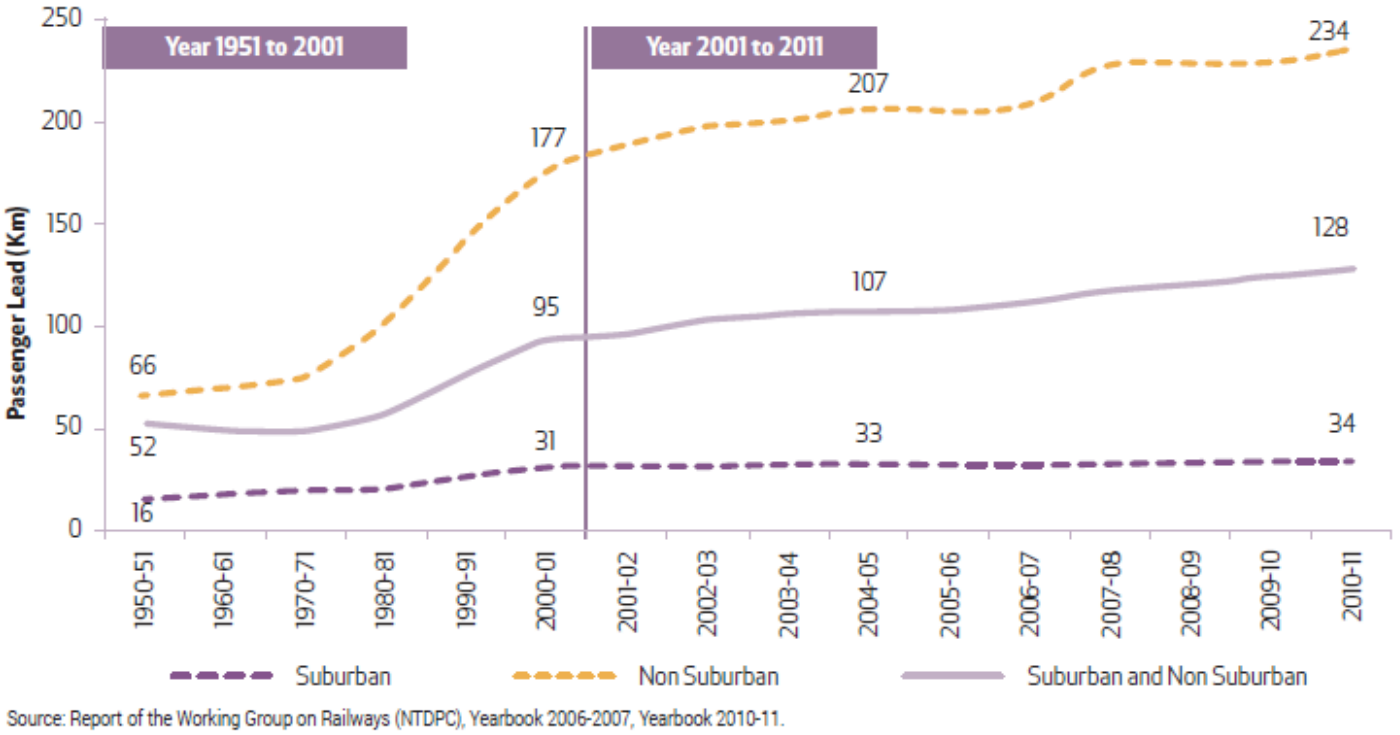


Source: Report of the Working Group on Railways (NTDPC), Yearbook 2010-11.

During the last decade (2001-11) the trend of suburban category being the driver of growth reversed and non-suburban passenger category has been the key driver of growth in total originating passengers with a CAGR of 6.2 per cent, compared to 3.6 per cent for the suburban passengers.

Passenger Lead on IR

Figure 1.6
Passenger Lead on IR
[Km]

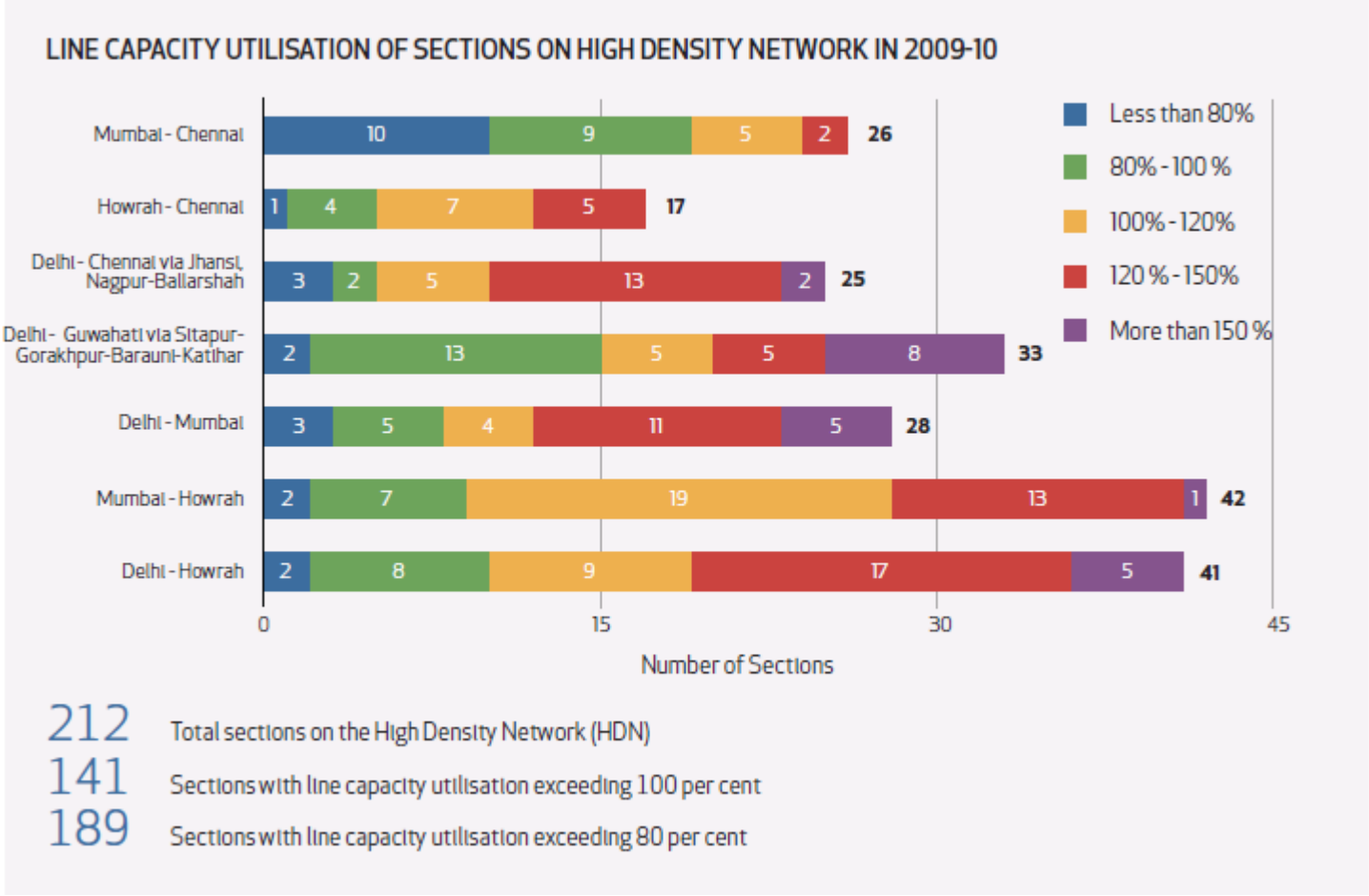


Source: Report of the Working Group on Railways (NTDPC), Yearbook 2006-2007, Yearbook 2010-11.

The lead in the nonsuburban category increased much faster (CAGR of 3 per cent) compared to suburban category (CAGR of 0.8 per cent) over the same period

LINE CAPACITY UTILISATION OF SECTIONS ON HIGH DENSITY NETWORK

These routes have reached over saturated levels of capacity utilization and at present are strained to the breaking point.



Note: A line-capacity utilization of 80 per cent is considered optimum as smooth operation of trains requires some slack in the line-capacity to absorb and recover from unforeseen disruptions.

Efficiency of Heavy Load Trains
Some examples

COUNTRY	EXAMPLES OF HEAVY-LOAD TRAINS AND TYPICAL FREIGHTERS
Australia	Typical interstate freighters: East-West 5,000 tonnes, North-South 2-3,000 tonnes. **Dedicated freight lines**: Rio Tinto: 30,000 tonnes iron ore trains BHP Billiton: 44,500 tonnes iron ore trains Leigh Creek: 10,000 tonne coal trains
Brazil	Typical freighters: Various **Dedicated:** Carajas Railway: 23,000 tonne iron ore trains
Canada	Typical long-distance freighter: Canadian National bulk trains: up to 20,000 tonnes
China	Typical long-distance freighter: 4,000 tonnes **Dedicated:** Daqin Railway (mainly coal): 20,000 tonne coal trains
Germany	Trains typically constrained to 740 metres but 835 m trains being introduced Hamburg to/from Denmark and long-term feasibility of running 1,500 m trains on key routes is being examined.
Japan	N/A
Russia	Typical long-distance freighters: 4,000 tonnes Iron ore to Finland: 5,500 tonnes
United States	Typical freighters: 3,000-5,000 tonnes. Double-stack container trains: typically 5,000-8,000 tonnes Some iron ore and coal trains: 10-20,000 tonnes

Freight Growth in IR

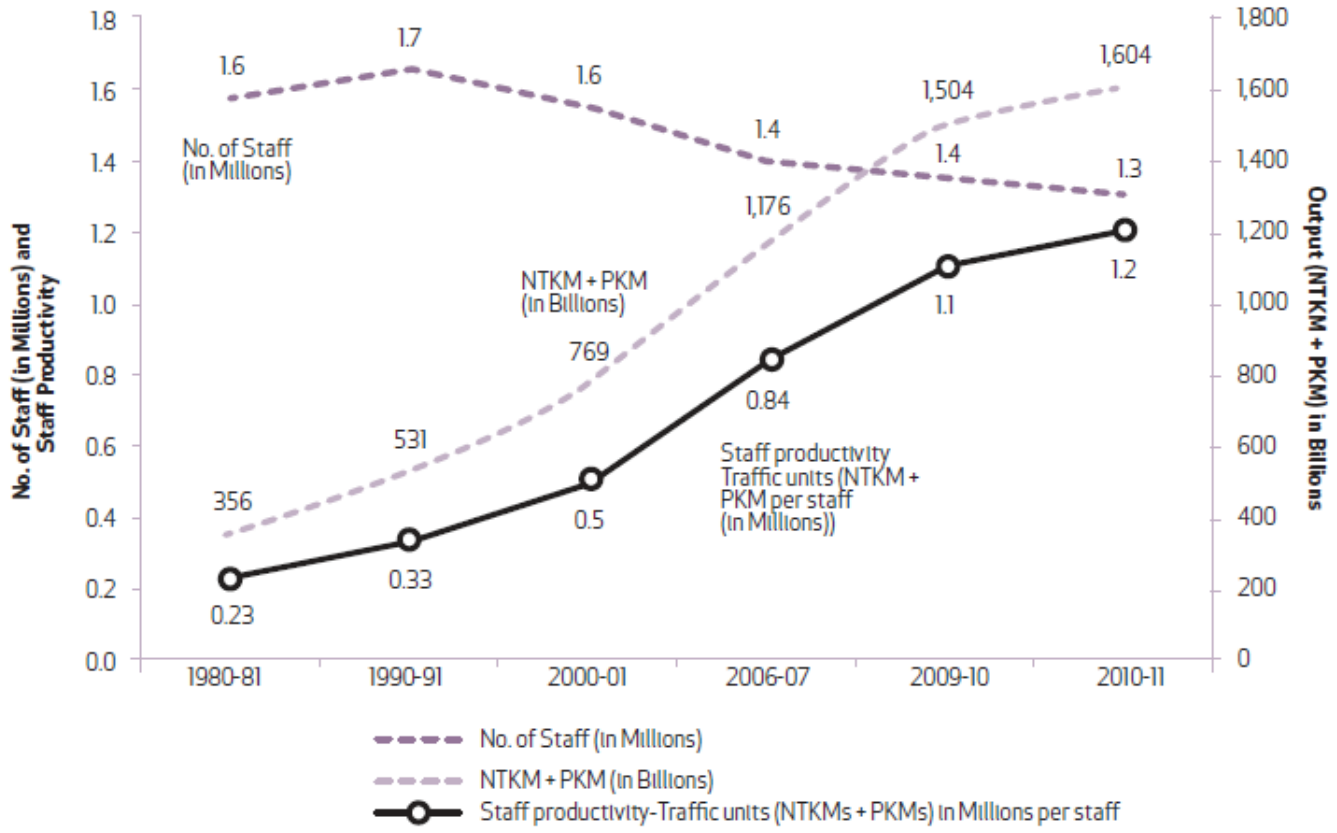
Figure 1.9b
Freight Growth: Select Commodities

Source: Ministry of Railways Yearbook 2010-11, Yearbook 2005-2006, Yearbook 2004-2005.

Note: IR has focused on carrying bulk cargo in train-loads dominated by a narrow basket of nine commodities such as coal (46 per cent), iron ore, cement, fertilisers, steel, raw materials for steel plants except iron ore, foodgrains, petroleum products and container traffic, together these account for over 90 per cent of the freight traffic.

Staff Productivity

Figure 1.11
Staff Productivity



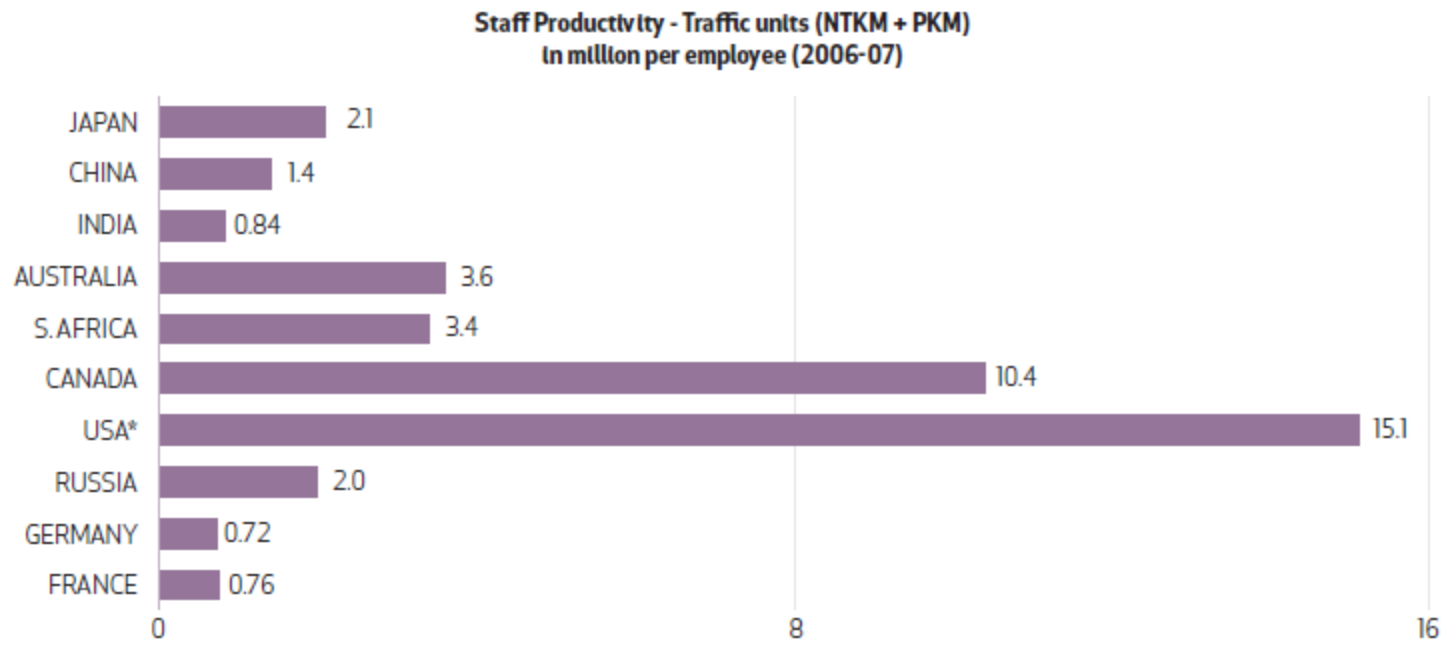
Source: Report of the Working Group on Railways (NTDPC), Year Book 2009-10, Year Book 2010-11.

Note: The major force driving the marginal increase in productivity has been the increase in transport volumes due to technology upgrade and appropriate operating strategies, combined with reduction in the number of employees from a peak of 1.65 million in 1990-91 to 1.32 million in 2010-11.

Over the years, productivity measured in terms of transport output (NTKM+PKMs in millions) per employee of IR has increased from 0.23 (1980-81) to 1.2 (2010-11)

Staff Productivity Comparison

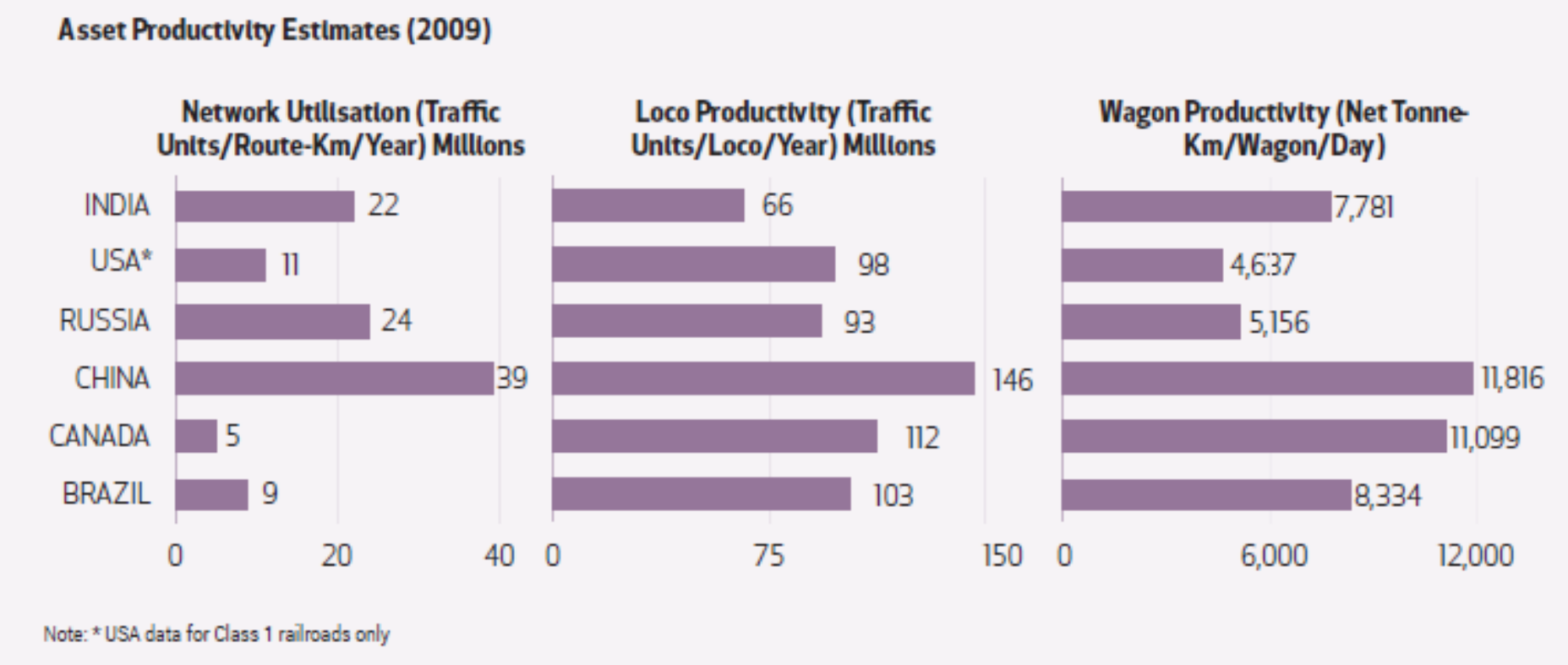
Figure 1.12
Staff Productivity Comparison (2006-07)



Source: Report of the Working Group on Railways (NTDPC), White Paper on Indian Railways, UIC 2007.
Note: * US data for AAR Class 1 and Amtrak.

The much higher staff productivity in the US and Canada vis-à-vis India; China and Russia can be partly explained by the difference in overall freight and passenger mix, as the larger passenger volumes handled in India, China and Russia require a more labour-intensive service response than freight

International Comparison of Asset Productivity



Discussion on Asset Productivity

Network utilisation:

The three networks that handle substantial passenger volumes (India, China and Russia) as well as freight have the highest overall network use, but such use can also be heavily influenced by the technology and operational standards.

The average is also affected by the relative intensity of use of different parts of the network.

For example, whereas nearly China's entire network is heavily used, the Indian average contains around 9,000 kms (more than 14 per cent of the network) of little-used non broad-gauge lines carrying only around 1 per cent of rail traffic.

Discussion on Asset Productivity

Locomotive productivity:

The achievable productivity is partly influenced by the markets offering, which differ from country to country.

Modern locomotive types and technologies also have higher haulage capability. Productivity is also influenced by the maintenance standards and efficiency of equipment.

India is significantly behind other countries in locomotive productivity

Discussion on Asset Productivity

Wagon productivity:

The achievable productivity depends partly on traffic mix; other things equal, it should be higher with longer length of haul, higher proportions of bulk relative to non-bulk traffic, and the use of non-specialist wagons for a variety of traffic types.

It is also influenced by train operating strategies and the efficiency of customers' terminal operations.

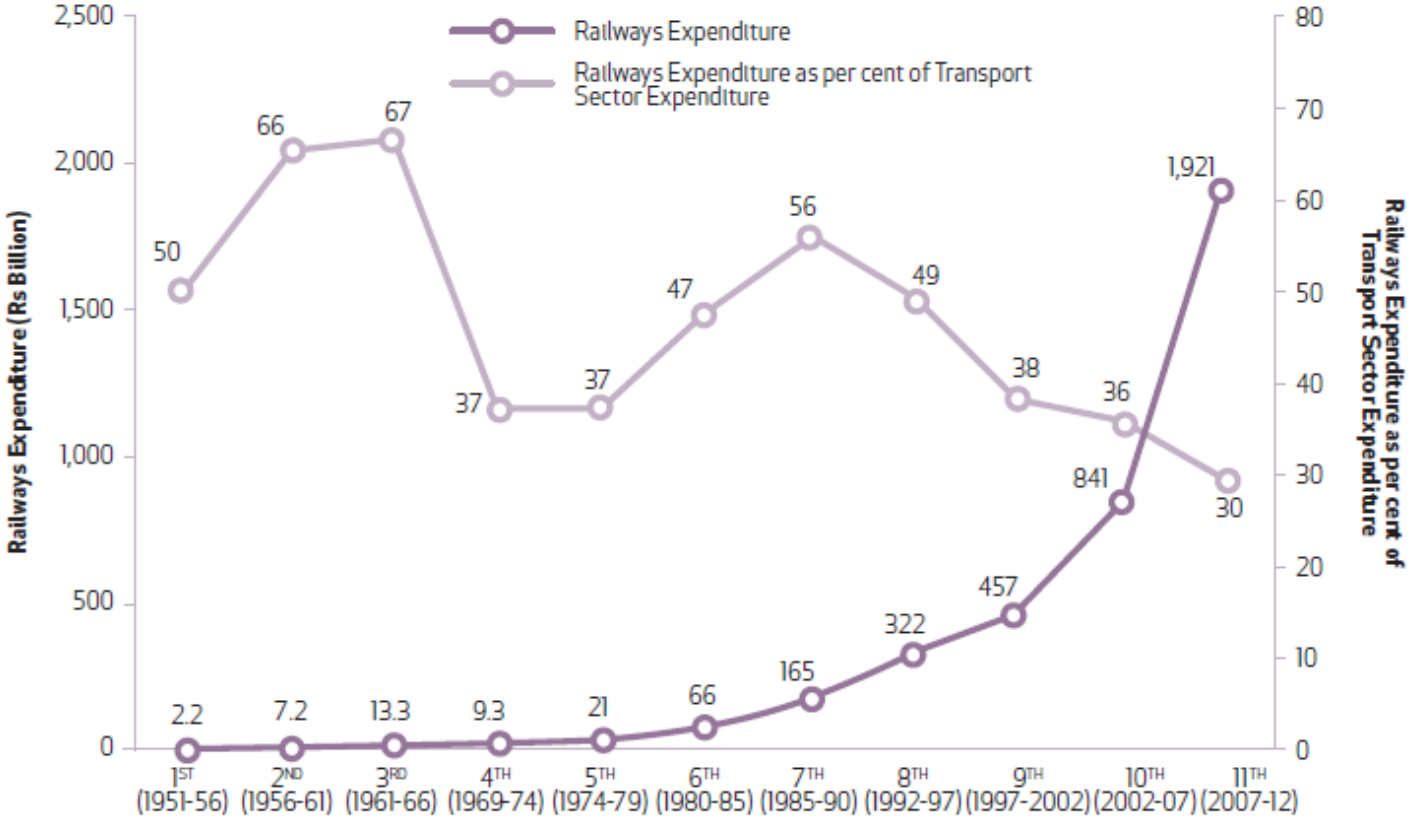
High utilisation generally assists in controlling operating costs, but it can occur at the expense of customers: for example many customers may prefer to use specialised wagons.

Source: Freight Railways Governance, Organisation and Management: An International Roundup; The World Bank; Paul F. Amos, 7 July 2011.

Trends in Railway investment

Figure 1.15

Trends in Railway Investments



Source: Various Five Year Plans, Planning Commission.

Note: IR's expenditure as a percentage of the transport sector expenditure has varied considerably over the Plan periods, as it moved from a peak of 67 per cent in the 3rd to a low of 30 per cent in the 11th Plan

Investments & Sources of Funding

The total investment in railways in each successive plan started increasing at a sharp rate from the 6th Plan (1980-85) onwards.

The total public sector investment has increased manifold from around Rs 66 billion in the 6th Plan, to around Rs 1,900 billion in the 11th Plan.

However, the IR's expenditure as a percentage of the transport sector expenditure has varied considerably over the Plan periods, as it moved from a peak of 67 per cent in the 3rd to a low of 30 per cent in the 11th Plan (Figure 1.15).

Intermodalism, Multimodalism and Logistics Capability – World experience

Country	Railway and Logistics
Australia	Rail freight operators have had close partnering arrangements with freight forwarders for decades but since railway restructuring freight companies with wider logistics businesses now run most interstate freight trains in Australia.
Brazil	Many of Brazil's railways deal with bulk mining and agricultural products but the company with the largest network (with concessions in Brazil and Argentina) 'America Latina Logistica', markets itself as a full service logistics company.
Canada	CN promotes itself as a transportation company that offers integrated services: rail, intermodal, trucking, freight forwarding, warehousing and distribution. Canadian Pacific stresses ability to plan and manage logistics solutions and provides one-stop shopping for door-to-door transportation using long-haul capabilities of the railway and the local market access of trucking, for both rail and non- rail served customers.
China	China Railway Container Transport Company was established to manage the container business, including rail and intermodal transport, cargo handling and delivery, the sale and leasing of wagons, containers and facilities. JV with international investors to establish 18 major intermodal centres linked by regular container train services.

Source: Freight Railways Governance Organisation and Management: An International Round-up, World Bank, Paul Amos, July 2011.

Intermodalism, Multimodalism and Logistics Capability – World experience

Germany	DB Schenker, the main national rail freight operator, is a multimodal transport company offering through separate LOB divisions and subsidiaries services in rail freight, land transport, air freight, ocean freight, contract logistics.
Japan	With limited bulk traffic Japan Rail Freight Company has necessarily concentrated on efficient inter-modal logistics linking 140 container rail terminals with road, sea, and air routes.
Russia	Has established subsidiary companies to provide overall logistics services in shipping containers, domestic container service, automobiles, perishable goods.
United States	Many different models but Class 1 railways now typically have overall Logistics Planning capability offering solutions and management of logistics across modes, as a LOB or as subsidiary or associated companies.

Source: Freight Railways Governance Organisation and Management: An International Round-up, World Bank, Paul Amos, July 2011.

MAJOR ISSUES CONFRONTING RAILWAYS

- Capacity constraints;
- Lack of clarity on social and commercial objectives;
- Safety;
- Inadequate Research & Development;
- Optimisation of land use;
- Energy conservation;
- Organisational and Human Resource issues.

ORGANISATIONAL REFORMS

- Institutional separation of roles into policy, regulatory and management functions.
- NTDPC recommends the separation of Railways management and operations from the Government.
- The Ministry of Railways (or the unified Ministry of Transport) in the future should be limited to setting policies
- A new Railways Regulatory Authority would be responsible for overall regulation, including the setting of tariffs;
- The Indian Railways Corporation (IRC) to be set up as a statutory corporation, which would retain many of the quasi governmental powers endowed to the Railways under the current Act.
- Existing railways corporations such as CONCOR, DFCCIL, and the like will become subsidiaries or joint ventures of the IRC.

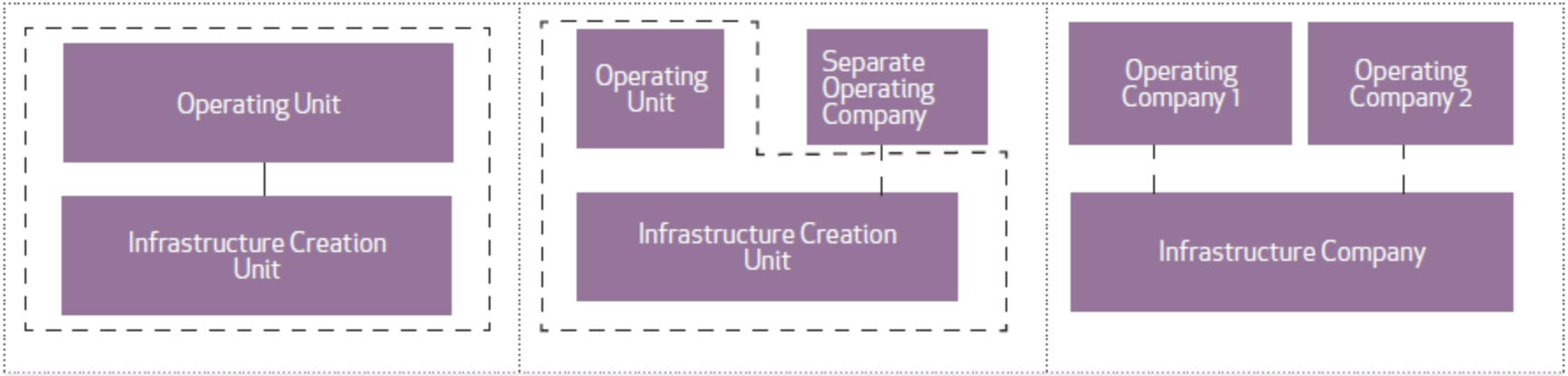
ORGANISATIONAL REFORMS ...2

- For these reforms to be implemented, the Railways Act, 1989, and the Indian Railway Board Act, 1905, will have to be amended accordingly.
- Corporatisation of the existing public sector Railways Production Units.
- To facilitate these reforms, the NTDPC recommends that the Railways should undertake recasting of its accounts in a company account format consistent with accounting norms under the Indian GAAP.
- It should be reorganised in terms of business lines such as infrastructure management, freight transportation, passenger transportation, parcel and miscellaneous activities should similarly be organised as separate profit-centres by IR.
- All activities falling outside the core transportation operations should be critically reviewed from the perspective of either retention or outsourcing.

ORGANISATIONAL REFORMS ...3

- GMs of Zonal Railways to be empowered to take decisions that enhance revenue, reduce costs or build platform for higher growth in future.
- GMs should have the power to take such decisions without reference to Railway Board within a framework of rules and investment limits.
- Simultaneously, the Zonal Railways would be made accountable for return on capital, transport output, profitability and safety.
- Organisational and institutional deficiencies inhibiting PPP need to be identified and addressed.
- The existing PPP policy framework should be reviewed in the light of hitherto poor response and PPP experience

Figure 1.30
Separation of Infrastructure and Operation

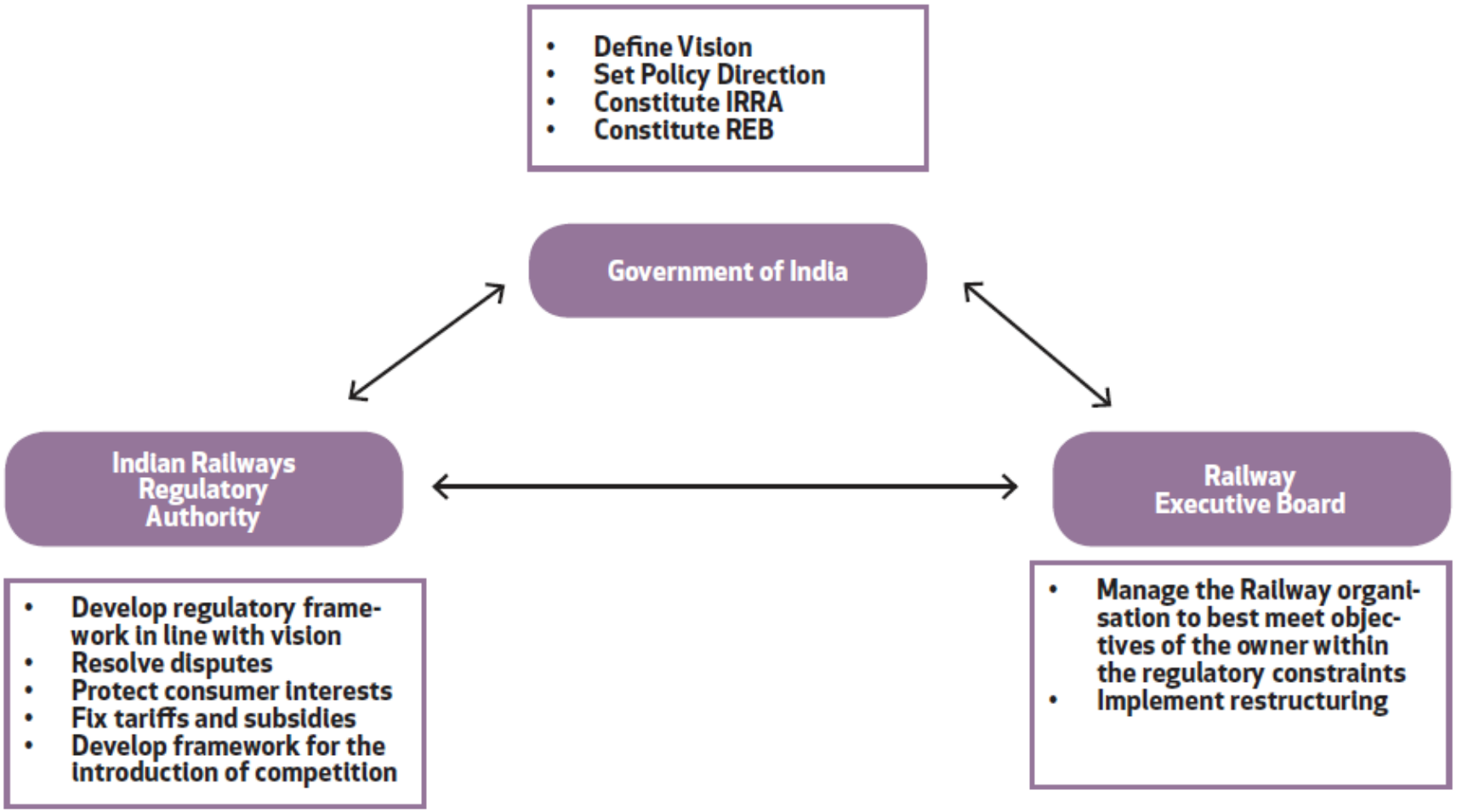


VERTICAL INTEGRATION	COMPETITIVE ACCESS	VERTICAL SEPARATION
India, New Zealand, Austria, Belgium, Greece, Ireland, Italy, Luxembourg, Latvia, Lithuania, Hungary, Poland, Switzerland	Japan, Europe (rolling stock), Sweden, Japan, Czech Republic, Finland, France, Slovenia	UK, Sweden, Bulgaria, Denmark, Norway, Netherlands, Portugal, Romania, Spain, Slovakia

Source: Report of the Working Group on Railways (NTDPC).

Figure 1.32

Separate Institutions for Separate Roles: The Expert Group on Indian Railways (2001)



Source: The Indian Railways Report 2001: Expert Group on Indian Railways.

Table 1.19

Reorganising the Railway Board

THE EXPERT GROUP ON INDIAN RAILWAYS (2001)	THE EXPERT GROUP FOR MODERNISATION OF INDIAN RAILWAYS (2012)
• Existing Railway Board to be phased out and the Indian Railway Executive Board to be constituted by the Government.	• **Re-organise Railway Board along business discipline to reflect Chairman as Chief Executive Officer and Members for the following:**
• **Executive Board to have 15 members:** **Operations Office (On-going management)** - Permanent position to have a minimum tenure of 5 years - Chairperson - COO freight - COO passenger - COO suburban - COO Infrastructure - fixed - COO Infrastructure - other - VP Finance and Planning - VP HR **External office for Strategy (transition management)** - Temporary positions - initial tenure of 3 years to be extended if necessary - COOs— non-core businesses (2) - Executive Directors (5) (Traffic -3, Infrastructure -2)	- Safety - Business Development/ Commercial - Technology/ ICT & Signalling - Freight - Passenger Services - Infrastructure - Finance - HR and PPP

Source: The Indian Railways Report 2001: Expert Group on Indian Railways; Report of the Expert Group for Modernisation of Indian Railways, Ministry of Railways, 2012.

Annex 1.3

Forms of Government Financial Support of Railway Passenger Services

TYPE	CHINA	GERMANY	JAPAN	RUSSIA
Compensation for carriage of specific user groups	No	Minor (less than 2 per cent of second class revenue on long-distance services)	No	Yes
Specific operating subsidies	No	Contract payments from regional administrations for public service contracts	No	Contributions towards regional companies from corresponding regional administrations
General operating subsidies	No	No	No	Deficit support of passenger revenue shortfalls during reform process.
Specific capital support	Grants for building new lines to remote areas	Replacement infrastructure investments, set out in a performance agreement with govt. Interest free loans and grants towards projects included in the federal transport infrastructure plan	The fees for rail company use of many high speed lines are set at less than full commercial rates on some lines.	For projects contained in the federal target programme. For 'special' projects (currently dominated by Olympic projects)
General capital support	No	No	No	Equity injections for maintenance repair and rehab.
Support from freight services	Freight services pay disproportionate share network costs	No	No	Freight services pay disproportionate share of network costs

Source: Passenger Railway Institutions and Financing: China, Germany, Japan and the Russian Federation, Paul F. Amos, 5 September 2011.

GOALS FOR 2032, STRATEGIC PLAN AND BUSINESS STRATEGY

- Optimal market share in freight: Aim to attain 50 per cent market share in inter-regional freight traffic by 2032, up from the current level of about 33 per cent.
- Indian Railways to satisfy passenger service demand in full.
- A shift of long-distance (500 km and above) transport of parcels - essentially non-bulk packaged items - to rail is a must.
- A multi-year investment plan fully supported by a credible funding plan will form the bedrock of the strategic plan.

International Experience:
Freight as a Business Distinct from Passenger Transport

COUNTRY	FREIGHT AS A DISTINCT BUSINESS ACTIVITY	BUSINESS SEPARATION
Australia	Both in federal and all state contexts (other than in Queensland) the operation of rail freight is managed by entities that do not operate passenger services. In Queensland freight is managed as separate division of Queensland Railways.	Mainly 1990s.
Brazil	Freight Concessions predominate (passenger services are mainly in city areas and are run by separate concessions)	1990s
Canada	Freight companies and passenger company (Via Rail) are separately owned. Via Rail is a publicly-owned passenger TOC that pays the freight private freight companies for access	1978
China	Still combined: Regional Railway Administrations deliver both freight and passenger services	N/A
Germany	The main freight rail operator, DB Schenker is a separate company within the State-owned DB holding structure and purchases network access from DB Netz, also in the group.	1991
Japan	The Japanese Freight railway Company is a free-standing freight TOC separate from the 6 passenger companies from whom it hires track access.	1987
Russia	The Russian Railways Corporation has progressively split Intercity Rail away from freight. Passenger Branch established 2006. Currently accounting separation only, but Passenger Brach structured to permit it being split into 5-7 regionally based passenger companies. Within the freight sector several private freight-only companies have been established, mainly with trains hauled by RZD.	2006
United States	Freight companies and passenger company (Amtrak) are separately managed and owned. Amtrak is a publicly-owned passenger TOC and pays the private freight companies for access (at regulated charges).	1970

Source: Freight Railways Governance Organisation and Management: An International Round-up, World Bank, Paul Amos, July 2011.

FREIGHT AND PARCEL BUSINESS STRATEGY

- Indian Railways to capture a significant share of the fast-growing FMCG, Consumer Durable and Information Technology (CDIT), containerised cargo and other segments like automobiles, etc., where its presence is negligible.
- In this regard an organised intermodal transport system which will combine the advantages of rail with that of road is needed.
- Setting up of a focused business organisation for multimodal transport of non-bulk commodities (e.g. parcels) under the PPP mode, combining the efficiency and advantages of rail and road.
- Development of a few selected corridors for heavy-haul operations.
- Development of last mile connectivity on PPP in a time-bound manner

FREIGHT AND PARCEL BUSINESS STRATEGY…2

- Running of freight trains at 100 km per hour.
- Running of premium freight services with differential pricing and assured deliveries.
- Supply of rakes on demand with differential pricing for different demand lead times.
- Running of trains on schedule with guaranteed transit time.
- Running of automobile, hazardous material trains, movement of bulk cement, etc by private train operators.
- Reduction in cargo parcel size to 1,000 tonnes and aggregation mechanism for even smaller parcel-sizes.
- Indian Railways to work closely with state and city authorities to set up rail-based multi-modal logistics parks to attract increasing volumes of miscellaneous cargo to rail.

PASSENGER BUSINESS STRATEGY

- Upgrade speed to 160-200 kmph on select corridors.
- Shift of focus to long-distance and inter-city transport and suburban corridors involving dense passenger movements.
- Redevelopment of stations for smooth flow and comfortable experience of passengers as also to ensure clean and hygienic environment.
- Redesign of coaches to enhance travel comfort.
- Conversion of all stopping passenger trains to EMUs/DMUs or railcars; invitation to state governments to manage uneconomic and unpatronised services.
- Augmentation of supply (more trains and longer trains) to ensure full satisfaction of demand.

Annex 1.2
Routes Suggested for Increasing Maximum Permissible Speed to 160-200 kmph

Important Recommendation
(verbatim)

Box 1.11
Separation of Suburban Services from Other Train Services

Suburban services could be separated from other train services. The sequencing of actions could be separation of accounting, followed by organisational separation creating suburban entities, followed by partnership with state government and private sector in SPV. Such SPV should also have the mandate for modernisation and upgradation of services at the request of state government.

State Governments should agree to finance on the basis of Peak Cash Deficit Funding by the Indian Railways similar to the funding of Phase II of the rail component of the MUTP being implemented through MRVC. SPV should enter into an agreement with IR for gradually reducing the operating losses reaching zero within a time frame of 5-10 years. SPV should be allowed to develop alternative sources of revenues through advertising rights, leasing of spaces to service providers etc. IR should get better track availability for its long distance passenger and freight trains after such upgradation.

Source: Report of the Working Group on Railway Programmes for the 11th Five Year Plan.

CAPACITY CREATION

- Construction of 6 Dedicated Freight Corridors on top priority.
- The Eastern DFC must be given the highest priority among the DFCs, and should be completed within the 12th Five Year Plan.
- Further, construction of Eastern, East-West and East Coast DFCs must start from the eastern end.
- Private sector participation should be encouraged for development and operations of the DFCs.
- Eight critical feeder routes for coal with a combined length of about 600 km and several other critical links for the steel industry with a combined length of about 2,340 km must be completed on the highest priority within the 12th FYP.
- Improved connectivity to industry clusters as well as significant ports (major and non-major), based on their current and projected traffic volumes. Development of last-mile connectivity should be encouraged through PPPs.

CAPACITY CREATION....2

- Development of 15 to 20 logistics parks as the main network hubs viz. Mumbai Bangalore, Cochin, Hyderabad, Kolkata, Delhi NCR, Ahmedabad, Nagpur, Vishakhapatnam, Siliguri, etc.
- Upgrade wagons and track to 25-tonne axle load.
- Upgrade rail wagons (higher axle load , better tare-to-payload by shifting away from carbon steel to stainless steel and aluminium/ other light-weight bodies, increased payload of covered wagons (BCN) through use of well wagons, better maintenance cycles, etc).
- Expand partnership with private sector to facilitate development of private freight terminals, operation of container, automobile and special freight trains and third-party leasing of wagons.
- Development of select High Speed Corridors (speed potential 350 Kmph) on a pilot basis, if and when deemed to be economically viable.

INVESTMENT PLANNING

- IR needs to shift to a programme approach from the current project-oriented approach.
- Quick pay-off projects that can ease the capacity constraint the fastest should be prioritised.
- Investment should be focused on total capacity creation including rolling stock, asset renewal, technology induction, information technology, identified investments in modernisation, etc.
- A more integrated approach is required to be taken of transport as a whole and choices will need to be made on the priorities to be placed on different investments.
- Priority should be given to projects such as DFCs which are self financing and critical to achieve the target of 50 per cent share of railways in freight

INVESTMENT PLANNING...2

- A programme for raising speed to 160-200 kmph on selected existing routes should be undertaken, till the time the HSR projects are found commercially justified or operationally required to cater to the country's growth and mobility needs.
- IR should encourage participation of private players (both domestic and international) in setting up manufacturing facilities for rolling stock and components.
- This would facilitate induction of world-class technology, besides being a source of capital for the resource constrained IR.
- Replacement and renewal of assets should be ensured.
- The ad hoc approach presently followed in respect of appropriation to Depreciation Reserve Fund needs to be overhauled and a rule-based approach needs to be put in place.

Broad heads for investments

Capacity Augmentation (including safety works)

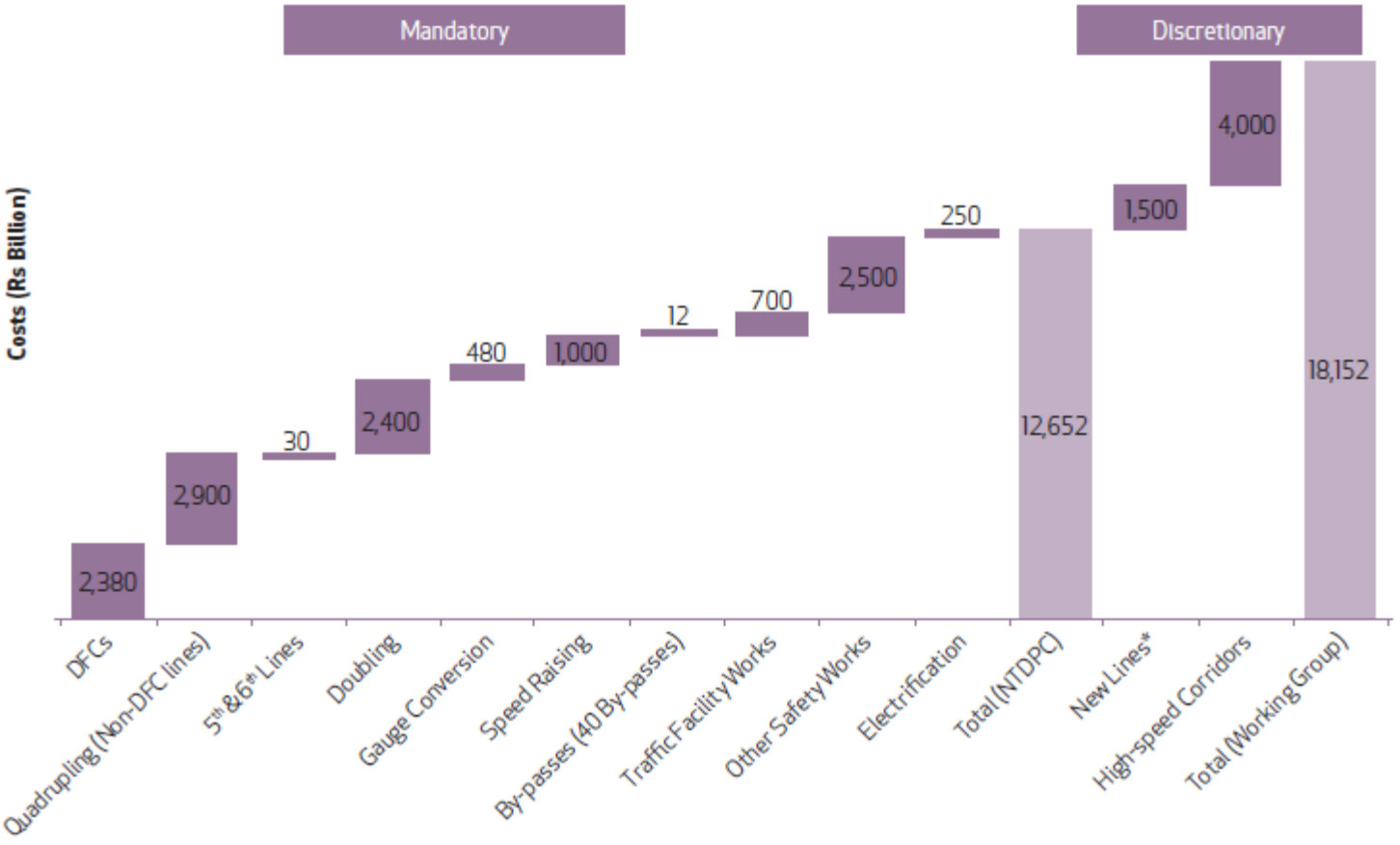
Rolling Stock

Stations & Terminals, Technological upgrade and modernisation

Summary of Capacity Augmentation: Figure 1.17 shows the summary of investments required for capacity augmentation by 2032. The total cost for various capacity augmentation initiatives discussed is close to Rs 12,500 billion, excluding the investments on new lines and HSR (the investment requirement increases to Rs 18,200 billion including these initiatives).

Figure 1.17

Investment Requirement for Capacity Augmentation Needed by 2032



Source: Report of the Working Group on Railways (NTDPC), NTDPC.
Note: Investment for new lines includes - (a) 132 projects already sanctioned and under implementation (11,200 km to be constructed out of 14,200 km); (b) new lines for economic development serving the industry estimated at 200 km p.a. for 20 years (these include international corridors and port connectivity works).

Rolling stock investment

Figure 1.18

Rolling Stock: Estimated Investment Requirement; Current Holding and Incremental Requirement

(RS BILLION)

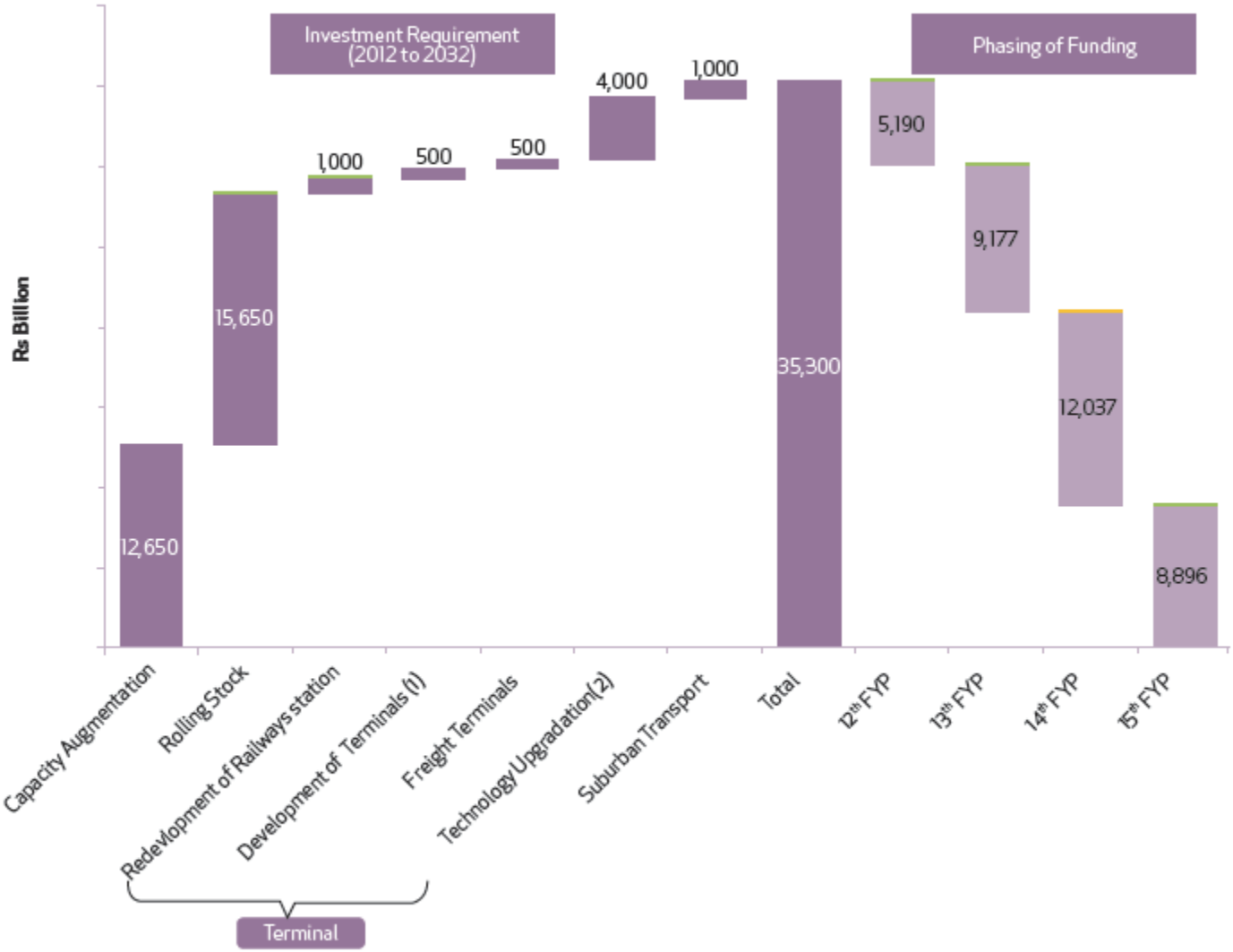
(IN NUMBERS)

	CURRENT HOLDING	INCREMENTAL REQUIREMENT*
Freight Wagons	220,000	1,100,000
Electric Locomotives	3,849	28,000
Diesel Locomotives	5,000	15,000
EMUs/MEMUs	6,694	30,000
Coaches	50,000	210,000
Upgradation of PUs/Workshop	Nil	Nil *Including replacement

Source: Report of the Working Group on Railways (NTDPC).

Figure 1.19

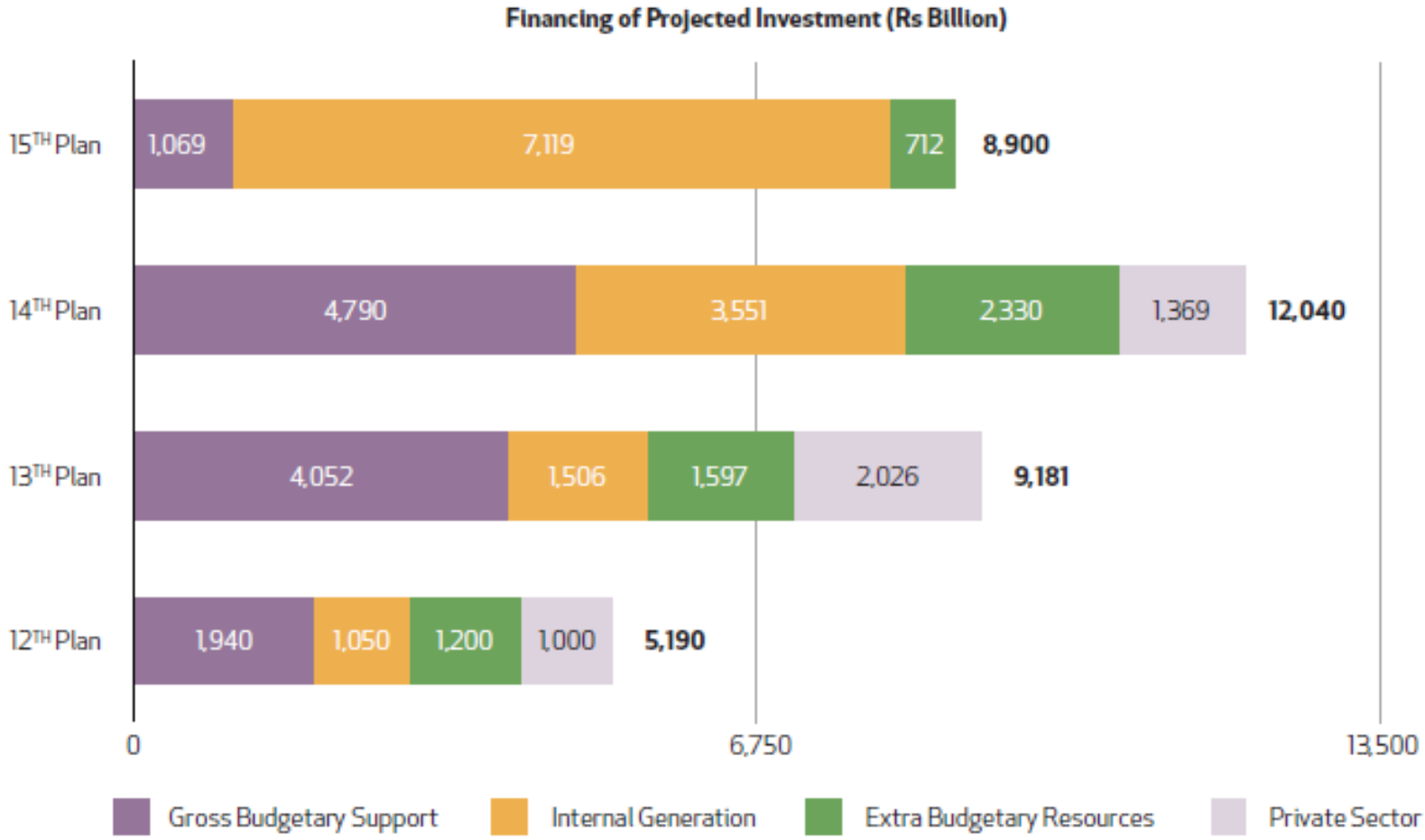
Investment Required by 2032 and Phasing of Funding



Source: Report of the Working Group on Railways (NTDPC); NTDPC.

Notes: 1. Development of coaching maintenance terminals.
2. Technological upgrade and modernisation (tracks, bridges, Signal & Telecom, Information Technology, Research & Development and other miscellaneous works).

Figure 1.20
Funding Sources
[Investment in Rs Billion at 2011-12 prices]



Source: Report of the Working Group on Railways, NTDPC (2012).

PROJECT EXECUTION

- Considering the need for massive capacity augmentation over the next 20 years, a separate body/ organisation, partially independent of the Ministry of Railways should be set up to expedite the delivery of projects.
- All works having a budget outlay of more than Rs 5 billion (or may be Rs 10 billion) should be entrusted to an ‘Authority’, which may be called the ‘National Railway Construction Authority’ (NRCA).
- The NRCA would be an umbrella organisation having a national level presence, fully autonomous, and having extensive powers for award of works.
- It will award contracts for construction, supervise quality of construction and would ensure smooth flow of funds for the works to continue unimpeded. Repayment of loans, tax-free bonds, etc. would be channelised through it.

PROJECT EXECUTION...2

- All capacity enhancement projects should be taken up after ensuring that funding is earmarked for each project.
- The concept of financial close may be introduced for each project.
- Project teams to be held accountable for timely completion of the projects.
- Project managers to continue in their positions till project completion.
- Performance-linked incentives should be provided and penalties for failure should also be imposed.

Table 1.11

Off Track: Time and Cost Overruns in Railway Projects

PROJECT	DATE OF COMMISSIONING		DELAY IN MONTHS	COST OVERRUN (PER CENT)
	ORIGINAL	ANTICIPATED		
Udhampur-Baramulla (new line)	March-01	Dec-17	201	700
Bankura-Srinagar-Damodar (Gauge conversion)	March-05	June-16	135	1162
Tamluk Digha (Line doubling)	June-05	June-16	132	270
Belapur-Seawood-Uran (Electrified double line)	March-04	March-14	120	276
Howrah-Amta-Champadanga (New line)	March-07	March-15	96	1,489

Source: Project Implementation Overview, December 2012, MOSPI, GoI.

TARIFF

- As has already been approved by the Government, independent Rail Tariff Authority should be set up with the mandate of fixation of rates and fares.
- As the overall railways reform proceeds, this Authority can be changed into an overall Railways Regulatory Authority which would encompass tariff setting, along with other regulatory functions. Service-based pricing to attract traffic for bagged bulk commodities and non-bulk commodities.
- A realistic programme of fare revision should be designed to reduce/eliminate the losses on passenger services. The government may subsidise up to 25 per cent of the costs of Suburban railways and no subsidy should be provided for non-suburban railways.

Tariff Regulation: Government Control in Varying Measures

COUNTRY	PASSENGER FARES REGULATION
China	Heavily Regulated. State Council has complete regulatory powers, but has granted more flexibility in recent years to reflect wider range of service qualities.
Russia	Regulated. Federal Tariff Service regulates domestic long-distance fares but since 2009 has granted independence of pricing for premium travel classes and trains.
Japan	Lightly Regulated. Maximum fares must be approved by Minister of Transport, and companies must coordinate fares and ticketing systems to allow smooth transfer between companies at non discriminatory fares.
Germany	Very lightly Regulated. Federal government must approve conditions of carriage including standard fare but policy is that long-distance markets should be regulated by competition. Suburban/regional fare regulation differs by concession.

Source: Passenger Railway Institutions and Financing, Paul F. Amos, 5 September 2011.

A Simplistic Programme for Fare Revision

Three alternate scenarios for fare revision have been examined, based on two factors: (a) Subsidy provided for Suburban railways, and (b) timeframe.

	SUBURBAN	NON-SUBURBAN
Revenue (Rs Billion)	18.7	239.2
Loss (Rs Billion)	23.2	141.7
Loss /Revenue (Per cent)	124 Per cent	59 Per cent
SCENARIO I		
Subsidy (on cost)	0 Per cent	0 Per cent
Timeframe for fare revision	10 Years	
Required increase in revenue to incur 'zero loss'*	124 Per cent	59 Per cent
Fare increase each year (per cent)	8.4 Per cent	4.8 Per cent

Other scenarios

SCENARIO II		
Subsidy (on cost)	25 Per cent	0 Per cent
Timeframe for fare revision	10 Years	
Required increase in revenue to incur 'zero loss'*	68 Per cent	59 Per cent
Fare increase each year (per cent)	5.3 Per cent	4.8 Per cent
SCENARIO III		
Subsidy (on cost)	25 Per cent	0 Per cent
Timeframe for fare revision	15 Years	
Required increase in revenue to incur 'zero loss'*	68 Per cent	59 Per cent
Fare increase each year (per cent)	3.5 Per cent	3.1 Per cent

* The figure is adjusted based on subsidy provided.

Source: NTDPC.

SAFETY

- Establish a National Board for Rail Safety which is independent of the operational agencies to avoid conflict of interest.
- The CEO of the Board should be of a rank of Secretary to the government of India and should report directly to the Railway Minister.

RESEARCH AND DEVELOPMENT (R&D)

- Establish Railway Research and Development Council (RRDC), an apex body that will replace the Governing Council and will be chaired by an eminent technologist/scientist, with the Chairman and Technical Members of the Railway Board as its members
- Establish Railway Research and Development Institute (RRDI), a multidisciplinary research organisation for applied research on current concerns and future technology development for Railways.
- It should target recruiting close to 300 researcher professionals by the end of the 13th Plan, with a healthy mix of Ph.D. degree holders, engineers, architects, professors from national and international universities etc.

RESEARCH AND DEVELOPMENT (R&D)...2

- Establish Academic Centres of Excellence or Railway Research Centres (RRCs) in at least 13 technical institutes and at least two IIMs by 2020.
- In addition to equipment, supplies, travel and research funds, the funding must include 5-10 endowed permanent Chairs and 10-20 endowed post-graduate scholarships.
- Result-oriented research teams should be set up to work on specified research projects. Such teams may include participants from outside IR, including from research/academic institutions and OEMs, contracted for the duration of the project.
- An Integrated Energy Management System (IEMS) need to be set up under a separate directorate in the Railway Board.

OPTIMISATION OF LAND USE

- Infrastructure Corridors: Suitable directives to be established whereby whenever a new transport infrastructure—rail or highway—is built, the corridor must provide for segments of the infrastructure,
- If a new port comes up, the rail connectivity must be in a corridor that also provides for highway, power lines, combined terminals, etc.
- Schedule of Dimension (SOD) and Maximum Moving Dimension (MMD) improvement should be undertaken.
- A standard template can be developed for redesign and redevelopment of the stations that maximises comfort for commuters and create space for premium retail in station premises.

INFORMATION TECHNOLOGY

- Computer and Information Systems (C&IS) directorate at the Railway Board should be greatly enhanced as to encompass the entire gamut of ICT applications on the network.
- Centre for Railway Information Systems (CRIS) should be converted from a society to a non-profit company with much greater freedom.
- Organisation(s) for operationalising ICT applications at field level should be converted into autonomous bodies.
- IR Institute of Transport Management (IRITM) should be entrusted with the task of human resource development.

HUMAN RESOURCES

- The recruitment to the railway cadres of officers should be totally dissociated from the Civil Services and Central Engineering Services exams.
- The SCRA exam should be upgraded to recruit candidates, who are already graduates, to two streams of Railway Service viz. Indian Railway Technical Service and Indian Railway Logistics Service, while overall reform is undertaken.
- Induction of unskilled staff to be reduced and gradually done away with.
- The recruitment processes to be supplemented by well researched and meticulously developed induction and in service training to constantly upgrade the skills of employees.
- Recruitment of highly qualified PhDs from IIMs/IITs and lateral recruitment from market would be considered for specialist functions with suitable compensation.
- A system of reward for collective performance and variable pay linked to incremental surplus generated by various units to be implemented.

Institutional Arrangement for Speeding Up Capacity Enhancement on IR

- All works having a budget outlay of more than Rs 5 billion (or may be Rs 10 billion) should be entrusted to an ‘Authority’, which may be called the **‘National Railway Construction Authority’ (NRCA).**

- The projects should be taken up as EPC contracts with fixed time-outlay and watertight fund provision. No time over-run and cost over-run may be allowed.

Accounting system

It is important that the accounts of the Railways should be recast into a company account format in line with the Indian GAAP so that the true state of Indian Railways finances become clearer.

International Experience in Railway Reform: Lessons for Indian Railways

COUNTRIES	MAIN RESPONSIBILITY FOR PUBLIC INTEREST ROLES			
	INTEGRATED TRANSPORT POLICIES	RAILWAY SECTOR STRATEGY/ POLICIES	ECONOMIC REGULATION	SAFETY REGULATION
Australia	Department of Transport		Australian Competition Commission	Departments of Transport or Independent regulators varies by State)
Brazil	Ministry of Transport		National Agency for Land Transport	
Canada	Department of transport		Canadian Transportation Agency	Transportation Safety Board
Germany	Ministry of Transport		Federal Cartel Office	Federal Rail Agency
Japan	Ministry of Transport			Japan Transport Safety Board
Russia	Ministry of Transport		MOT & Ministry of Economic Development and Trade (MEDT)	Ministry of Transport
USA	Department of Transport (DOT)		DOT-Surface Transportation Board	National Transport Safety Board/ DOT-FRA

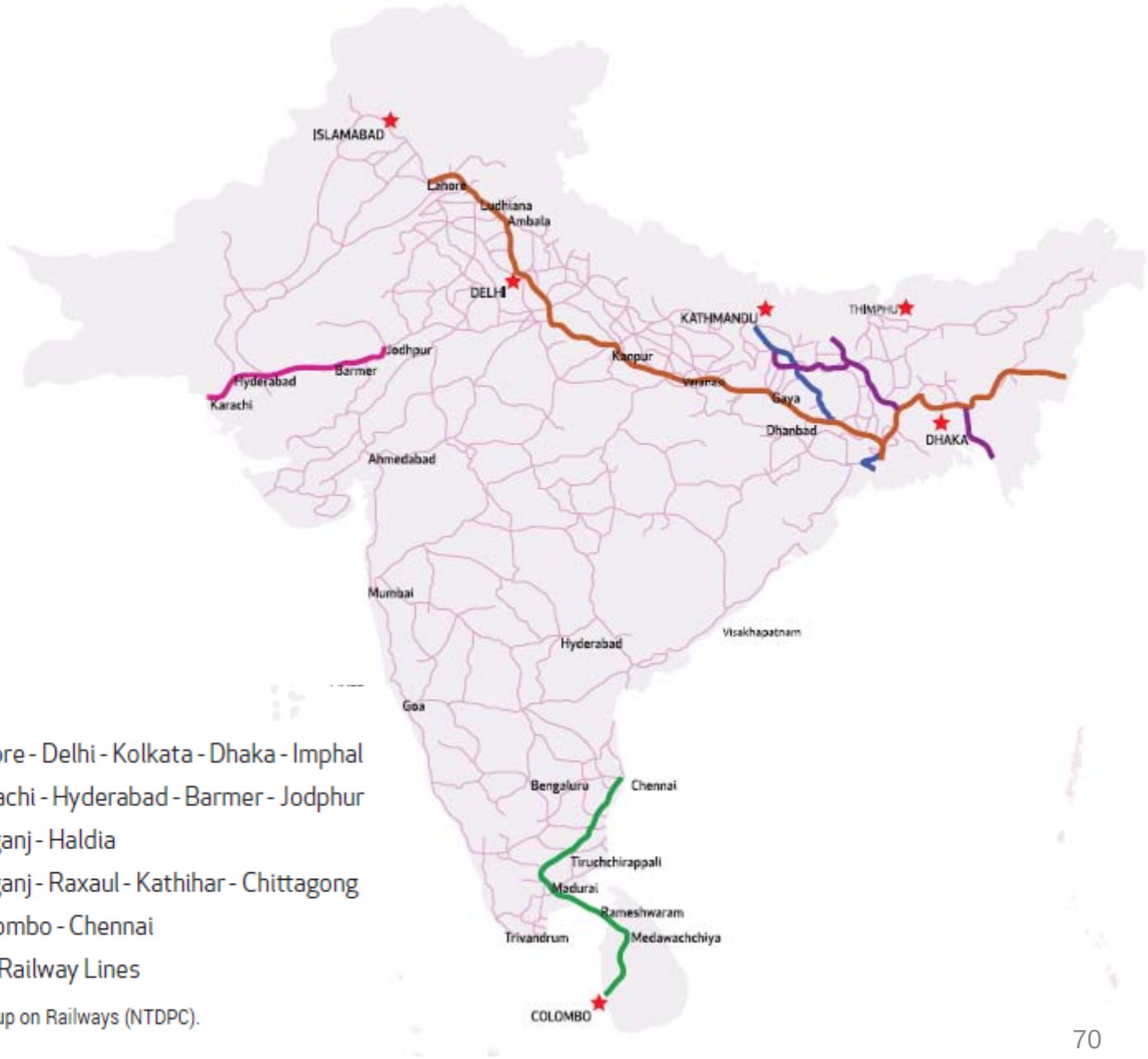
Source: Freight Railways Governance Organisation and Management: An International Round-up, World Bank, Page 9, Paul Amos, July 2011.

SAARC Rail Link

SAARC Corridors

	CORRIDOR	COUNTRIES SERVED	BASIS FOR SELECTION
SRC 1.	Lahore (Pakistan)-Delhi/ Kolkata (India)-Dhaka (Bangladesh)-Mahishasan-Imphal (India)	Pakistan, India & Bangladesh	Potential growth of intraregional traffic. Reduced distance and shorter transit time.
SRC 2.	Karachi (Pakistan)-Hyderabad-Khokrapar-Munabao-Barmer-Jodhpur (India).	Pakistan & India	Shorter route for intra-regional traffic. Access to Karachi port and potential third country traffic.
SRC 3.	Birgunj (Nepal)-Raxaul-Haldia/Kolkata (India)	Nepal & India	Access to the landlocked Nepal. Potential corridor for third country and bilateral traffic (Already functional).
SRC 4.	Birgunj (Nepal)-Raxaul-Katihar (India)-Rohanpur-Chittagong (Bangladesh) with links to Jogbani (Nepal) and Agartala (India)	Nepal, India & Bangladesh	Access to Chittagong port for Indian and Nepalese traffic. Shorter route for North Eastern States of India through Bangladesh
SRC 5.	Colombo (Sri Lanka)-Chennai (India)	Sri Lanka & India	Restoration of old rail ferry link to provide passenger and goods access from Sri Lanka to mainland South Asia

SAARC RAIL CORRIDORS



Source: Report of the Working Group on Railways (NTDPC).

The Report says……

The massive capacity expansion, as envisaged, will not take place in a business as usual scenario.

Hence it is of the utmost importance that a vision similar to that of NHDP (**National Highways Development Project)** is laid down for railways so that we may expect a transformed railway network by 2032.

This will have to be supported by

(a) the required organizational changes, and

(b) certain strategic decisions in terms of the relative allocation of resources between rail and road.

Further Reading

RITES Total Transport Report

High Level Safety Review Committee under the chairmanship of Dr. Anil Kakodkar

World Bank on India Transport Sector 2002

http://www.ciilogistics.com/autoscm/day1/THOMAS%20NETZER-McKinsey.pdf

http://www.mckinsey.com/insights/travel_transportation/transforming_indias_logistics_infrastructure

http://siteresources.worldbank.org/INTSARREGTOPTRANSPORT/2045693-1330028581692/23126042/Prsntn5-PaulAmos.pdf

http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/0,,contentMDK:20457516~menuPK:1323447~pagePK:148956~piPK:216618~theSitePK:337116,00.html

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