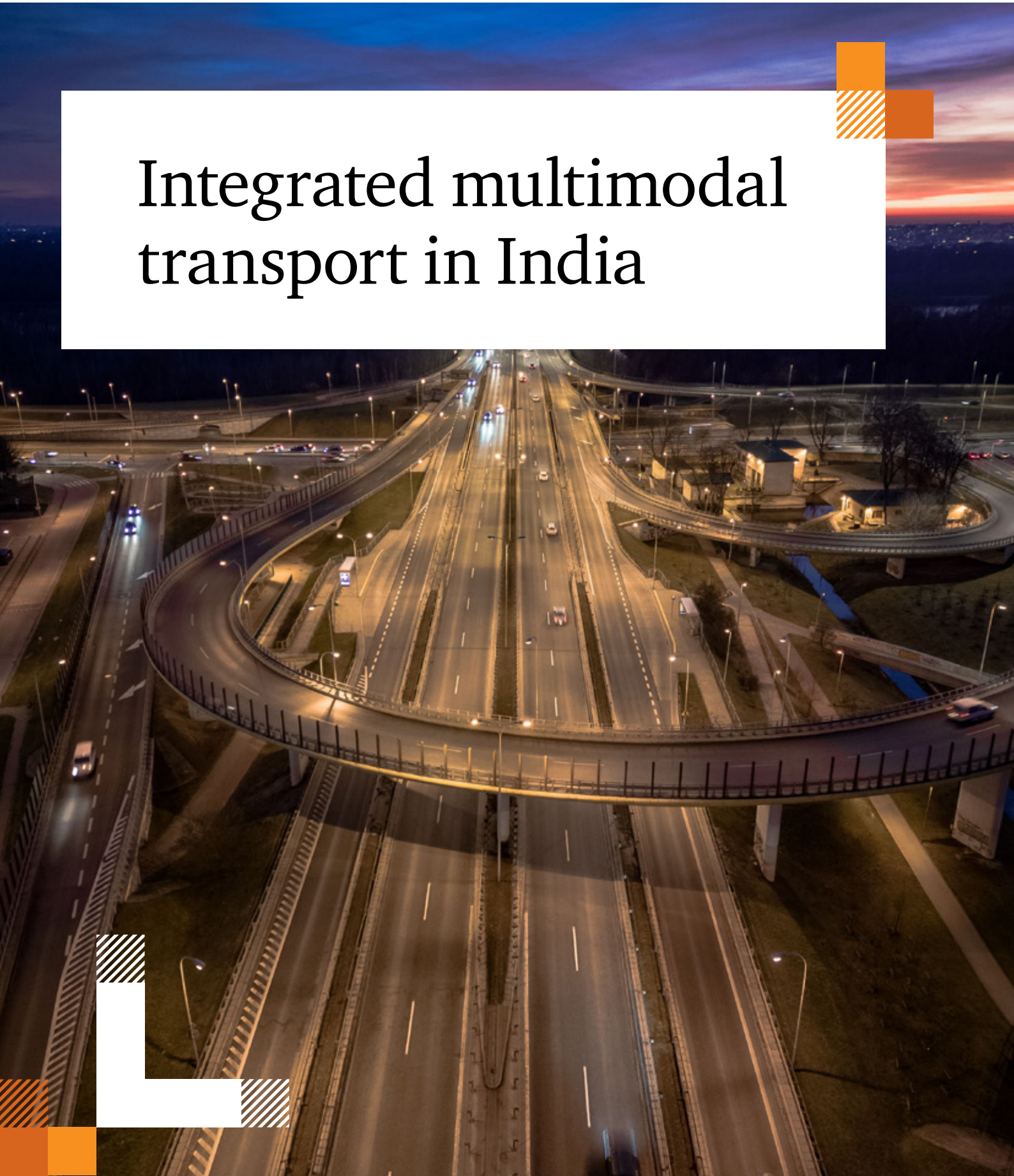
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FICCI

Integrated multimodal transport in India



Foreword from FICCI



Rizwan Soomar
Chairman - FICCI Logistics Committee and CEO and MD (Middle-East and North Africa, India Subcontinent)
DP World

I am delighted to share with you the FICCI–PwC report on 'Integrated multimodal transport in India' to be released at the 2nd Edition of GatiShakti Summit organised by FICCI.

India's transport sector is poised to evolve into a seamless and efficient multimodal ecosystem that drives economic growth, sustainability and connectivity. With rapid urbanisation, industrial expansion and increasing trade volumes, the need for a well-integrated transport infrastructure has never been more pressing. A robust multimodal transportation ecosystem will not only optimise logistics cost and enhance trade competitiveness but also promote sustainable mobility, reduce congestion and improve regional connectivity.

The PM GatiShakti National Master Plan, coupled with the Unified Logistics Interface Platform (ULIP), is fostering integrated planning and coordination. The continued development of dedicated freight corridors (DFCs) and large-scale port modernisation under the 'Maritime Amrit Kaal Vision 2047' will enhance efficiency, reduce costs and solidify India's position as a preferred global trade hub.

This report delves into the current state of multimodal transport in India, highlights specific areas in infrastructure and the policies that merits review, and showcases global best practices. It also provides strategic recommendations to strengthen India's transport network through digitalisation, policy reforms and regional planning. The focus on integrated ticketing, smart mobility solutions and intermodal connectivity will ensure that India remains at the forefront of global transport innovation.

We welcome your insights and collaboration in this transformative journey.

Foreword from PwC



Manish R Sharma
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We are pleased to present the knowledge paper 'Integrated multimodal transport in India' developed by PwC in association with FICCI. In recent years, the landscape of transportation in India has undergone significant transformation, driven by the country's rapid urbanisation, economic growth and increasing demands for efficient mobility solutions. As India continues to position itself as a global economic powerhouse, the need for a robust, integrate, and sustainable transport system has become paramount. This paper on integrated multimodal transport (IMT) delves into our understanding of how different modes of transport can be effectively interconnected to enhance the nation's mobility infrastructure.

IMT refers to the seamless integration of various transport modes, to facilitate efficient and seamless movement of people and goods. In India, the potential of an IMT system is immense, given the varied geographic, economic and social environments across regions. By connecting distinct transport networks, we can not only improve accessibility and reduce congestion but also drive the economic development and sustainability in the country.

This knowledge paper delves into the current state of multimodal transport in India, examining the challenges and opportunities that lie ahead. It provides valuable insights into the technologies and strategies and that can be leveraged to create a unified transport ecosystem. The paper also highlights thriving case studies and international best practices that can serve as exhibits for India.

As policymakers, industry leaders and stakeholders in the transport sector engage with this paper, it is my hope that it will spark renewed dialogue and action towards creating an IMT system that is inclusive, efficient, and resilient. Such a system will play a key role in amplifying social and economic benefits while conscientiously addressing inclusivity and sustainability.

Let us embrace this opportunity to move forward together towards a more connected and sustainable India.



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1. Overview of India's transport system

1.1. India's transport system

Road transport: India's road network, the second largest globally, extends over 6.671 million km, as of FY24.[1] This vast network is essential to the nation's logistics, handling approximately 65–70% of freight transportation and carrying 90% of passenger traffic. The road network is organised into national highways (NH), state highways (SH) and other roads – each crucial to the transport of goods and individuals throughout the country. Additionally, the construction rate for national highways has surged, reaching 33.8 km per day in 2023-24, up from 12.1 km per day in 2014-15.[2]

Railways: In addition to its road network, India boasts the world's fourth-largest rail network, with a route length exceeding 68,000 km.[3] This network is vital to the nation's logistics and transportation framework. Despite its extensive reach and critical importance, the rail network's share in freight transportation is relatively lower, accounting for approximately 28% of the total freight movement in India.[4] The network carried more than 6 billion passengers and ~1.4 billion MT of freight traffic in FY24.[5] Initiatives like DFCs are expected to boost freight efficiency, while projects like station redevelopment and the introduction of semi high-speed trains such as Vande Bharat aim to improve passenger services.

Air transport: India's air transport sector has experienced notable advancements recently, highlighted by a growing network of airports and increasing air traffic. From a mere 50 operational airports in 2000, the number has expanded to 158, including 12 newly established greenfield airports. The introduction of the Ude Desh ka Aam Naagrik (UDAN) scheme in 2016 became a major initiative aimed at improving air connectivity to smaller cities and towns by focusing on regional airport development. This progress fosters regional growth and also significantly improves accessibility across the nation.[6]

Ports and waterways: India's extensive 7,500-km[7] coastline and vast network of rivers offer significant potential for developing its water transport infrastructure. The government is actively working to enhance inland waterways, complementing the existing road and rail infrastructure, as ports handle an impressive 95% of the nation's international trade volume. Launched in 2015, the Sagarmala initiative is a key strategy designed to increase port capacity and efficiency, promote industrialisation centred around ports, and strengthen connections to inland areas. Inland waterways, which include rivers, canals, backwaters and creeks, are celebrated for being both eco-friendly and cost-efficient, promising advantages such as reduced congestion, lower emissions and decreased transportation expenses.

Urban transport: India's urban transport system plays a crucial role in the nation's transport infrastructure, addressing the mobility demands of its swiftly expanding urban population. As cities grow and populations increase, efficient urban transit becomes vital for tackling issues like congestion, pollution and accessibility. Driven by rapid urbanisation, the metro rail network expanded from serving just five cities in 2014 to reaching 23 cities by 2024, with its length increasing from 248 km to 1,010 km. Additionally, another 980 km of metro network is currently under construction across six cities. By January 2025, daily ridership across these 23 cities had surpassed 10 million passengers, underscoring the system's growing importance and usage.[8]

Despite the significant progress in transportation infrastructure, the modal share in India remains disproportionately tilted toward roadways, which account for 88% of passenger traffic and approximately 65-70%% of freight movement. Meanwhile, the rail network handles around 28% of freight, down from about 40% in the 1980s.[9] This imbalance, along with gaps in infrastructure, has resulted in elevated logistics costs and inconsistent connectivity quality across different regions. Addressing these issues is crucial for optimising transport efficiency and ensuring balanced regional development.

1 Press Information Bureau – Year End Review 2023 - Ministry of Road Transport and Highways
2 MoRTH, Road Transport yearbook 2024-25
3 Indian Railways Yearbook 2022-23
4 Press Information Bureau – NRP, 2023
5 Press Information Bureau – Year End Review 2024 - Ministry of Railways
6 DGCA cargo data 2024
7 Ministry of Earth Sciences website
8 https://www.indiabudget.gov.in/economicsurvey/doc/eschapter/echap06.pdf

1.2. Integrated multimodal transport

IMT refers to a seamless movement of passengers and goods using two or more transportation modes within a unified system.

Relevance in India's economic and logistics network: In the context of India's economic and logistics network, the country manages over 4.6 billion tonnes of freight annually.[10] Historically, a lack of integration among various transport modes has led to inefficiencies like highway congestion and delays at ports. The IMT framework is designed to align different transportation modes, aiming to reduce logistics costs and enhance global competitiveness. The PM Gati Shakti National Master Plan emphasises coordinated efforts among multiple agencies and comprehensive infrastructure planning to establish a seamless and efficient logistics network.

IMT is crucial for advancing India's manufacturing and export capabilities and supports the goal of achieving a USD 5 trillion economy. By ensuring seamless transitions between various transport modes, IMT enhances speed and efficiency, benefiting both businesses and individuals. The system effectively integrates different transport infrastructures, optimising the use of railways and waterways for long distances, roads for last-mile delivery, air for urgent shipments and pipelines for bulk materials. By facilitating efficient interchanges through logistics parks, IMT can reduce logistics costs and improve efficiency, thus strengthening trade and contributing to economic growth.

Adopting an IMT system yields numerous benefits for India's industries, businesses and overall mobility:

- **Efficiency and time savings:** IMT enhances logistical efficiency by reducing delays at transfer points, by utilising the most suitable mode of transport for each segment of a journey. In freight movement, shifting from road transport to dedicated freight rail networks significantly improves supply chain speed. For example, the introduction of double-stack container trains on DFCs has reduced transit time for shipments from Gujarat ports to Delhi to under 12 hours, compared to over 35 hours by road. Similarly, for passenger mobility, well-coordinated schedules facilitate seamless transfers, minimising wait times and promoting the adoption of public transportation over private vehicles.[11]
- **Cost reduction:** Multimodal integration can significantly reduce transportation costs by optimising mode selection based on commodity type and distance. **Multimodal logistics parks (MMLPs)** further enhance cost efficiency by co-locating transport, storage and industrial infrastructure, thereby streamlining supply chains and reducing overall logistics expenses.
- Deriving optimal benefits from the government's investments: Maximising the impact of the government's sustained investments in transport infrastructure requires seamless integration across various transport modes. An integrated system ensures seamless connectivity, efficient transfers, and improved first- and last-mile services, enhancing asset utilisation and economic productivity. Strategic policy and digital integration are fostering a unified transport ecosystem that maximises efficiency, boosts trade competitiveness and supports economic growth.
- **Connectivity and accessibility:** IMT enhances connectivity to remote and hinterland regions by enabling seamless multimodal links. This improved access allows rural producers and small-scale industries to integrate into global supply chains, with goods efficiently moving from rural roads to railheads and ports. Strengthened first-mile and last-mile connectivity expands market opportunities for farmers and micro, small and medium enterprises (MSMEs), while integrated transport systems improve access to employment, education and essential services. By facilitating efficient commuting between distant areas and urban centres, IMT supports inclusive economic growth and regional development.
- **Sustainability:** Multimodal transport mitigates congestion and emissions by prioritising eco-friendly modes such as electrified rail and waterways, significantly reducing fuel consumption and carbon output. Indian Railways targets increasing its freight share to 45% by 2030, capitalising on rail's substantially lower CO_2 emissions compared to road transport. In urban areas, seamless transport integration encourages a shift from private vehicles to public transit, alleviating traffic congestion and pollution while supporting sustainability initiatives like park-and-ride and bike-sharing. A well-developed multimodal network enhances operational efficiency, minimises environmental impact and promotes energy savings, aligning with sustainable business practices and long-term economic goals.[12]
- **Economic growth and productivity:** Efficient transportation boosts economic productivity by lowering logistics costs and enhancing competitiveness. Integrated multimodal networks reduce inefficiencies such as idle goods and traffic congestion, potentially saving India billions and driving gross domestic product (GDP) growth. For industries, reliable transport systems improve inventory management and enable more extensive supply chains. Strong multimodal connectivity also attracts manufacturing and distribution hubs, fostering industrial expansion beyond traditional economic centres and supporting balanced regional development.

9 Press Information Bureau – NRP, 2023
10 https://www.niti.gov.in/sites/default/files/2021-06/FreightReportNationalLevel.pdf
11 Press release DFCCIL - 2021
12 NITI Aayog - A roadmap for clean and cost-effective goods transport

- **Urban decongestion and quality of life:** An integrated transit system improves urban mobility by offering seamless door-to-door transport options, encouraging a shift from private vehicles to public transport. This reduces congestion, shortens travel times and enhances road safety. A well-connected network also alleviates commuter stress and improves overall quality of life. Additionally, integrated ticketing simplifies travel, making public transport more convenient and accessible, further promoting its adoption.

IMT creates a mutually beneficial scenario where businesses reduce logistics costs and expand market reach, commuters experience faster and more convenient travel, and the nation benefits from lower emissions and better infrastructure utilisation. However, achieving these advantages requires adherence to core integration principles and a shift away from siloed planning approaches. To realise these benefits, it is crucial to adhere to core integration principles and overcome siloed planning approaches, as discussed below.

Building an integrated multimodal transport ecosystem in India relies on a few core principles:

- **Interoperability:** Seamless transportation transitions rely on interoperability across all modes and infrastructures. Standardisation of key elements such as container sizes and rail gauges, along with harmonised information-sharing protocols, is essential. For instance, the use of ISO containers facilitates smooth cargo transfers between ships, trains and trucks. In passenger transport, universal payment systems and synchronised schedules enhance connectivity. Additionally, policy alignment – such as a unified transport operator licence – ensures cohesive operations across different transport sectors.
- **Seamless connectivity:** A well-integrated multimodal network minimises transfer friction through strategically located hubs and synchronised schedules. Effective planning places railway stations near metro and bus terminals, enhancing efficiency. Robust last-mile connectivity is equally critical, ensuring smooth movement of both passengers and cargo. Direct rail and highway links to ports, express connections from airports to city centres, and pedestrian-friendly transit interchanges are key infrastructure considerations. The PM Gati Shakti Master Plan is specifically designed to bridge connectivity gaps and enhance logistical efficiency through comprehensive modal integration.
- **Coordination and integration (institutional):** Successful IMT implementation depends on strong governance, with cross-sector and inter-governmental collaboration playing a crucial role. Aligning the operations of railways, highways and ports enhances overall efficiency. Institutional enablers, such as joint committees and metropolitan transport authorities, facilitate stakeholder coordination. The 2014 National Transport Policy proposed establishing a unified ministry or policy body to oversee multimodal integration. A harmonised operational framework, shared policies and commercial alignment among transport authorities are essential for achieving an efficient and sustainable system.
- **Sustainability and environmental stewardship:** An environmentally sustainable transport system prioritises carbon reduction through modal shifts and green infrastructure. Expanding rail and waterway freight, strengthening public transit and promoting non-motorised transport are key measures. Initiatives such as **electrified transport corridors and electric vehicle (EV) charging infrastructure** align with national climate goals, particularly under the **National Rail Plan 2030**. Additionally, **transit-oriented development (TOD)** strategies reduce travel distances and car dependency by integrating transport with urban planning, fostering sustainability.
- **Modern IMT:** Smart technology enhances multimodal transport by integrating Information and Communication Technology (ICT) systems, real-time tracking and data analytics for seamless coordination. Platforms like ULIP improve freight visibility, while Internet of Things (IoT), Global Positioning System (GPS), Geographic Information System (GIS) and AI optimise scheduling and reduce delays. Unified payment systems and multimodal journey planners simplify transactions and connectivity, while a real-time digital thread ensures efficiency. These innovations drive interoperability, creating a smarter and more connected transport ecosystem.
- **User-centric design:** A user-first approach ensures that IMT systems are practical, efficient and service-oriented. Clear signage, minimal paperwork (e.g. single freight documentation) and accessibility considerations enhance convenience for all users. Passenger experience is improved through smooth transfers, efficient luggage handling and comfortable transit hubs. For freight, an end-to-end logistics operator model simplifies supply chain management. Placing user needs at the forefront of IMT design ensures long-term adoption and effectiveness.



1.3. Current state of multimodal transport infrastructure in India

India's existing transport infrastructure includes several elements of multimodal connectivity, though the level of integration varies by corridor and region.

Freight multimodal infrastructure: Historically, Indian freights operated in isolation – bulk by rail and the rest by road, with scant intermodal transshipment. This is changing with the establishment of inland container depots (ICDs) and container freight stations (CFSs) to provide greater road-rail-port connectivity.

As per the latest statistics, there are over 100 ICDs[13] (dry ports) in states, which are inland nodes where export-import containers are pulled by rail from gateway ports and then shipped by road to nearby industries (or vice versa). ICDs are islands of multimodal functionality, although their efficiency has been variable because of land area limitations, transit performance on railways and city level entry/exit restrictions.

On the port side, connectivity has improved under Sagarmala. Major ports have exclusive road and rail corridors to connect to hinterland markets. Coastal shipping lines also act as multimodal feeders, transporting cargo and containers by sea between ports thus supplementing surface transport modes. Inland waterways infrastructure is still in infancy stage: National waterway (NW)-1 (Ganga-Bhagirathi-Hooghly) has multimodal terminals at Varanasi and Sahibganj with rail/road connectivity, and NW-2 (Brahmaputra) has a terminal at Jogighopa where a rail-connected MMLP is under construction. These are aimed to create river ports feeding into the country's rail-road network.

MMLPs: Identifying the gaps in infrastructure, the government initiated a program of constructing 35 MMLPs across the country under the Bharatmala scheme.[14] These are massive, 100+ acre nodes for integrated freight handling, such as warehousing and intermodal transfer. Interestingly, the Nagpur MMLP in Maharashtra, which received a PPP concession in 2023, will span 150 acres with a 3 km rail siding and highway connectivity, and will be capable of processing 9.5 MT of freight every year, with cold storage and customs clearance.[15] Such projects are in the works at Bengaluru (Karnataka), where an MMLP at Dobbaspet will link to NH-4 as well as a railway line, and at Chennai (Tamil Nadu) and Guwahati (Assam).[16] Currently, logistics parks near ports and cities (such as the Dhulagarh truck terminal near Kolkata, or the Palwal logistics park near NCR) are offering some intermodal services on a smaller scale.

Passenger multimodal infrastructure: Cities are advancing to combine transport modes, with cities building interchange stations. Delhi's Kashmere Gate connects metro rail lines and a bus station, and Chennai and Mumbai renovate rail stations for metro linkages. Bengaluru and Hyderabad increase park-and-ride lots and metro feeder buses. Unified Metropolitan Transport Authorities organise transport routes in some states. Multimodal ticketing is lacking, but seamless transfers exist. Multimodal terminals providing intercity connectivity, such as Bhopal's Habibganj station, provide joint bus and railway facilities. Delhi's soon-to-open Sarai Kale Khan hub will integrate different transport networks, reflecting an attempt at integration.

13 Press Information Bureau – Dry Ports in India - 2022
14 https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1845881
15 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1985520

1.4. Key stakeholders in India's transport network and institutional arrangements

India's transport ecosystem involves a complex web of stakeholders – government bodies at central and state levels, private companies, and coordinating institutions – each playing a role in multimodal integration:

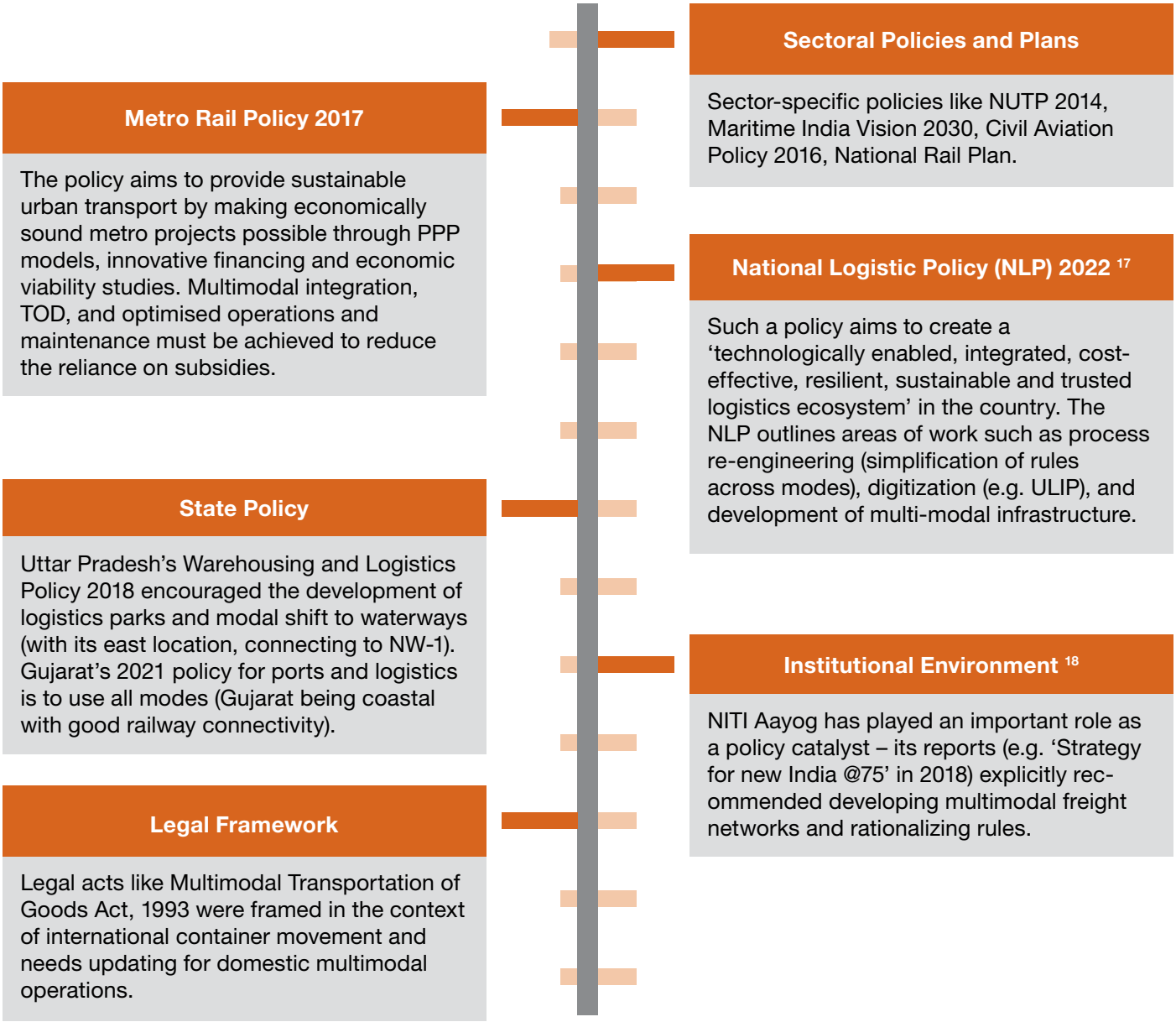
Figure 1: Stakeholders in India's transport system

Central government ministries	• Ministry of Road Transport and Highways of India (MoRTH) for roads, railways for the railways, Ports for the port, Civil Aviation for the airport, and Ministry of Housing and Urban Affairs (MoHUA) for urban mobility. Once segregated, PM Gati Shakti now promotes end-to-end connected planning. Logistics parks and unified transport policy push NITI Aayog.
State government & local authorities	• Transport is partially a state subject, including intra-state roads, highways, and urban transport. State PWDs operate roads, and transport enterprises operate buses. • States such as Gujarat and Karnataka have multimodal hub logistics policies; Maharashtra has the Maritime Board for port connection. State corporations (e.g. Karnataka State Road Transport Corporation (KSRTC) combine buses with rail.
Public sector transport companies	• PSUs are very important in multimodal transport. • Container Corporation of India (CONCOR) operates dry ports and rail-road freight. DFCCIL constructs freight rail lines. National Highway Authority of India (NHAI), through National Highways Logistics Management Limited (NHLML), develops MMLPs. • The Airports Authority works on metro connections. Port Authorities operate ports and rail links. Sagarmala and Bharatmala programmes provide integrated connectivity.
Metro rail corporations	• Metro rail corporations are responsible for the planning, construction, operation and maintenance of metro rail systems in a city – e.g. Delhi Metro Rail Corporation (DMRC), Kolkata Metro Rail Corporation (KMRC), Mumbai Metro Rail Corporation (MMRC), Bangalore Metro Rail Corporation (BMRCL) etc.
Private sector players	• Private sector players are part of India's transport integration, undertaking PPPs in the construction of infrastructure and upgrading stations. Companies such as Transport Corporation of India and DHL handle multimodal cargo, fueling integration demand.
Regulatory and coordinating bodies	• India's transport coordination consists of National Capital Region Planning Board (NCRP), for the Delhi RRTS, Chennai Unified Metropolitan Transport Authority (CUMPTA), etc. the Logistics Coordination Committee for policy implementation and ULIP for integrating data. • Regulators such as Tariff Authority for Major Ports (TAMP) shape multimodal flows.
Industry associations	• Trade associations such as FICCI, and transport associations, shape policies by bringing up issues such as paperwork and connectivity, and engage in policy consultations, such as the draft National Logistics Policy.

1.5. Institutional and policy environment governing multimodal transport in India

India's policy environment for multimodal transport is evolving, with several national and state policies converging on the goal of integrated connectivity. Key components of this environment include:

Figure 2. Institutional and policy environment



1.5.1. National Transport Policy and Vision

India's long-term transport vision seeks to build a future-proof infrastructure network that promotes economic growth, sustainability, and inclusivity. While officially there is no consolidated National Transport Policy yet, a number of top-level vision statements and plans speak of the goals:

Vision 2030 and 2047: The Government has routinely cited 2030 goals (similar to Sustainable Development Goals timeline) and 2047 (100 years of Independence, a vision of Viksit Bharat). Better logistics efficiency and lowering of logistics cost from ~14% of GDP to 8–10% will align India with the developed countries, and help in achieving the goals by 2030. Effective transport has been identified as a major enabler for the USD 5 trillion economy target.[19]

17 https://dpiit.gov.in/logistics/national-logistics-policy
18 https://www.niti.gov.in/sites/default/files/2019-01/Strategy_for_New_India_0.pdf
19 https://infra.economictimes.indiatimes.com/news/logistics/logistics-cost-will-be-cut-to-8-9-per-cent-of-gdp-by-2030-dpiit-secretary/94314215

To the year 2047, the government's Vision 2047 reports (in preparation) conceivably feature seamless multimodal transport, with high-speed rail, world-class roads, 100% electrified and even net-zero-emission transport networks, and universal connectivity – where each village and city is well-linked to the national network.[20]

National Infrastructure Pipeline (NIP) 2019-2025: The NIP, though more an investment strategy, sets out a general sectoral vision, of which transport (roads, rail, ports, airports, urban) constitutes a major part of the USD 100 lakh crore strategy. Successful project completion of NIP will plug critical infrastructure deficiencies and lay the ground for enhanced integration.[21]

Segments like energy (24%), roads (19%), urban (16%) and railways (13%) are estimated to contribute approximately 70% of the capital investment in infrastructure in India between 2020 and 2025. The NIP and Gati Shakti collectively plan an integrated network of economic corridors connecting all the major production and consumption hubs by 2025.[22]

Modal share targets: India will seek to maximise the transport mix for freight as well as passenger traffic. The National Rail Plan aims at 45% rail share in freight by 2030 (an increase from ~27% in 2021).[23]

For urban mobility, the goal is to provide safe, affordable and sustainable public transport. The Electric Mobility Mission supports this by targeting 30% electric vehicles by 2030, aligning with transport decarbonisation efforts.[24]

Indian Logistics Ranking: India achieved the 22nd ranking globally in International Shipments and was ranked at 38 among all countries in the World Bank's 2023 Logistics Performance Index (LPI). Indian ports' efficiency has significantly enhanced, with turnaround time lowered to nearly one day. This performance surpasses a few nations, i.e. the US (1.5 days), Australia (1.7 days), Belgium (1.3 days), Canada (2.0 days), Germany (1.3 days), the UAE (1.1 days) and Singapore (1.0 day).[25]

Domestically, bringing North-East India at par with national connectivity and linking Kashmir seamlessly are a part of the vision (which projects like Bharatmala and UDAN are addressing).[26]

National Master Plan (Gati Shakti): Gati Shakti acts as an implementation strategy as well as a vision, committing to holistic and integrated infrastructure development. Its six pillars highlight data-driven planning, optimisation and long-term harmonisation.[27]

India's national transport vision puts multisector connectivity, efficiency and sustainability at the forefront. The main areas of focus are:

- achieving a 50:50 freight modal balance (road vs. non-road)
- developing public transport-oriented cities
- creating world-class logistics hubs
- enabling full digital integration of transport networks.

Schemes such as NLP, Gati Shakti, Sagarmala, Bharatmala, and DFCs are aimed at aligning short-term measures with long-term vision. These programmes are designed to create a transportation network that enables India to transform into a developed economy by 2047.

20 https://government.economictimes.indiatimes.com/news/digital-india/vision-2047-master-plan-morth-has-adopted-a-big-data-driven-approach-to-infra-planning-says-nitin-gadkari/118391627
21 https://pib.gov.in/PressReleasePage.aspx?PRID=1601239
22 Press Information Bureau - Ministry of Finance - 2019
23 https://pib.gov.in/Pressreleaseshare.aspx?PRID=1797575
24 https://www.psa.gov.in/mission/electric-vehicles/36
25 http://pib.gov.in/PressReleasePage.aspx?PRID=2101760 – 11th Feb 2025
26 https://www.india.gov.in/spotlight/bharatmala-pariyojana-stepping-stone-towards-new-india
27 https://www.india.gov.in/spotlight/pm-gati-shakti-national-master-plan-multi-modal-connectivity



1.5.2. Institutional coordination, policy and governance

Effective multimodal integration requires strong institutional coordination and supportive policy frameworks. India is taking steps to improve governance structures and inter-agency collaboration:[29]

Figure 3. Institutional coordination, policy and governance

Interagency coordination mechanism

Launched in 2021, the PM Gati Shakti National Master Plan employs a technology platform to bring together 16 central ministries through GIS for integrated infrastructure planning. It coordinates efforts such as railways and fiber-optics with highways under the guidance of a Network Planning Group that assesses projects multimodally

Unified logistics and transport polices

The National Logistics Policy (NLP) 2022 aims to simplify multimodal logistics with a view to reducing costs to around 8% of GDP and becoming a top 25 performer in the Logistics Performance Index. It facilitates Gati Shakti by emphasising standardisation, process re-engineering, and digitisation.

Institutional bodies and reforms

New institutional arrangements are strengthening governance. An Empowered Group of Secretaries (EGoS), headed by the Cabinet Secretary, was formed for the PM Gati Shakti program to examine and settle inter-ministerial issues. The group can resolve differences and speed up clearances.

State-level coordination

States are crucial for multimodal logistics, especially in land procurement and connectivity. State policies advise establishing State Logistics Coordination Committees and creating state logistics policies, such as Uttar Pradesh's 2022 policy favoring multimodal hubs.

Public-private collaboration

Governance involves involving private stakeholders through avenues such as the LEADS index and logistics summits, which promote states to resolve bottlenecks based on industry input. The ULIP platform is an example of collaborative governance, providing government data for private solutions and innovation.

29 www.pmgatishakti.gov.in – Multimodal transport governance

1.5.3. Government initiatives for integration of multimodal transport modes – Gati Shakti/ ULIP

The Government of India has launched flagship initiatives explicitly aimed at integrating multiple transport modes and breaking silos. Two of the most significant are **PM Gati Shakti** and **ULIP**:

Figure 4. Government initiatives and its outcomes

PM Gati Shakti National Master Plan	Unified Logistics Interface Platform (ULIP)
• Launched in October 2021, PM Gati Shakti is built on six pillars, comprehensiveness, prioritisation, optimisation, synchronisation, analytical and dynamic. • It introduces a data-driven, holistic approach to infrastructure development and execution. • The initiative integrates 44 central ministries through a GIS-based portal for synchronided planning. • Ministries can view and align their infrastructure projects to avoid redundancy and optimide resource use. For example, MoRTH can plan highways considering existing pipelines and railway lines, while Railways can develop feeder lines to ports alongside highway construction.	• Unveiled under the 2022 National Logistics Policy, ULIP unifies digital systems across transport ministries and private logistics players. • It creates a logistics stack for end-to-end digital connectivity, similar to UPI in financial services. • ULIP improves transparency, reduces costs, and optimides logistics operations through real-time data sharing. • Quick verification of drivers and vehicles speeds up warehouse gate entry, improving turnaround time. • Integrated rail and road data enables optimal multimodal route selection, reducing delays and inefficiencies.
Outcomes	
• Gati Shakti identifies key economic nodes (industrial clusters, logistics parks) and economic corridors that require multimodal integration. • Ministries are coordinating infrastructure projects along these corridors to maximise synergy and efficiency. • An EGOS oversees high-level coordination, ensuring strategic decision-making. • The Network Planning Group (NPG) manages detailed planning and implementation across ministries.	• ULIP connects 30 systems from 7 ministries, covering 1,600+ data fields across transport, logistics, and taxation. It integrates platforms such as the Port Community System, FOIS (Railways), Vahan and Sarathi (vehicle/driver data), and GSTN (tax data). • Authorised users can retrieve diverse logistics data through a single portal or API. • Logistics companies can track shipments in real time, from rail location to customs clearance and truck details. • This integration reduces bottlenecks, improves decision-making and optimises supply chain efficiency.

2. Challenges in the existing multimodal transport system

India's efforts to enhance multimodal connectivity face multiple obstacles that prevent the achievement of a completely unified transport system:

Figure 5. Challenges in existing system

Infrastucture limitation

- Poor infrastructure at ports, rail terminals and logistics hubs hampers smooth transitions between modes.
- Many freight corridors lack the last mile connectivity – e.g. industries might be near a railway line, but no rail sliding or terminal exists for actual

Bottlenecks in policy

- Transport policies vary across states, causing compliance issues in freight movement
- Permits and customs procedures are not streamlined for multimodal moves –a container going from road to rail to ship may face repetitive documentation at each mode change.

Uncordinated agencies

- Agencies often work in stovepipes – e.g. a highway might be built without consulting railways if a rail overbridge is needed, leading to time-consuming revisions.

Financial challenges

- Funding constraints lead to staggered implementation –e.g. railways might delay building a spur line to a port due to budget, even if the port is ready for funds.
  Expansion of metro rail or first-/last-mile operations may encounter feasibility challenges.

Countries across the globe have adopted integrated transport planning across various modes to tackle the challenges due to fragmented planning processes. The literature defines four realms where integration manifests to various extents.

Figure 6. Four areas to overcome challenges

Physical

This refers to smaller hard-infrastructure integration, which allows for easy access and interchanges between different modes of transport, such as building stations that service multiple types of transport.

Network

This refers to the larger hard-infrastructure investments that need to take place to ensure integration across modes of transport, such as rail and bus systems.

Operational

This can include a number of different soft-infrastructure aspects, including routing alignment, aligning timetabling, ticketing and fares, and providing information to consumers on links between modes.

Institutional

This integration often requires the most time, involving coordination or merging of government transport agencies and private providers, as well as aligning transport with land-use planning institutions.

2.1. Infrastructure gaps and upgrades

India is targeting the critical infrastructure deficiencies that obstruct seamless connectivity to build its integrated multimodal system. Some major gaps and planned upgrades include:

Figure 7. Infrastructure gaps and upgrades

Gaps	Upgrades
Missing road-rail links to ports and industrial hubs Several ports and industrial areas lack efficient rail connectivity, resulting in over-reliance on roads.	**DFC linked with last mille connectors** For example, new spur lines are under construction to connect all major gujarat ports (Mundra, Pipavav, Kandla) to the western DFC by 2025. Where direct rail is not viable, high-quality highways are being built.
Urban transit integration gaps In cities, one gap has been the lack of integrated terminals where different public transport modes meet.	**Metro network extensions** Addressing some of this, many phase-III metro projects in cities explicitly include interchange with suburban rail and bus depots (Delhi's new metro stations at Anand Vihar, Sarai Kale Khan, etc., are adjacent to existing bus/rail hubs).
Inland waterway and coastal shipping infrastructure While 111 national waterways have been notified, only a few are operational. The gap is in terminals and navigational aids to integrate waterways with land modes.	Jal Marg Vikas Project on the Ganga (NW-1) is developing multimodal terminals with road and rail connections at Varanasi, Sahibganj, And Haldia. It also includes dredging, cargo-transfer cranes, and ro-pax ferry terminals. Meanwhile, Sagarmala is enhancing domestic shipping with new coastal berths at Mumbai and Kandla.
Rolling stock and handling equipment An often-overlooked gap is the availability of appropriate rolling stock and equipment for multimodal transfers.	To address this, indian railways is introducing more container flat wagons, automobile carrier wagons, and even working on designing trailer-train services for trucks. Ports are augmenting crane capacity and conveyors to speed up loading/unloading (e.g. conveyor systems connecting ports to nearby power plants or factories).
Last-mile connectivity within cities and to rural areas Recognising that even a great metro system won't thrive if people can't reach stations easily, there's a push for last-mile solutions.	To address the gaps, deploying fleets of electric feeder buses, setting up bike-sharing docks at transit hubs (as seen in cities like Pune and Chennai on a pilot basis), and completing footpath networks around stations.



2.2. Funding and investment issues

Figure 8. Funding and investment issues

Public funding constraints

In recent years, government funding allocations have significantly increased for road and railway infrastructure development. MoRTH's budget increased since 2014, yet it faces funding constraints due to competing priorities in health and education.

Using only general budget allocations and borrowing could put excessive stress on public financial resources.

Public-private partnerships

PPPs have a mixed track record – very successful in telecom and power, somewhat successful in ports/airports (most major port terminals and a few airports like Delhi, Mumbai are PPP-run), but more challenging in rail and state-run bus systems. To enhance PPP in logistics, the government has structured projects to be more investor friendly.

Risk and viability concerns

Viability is a key concern in funding multimodal infrastructure, as projects with long payback periods or social benefits, like rural connectivity or urban transit, often lack short-term profitability. Governments support PPPs through viability gap funding grants and by assuming risks like land acquisition costs.

Maintenance and lifecycles funding

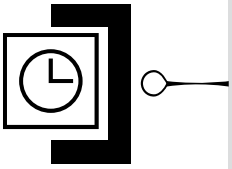
Infrastructure development and upkeep require significant funding. Public projects often lack sufficient maintenance, leading to deterioration. PPPs ensure maintenance through concession agreements, while the government allocates more funds for maintenance in publicly operated projects.

3. Technological innovations in IMT

3.1. Role of digitisation and smart mobility solutions

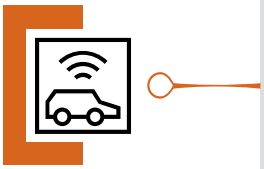
Digitalisation is a cornerstone of India's strategy to unify transport modes and create smart mobility systems. By leveraging modern IT solutions, India aims to provide faster, more reliable, and user-friendly logistics and transit services. Key aspects of this include:

Figure 9. Digitisation's role in smart mobility



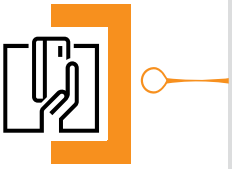
Real time tracking and visibility

- Real-time shipment and vehicle tracking across transport modes enhances logistics efficiency.
- Digital platforms allow companies to monitor freight movements live, from factory to final destination, via apps or dashboards.
- GPS, Radio Frequency Identification (RFID) and cloud-based platforms like ULIP enable seamless data tracking and visibility.
- Real-time tracking allows quick contingency actions, such as rerouting or expediting shipments, in case of delays.



Smart mobility in urban areas (MaaS)

- Mobility-as-a-Service (MaaS) integrates multiple transport modes (bus, metro, ride-share, bike-share) into a single digital platform.
- Commuters can plan, pay, and access all transport modes through one app using a single ticket or QR code.
- While piloted globally, India is advancing with apps like One Delhi, which combines metro and bus information and moves toward unified ticketing.
- The National Common Mobility Card (NCMC), a Rupay-based smart card, aims to facilitate MaaS by enabling nationwide transit payments.



Digital payment system and ticketing

- Unified Payments Interface (UPI) has built a robust payment infrastructure that transit agencies are leveraging for seamless transactions.
- Metro systems and Indian Railways enable ticket purchases via UPI and mobile wallets, reducing queues and improving convenience.
- Digital payments simplify ticketing across different transport modes, enhancing travel efficiency.
- Beyond toll payments, FASTag is being integrated with parking and drive-through services, expanding its role in mobility payments..

3.2. Integrated ticketing systems

One of the most visible and user-centric aspects of multimodal integration is the development of integrated ticketing systems, which allow travellers to use multiple modes of transport with a single ticket or payment mechanism. India has made some progress in this area, though challenges remain:[30]

Figure 10. Integrated ticketing system

01	**NCMC – One Nation One Card**	• Launched in 2019, NCMC is a RuPay-based open-loop smart card for seamless transit payments across India. • It enables payments across metro, buses, suburban rail, tolls, parking and retail shopping. • Major transit operators have been upgrading infrastructure to accept NCMC for widespread adoption. • Delhi Metro introduced NCMC in 2020, followed by Kolkata and Bangalore Metros by 2023. • The NCRTC RRTS (Delhi-Meerut) launched a co-branded NCMC card for use across its network and other transit systems.
02	**QR code and phone-based integration**	• Another approach is using QR codes and OTPs. • Many metro systems (Delhi, Bangalore, Chennai) now allow one to book a QR ticket on their phone, and similarly many bus systems are moving to digital passes. • In absence of a single card, the smartphone can act as the unifier if apps are linked. Some state governments are exploring integrating their transit apps with each other or with journey planners.

Case study: The **Namo Bharat RRTS** in NCR introduced a **co-branded NCMC mobility card** for seamless travel across multiple transit modes. This integrated ticketing system simplifies multimodal journeys and is set to expand with new **RRTS corridors and metro extensions**, advancing India's goal of **unified, efficient transit solutions.**[31]

Indian metros are increasingly adopting **digital fare payments**, reducing reliance on cash transactions. By 2022, **78% of Delhi Metro passengers** used smart cards, up from ~70% previously, improving **efficiency and convenience.** As **integrated mobility** grows, digital payments will remain key to **urban transit modernisation**.[32]

The adoption of **integrated ticketing** has significantly enhanced **commuter satisfaction and system efficiency,** as reflected in user feedback and operational data. Passengers appreciate the **convenience of a single payment method** across multiple transit systems, removing the hassle of purchasing separate tickets. The **Delhi NCR RRTS (Namo Bharat)** implemented **NCMC from its inception**, receiving strong approval for its **seamless travel experience**. This success highlights the increasing demand for **unified mobility solutions,** driving greater **efficiency in urban transportation.**[33]

Mumbai's **NCMC-based mobile app and smartcard** (Common Mobility Card), launched by **MMRDA** for metros and buses, aims to enhance **seamless travel and user satisfaction**. By improving **trip chaining**, it reduces friction in multimodal travel. A **Seoul survey** found that **81% of users** rated integrated smartcards highly–a standard Indian cities aim to achieve. As adoption increases, **Mumbai's model** could serve as a blueprint for **urban transit systems across India.**[34]

30 https://www.npci.org.in/newsletter/May_Month_19/other-highlights.html
31 https://ncrtc.in/launch-of-namo-bharat-ncmc-cards/
32 https://infra.economictimes.indiatimes.com/news/urban-transportation/significant-rise-in-number-of-delhi-metro-smart-card-users-dmrc/91591402#:~:text=DMRC%20infra,70%20per%20cent%20in
33 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2066736#%3A~%3Atext=Image%C2%A0Image
34 https://www.npci.org.in/PDF/npci/knowledge-center/partner-whitepapers/NCMC-Tap-and-Transit-Pan-India-with-RuPay.pdf#:~:text=According%20to%20a%20survey%20conducted,the%20cities%20using%20smart



3.3. Innovation in infrastructure planning and operations

Innovative approaches in planning and operations are critical to achieving true seamless transfers between modes. India is adopting and piloting several such innovations.[35]

BISAG-N, an autonomous body under MeitY, plays a key role in geo-spatial technology and its real-world applications. As part of the Gati Shakti framework, it developed a powerful GIS-based platform that brings together over 1,450 data layers, including satellite imagery from ISRO. This system helps planners and policymakers make smarter, real-time decisions, ensuring better coordination and efficiency in infrastructure development.

Key contributions

- **Integrated planning:** It enables ministries to collaboratively visualise and analyse infrastructure projects, enhancing coordination, decision-making and efficient resource allocation.
- **Analytical tools:** It identifies infrastructure gaps and prioritises projects through data-driven insights, ensuring strategic planning and optimised resource allocation.
- **Dynamic monitoring:** It leverages real-time satellite imagery to monitor project progress, ensuring transparency, accountability, and timely interventions for efficient execution.

Achievements

- **Project evaluation:** It has assessed over 200 projects using GIS-based insights, enabling data-driven planning and execution.
- **State integration:** All 36 states and UTs have aligned their master plans with the National Master Plan, ensuring coordinated infrastructure development and streamlined execution.
- **International interest:** Countries such as Nepal, Bangladesh and Senegal are exploring ways to replicate this model, recognising its effectiveness in integrated infrastructure planning and execution.

Passenger transfer hubs (multi-modal integration at stations): New station infrastructure planning focuses on co-locating multiple transport modes and implementing pedestrian-friendly designs to ensure quick, seamless, and comfortable transfers.

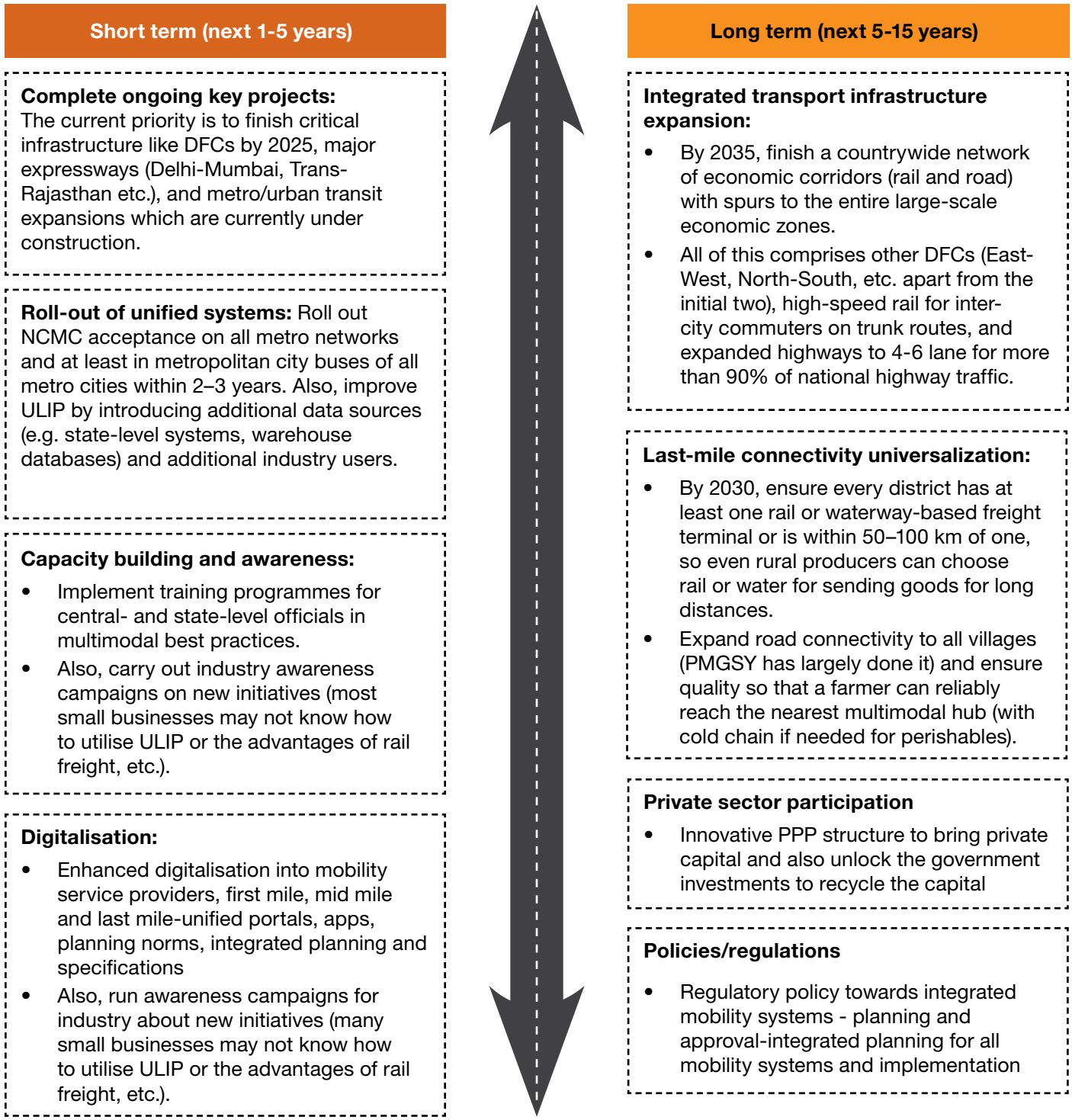
- For instance, the Gandhinagar Capital railway station in Gujarat was redeveloped with an integrated layout including a luxury hotel and seamless walkway to parking and bus areas
- **The Sarai Kale Khan multimodal hub in Delhi** (under construction) will integrate an underground RRTS station, a new Delhi Metro station, and the existing bus terminal, all seamlessly connected via escalators and footbridges for efficient passenger transfers.
- In designs, special care is given to vertical circulation (elevators/escalators) to handle large transfer volumes quickly, and passenger information systems are unified so that one can see all onward connection timings on one display.

35 https://www.india-briefing.com/news/pm-gati-shakti-national-master-plan-achievements-2024-35336.html/
36 https://www.india-briefing.com/news/pm-gati-shakti-national-master-plan-achievements-2024-35336.html/

4. Roadmap for enhanced multimodal transport integration

To build on current progress and fully realise an integrated multimodal transport ecosystem, India needs to pursue a clear roadmap with short-term and long-term strategies:

Figure 11. Roadmap for multimodal transport integration



4.1. International best practices in integrated multimodal transport

Looking at developed countries and successful models abroad provides valuable lessons for India's multimodal integration journey. Several best practices stand out:

Country	Best practices
Japan	**Efficient public transport integration:** • Cities like Tokyo have multiple rail operators (subway, JR, private lines) yet offer integrated fare cards like Suica/Pasmo that work on virtually all modes, and tightly coordinated schedules. • The Shinkansen (bullet trains) network interfaces smoothly with local transport – for instance, many Shinkansen stations have adjacent bus terminals and clear signage for connections. • Japan's emphasis on transit-oriented development keeps city centres very walkable and connected. • Also, Japan's use of high-speed freight trains (on separate narrow-gauge tracks) for parcel delivery shows innovation in speeding freight. **Lesson for India:** The importance of a unified payment system (mirroring NCMC) and building dense networks around stations
US	**Intermodal freight and deregulation:** • A key best practice was deregulation (Staggers Rail Act 1980) which allowed railroads flexibility in pricing and services, leading to innovations like double-stack container trains and intermodal partnerships with trucking companies. • Major freight railroads in US operate massive intermodal yards where containers are quickly transferred between train and truck (like BNSF's Chicago logistics park). • The US also has private sector-driven trucking hubs and widespread use of technology in fleet management. **Lesson for India:** Encourage an environment where rail and trucking companies can partner (through open access or liberalised policies). Also invest in capable intermodal terminal.
Singapore	**Integrated logistics and single window:** • Its port, airport and free trade zones operate in unison with a single-window trade platform that handles all documentation. • Shippers in Singapore can in a single digital interface manage customs, port booking, truck arrival scheduling, etc. • The city's small size belies its logistics prowess – cargo from the port can reach the airport in under an hour, and multimodal coordination is extremely high to facilitate this. • On passenger front, Singapore's EZ-Link card (and now SimplyGo system) allows use of MRT (metro), buses and even some retail with one account – something India is aiming for with NCMC **Lesson for India:** Digital single-window significantly boosts efficiency – India's ULIP and Port Community System are analogous; pushing them to be as comprehensive as Singapore's system.

4.2. Role of regional planning and development

In India, regional planning and development play a pivotal role in enhancing integrated multimodal transport systems. Given the country's vast geographic expanse, diverse population and rapidly growing economy, effective transportation planning is crucial.

I. **Balanced regional connectivity:** Historically, certain Indian areas (e.g. the west, northwest, and south) have had better transport facilities than others (e.g. the northeast, central and east)
   a. Regional planning attempts to minimise such imbalances by concentrating investments in backward regions – for instance, the Northeastern Region (NER) has a ministry and connectivity plans (rail connectivity to all state capitals, improvement of Brahmaputra waterways, etc.).

II. **Economic corridors and industrial Regions:** The government's approach to industrial development through **industrial corridors (e.g. DMIC, AKIC, CBIC, VCIC, etc.)** inherently ties into regional transport planning
   a. These corridors are conceived as development axes where manufacturing clusters are supported by high-quality multimodal transport spines.
   b. By planning industry and transport together, regions along these corridors see integrated growth – e.g. new industrial townships in Gujarat and Maharashtra are planned adjacent to the DFC route with spur lines and expressway access (e.g. DMIC nodes like Dholera, Shendra).

III. **Socio-economic impact:** When regions are well-integrated, it fosters more uniform development:
   a. People in backward areas can travel for education or healthcare to advanced centres more easily (e.g. a patient from rural Maharashtra reaching Mumbai via an integrated network of local bus + train).
   b. It also enables **circular migration** (people can work seasonally in cities and return home) rather than permanent migration, because travel is easier.
   c. This maintains regional balances to some degree. Politically, having visible transport links (like new trains or buses connecting far-flung regions) also strengthens national integration.

4.3. Enhancing intermodal connectivity

Enhancing intermodal connectivity is crucial for the efficiency of multimodal transport systems, focusing on improving first-mile and last-mile segments for freight and passenger transport.

I. **First-mile connectivity for freight**

This typically involves moving goods from factories, farms, or mines to the nearest hub (like a rail terminal, highway or port). Strategies to enhance this include building feeder roads and rail sidings.

   a. **Infrastructure development:** Initiatives like Sagarmala and Bharatmala focus on projects such as four-laning roads and building rail connections to improve access from industrial clusters to major networks.
   b. **Rail integration:** Developing private or common-user rail sidings in industrial zones allows for direct loading onto trains, reducing reliance on road haulage.
   c. **Private freight terminals:** Expanding the scheme for railways private freight terminals can encourage businesses to establish mini-terminals, streamlining first-mile logistics.

II. **Last-mile connectivity for freight**
   a. **Urban freight centres:** Having distribution centres on the outskirts of cities allows for an easy transition from large trucks to smaller ones, reducing city traffic.
   b. **Port connectivity:** Development of high-capacity rail terminals and express road connectivity between ports and national networks enhances efficiency, as in the case of Jawaharlal Nehru Port's dedicated highway and DFC connectivity.

III. **Last-mile passenger connectivity**
   a. **Feeder services:** Expanding feeder bus, van and auto-rickshaw services at transit stops improves accessibility to neighbourhoods and offices.
   b. **Innovative solutions:** Cities are enhancing connectivity with feeder bus services for metro rails and electric rickshaws for short distances. Park-and-ride facilities also support seamless transitions from personal vehicles to public transit.

IV. **Integration of schedules and information**
   a. **Journey planning tools:** Incorporating first/last-mile modes into web journey planning tools can promote multimodal travel by making available real-time transit connection information.
   b. **Timetable coordination:** Timetable coordination of feeder services with main transit services reduces waiting time and enhances user convenience. Coordination of railways and state transport ensures buses reach major train timetables, especially in tourist and rural areas. These strategies collectively aim to streamline connectivity, improve efficiency and promote the use of multimodal transport systems in India.

5. Strategic recommendations for an IMT ecosystem



Considering the analysis so far, several strategic recommendations emerge to accelerate the development of an integrated multimodal transport ecosystem in India:

1. **Policy and institutional reforms**
    - **Implement a national transport policy:** Establish and implement a transport policy that provides mode share targets and requires integration and thus obliges states to develop multimodal plans.
    - **Enhance central coordination:** Develop an enhanced specialised agency to manage bi- and multimodal plans, monitor KPIs and report to the highest government offices.
    - **Empower UMTAs and regional boards:** Establish unified metropolitan transport authorities and regional transport boards with regulatory authority to manage and fund cross-boundary projects.
    - **Harmonise regulations:** Revise and harmonise transport laws to facilitate seamless intermodal operations, including standardised container regulations and streamlined permits.

2. **Infrastructure investment priorities**
    - **Complete economic corridors:** Invest in the completion of national corridors and their first-/last-mile links, allocating funds specially for multimodal projects.
    - **Expand dedicated freight network:** Strategise and implement additional DFCs, while enhancing coastal shipping and inland waterways.
    - **Urban transit coverage:** Expand the existing public transit network within the cities, ensuring integration and interchange facilities.
    - **Logistics parks and hubs:** Develop logistics parks and hubs, encouraging private investment in proximity to Tier-2 cities and border areas for efficient cross-border operations.
3. **Technology and digital integration**
    - **Scale up ULIP adoption:** Mandate compatibility with ULIP for new logistics IT systems and incentivise integration to increase data sharing and network effects.
    - **Develop a nationwide mobility-as-a-service app:** Building on NCMC, support the creation of a mobility-as-a-service application for integrated planning and payment across modes, potentially piloting in major cities.
    - **Smart infrastructure management:** Deploy IoT and AI solutions for monitoring infrastructure to mitigate unscheduled downtime and optimise capacity.
    - **Open data and APIs:** Promote open data publication to catalyse innovative private sector solutions for journey planning and logistics optimisation.
4. **Process simplification and service quality**
    - **One-stop clearance for multimodal projects:** Establish expedited clearance mechanisms for projects with multimodal benefits to minimise implementation delays.
    - **Seamless transshipment facilities:** Develop efficient transshipment processes at hubs to reduce costs and time.
    - **Customer-centric approach:** Prioritise customer-centric improvements in public transport and freight services, addressing last-mile issues and developing dedicated corridors for specific industries.
    - **Pilot projects and case studies:** Implement pilot projects to showcase multimodal efficiency, demonstrate reliability and cost-effectiveness.
5. **Sustainability and inclusivity**
    - **Green multimodal initiatives:** Align transport strategies with climate goals through promotion of modal shifts to rail and waterways, electrification and incentivising green practices.
    - **Inclusive access:** Ensure barrier-free design and safety measures in transit, offering equitable fare integration for low-income commuters.
    - **Regional equity:** Allocate resources to enhance connectivity in remote regions, ensuring comprehensive network inclusion.

By executing these recommendations, India can cultivate a synergised transportation network, thereby amplifying social and economic benefits while conscientiously addressing inclusivity and sustainability.

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