



India's Logistics Future: Vision 2047

Under the visionary leadership of our Prime Minister, Narendra Modi, India has progressed well over the last 12 years through the National Infrastructure Pipeline, and today our logistics sector stands at a defining moment in its economic transformation.

Transportation and logistics are the backbone of economic growth for any country. Every product we consume, every journey we undertake, and every city we inhabit depends on the smooth movement of people, goods and services.

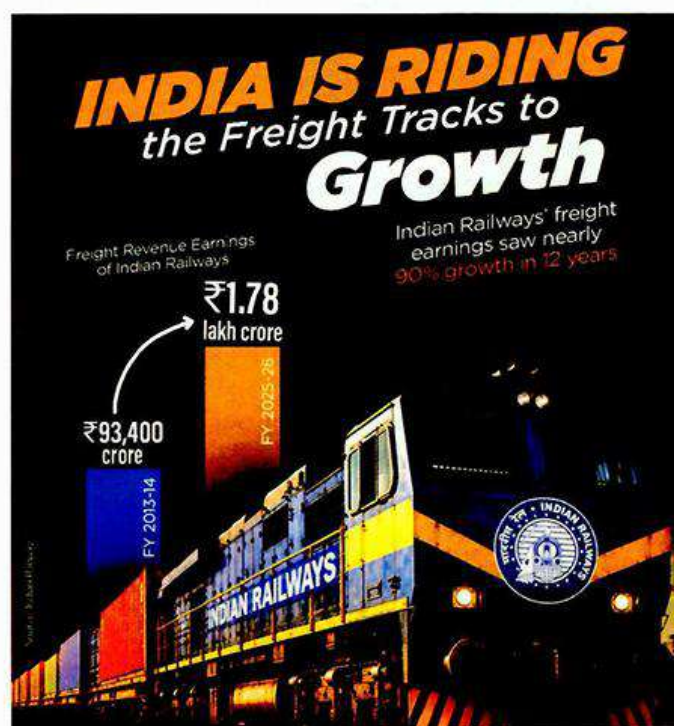
'Logistics' means transportation & handling of goods between points of production and consumption, storage, value addition and allied services.

Whether the goal is to improve our manufacturing competitiveness or to ensure that domestic inflation is under control, efficient logistics systems are the backbone for our future. The stronger the logistics services, the stronger our borders remain. The "efficient handling of resources" is an important parameter for the success of any military mission as well. In times of wars, emergencies or global pandemics, countries with strong logistical chains are the ones that have proven to be "stable, secure and capable". Therefore, for economic growth or defence purposes, Logistics has become a central theme as it has a multiplier effect on GDP growth. The disruptions of this decade, such as, the Pandemic, the Russia-Ukraine War, the West Asia Crisis, etc., have put enormous focus on resilient supply chains and logistics enablement.

Under the visionary leadership of our Prime Minister, Narendra Modi, India has progressed well over the last 12 years through the National Infrastructure Pipeline, and today our logistics sector stands at a

defining moment in its economic transformation. Over the past decade, the country has undertaken a very ambitious infrastructure modernisation programme, driven by large-scale public investment in railways, freight logistics, highways, freight logistics corridors, ports and maritime sector, aviation, integrated planning architecture and digital logistics systems. A brief summary is as follows:

- **Railways:** Almost 100% electrification of our broad-gauge network, introduction of *Vande Bharat*



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trains, *Amrit Bharat* Station Redevelopment to transform the railway stations into economic hubs, expansion of indigenous locomotive and coach manufacturing, first-time rail connectivity to J&K and Mizoram, focus on increased safety through indigenous technologies like *Kavach*, introduction of 1st Hydrogen-powered train on the Sonapat-Jind route.

- **Dedicated Freight Corridors:** 2843 km of East and West dedicated freight corridors with connectivity up to Jawaharlal Nehru Port Trust (JNPT). Enabling segregation of freight and passenger trains, thereby increasing speeds and capacity.
- **High Speed Train (Bullet Train):** 1st Bullet train with specifications of 320 km/h between Ahmedabad and Mumbai (508 km), with the 1st phase slated to open in 2027.
- **Highways and Expressways:** *Bharatmala* (22500+ km), highway network expansion to 1.46 Lakh kms and Expressways (3052+ km). Access-controlled expressways are a new mode of commuting, and so are sustainable practices in road construction. Ganga Expressway, Delhi-Dehradun Economic Corridor, and Delhi-Mumbai Industrial Corridor are great examples of expressways that significantly enhance logistics efficiency.
- **Aviation:** Increase in civil aviation airports from 74 (2014) to 165 (2026), UDAN scheme to connect Tier-2/Tier-3 cities, establishment of aircraft assembly operations such as C-295 Military Transport Aircraft, and policies to set up the MRO (Maintenance, Repair, and Overhaul) sector in the country. New airports at Jewar and Navi Mumbai are examples to address the demand in our big cities.
- **Ports and Maritime:** Drastic improvement in the turnaround time at our major ports, announcement of a green-field multimodal port at VadHAVAN, initiation of ship-building through the Maritime Development Fund, and *Sagarmala* Programme, which focuses on port modernisation, port connectivity, and coastal community development. 9 Indian Ports are now amongst the world's top 100.
- **Waterways:** 111 National Waterways are notified, benefiting over 35 Lakhs passengers.
- **Urban Mobility:** Metro expansion to 26 cities (from 5 a decade ago) and 1155 km, quadrupling of the metro network, introduction of RRTS (Regional



Rapid Transit System), and BRTS (Bus Rapid Transit System), improvement of electric mobility options under FAME (Faster Adoption and Manufacturing of Electric Vehicles).

- **Multimodal Logistics Parks:** Establishment of 35 logistics parks, 306 *Gati Shakti* Cargo terminals, and inland container depots.
- ***Gati Shakti Vishwavidyalaya*:** 1st dedicated university for the transportation and logistics sector.

Various components of the logistics costs include transportation and shipping, order-processing, inventory management, warehousing, material handling, packaging, and monitoring, etc. It is important to address each of these components individually as well as with a comprehensive system viewpoint.

Two major policy-level initiatives that are leading to these very rapid improvements:

PM *Gati Shakti* National Master Plan (2021)

It is a revolutionary initiative by the Government of India aimed at transforming infrastructure development and boosting multi-modal connectivity across the country. The scheme utilising a Geo-Spatial Digital Platform in a "Whole of the Government"

approach is designed to break inter-ministerial silos, promote integrated planning, and enhance logistics efficiency, ultimately propelling India's economic growth. Today, over 3,200 data layers from 58 Central Ministries and 36 States/UTs, have replaced subjective decision-making with objective, data-driven governance. This unified 'single source of truth' is enabled through key pillars of comprehensiveness, prioritisation, optimisation, synchronisation, analytical depth, and dynamic real-time API integration, ensuring accurate and timely information for decision-makers. Today, PM *Gati Shakti* is used both for physical infrastructure projects (railways, highways, telecom, gas pipelines, etc.) and social infrastructure (schools, healthcare, etc.).

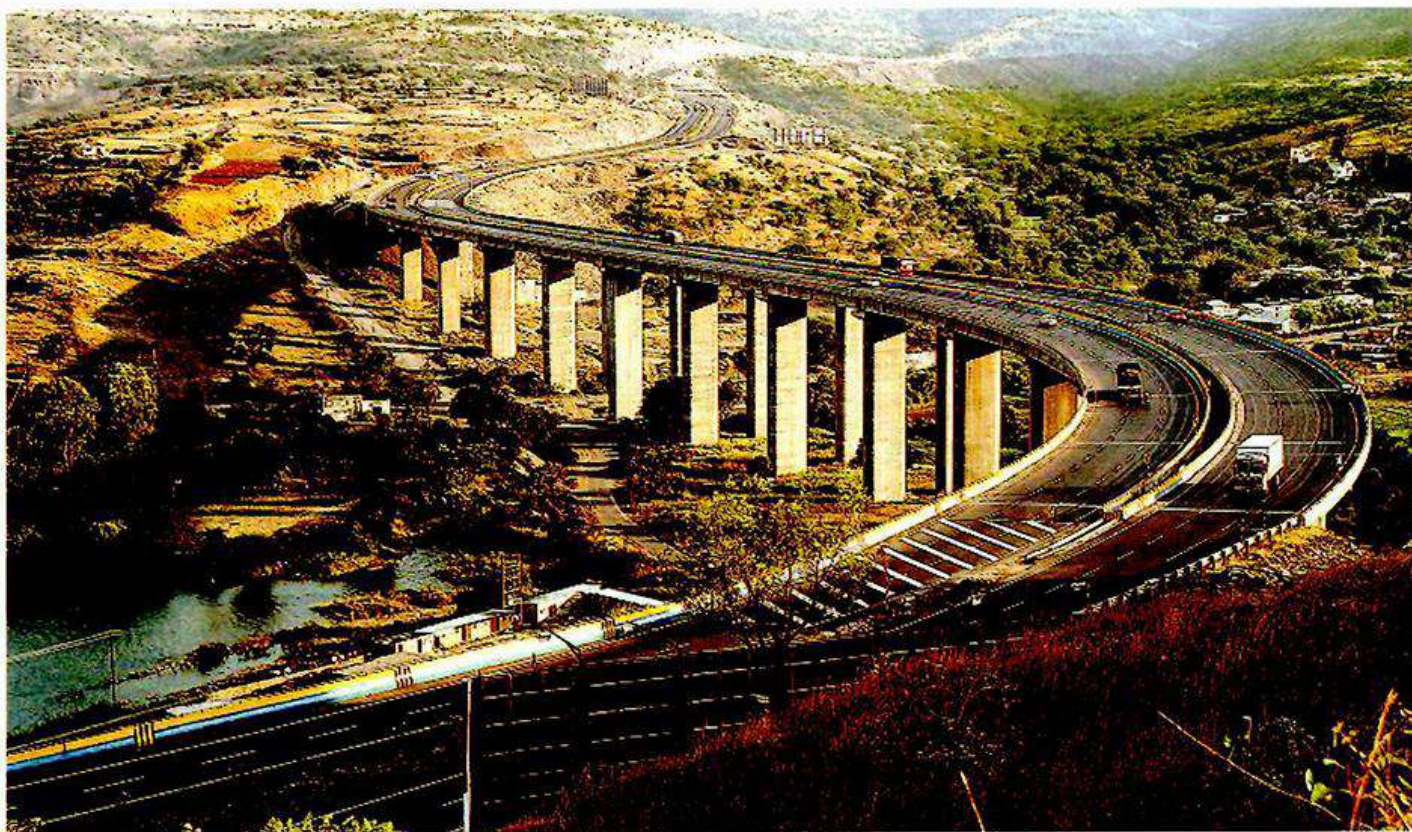
Within 4 years of its launch, approximately 240 projects worth Rs 15 Lakh Crores have been evaluated through PM *Gati Shakti*. To expedite project execution, PRAGATI (Pro-active Governance and Timely Implementation of national projects, and public grievance redressal) is put into place to identify and eliminate bottlenecks during the project execution. The platform ensures that projects are aligned with national priorities and completed on time, minimising delays and reducing cost overruns. This integration is key to meeting India's Net Zero by 2070 commitments, as the platform promotes the use of green infrastructure and

sustainable logistics solutions. The PM *Gati Shakti* has already been extended to all districts in the country.

National Logistics Policy (2022)

With a vision 'to develop a technologically enabled, integrated, cost efficient, resilient, sustainable and trusted logistics ecosystem in the country for accelerated and inclusive growth,' the National Logistics Policy (NLP) 2022 includes a comprehensive action plan to integrate digital logistics systems, standardisation of physical assets & benchmarking service quality standards, logistics human resources development & capacity building, engagement of states in the true spirit of "cooperative federalism", focus on exim (Export-Import) logistics, sector-wise plans (e.g. for coal, steel, fertiliser, food and public distribution, cement etc.) to improve logistics efficiency & address issues on supply and demand side, development of logistics parks etc. initiatives taken include:

- Unified Logistics Interface Platform (ULIP), which acts as a digital gateway for the logistics ecosystem to access data available on various Government systems to track/trace, for authentication, document digitisation, process automation, discovery services, etc. All modes of logistics (air/road/rail/port) are covered, irrespective of cargo.



Pune-Katraj National Highway

- Logistics Data Bank (LDB) ensures 100% tracking of all EXIM containers through RFID, IoT, Big Data
- LEADS (Logistics Ease Across Different States): strengthening both competitive and cooperative federalism by enabling states to benchmark performance, learn from the best practices and drive continuous improvements, considering their geographical peculiarities.

Human resources capacity building for the logistics sector is becoming a critical element due to the high growth of the sector, as well as new technology adoption.

Dual-use infrastructure: Policy is enabling cost efficiencies and operational advantages as infrastructure is built and used for dual usage, both for civilian as well as defence purposes, therefore encouraging the civil-military fusion. The use of Artificial Intelligence shall ensure predictive demand modelling, resource forecasting, project monitoring and risk management.

Warehousing Sector: Unlike transport costs, which are typically distance-based or mode-based, warehousing costs are determined by factors such as commodity type, land and infrastructure availability, location, storage duration, technology adoption, and operational efficiency. Temperature-controlled warehouses, commonly used for perishables, pharmaceuticals, and certain chemicals, cost approximately double the standard rate. Similarly, facilities handling hazardous cargo attract a higher

average cost due to additional safety, regulatory, and infrastructure requirements. The warehousing sector is witnessing a tremendous amount of technology-enabled modernisation and operational efficiency leveraging digital twins, Internet of Things and Robotics.

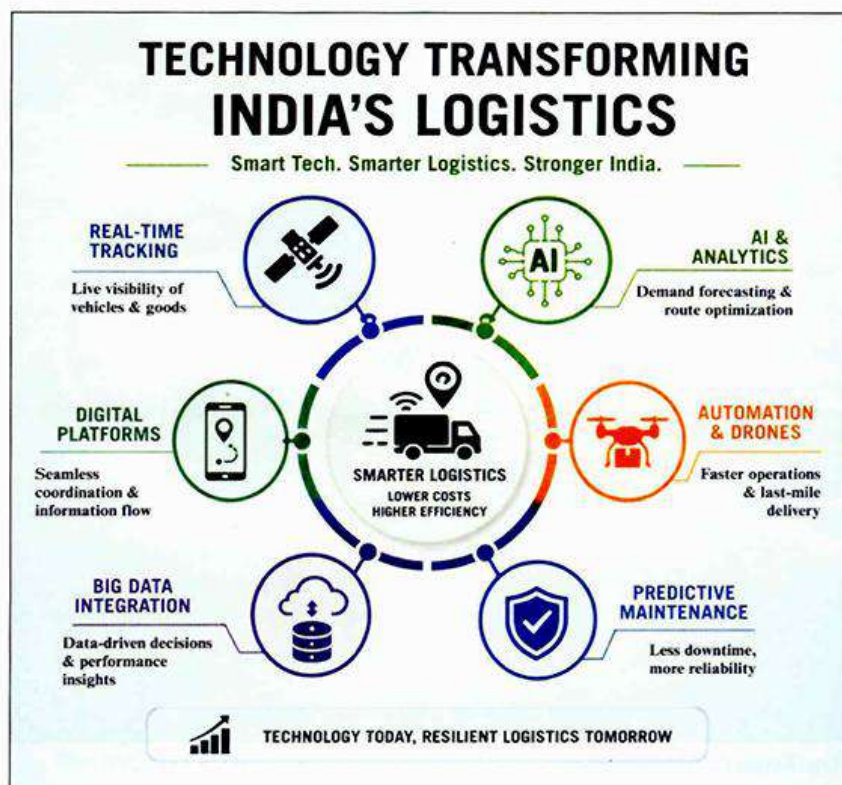
AI & Data Science in Logistics: A Paradigm Shift

Transportation systems today generate unprecedented volumes of data from traffic sensors, GPS-enabled vehicles, and electronic tolling systems to ticketing platforms, surveillance cameras, weather feeds, and logistics management networks. Artificial Intelligence (AI) and Data Science transform this raw, high-velocity, high-volume data into actionable intelligence, enabling transportation systems to become predictive, adaptive, and resilient. This shift is especially visible in India, where large-scale digital platforms and new infrastructure projects are redefining how mobility and logistics are planned and operated.

In urban and highway mobility, Intelligent Transportation Systems (ITS) powered by machine learning are increasingly central to traffic and toll operations. A prominent example is FASTag, which has digitised toll collection across national highways, generating real-time data on vehicle movement, traffic density, and corridor utilisation. This data enables congestion analysis, dynamic traffic management, and evidence-based infrastructure planning. Similarly, AI-enabled traffic signal control systems deployed in several Indian cities analyse live camera feeds and sensor data to optimise signal timings, reduce idling time, and improve intersection safety.

AI and advanced analytics applied to Unified Logistics Interface Platform (ULIP)-type platforms support demand forecasting, route optimisation, and bottleneck identification across multimodal networks. These capabilities are particularly important as India develops multimodal logistics parks, *Gati Shakti* cargo terminals and expands dedicated freight corridors to reduce logistics costs and improve supply chain reliability.

AI can optimise scheduling, energy consumption, passenger flow, and maintenance planning. As India moves toward high-speed rail corridors, data-driven control, real-time monitoring, and predictive maintenance will be



indispensable for ensuring safety, punctuality, and operational efficiency at high velocities. Predictive maintenance remains one of the most impactful applications of AI across railways, aviation, and highways. By analysing data from tracks, rolling stock, signalling systems, bridges, and aircraft components, AI models detect early signs of degradation and failure. This proactive approach enhances safety, minimises service disruptions, and significantly reduces lifecycle costs of infrastructure assets.

Multimodal Transport Planning and Logistics for Viksit Bharat@2047

Recently published reports suggest that the logistics costs in India have begun to come down. The next challenge isn't merely reducing costs - it's improving productivity and last-mile delivery. The history shows that infrastructure alone doesn't create logistics excellence. Germany's advantage comes from industrial clustering. The Netherlands excels through digital integration. China aligned its infrastructure with industrial policy and manufacturing strategy. In each case, infrastructure was an enabler - not the end goal.

Logistics Efficiency may be measured in terms of:

- Seamless operations that take care of both the First-Mile and Last-Mile Connectivity
- Supply chains are becoming more resilient
- Businesses carrying less inventory and thus becoming operationally efficient
- Logistics networks are becoming more productive in terms of service delivery and quality
- Goods moving more predictably with guaranteed on-time performance

The recently inaugurated Ganga Expressway (Meerut to Prayagraj, 596 km) is designed to foster industrial and freight corridors along its route, supporting a dual-use infrastructure approach that goes beyond serving merely as a transport artery. The announcements in the Budget 2026 related to the 3rd Dedicated Freight Corridor (Dankuni to Surat, 2150 km) and 7 new high-speed corridors (called the "Growth Connectors") are great steps in this direction.

From a public policy perspective, India's next logistics reforms may focus more on system efficiency through modal balance (road freight versus rail and waterways), land-use planning (industrial zoning,



warehousing clusters, and urban freight planning), and institutional coordination (integrating the multiple agencies that govern logistics).

The "Whole of the Sector" approach continues in data-driven integrated transport planning to strengthen evidence-based infrastructure, national transport master plan, use of transport demand modelling, freight flow analysis and scenario-based forecasting tools to project transport and logistics demand over the next decades.

This integrated transport and logistics planning:

- Must align well with land use, urban development patterns, national security imperatives, resilience-focused funding strategies and environmental concerns
- Should link domestic transport networks to regional, transnational and international multi-modal (rail, road, port, air, pipelines, ropeways, waterways, etc.) transport and logistics networks
- Need to prioritise sustainable and green logistics.

The planning may adhere to strict, time-bound transit objectives designed to standardise logistics and mobility expectations across the entire country. An integrated transport planning authority for the country is underway to break silos in planning and execution between various ministries, and to accelerate our journey to Viksit Bharat by 2047. □