

Fast-Tracking MMLPs to Enable Modal Shift

India's Multimodal Logistics Transformation: A Strategic Outlook

2026

This report highlights the need to accelerate the integration of India's multimodal logistics ecosystem to achieve the country's strategic policy objectives

knightfrank.co.in/research



Mumbai (HO)

Knight Frank (India) Pvt. Ltd.
Paville House, Near Twin Towers, Off. Veer Savarkar Marg, Prabhadevi, Mumbai 400 025, India
Tel: +91 22 6745 0101

Ahmedabad

Knight Frank (India) Pvt. Ltd.
Unit No. 407 & 408, 4th Floor, Block-C
'The First', Behind ITC Hotel, Near Keshav Baug
Party Plot, Vastrapur, Ahmedabad 380 015, India
Tel: +91 79 6813 1501

Indore

Knight Frank (India) Pvt. Ltd.
Unit No. 1601, 16th Floor, Skye Corporate Park, Near
Satya Sai Square, Vijay Nagar, A B Road, Indore,
Madhya Pradesh 452 010, India
Tel: +91 79 6813 1501

Bengaluru

First Floor, Pinnacle Tower
Embassy One, #8 Bellary Road
Ganganagar, Bengaluru 560 032, India
Tel: +91 80 6818 5600

Kochi

No. 66/4966, SPAZONE MG Road,
2nd floor, Alapatt Heritage,
Mahatma Gandhi Road, Padma Junction,
Kacheripady, Kochi, Ernakulam,
Keralam 682 035, India

Chennai

Knight Frank (India) Pvt. Ltd.
1st Floor, Centre block, Sunny Side,
8/17, Shafee Mohammed Road,
Nungambakkam, Chennai 600 006, India
Tel: +91 44 4296 9000

Kolkata

Knight Frank (India) Pvt. Ltd.
PS Srijan Corporate Park
Unit Number – 1202A, 12th Floor,
Block – EP & GP, Plot Number – GP 2,
Sector – V, Salt Lake, Kolkata 700 091, India
Tel: +91 33 6652 1000

Gurugram

Knight Frank (India) Pvt. Ltd.
1505-1508, 15th Floor, Tower B,
Signature Towers South City 1,
Gurugram 122 001, India
Tel: +91 124 4782700

Pune

Knight Frank (India) Pvt. Ltd.
Unit No.701, Level 7, Pentagon Towers P4,
Magarpatta City, Hadapsar,
Pune 411 013, India
Tel: +91 20 6749 1500

Hyderabad

Knight Frank (India) Pvt. Ltd.
Part of 10th Floor, Atria Block, ITPH, Plot no:17, Hitech
City Rd, Software Units Layout, Madhapur,
Hyderabad, Telangana 500 081, India
Tel: +91 40 4455 4141

Table of Contents



1

Section 1

Infrastructure Investments and Its Consequent Impact on Logistics



2

Section 2

Dominance of Road in Freight Movement



4

Section 4

Multimodal Logistics Ecosystem: Status, Gaps and Scale Requirements



3

Section 3

MMLPs and Freight Transformation: The Economic Mechanisms of Modal Shift



5

Section 5

International Comparables of Integrated Logistics Ecosystem

6

Section 6

Measures to Strengthen Logistics Efficiency

Foreword



Shishir Bajjal

International Partner, Chairman and Managing Director - Knight Frank India

India's logistics sector stands at a defining moment in its economic transformation. Over the past decade, the country has undertaken one of the world's most ambitious infrastructure modernisation programmes, driven by large-scale public investment in highways, rail freight corridors, ports, digital logistics systems, and integrated planning architecture. Flagship initiatives such as the National Logistics Policy, PM Gati Shakti National Master Plan, Bharatmala Pariyojana, and the Dedicated Freight Corridor programme have collectively strengthened the physical and institutional foundations of India's freight ecosystem.

These efforts have already delivered measurable gains. Logistics efficiency has improved materially, transport networks have expanded in both scale and capability, and India's logistics competitiveness has strengthened in global benchmarks. Yet, despite this progress, a structural contradiction persists. Much of India's freight movement remains heavily dependent on road transport, while rail continues to underperform its potential as a commercially viable mode for non-bulk freight. This modal imbalance imposes systemic costs on manufacturers, exporters, and consumers through higher logistics expenditure, fragmented cargo movement, and avoidable inefficiencies across supply chains.

The challenge is no longer one of infrastructure creation alone. India has made substantial progress in building transport corridors; the next phase requires integrating them into a seamless, commercially viable freight ecosystem. The critical missing link lies in multimodal interchange infrastructure capable of connecting dispersed industrial demand to high-capacity rail networks.

This report examines the strategic role of Multimodal Logistics Parks (MMLPs) in enabling this transition. It argues that MMLPs are not merely storage or cargo-handling facilities, but foundational economic infrastructure capable of converting rail's latent line-haul cost advantage into an end-to-end logistics proposition competitive with road transport. By enabling freight aggregation, reducing interchange dwell, supporting scheduled services, integrating digital visibility, and facilitating non-bulk cargo movement, MMLPs create the operating conditions necessary for sustained modal shift.

The report further evaluates the current status of India's operational logistics infrastructure, identifies structural execution and scale gaps, and assesses the infrastructure requirements necessary to achieve the National Rail Plan's target of increasing rail's freight modal share to 45% by 2030 and sustaining that transition over the long term. Drawing on international experience from advanced multimodal freight systems, the analysis highlights the importance of coordinated planning, commercially viable asset design, and institutional certainty in achieving large-scale logistics transformation.

India's long-term manufacturing competitiveness, export resilience, and supply-chain efficiency will depend not only on expanding infrastructure capacity but on ensuring that infrastructure functions as an integrated system. The strategic decisions taken today regarding MMLP design, connectivity standards, digital integration, and private-sector participation will shape the country's freight architecture for decades to come.

This report presents an evidence-based framework for accelerating multimodal logistics transformation and positioning India for a more efficient, competitive, and resilient economic future.

Foreword



Ashwani Gupta

*Chairman, CII National Committee on Ports and Shipping and
Whole Time Director & CEO, Adani Ports and SEZ*

India's logistics sector is undergoing a profound structural transformation. Central government capital expenditure toward transport infrastructure has surged 4.3x over the past decade, establishing a formidable trunk network including over 1,46,000 km of national highways and the landmark Dedicated Freight Corridors (DFCs). While these massive supply-side investments have driven down systemic logistics costs toward 10%-10.7% of GDP and elevated our global standing, a persistent modal paradox remains. Long-haul freight efficiencies remain fragmented, leaving the vast majority of our manufacturing base—particularly 17 million MSMEs—reliant on road transport.

The core challenge is no longer an infrastructure deficit, but a lack of connective nodes. Multimodal Logistics Parks (MMLPs) are the essential connective tissue required to convert rail's line-haul cost advantages into door-to-door competitiveness. By aggregating fragmented, sub-threshold cargo, MMLP-grade interchange unlocks a monumental 43% total cost advantage over road freight on DFC corridors. Simultaneously, MMLPs compress terminal origin-side dwell times by over 90% and drastically reduce handling damage, transforming rail into a time-predictable, reliable logistics channel for high-growth, non-bulk sectors like FMCG, automotive, and e-commerce.

To achieve the National Rail Plan's target of a 45% freight modal share by 2047, India must aggressively scale its intermodal network. Transitioning to next-generation, large-format greenfield assets like the Bharatmala Phase I MMLPs is crucial to achieving the cargo density needed for sustainable modal shift. Activating this ecosystem requires parallel clearances to accelerate execution, utilizing Central Public Sector Enterprise (CPSE) freight as transitional anchor demand to derisk private investments, and systematically bridging first- and last-mile industrial cluster connectivity gaps.

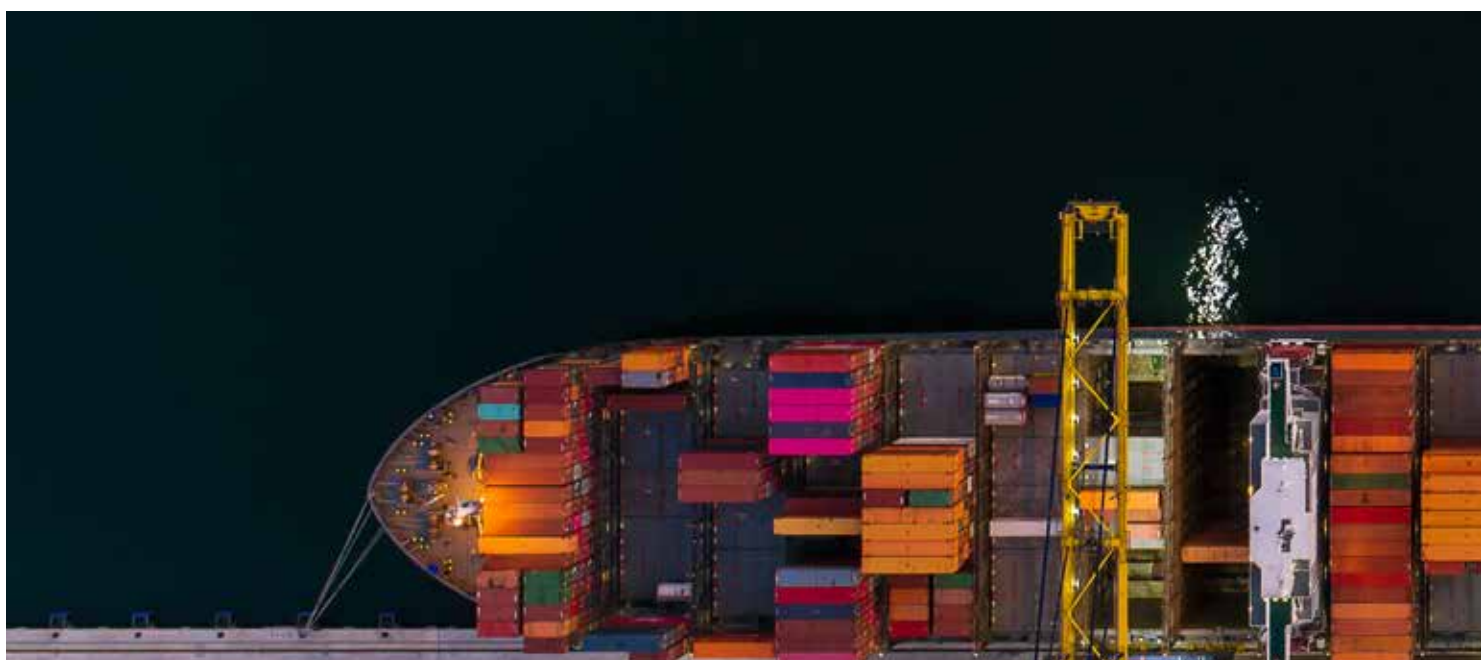
This joint report by the Confederation of Indian Industry (CII) and Knight Frank offers a timely, actionable roadmap to network optimization. By pairing physically efficient MMLPs with advanced digital architectures like the Unified Logistics Interface Platform (ULIP), India can catalyze economy-wide competitiveness. CII remains dedicated to anchoring the public-private collaborations required to build a world-class, integrated freight economy.

Executive Summary

India's logistics sector has historically operated at elevated cost relative to global benchmark economies, with logistics expenditure estimated at 13-14% of GDP a decade ago, compared with 8-9% in advanced logistics markets. This structural cost disadvantage has been driven by road-dominated freight movement, fragmented cargo flows, limited multimodal integration, and inadequate freight aggregation infrastructure.

Over the last decade, substantial progress has been made. Central government capital expenditure on transport infrastructure has increased 5.8 times, from USD 10 bn in FY2016 to USD 58 bn in FY2026, accounting for 48% of total central capital expenditure. During the same period, India's Operational Infrastructure Index improved by 59%, reflecting major gains in network quality, freight throughput, and corridor capacity.

Despite this progress, rail freight modal share remains at approximately 27-28%, indicating that rail's commercial reach beyond bulk cargo remains structurally constrained. Achieving structurally lower logistics costs will require a gradual rebalancing of freight movement away from road-dominated transport toward more efficient multimodal alternatives, particularly rail-linked systems capable of supporting large-scale industrial and containerised freight movement.



Strategic Significance of the Study

Global evidence demonstrates that logistics efficiency is not merely determined by modal composition, but by network integration and operational reliability. The United States maintains logistics costs of 8.8% of GDP despite 67% road freight share, while Germany sustains logistics costs near 8.7% of GDP with 71% road freight movement. These outcomes are enabled by strong multimodal coordination, predictable scheduling, and seamless regional connectivity. For India, improving logistics efficiency is central to manufacturing competitiveness, export resilience, and long-term decarbonisation. Domestic freight demand is projected to expand more than 4x by 2047, making multimodal freight optimisation an economic necessity rather than a sectoral reform objective.

Scope and Analytical Framework

This report examines the structural constraints limiting rail freight competitiveness and evaluates Multimodal Logistics Parks (MMLPs) as the critical aggregation layer required to connect Dedicated Freight Corridors (DFCs) with India's fragmented manufacturing base.

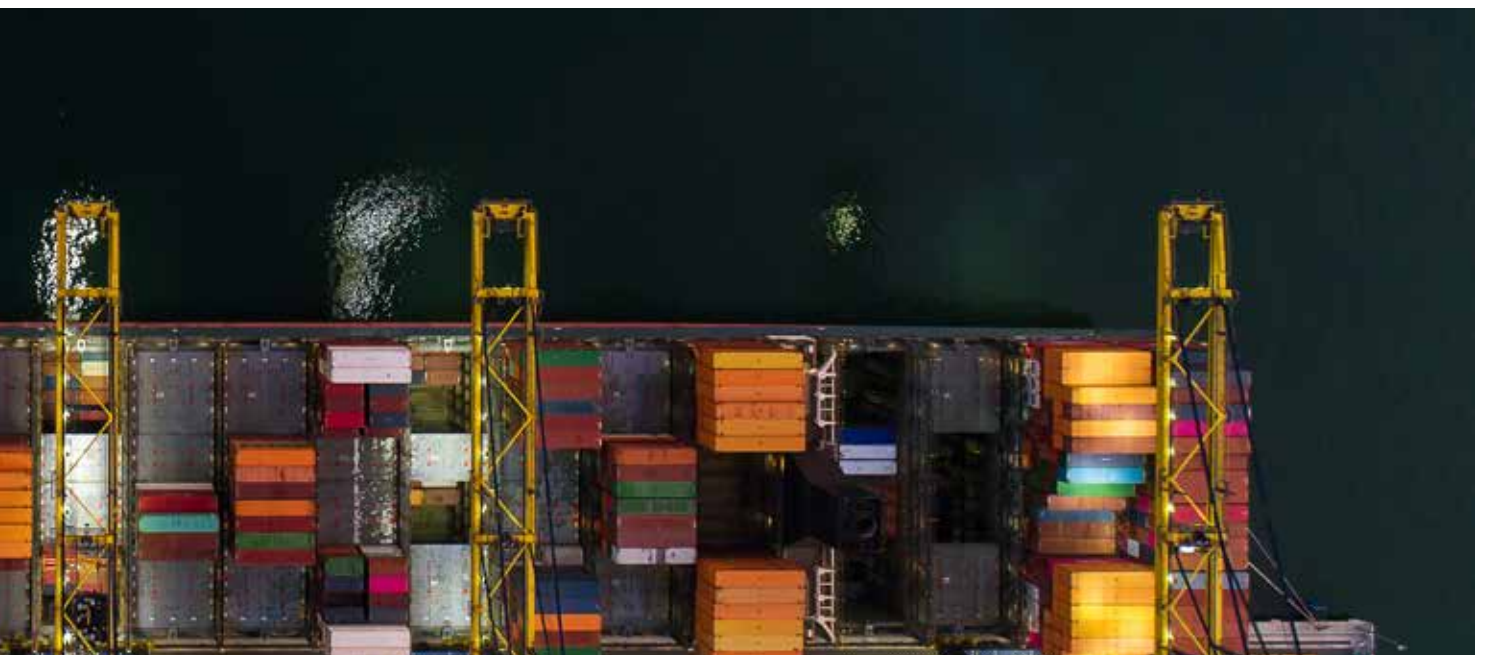
The analysis evaluates:

- Structural barriers to rail modal transition
- DFC-MMLP integration economics
- Freight aggregation and interchange efficiency
- Existing operational capacity versus long-term throughput requirements
- International multimodal benchmarks and institutional learnings
- Strategic execution priorities for scaling multimodal logistics

Principal Findings and Policy Implications

The analysis finds that rail's line-haul cost advantage alone is insufficient to induce modal shift. At conventional freight facilities, origin-side dwell typically ranges between 34 and 152 hours. Integrated MMLP operations reduce this to 2.5-8 hours, representing a reduction of over 90%.

India's current MMLP ecosystem remains materially below required scale. Achieving the National Rail Plan target will require larger multi-modal logistics integration which requires gateway-scale facilities, stronger first- and last-mile industrial connectivity, structured CPSE anchor freight participation during ramp-up, and deeper institutional coordination. In this study we conclude that India has established the necessary policy structure and capital commitment. The next phase of logistics transformation will depend on disciplined execution, integrated system design, and commercial activation at scale.



Section 1

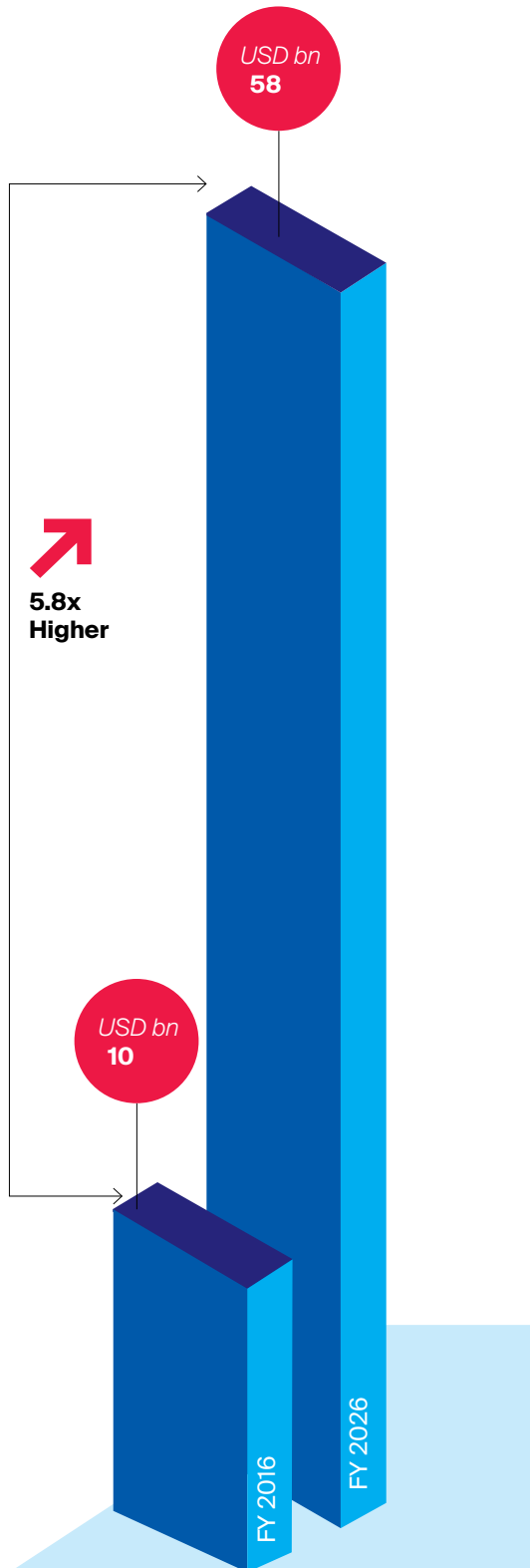
Infrastructure Investments and Its Consequent Impact on Logistics

India's logistics sector has emerged as one of the most critical pillars of the country's economic transformation and has been undergoing a significant structural shift over the last decade, driven by policy reforms, infrastructure expansion, and digital integration. As the world's fifth-largest economy, India depends heavily on an efficient logistics network to support domestic trade, industrial production, and international commerce. However, historically, the country's logistics ecosystem has been characterised by high costs, fragmented modal networks, poor multimodal integration, and procedural inefficiencies. Logistics costs were estimated at nearly 13-14% of GDP, substantially higher than the 8-10% typical of advanced economies such as the United States and Germany. Over the last decade, recognising logistics as a strategic driver of competitiveness rather than merely a transportation challenge, policymakers in India have actively introduced broad-based policy measures and infrastructure initiatives aimed at reducing logistics costs, improving supply chain reliability, and positioning the country as a global manufacturing and export hub. As a result, recent estimates by National Council for Applied Economic Research (NCAER) suggest that India's logistics costs may have declined to nearly 7.97% of GDP, indicating a significant structural improvement in logistics efficiency.

A major catalyst for this transformation is the strong policy support through initiatives such as the National Logistics Policy (2022), the PM Gati Shakti National Master Plan, and the continued implementation of the Goods and Services Tax (GST), which has significantly reduced interstate transit delays by eliminating multiple state-level checkpoints. Complementing these reforms, India has made large volume of investments in physical infrastructure under programs such as Bharatmala Pariyojana for highways, Sagarmala for port-led development, and the Dedicated Freight Corridor (DFC) project for rail freight modernization. The central government annual capital expenditure (capex) on transport infrastructure has increased nearly by ~5.8x over the past decade, from USD 10 bn in FY 2016 to USD 58 bn, accounting for 48% of the total capex in FY 2026, this sharp increase underscores the policy commitment to infrastructure development and improving its efficiency.

¹ Assessment of logistics cost in India, DPIIT, September 2025

Annual central govt spend towards transport infrastructure higher by ~5.8x than a decade ago



Source: Union Budget Documents, Knight Frank Research, Note: Includes CapEx across - Roads, Railways, Airports, Ports, Shipping & Waterways

~ USD 360 bn
in central government CapEx directed towards transport infrastructure in the last 10 years

As a result, India's transport infrastructure has expanded significantly in both scale and capability. The country today possesses over 1,46,000 km of national highways, more than 68,000 km of railway network, 13 major ports handling substantial export-import (EXIM) cargo volumes, and rapidly expanding Grade-A warehousing capacity with an estimated stock of 550 mn sq ft across top 8 cities in India². Alongside this quantitative expansion, operational efficiency across logistics systems has improved materially. Average truck speeds on key freight corridors have nearly doubled from 20-25 km/h in 2015 to approximately 40-45 km/h today. Port turnaround times have fallen sharply from over 4 days in FY 2015 to an estimated 2.1 days, and digital freight tracking systems have improved shipment visibility, reliability, and coordination³. The emergence of integrated logistics parks, warehousing automation, RFID-enabled cargo movement, AI-driven route optimisation, and blockchain-based tracking systems has further strengthened supply chain efficiency and reduced operational friction across the logistics ecosystem.

The most visible sign of this infrastructure-led transformation has been the development of the Eastern and Western Dedicated Freight Corridors (DFCs), representing an investment of nearly USD 12 bn (INR 1.24 trn) across 2,843 km of freight rail infrastructure. Designed to segregate freight movement from passenger rail traffic, the DFCs have dramatically improved line-haul freight efficiency. Container trains on the Western DFC can now move between Delhi and Mumbai in 24 to 36 hours, compared to transit times that previously stretched over several days. Rail freight volumes have correspondingly surged, with Indian Railways transporting 1.7 bn tonnes of freight in FY 2026, making it the world's second-largest rail freight carrier, ahead of the US and Russia.

Overall, the cumulative impact of these investments is visible in measurable improvements in logistics infrastructure performance. Relative to India's 2030 infrastructure targets, Knight Frank's **Operational Infrastructure Index (OII)**, a composite measure of infrastructure scale and efficiency, depicts an improvement of nearly 59%, rising from 0.39 in FY 2016 to 0.62 in FY 2026. **The resulting efficiency gains from infrastructure development alone are estimated to have reduced logistics costs from nearly 13-14% of GDP in FY 2016 to approximately 10-10.7% in FY 2026, translating into estimated annual savings of INR 10.8 - 11.7 trn or USD 123 - 133 bn, for the economy.**⁴

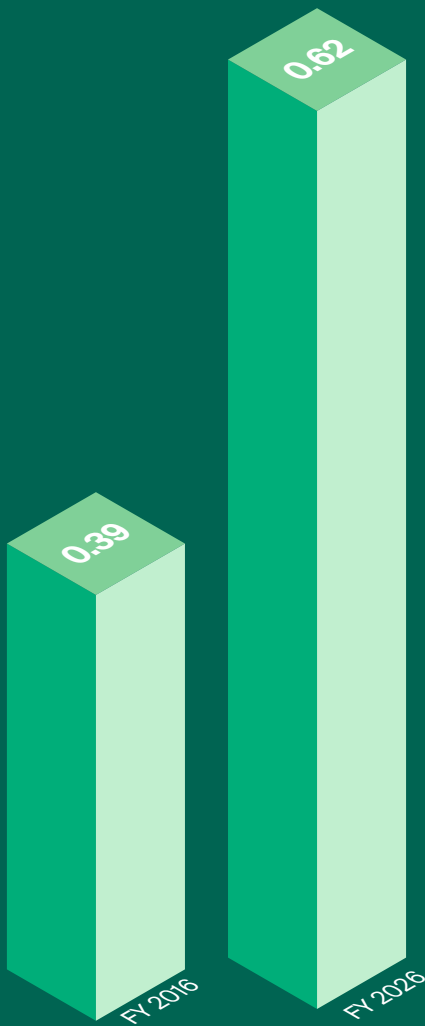
² Top 8 cities include - Delhi NCR, Mumbai Metropolitan Region, Bengaluru, Hyderabad, Chennai, Pune, Ahmedabad, Kolkata

³ Details in Annexure 1

⁴ The estimates account only for gains from transportation development and exclude other key components of logistics costs, such as warehousing and storage, inventory carrying, packaging, and administration costs.

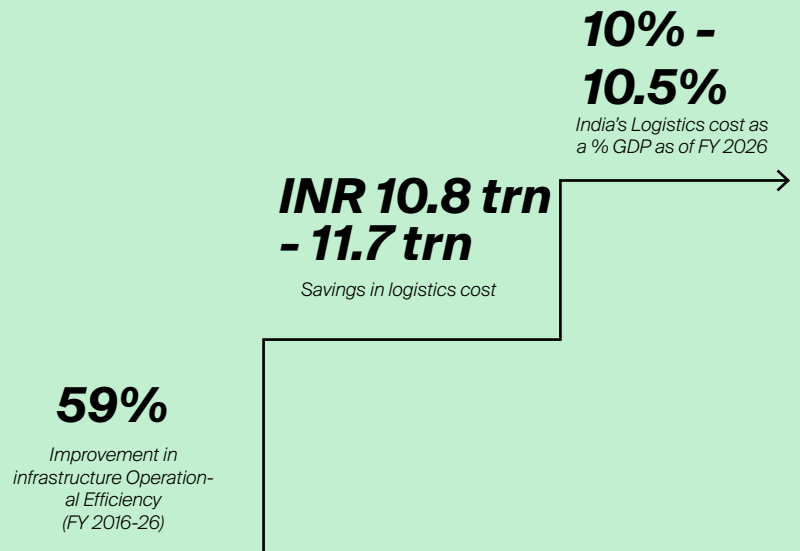
Operational Infrastructure Index

India's infrastructure improved by 59% in the last 10 years enabling efficiency



Source: Knight Frank Research

59% improvement in infrastructure has resulted in INR 10.8 – 11.7 trn in annual logistics savings to the economy



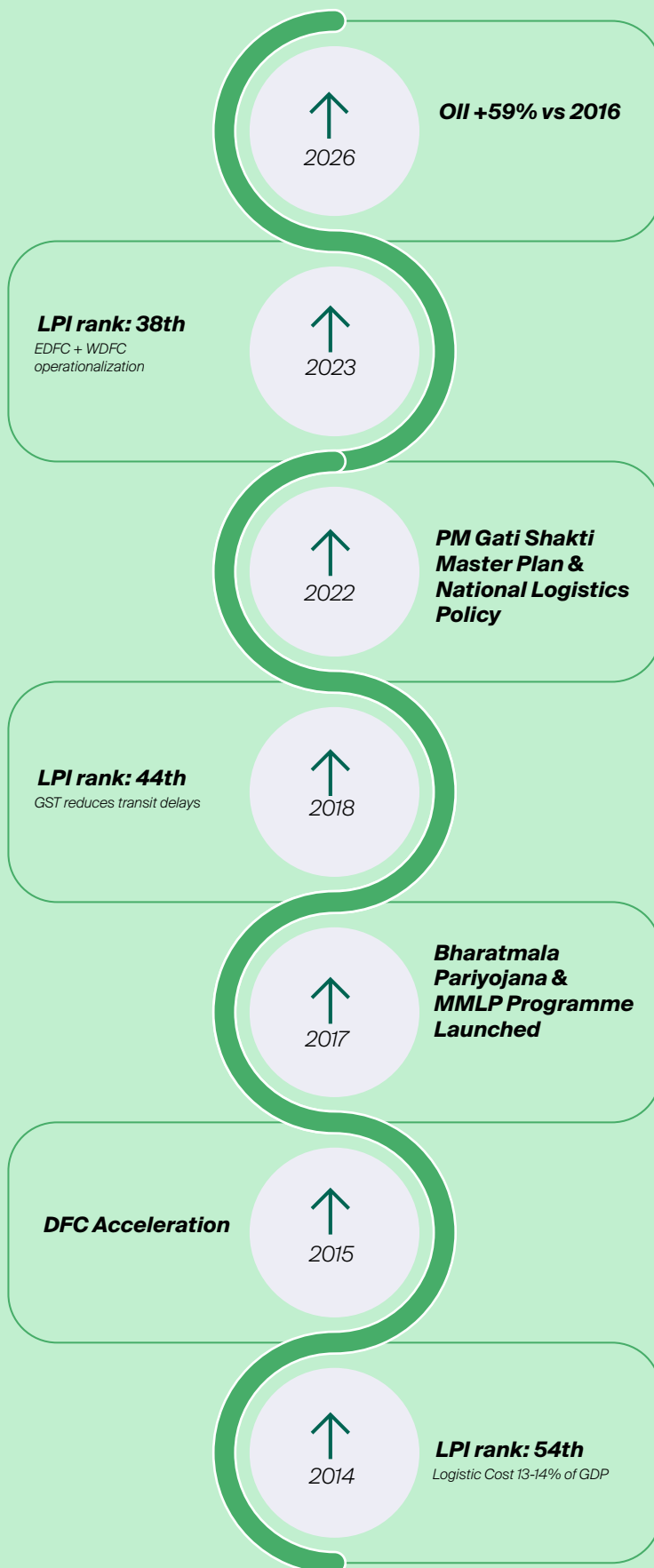
Source: Knight Frank Research;
Note: Includes only savings in logistics cost from improvement in transport infrastructure

India's improving logistics capabilities are also reflected internationally through its steady rise in the World Bank's Logistics Performance Index (LPI). India's ranking improved from 54th in 2014, to 44th in 2018, and further to 38th in 2023, among 139 countries, reflecting notable progress in transport infrastructure quality and logistics service capability.

Yet beneath these headline improvements lies a persistent structural contradiction, primarily a modal paradox that continues to limit the broader economic impact of infrastructure investments. While India has made massive improvements in trunk infrastructure and long-haul freight efficiency, the benefits remain unevenly distributed across the manufacturing ecosystem. The DFCs, for instance, provide transformational speed and reliability advantages only to shippers with direct rail-linked facilities or the scale necessary to aggregate cargo independently. For the overwhelming majority of India's manufacturing base, particularly its 17 million MSMEs, access to these efficiencies remains indirect and fragmented.

Furthermore, the disaggregated component of World Bank's LPI indicate that India's improvement in overall rankings has been driven primarily by gains in customs efficiency and international shipments. However, comparatively limited progress in logistics infrastructure, tracking and tracing systems, and logistics competence indicates that large-scale

Progress in India's logistics ecosystem since 2014



infrastructure investments have not yet fully translated into commensurate improvements in logistics outcomes, pointing to persistent integration, coordination, and last-mile connectivity challenges. Multimodal integration of freight transport is one of the key concerns in India's logistics ecosystem. For an improvement in logistics efficiency and lowering logistics cost, the central policy focus has been to shift a share of modal transport from road to railways and waterways, which are cheaper as well as more sustainable. The core issue is not the absence of corridors, but the absence of connective nodes. Most manufacturing especially the MSMEs lack direct access to rail freight infrastructure and generate shipment volumes much below the requirement to economically utilise DFC based logistics. Between the factory gate and the high-speed freight corridor lies a missing intermediary layer, i.e. multimodal consolidation hubs capable of aggregating fragmented cargo into rail-viable volumes. Consequently, even though India is progressing in developing globally competitive freight corridors, much of the economy continues to rely on fragmented first-mile and last-mile trucking networks, multiple cargo handling points, and inefficient warehousing systems.

This is the central challenge of India's logistics phase. The country has successfully addressed large parts of the infrastructure deficit; however, the integration is still at a nascent stage. Going forward, the country's manufacturing and export competitiveness will depend not merely on adding more highways, ports, or freight corridors, but on building the connective tissue that allows firms of all sizes to seamlessly access national logistics networks. Multimodal logistics parks, inland container depots, regional consolidation centres, digitally integrated freight exchanges, and standardised warehousing ecosystems will become critical to ensuring that infrastructure efficiency translates into economy-wide competitiveness.

Therefore, for a India to gain greater export competitiveness, stronger manufacturing growth and an integrated freight economy, it is crucial that a strong emphasis is laid on accessibility, integration and network efficiency of infrastructure corridors.

Section 3

Dominance of Road in Freight Movement

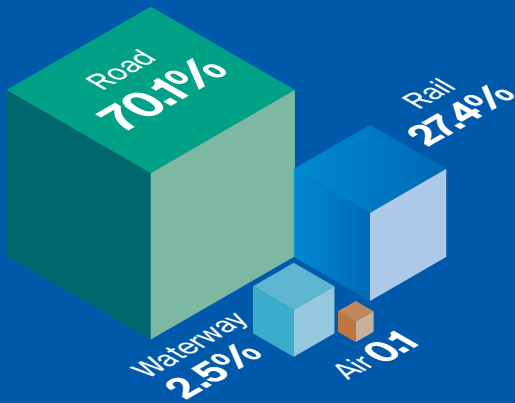
India's freight network is heavily tilted towards road transport, which accounts for approximately 70% of freight movement by tonne-kilometre. This is largely a function of the service characteristics that road offers relative to available alternatives, such as door-to-door connectivity, flexible scheduling, and reliable transit times, rather than a straightforward cost advantage. Rail, while cheaper, at roughly INR 1.9 per tonne-km against INR 3.78 by road, has historically been constrained by network capacity prioritised toward passenger traffic, limited terminal infrastructure, and weak first-and-last-mile connectivity, factors that collectively narrow its commercial viability to bulk commodities moving between a limited set of high-volume corridors. The trucking market, though fragmented and predominantly informal, has consequently absorbed the bulk of general freight demand by default.

The global evidence suggests that shifting freight away from road transport alone does not necessarily lead to lower logistics costs. The key determinant is the overall efficiency of multimodal integration and network connectivity. For example, the European Union maintains relatively low logistics costs of around 8-9% of GDP, through a well-developed multimodal systems and extensive use of rail and inland waterways. However, countries such as Germany demonstrate that even road-dominant freight systems can remain highly cost-efficient. Despite nearly 71% of freight movement occurring by road, primarily over shorter distances, Germany's high-quality infrastructure, seamless regional connectivity, and operational efficiency keep logistics costs low at approximately 8.7% of its GDP.



~70%
of the freight movement in
India is dependent on road

~70% of the freight movement in India is dependent on road

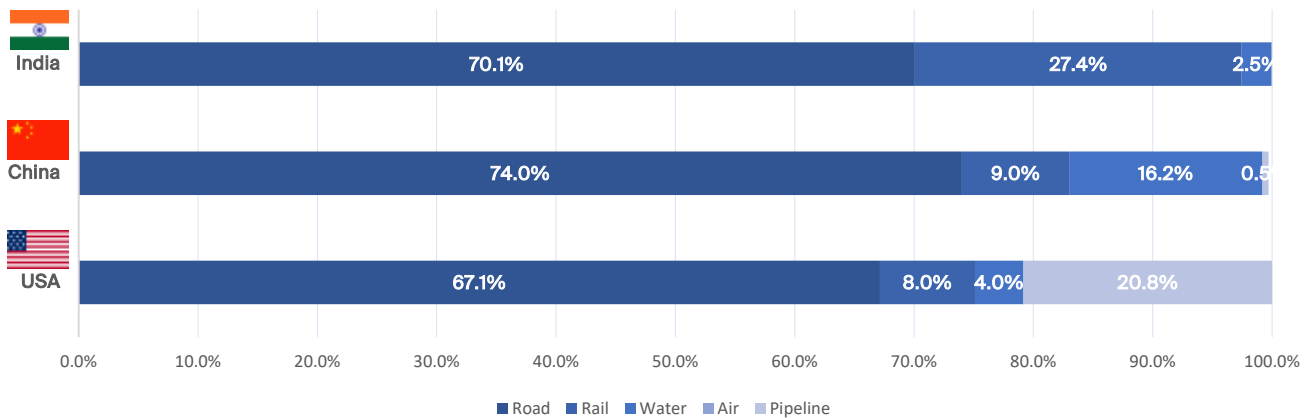


Source: Gol, Knight Frank Research

The US, with a comparable road freight share of ~67%, maintains logistics costs at 8.8% of GDP, whereas India's logistics costs have historically been estimated to be significantly higher. This contrast suggests that modal split alone does not determine logistics efficiency; underlying institutional and infrastructural conditions play an equally important role. Against this backdrop, India's policy focus toward DFCs and multimodal logistics infrastructure represents an effort to restructure the supply-side conditions under which modal choice is made by expanding the range of freight categories for which rail is a commercially viable option, and these investments are intended to gradually rebalance freight movement away from the current road-dominated structure toward a more efficient multimodal logistics system.

China has heavily invested in rail and inland waterways like the Yangtze River. However, ~74% of its freight is moved by road, which is more expensive than rail or waterways. China's logistics cost as well is relatively high at 14-15% of the GDP due to factors such as, regional disparities, high inventory costs and continued reliance on road transport. These incidences highlight that, although shifting the freight movement from road to rail and waterways can be cost efficient, and needs capital investments, it is also crucial that the infrastructure development is complimented by an overall system efficiency and a seamless multimodal integration.

Cross country comparison of modal share of freight transport



Source: Gol, Knight Frank Research

Over the last few years, India's high logistics cost at 13-14% of the GDP has been a 5 to 6 percentage point premium over these benchmarks of key manufacturing economies. On an economy of approximately USD 3.9 trn, that premium implies an annual efficiency loss in the range of USD 120 to 234 bn. The burden falls disproportionately on manufacturing exports which compete internationally, and on the agricultural sector, where logistics costs as a share of final product value are structurally high. The National Logistics Policy's target of reducing logistics costs to 8% of GDP is a much-required policy ambition.

The NCAER has estimated that the direct logistics cost is at 8% of the GDP. This, however, is only a precise measure of

what firms directly spend on logistics services. The residual loss is concentrated in inventory, damage and spoilage costs - the categories most sensitive to transit time reliability and modal integration. This necessitates the need for Multimodal Logistics Parks (MMLPs), which address these categories directly.

Section 3

MMLPs and Freight Transformation: The Economic Mechanisms of Modal Shift

India's freight logistics system is entering a decisive phase of structural transformation. The commissioning of the DFCs has delivered measurable gains in network speed, reliability, and throughput capacity. At the same time, the National Logistics Policy, PM Gati Shakti, and the MMLP programme under Bharatmala Phase I have established the institutional foundations for integrated multimodal freight movement.

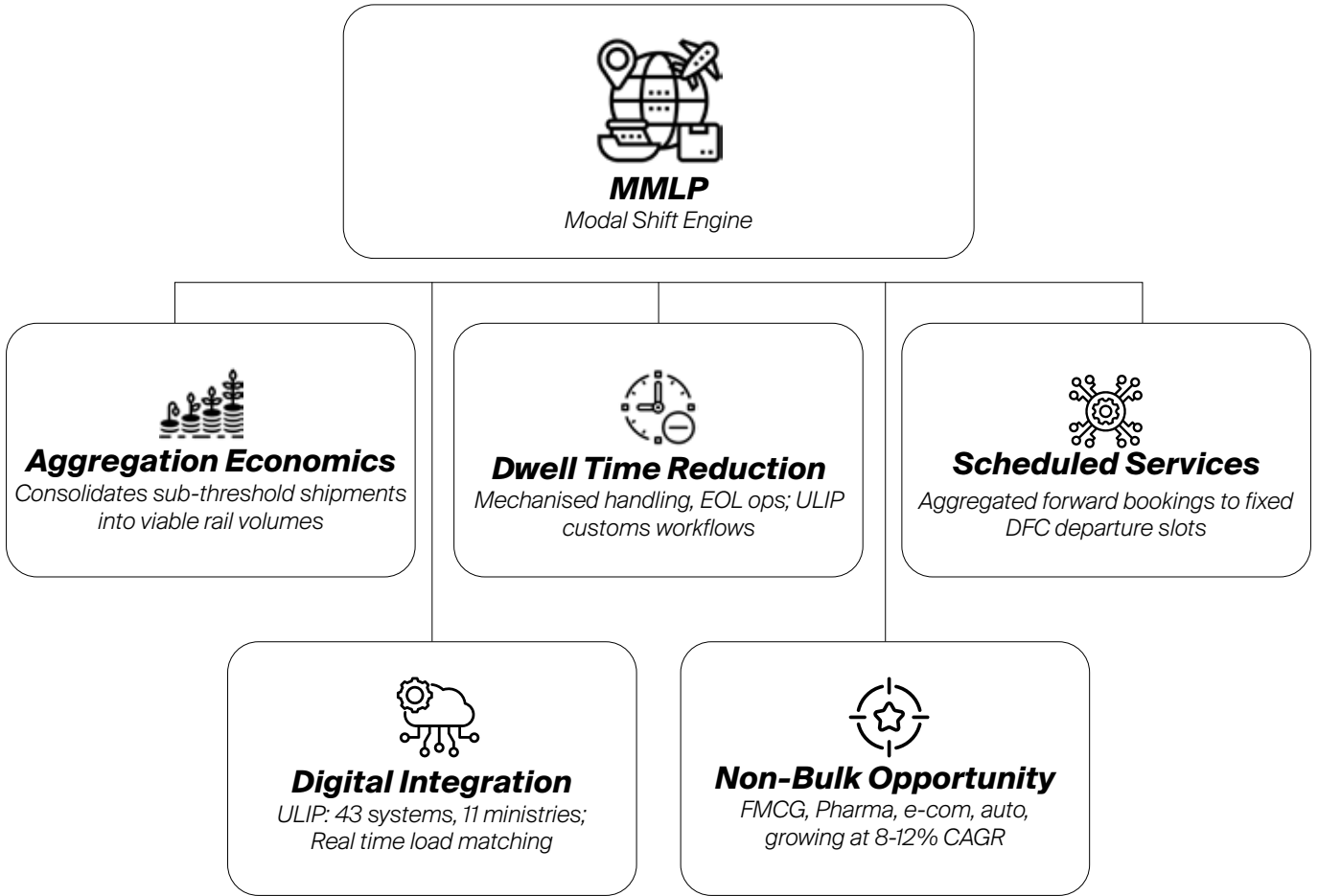
The next phase of reform is less about infrastructure creation and more about system optimisation. The central policy question is no longer whether multimodal logistics infrastructure is necessary, but under what design, corridor, and utilisation conditions it can deliver sustained modal shift from road to rail. This requires a clearer understanding of the economic mechanisms through which MMLPs convert rail's latent line-haul cost advantage into commercially viable door-to-door freight movement.

The strategic payoff is substantial. Raising rail's freight modal share from 25% to 45% by 2030, as targeted by the National Rail Plan, and maintaining it over the long term would materially lower logistics costs embedded in consumer and industrial supply chains, strengthen export competitiveness, and reduce annual carbon emissions by more than 200 mn tonnes. Realising this outcome requires an evidence-based framework capable of guiding both public investment sequencing and private-sector participation.

This section develops a framework around five mutually reinforcing mechanisms: aggregation economics, interchange efficiency, scheduled service enablement, building rail infrastructure for non-bulk and digital integration. Durable modal shift depends on all five operating simultaneously and at sufficient scale.

Five Mechanisms of Modal Shift via MMLP

Durable modal shift requires all 5 operating simultaneously at sufficient scale



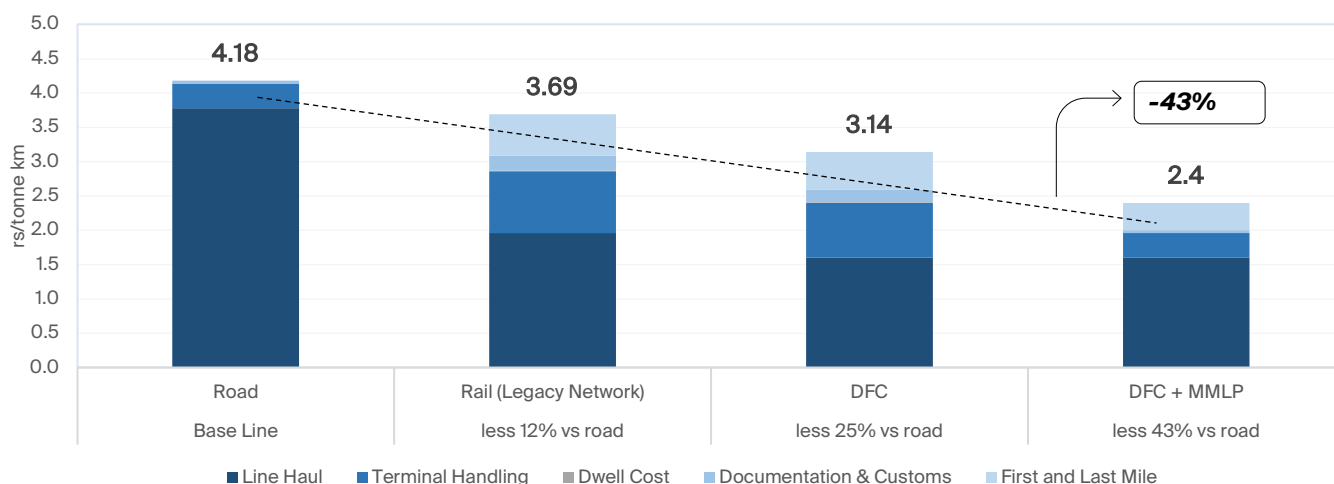
3.1. Aggregation Economics: Unlocking Rail’s Cost Advantage

Rail’s line-haul cost advantage over road is well established. The DPIIT-NCAER Logistics Cost Study (2024) estimates that average rail freight costs INR 1.96 per tonne-kilometre, compared with INR 3.78 for road, implying cost advantage. However, this advantage applies primarily to line-haul movement and excludes first- and last-mile logistics costs. For, shorter distances and fragmented cargo flows, high terminal handling, transshipment, and coordination costs often eliminate rail’s theoretical price advantage, leaving road commercially dominant.

This gap between line-haul efficiency and door-to-door competitiveness is precisely the market failure that MMLPs are designed to address.

The principal cost penalties arise at the interchange interface such as terminal handling, cargo dwell, documentation friction, and first- and last-mile road connectivity at both origin and destination. The below table disaggregates these cost components across alternative operating scenarios.

Exhibit 1: Door-to-door freight cost breakdown across transport components



Source: Stakeholder Interactions, Knight Frank's estimates. Note: The values are only an approximate

The aggregation mechanism highlights that; an integrated line haul cost advantage translates into a 43% total door-to-door advantage on DFC corridors with MMLP-grade interchange at both ends. Without that interchange, the advantage falls by 18% on the DFC and near-zero on the legacy network. Aggregation, i.e. making MMLP-grade interchange financially viable through volume consolidation, is a critical mechanism that converts the line-haul advantage into a competitive offer for manufactured goods and commercial freight.

3.2. Dwell Time and Handling Cost Reduction at Interchange

Beyond the lone haul cost, the freight mode selection is also dependent on the broader assessment of total logistics components, such as predictable deliveries and reliable operation of the transport mode and network. All of these are shaped by the terminal dwell and handling efficiency.

At conventional goods sheds and private sidings, origin-side dwell accumulates across multiple points of delay, such as wagon allocation waiting times of 12 to 72 hours, manual loading processes requiring 90 to 180 minutes per container, and departure-queue delays of 6 to 24 hours at Indian Railways-DFC interchange points. At terminals lacking digital integration, documentation and customs processing can add a further 12 to 48 hours. In aggregate, origin-side dwell at conventional facilities typically ranges between 34 and 152 hours. Thus, causing delays and time extensions on moving freight, causing inefficiency of the freight movement.

MMLPs are designed to reverse this inefficiency through engine-on-load (EOL) operations, mechanised handling systems, pre-committed DFC departure slots, and ULIP-integrated customs and documentation workflows. As depicted in exhibit 2, MMLPs reduce total origin-side dwell to 2.5- 8 hours, which is a reduction of over 90%. However, the resulting cost advantage does not arise from

terminal handling improvements alone. The larger savings are generated through the interaction of faster terminal turnaround with improved train scheduling reliability, higher wagon and container utilisation, lower inventory holding costs due to predictable deliveries, reduced idle-time penalties, and lower cargo damage rates enabled by containerisation and mechanised handling. Damage losses, for instance, decline from approximately 0.8-2.5% of shipment value at conventional facilities to 0.1-0.3% under integrated MMLP operations. Together, these network-wide efficiency gains account for the majority of the observed cost differential and resulting in an estimated 43% cost advantage achieved through DFC-MMLP integration.

The effect is not merely operational but structural. By compressing dwell below line-haul transit time, MMLPs convert rail from a low-cost but uncertain transport mode into a time-competitive and commercially reliable logistics service. This reduction in interchange friction is a central condition for sustained modal shift in manufactured and non-bulk freight markets.

Exhibit 2: Dwell time and handling quality: Conventional siding vs. MMLP-grade terminal



Source: DFCCIL operational data; GCT Policy; Knight Frank Research

3.3. Enabling Scheduled Services

In addition to cost competitiveness and handling efficiency, scheduling reliability plays a critical role in modal shift, especially in the non-bulk freight. Road freight delivers scheduling flexibility by design, i.e. trucks can be booked at short notice, with clearly contracted delivery windows and predictable dispatch control. Legacy rail freight has historically lacked this capability, as wagon allocation and departure timing are governed by system-wide operational availability rather than forward commercial commitment. For manufacturers operating integrated supply chains, this uncertainty is a barrier. A shipper unable to guarantee delivery windows to downstream customers cannot rely on a transport mode without assured departure and arrival performance. Scheduled container services on the DFC which is defined by fixed departure slots, guaranteed transit times, and end-to-end tracking, are commercially viable for rail operators only when per-departure committed volume is sufficient to cover fixed costs. This scenario makes MMLP indispensable. By aggregating forward bookings from multiple manufacturers with individually sub-threshold freight volumes, MMLPs create the demand certainty required for rail operators to offer fixed schedules.

The importance of this aggregation function is increasingly recognised in international analysis. The World Bank (2025) identifies assured transit performance and door-to-door logistics solutions for smaller shippers as essential to onboarding quality-sensitive freight to rail. Private-sector adoption patterns reinforce this conclusion. Amazon India's early use of DFC-linked freight services has demonstrated that sophisticated logistics operators will shift substantial traffic to rail when schedule reliability is credible and service performance is contractually predictable. This offers an important market signal: once reliability conditions are met, modal transition can scale rapidly.

India's institutional framework is already capable of supporting this transition. The Special Parcel Train Operator (SPTO) and Special Freight Train Operator (SFTO) models provide established mechanisms for private operators to run scheduled services on Indian Railways capacity. Extending these frameworks to MMLP-anchored container operations on DFC corridors would provide the operational architecture required to institutionalise scheduled multimodal freight at scale.

Case study: **Amazon India and the Commercial Viability of Scheduled Rail Freight**



In 2019, Amazon became the first major Indian e-commerce company to integrate rail into its national logistics network, launching parcel movement through the Mumbai–Delhi Rajdhani corridor. This decision was significant because it reflected confidence in rail as a strategic logistics mode rather than a residual low-cost alternative. At the time, Indian Railways' parcel services lacked the speed, frequency, and operational flexibility typically required for e-commerce fulfilment, making the move commercially ambitious.

The Commercial Challenge

Amazon's logistics model depends on strict delivery commitments, often requiring next-day or two-day delivery windows across geographically dispersed markets. Conventional rail freight posed three structural constraints:

- Limited departure certainty compared with road dispatch
- Dependence on advance capacity coordination
- Requirement for consolidated shipment density to justify scheduled movement

For most shippers, these constraints make rail commercially impractical. Amazon overcame them by internally aggregating parcel flows across multiple fulfilment centres into predictable rail-bound freight blocks.

In effect, Amazon recreated within its own network the aggregation functions that MMLPs are designed to provide across multiple external shippers.

Scale-Up and DFC Integration

The model proved commercially viable.

Between 2019 and 2024, Amazon expanded from a single rail-linked service to more than 120 train movements across 130 intercity routes serving 91 cities, representing a 15-fold increase in parcel movement through railway corridors.

In 2023, Amazon became the first Indian e-commerce operator to integrate Dedicated Freight Corridor-linked movement into its logistics architecture. The DFC materially improved transit consistency, reduced congestion-related variability, and strengthened rail's ability to support premium delivery commitments.



This operational scaling culminated in the 2024 Memorandum of Understanding between Amazon India and Indian Railways, focused on:

- Expanding parcel rail corridors
- Developing hub-and-spoke logistics architecture
- Strengthening first- and last-mile connectivity
- Improving service predictability through dedicated operational coordination
- Scaling rail as a mainstream national logistics channel

The commercial model continues to deepen. In 2026, Indian Railways enabled Amazon's entry into the Kashmir Valley through dedicated daily freight services between NCR and Budgam, reducing delivery times to under 30 hours and establishing reliable two-way movement for consumer goods and regional products. This demonstrated that once schedule certainty is established, rail can profitably serve even geographically complex, high-friction markets

Policy Insight: Amazon's experience demonstrates that rail adoption is driven not by lower tariffs alone, but by predictable scheduling supported by sufficient freight aggregation. Amazon generated this density internally. MMLPs provide the same scheduling advantage externally for fragmented industrial shippers, making scheduled rail freight commercially viable at scale.

Source: Amazon Press Centre, August 2024⁶

Scheduled rail services require minimum per-departure volume certainty that individual shippers cannot independently provide. MMLPs aggregate forward bookings to underpin fixed schedules, creating the reliability condition that road currently provides and rail cannot match without aggregation infrastructure. Amazon India's growth from 1 to 120+ dedicated rail runs over five years illustrates the commercial trajectory when scheduling conditions are met.

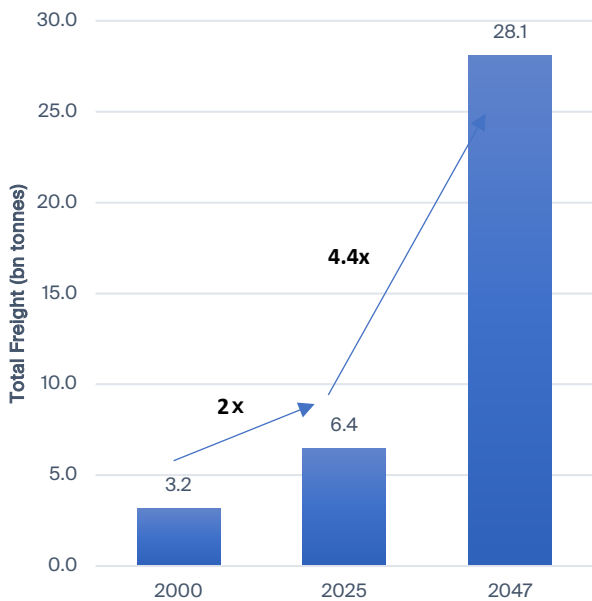
⁶<https://press.aboutamazon.com/in/2024/8/amazon-india-signs-an-mou-with-indian-railways-to-scale-up-use-of-railway-network-for-faster-movement-of-customer-packages>

3.4. The Non-Bulk Opportunity

India currently moves nearly 6.4 bn tonnes of freight domestically, and this demand is projected to increase to 25-27 bn tonnes by 2047, a more than 4x expansion, driven by consumption, urbanisation, infrastructure development, manufacturing scale up etc. Rail’s share of this expanding market is a key lever to the modal shift. Currently, ~80% of rail freight consists of bulk commodities such as coal, cement, iron ore, and fertilisers.

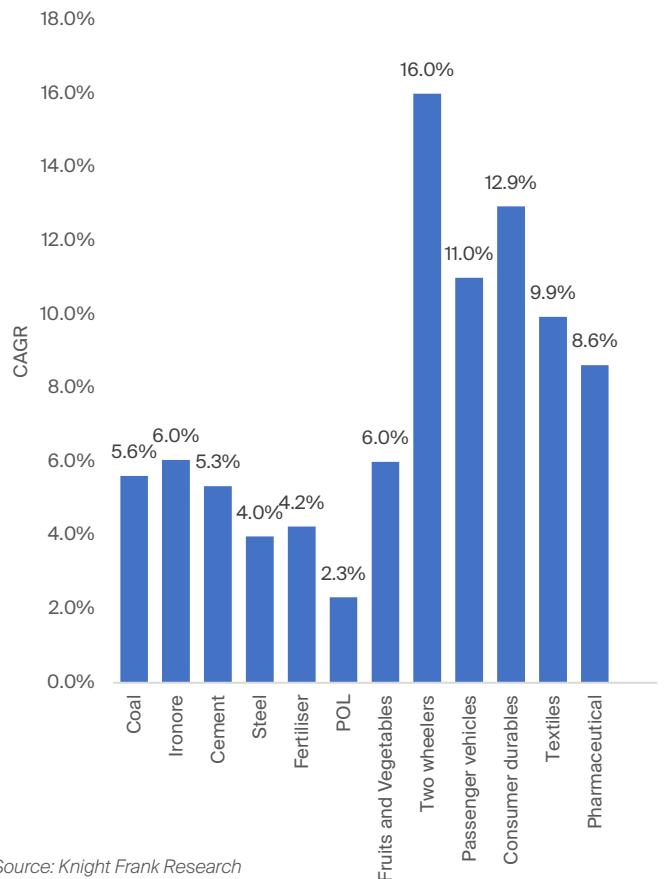
However, the future growth of freight demand will significantly emerge from non-bulk segments including FMCG, pharmaceuticals, e-commerce, textiles, automotive components, perishables and containerised manufacturing goods. As per our estimates, bulk commodities are expected to grow at a CAGR of 4-6% between 2026 and 2047. In contrast, non-bulk commodities are projected to witness significantly higher growth, with CAGRs ranging from 8-12% across different commodity segments. This shift in trend necessitates the need to develop and strengthen the rail infrastructure to support these logistics shift. For railways to increase its modal share from existing 27% to 45% by 2047, it is critical that it strengthen its infrastructure to support the movement of non-bulk goods.

India’s freight demand to expand 4.4x by 2047



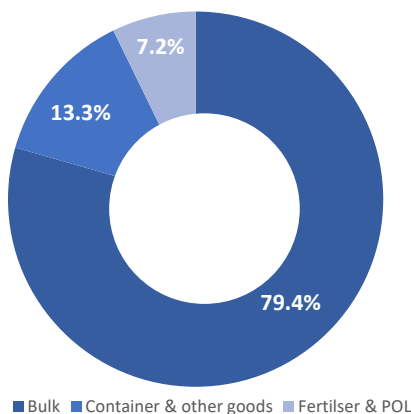
Source: Government documents, Knight Frank Research

Between 2026-2047 non-bulk goods are estimated to grow at a faster rate than bulk commodities



Source: Knight Frank Research

Bulk goods dominate rail freight



Source: Indian Railways Annual Report 2024-25

As freight volumes diversify and grow across sectors, this shift provides the railways with a critical window to strengthen its position as a competitive, efficient, and sustainable mode of freight transportation. This transition is not merely an operational necessity but is supported by a broader strategic rationale, making a compelling multi-dimensional case for increasing non-bulk rail freight.

A Multi-dimensional Case to Increase Non-bulk Rail Freight



Economic Efficiency

Rail heavy modal mix drives structural logistics efficiency across the economy

57%

Line haul cost advantage

43%

lower door to door cost on DFC

Boosts manufacturing under Make in India and PLI scheme



Rail Revenue Resilience

Coal is ~45% of freight tonnage - a long term risk as India moves to net zero by 2070

+25%

Additional annual revenue by doubling the non-bulk modal share of train

Non-bulk earns higher revenue per tonne-km than bulk - essential diversification



Climate Imperative

Road freight = 95% of sector CO2 (209 MT/yr).
Electrified rail emits ~1/5th per tonne km.

388 MT

CO2 saved per year

4.3 GT

*cumulative savings between now and 2050
(NITI Aayog)*

98% of broad gauge network already electrified



Global Competitiveness

FDI decisions weigh total logistics cost, in addition to labour and land. India must close the gap with China, Vietnam and Bangladesh.

Key Enablers:
PLI scheme, Make in India

Rail shift for non-bulk is the most direct lever to improve India's supply-chain competitiveness

3.5. Digital Platforms as an Enabling Layer

The fifth mechanism driving modal shift is informational: reducing transaction costs and information asymmetry through digital integration. Since the launch of the National Logistics Policy in 2022, India's logistics digital architecture has expanded significantly. By August 2025, the Unified Logistics Interface Platform (ULIP) had integrated 43 systems across 11 ministries through 129 APIs, covering over 1,800 data fields, processing more than 160 crore API transactions, and supporting over 1,300 registered companies.

This digital infrastructure addresses one of rail freight's longstanding commercial disadvantages: lack of visibility, where shippers cannot track consignments in real time, road retains a clear operational advantage. ULIP reduces this asymmetry by integrating multimodal data streams—including FASTag-based road movement, rail Freight Number (FNR) tracking, port operations, and customs clearance—into a unified interface.

The implications for MMLPs are significant. To achieve commercially viable utilisation, MMLPs must aggregate forward bookings with sufficient lead time to support fixed-schedule departures. Digital load-matching integrated with terminal management systems makes this possible. It allows shippers to book space on scheduled services, receive confirmed departure windows, track cargo across modes, and obtain digital proof of delivery.



This transforms rail from a transactional freight service into an integrated supply-chain management platform.

The relationship between ULIP-class digital systems and MMLP physical infrastructure is complementary rather than substitutive. Digital visibility alone does not resolve interchange inefficiencies. Equally, physical terminal modernisation without digital integration cannot deliver the scheduling certainty and information transparency that sophisticated manufacturers require.

The competitive advantage emerges only when both layers operate together: physically efficient MMLPs integrated with real-time booking, load-matching, tracking, and digital customs workflows. This combination allows multimodal freight to compete with road simultaneously on cost, reliability, visibility, and scheduling performance.

India's digital logistics architecture has reached the scale necessary to support multimodal freight integration. However, digital platforms generate modal shift only when paired with MMLP-grade physical infrastructure. Together, they create the full-service logistics proposition required for sustained rail adoption in non-bulk freight markets.

Section 4

Multimodal Logistics Ecosystem: Status, Gaps and Scale Requirements

India's multimodal logistics ecosystem has progressed from policy conception to physical infrastructure deployment at a meaningful scale over the past decade. Currently, India's has over 100 operational inland container depots (ICDs) linked to rails and about 30 operational multimodal logistics parks, in addition to 45 parks which are under various stages of development (includes under construction and proposed). These parks have mapped across three key distinct development channels: (i) Sagarmala-linked port and coastal logistics parks, (ii) CONCOR-operated inland container depots and rail-linked terminals, (iii) MMLPs initiated under Bharatmala program and (iv) privately developed logistics parks led by industrial groups and third-party logistics operators. Together, the operational MMLPs carry a combined throughput capacity of ~129 MMT, a significant base, but modest 2% of India's annual freight demand.

In addition to this, the operational 118 Gati Shakti Terminals (GCTs), provide further evidence of commercial momentum. Since the inception of the GCT Policy, approximately INR 86 bn of private investment has been mobilised, underscoring strong industry participation and the success of the public-private partnership model. The 118 commissioned terminals have an estimated combined traffic handling capacity of 192 mn tonnes per annum, contributing to lower logistics costs and a significant increase in rail cargo movement⁷. This performance validates the underlying commercial proposition and demonstrates that private capital can be deployed at scale where policy stability, network certainty, and credible utilisation pathways are established.

⁷ Gati Shakti Multi-Modal Cargo Terminals (GCTs): Driving India's Logistics Transformation, PIB, 2026

India's Multimodal Logistics Ecosystem

Multimodal Logistics parks (MMLPs)

30	45	2.9
Operational	Awarded (Under Construction) + bids invited + proposed	Average Cargo Capacity (MMT/year)

Gati Shakti Terminals (GCTs)

118	84	0.6
Operational	Awarded (Under Construction) + Bids Invited	Average Cargo Capacity (MMT/year)

Inland Container Depots (ICDs)

95	-	0.01
Operational	Awarded (Under Construction) + Bids Invited	Average Cargo Capacity (MMT/year)

Source: Government documents, Company reports, Knight Frank Research, Note: Some of the MMLPs are also interchangeably used as ICDs

While these assets collectively demonstrate commercial viability, they vary significantly in scale, design specification, and modal functionality. Most existing parks were conceived as corridor specific logistics assets responding to local industrial demand, port evacuation requirements, or container handling needs. Consequently, average throughput capacities remain relatively modest, and multimodal integration standards are uneven across the network. Many facilities operate as warehousing-led or ICD-centric nodes rather than as fully integrated high-volume freight consolidation platforms capable of materially shifting national modal share. The 35 Bharatmala Phase I MMLPs conceived in 2017, represent a categorically different asset class. Unlike the existing operational parks, which evolved through fragmented and demand-led investment cycles, Bharatmala MMLPs are being developed under a standardised national design framework with significantly larger land parcels of minimum 100 acres, higher designed throughput capacities, dedicated rail connectivity, and direct integration with DFC and National Highway corridor infrastructure. Therefore, their scale reflects the throughput economics required for multimodal viability. Freight aggregation below critical density thresholds cannot sustain competitive rail operations, whereas Bharatmala-scale facilities are explicitly sized to achieve the cargo concentration necessary to support regular rake formation, lower per-unit handling costs, and commercially sustainable modal transfer.

This standardisation marks a structural inflection point in India's logistics infrastructure strategy. It reflects a deliberate shift from opportunistic, corridor-specific asset creation toward a network-planning approach grounded in scale efficiency and

system-wide freight optimisation. **If executed as intended, the Bharatmala MMLP programme will establish the high-capacity backbone required to consolidate dispersed freight flows, improve network reliability, and create the operational predictability necessary for large-scale private participation in multimodal logistics services.** More importantly, it provides an efficient pathway for India to transition from isolated logistics nodes to an integrated national freight architecture capable of materially increasing rail's modal share. The optimisation of this asset class predominantly depends on ensuring that each park is commissioned with sufficient hinterland connectivity, anchor cargo commitments, and operational integration with the broader DFC and highway network to achieve threshold utilisation from inception.



Mapping Scale and Capacity Requirements

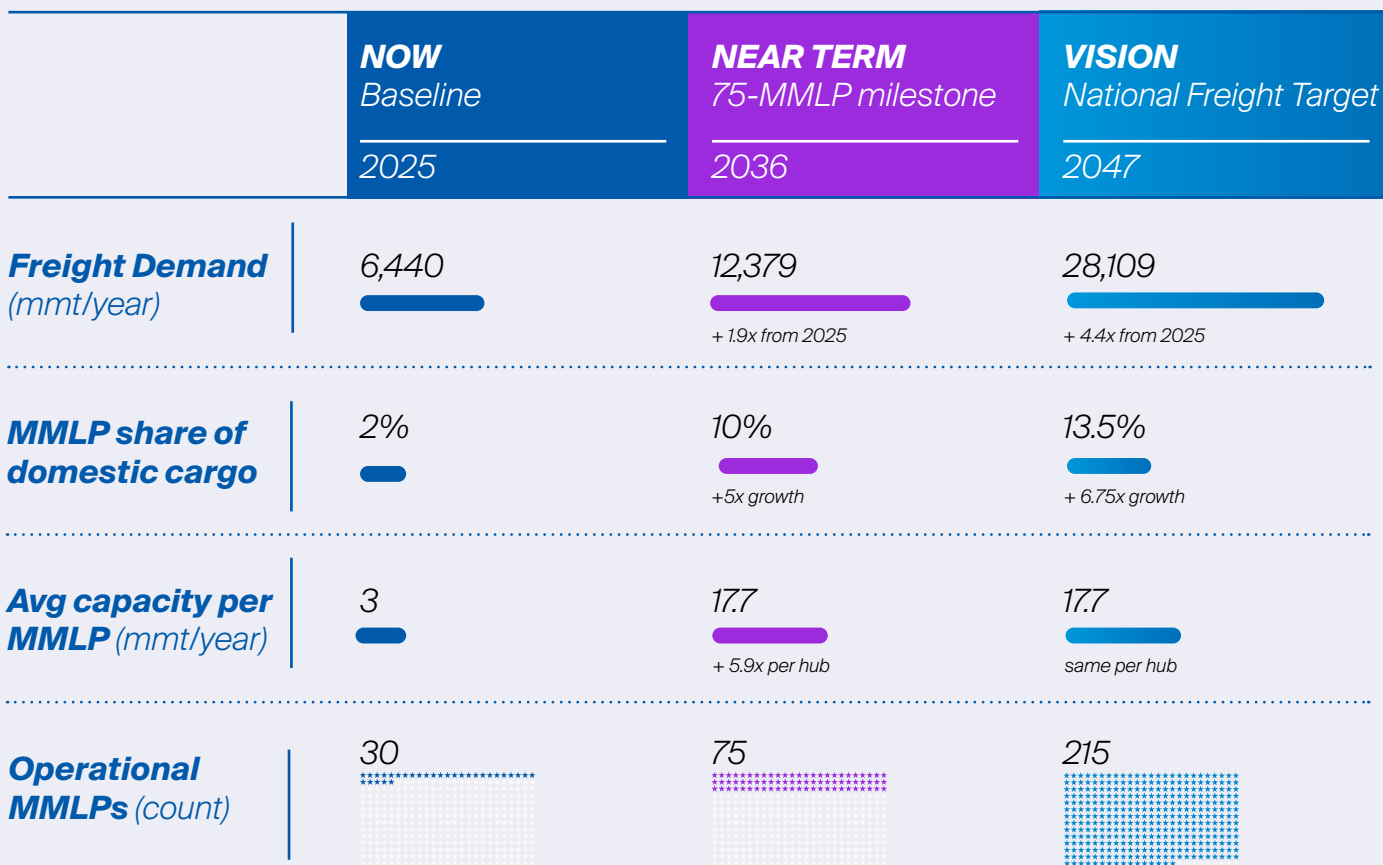
As stated above, the existing 129 MMT annual cargo handled by MMLPs is merely 2% of India's total freight. This reflects meaningful progress in establishing the institutional and physical foundations of a national multimodal logistics network. However, to achieve the modal shift plan established by the National Rail Plan, it is an imperative to expand the scale and capacity of MMLPs in India. As per our estimates, for MMLPs to carry even 10% of India's existing freight movement, it would require 215 parks at the current average unit capacity of 3 MMT/year. Such a linear expansion model, however, would be operationally inefficient and economically suboptimal. The long-term success of the programme depends on both increasing the number of parks, as well as materially enhancing average unit throughput capacity through larger format, high density, multimodal facilities capable of aggregating cargo at commercially viable scale.

This strategic shift is already reflected in the policy architecture of the greenfield MMLPs being developed under the Bharatmala Pariyojana programme. Unlike the legacy asset base, these parks are being designed as next-generation

freight consolidation platforms with significantly larger land aggregation, integrated rail connectivity, provision of value add services, and phased throughput ramp-up aligned to corridor demand growth. The awarded Bharatmala MMLPs are expected to achieve long-term cargo throughput capacities in the range of 10-30 MMT/year, depending on location and phased build-out.

The future scale and capacity requirements of India's MMLP network are fundamentally determined by the projected expansion of domestic freight demand and the modal-shift targets established for rail-based logistics under the National Rail Plan. Accordingly, our estimates of MMLP throughput capacity and unit requirements have been developed against these two demand-side drivers, with separate projections for the medium-term (2036) and long-term planning horizon (2047). We emphasise that meeting India's freight transformation objectives will require a deliberate acceleration in both the number and average capacity of MMLPs, supported by sustained investment in larger, higher-throughput, and fully integrated multimodal assets.

Scale and efficiency requirement of MMLPs



Source: Knight Frank Research



Our analysis, assuming that India has 75 MMLPs operational by 2036, to carry even 10% of India's projected freight movement of 13,250 MMT/year, average throughput capacity per park would need to increase to ~18 MM/year, a near 6x expansion over the current average capacity of 3 MMT/year.

This scale is a challenge and cannot be addressed through incremental optimisation of the existing asset base. Most operational MMLPs were conceived under earlier policy frameworks and built for substantially lower throughput intensity. Their design limitations make large-scale expansion difficult and, in many cases, economically inefficient. Therefore, it is an imperative that the next upcoming development of MMLPs are designed with optimum capacities.

For the long term, our estimates are anchored to India's 2047 freight transformation objective and the National Rail Plan target of achieving a 45% rail modal share. Based on our projected total domestic freight movement of approximately 28,109 MMT/year by 2047, India's rail network would be required to carry nearly 12,649 MMT/year to meet this target.

Under a conservative assumption that MMLPs handle 30% of total rail freight throughput⁸, this would require the national MMLP network to process approximately 3,795 MMT per annum. At an expanded average unit capacity of 17.7 MMT per MMLP per year, reflecting the scale efficiency expected from next-generation, Bharatmala-class multimodal assets, India would require approximately 215 operational MMLPs by 2047.

Thus, India's long-term freight ambitions would need an incremental expansion of the existing MMLP programme. Achieving the modal shift will further require a deliberate policy shift towards developing a larger, denser and significantly a well connected intermodal transport network integrated with logistic parks. Thus, the current bidding and development cycle represents a strategic window that can be utilised by the stakeholders to optimise the MMLP asset class in the long run. Current policy decisions on factors such as – land allocation, capacity design, rail connectivity standard, private sector participation framework etc will determine the capable network of MMLPs in 2036 and 2047. The creation of this efficient logistic ecosystem would certainly enable India's competitiveness in manufacturing and exports.

⁸Remaining assumed to be managed by GCTs, dry ports etc

Section 5

International Comparables of Integrated Logistics Ecosystem

Global experience offers clear evidence that large-scale multimodal logistics transformation is achievable when infrastructure planning is anchored in scale efficiency, corridor integration, and investment frameworks that effectively mobilise private capital. Across mature freight economies, successful multimodal logistics networks have been built through deliberate long-term coordination between public infrastructure provision and commercially disciplined private-sector participation. These case studies provide practical reference points for India's own programme evolution, illustrating how policy design, network architecture, and concession structuring can be aligned to create logistics systems capable of sustaining high throughput, accelerating modal shift, and supporting national economic competitiveness at scale.

When compared globally, India's existing policy initiatives aimed at multimodal freight transport and logistics is notable for its scale and ambition, although it remains at an early stage of execution. Manufacturing economies in Europe such as Germany, Netherlands etc have mature multimodal freight systems characterised by decades of institutional coordination, highly reliable rail freight systems, advanced inland waterway integration, and sophisticated private logistics participation.

The United States presents a different model, where multimodal logistics infrastructure is extensive but largely market-driven rather than centrally coordinated. Major intermodal hubs are largely controlled by private Class I railroads, which own and manage extensive terminal infrastructure across the country. For example, Chicago serves as the nation's most critical rail interchange, handling approximately 25% of all U.S. rail traffic and functioning as a key node for freight transfers across national corridors. Similarly, Memphis has emerged as a premier tri-modal logistics hub due to its strategic integration of air, rail, and highway transport systems.

Singapore demonstrates one of the world’s most efficient and technologically advanced logistics systems, built around digital integration, automation, and centralised governance. Supported by advanced technologies, it handled ~44.5 mn TEUs in 2025, reinforcing its position as the world’s largest transshipment hub, with connectivity to more than 600 ports globally. Its Tuas Port, designed to reach 65 mn TEU capacity by the 2040s, uses AI-driven automation, autonomous vehicles, and centralized digital coordination to optimize cargo movement. This efficiency is supported by Singapore’s compact geography of just 734 sq. km and highly centralized governance.



Germany

Bundesverkehrswegeplan (BVWP), since 1973
 1973 First (BVWP): A intermodal investment masterplan

EUR 270 bn

Budgeted Federal Transport Infrastructure Plan 2030

91%

Growth in rail freight tonne-km since 1994

Modal Integration

Road-rail-waterway planned under a single intermodal masterplan since 1973; Rhine-Ruhr barge network integrated with Duisport rail hub; 30+ GVZ freight village network, coordinating last-mile across modes

Governance

Federal + state cost-benefit planning via BVWP; DB InfraGo as public-good rail infrastructure company; private logistics operators on commercial leases within GVZ freight villages

Key Strength

- Standardised intermodal cost-benefit planning applied consistently across five decades.
- Policy mandates evaluation of road, rail, and waterway investments through a unified budget framework, preventing mode-specific planning silos and reducing stranded infrastructure.
- Duisport’s dominance in China-Europe rail freight reflects 50 years of coordinated corridor investment.



Netherlands

Gateway to Europe strategy from 1988

Betuweroort construction 1997-2007 · Port-base 2002



14.2M TEU

Rotterdam container throughput (2025)

35-40%

of Dutch domestic freight moved by inland barge - highest in Europe

20,000+

freight trains annually on Betuweroort (opened 2007)

Modal Integration

Rhine-Meuse-Waal barge network covering 6,000+ km; Betuweroort dedicated freight rail to Germany; Portbase Port Community System pre-clearing cargo digitally; Nextlogic integrated planning for 40+ inland barge terminals on fixed corridor schedules

Governance

Port of Rotterdam Authority: public company jointly owned by City of Rotterdam + Dutch State since 2004; national 'mainport policy' prioritising Rotterdam as strategic national asset; EU TEN-T Rhine-Alpine corridor funding

Key Strength

- By managing container pre-sorting by inland mode (barge, rail, truck) immediately upon discharge, coordinated through Portbase's digital platform and Nextlogic's integrated scheduling.



China

11th Five year plan (2006-2011). Belt and Road Initiative 2013.

National Logistics Action Plan, 2026

58.7 bn tonnes

Annual Freight (2025)

1,27,000 kms

Inland Waterway Transport (IWT) network

3,417

China-Europe freight train trips from Zhengzhou alone in 2025

Modal Integration

Port-rail-park unified under state ownership in top-performing facilities; CR Express China-Europe rail network; air-rail intermodal at Zhengzhou South Station (first integrated air-rail cargo distribution centre in China); inland dry ports in all major manufacturing provinces.

Governance

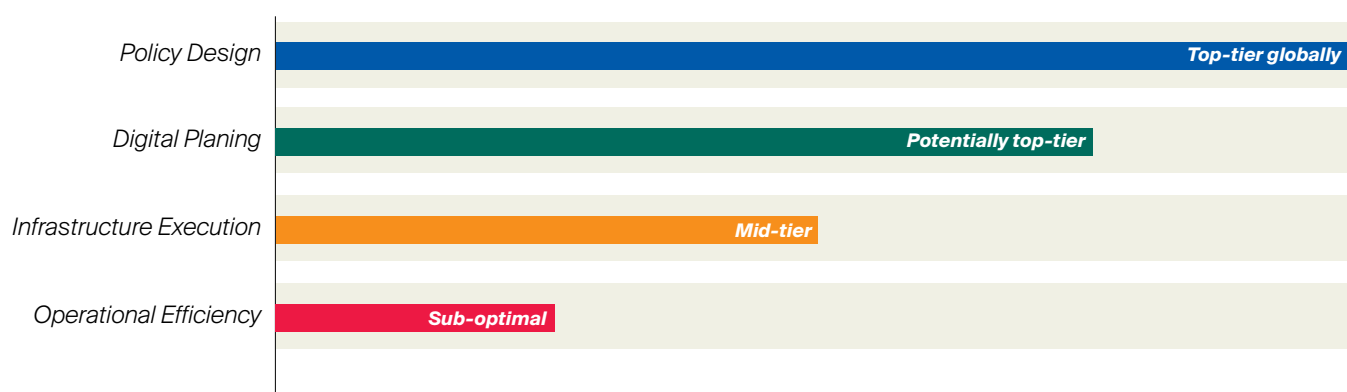
NDRC five-year planning cycles set national targets with performance metrics; Ministry of Transport coordinates across modes; SOE freight diversion mandated to new facilities during ramp-up; Belt and Road provide international corridor funding framework

Key Strength

- "Single-bill-system" unifying national legal and cooperative services framework.
- Deep spatial integration via mega corridors like the **New International Land-Sea Trade Corridor** in western China and expanded continental logistics hubs
- Building 30 comprehensive national freight hubs and establishing 229 National Logistics Hubs that directly link deep-water river berths and high-capacity rail lines into a singular node

When compared to the global integrated logistics systems, India's policy measures in the last few years indicate a strong strategic commitment towards building an integrated and future-ready logistics ecosystem. Initiatives such as PM Gati Shakti National Master Plan, National Logistics Policy, DFCs, and ULIP have created a supportive policy environment focused on digital coordination, infrastructure integration, and multimodal efficiency. These reforms position India strongly in areas such as national-scale planning, corridor-led industrial connectivity, and public digital logistics interoperability. However, despite this policy momentum, structural gaps persist in execution efficiency, modal diversification, institutional coordination, technology adoption, and private-sector confidence. A balanced assessment therefore reveals that while India has established a robust policy foundation comparable to global best practices, translating this vision into operational competitiveness remains the critical challenge for achieving a world-class multimodal logistics ecosystem.

India's multi-modal transport and logistics initiatives: Assessment across four key dimensions



Overview of India's Multimodal Logistics Strengths and Constraints

<p>India's Building Advantage</p> <p>Integrated national-scale infrastructure planning: PM Gati Shakti integrates 1,600+ GIS data layers across 16 ministries roads, railways, ports, airports, industrial corridors, utilities, and land-use constraints.</p> <p>Corridor-based industrial-logistics integration: USD 24 bn investments under PLI scheme linked with 34,000 kms of road construction under Bharatmala and DFC corridors, directly integrating logistics with manufacturing growth.</p> <p>Public digital logistics interoperability: ULIP connects 30+ logistics systems, 1,200+ APIs, and multiple public/private stakeholders, one of the world's largest public logistics data-exchange platforms.</p> <p>Public digital logistics interoperability: NIP 1.0 (2020-25) mobilised USD 1.4 trn, creating foundation for a massive, coordinated logistics network.</p>	<p>Structural Gaps</p> <p>Land acquisition and project delays: Major infrastructure projects face average delays of 2-5 years. Land acquisition contributes to over 35% of project execution delays.</p> <p>Fragmented institutional execution: Logistics governance spans 16+ central ministries, 28 states, multiple regulators, and port trusts, thus, creating a substantial implementation coordination friction.</p> <p>Limited warehouse automation: Warehouse automation penetration in India is below 10-15%, versus 40-60% in advanced markets such as Germany and Singapore.</p> <p>Last-mile and first-mile connectivity gaps: Over 30% of industrial clusters lack efficient multimodal first-mile connectivity to railheads, ports, or inland terminals.</p> <p>Limited private sector confidence: India attracts ~USD 8 to 10 bn annually in private logistics infrastructure investment vs China's USD 40-50 bn+ during comparable expansion phases.</p>
--	--

Section 6

Measures to Strengthen Logistics Efficiency

In the last few years, India has established substantial physical foundations of multimodal freight ecosystem through developing strong and efficient transport networks and logistics parks. The major policy initiatives are strengthening country's ability to integrate road, rail, port, and warehousing networks into a more efficient freight movement architecture. This has been complemented by digital coordination platforms such as PM Gati Shakti, which have improved infrastructure planning through greater inter-ministerial integration and data-driven network alignment.

The development of strategically located logistics parks across key industrial and freight corridors represents an important step in this transition. These facilities are designed to consolidate cargo flows, reduce logistics fragmentation, improve modal interchange efficiency, and lower overall freight handling costs. Together with expanding rail freight capacity and improved highway connectivity, they create the physical backbone required to support a more competitive and resilient national logistics system.

As several of these assets move toward commissioning and operational maturity, the policy focus is now shifting from infrastructure creation to network activation. The next phase of progress will depend not only on physical readiness, but on ensuring that these facilities achieve commercially sustainable utilisation early enough to accelerate freight aggregation and support long-term multimodal adoption across India's logistics ecosystem. This creates a timely policy opportunity to complement infrastructure delivery with targeted demand-side interventions that can accelerate freight aggregation, strengthen commercial confidence, and support the emergence of self-sustaining multimodal logistics hubs during the critical ramp-up phase. Below are some of the key interventions across multimodal networks and well as MMLPs targeted towards building India's logistics efficiency.

(i) Prioritise gateway MMLPs through enhanced central coordination

India's MMLP program, approved in 2017 envisaged 35 greenfield logistics parks with planned investment of approximately INR 460 bn and cargo-handling capacity of nearly 700 mn metric tonnes. While the programme remains strategically significant, implementation has progressed slower than intended. As of 2026, six projects are under implementation, while execution disruptions (including the re-awarding of the Nagpur project) highlight persistent delivery challenges. The issue is not policy intent or capital availability, rather it is of fragmented execution.

The programme, originally conceived under the Bharatmala Pariyojana framework and now continuing under National Highways Logistics Management Limited (NHLML), relies heavily on sequential approvals across ministries and state governments. Land identification remains slow, rail connectivity often trails commercial timelines, and no single institution holds full accountability for end-to-end delivery. This governance structure weakens execution certainty and reduces private-sector confidence.

To address this, India should accord gateway-scale MMLPs an enhanced priority status with empowered inter-ministerial coordination authority. These should include strategically located sites with direct DFC access, strong industrial cluster linkages, and significant port-hinterland integration potential.

This would generate immediate improvement such as –

First, it would centralise land coordination. Land acquisition remains a primary cause of delay with several projects awaiting timely state level identification and transfer. Therefore, a dedicated central Project Development Cell, working to defined timelines with state agencies, would reduce this uncertainty and improve delivery discipline.

Second, it would replace sequential approvals with parallel clearances. Environmental approvals, utility integration, railway siding permissions, highway access upgrades etc currently move through separate institutional processes. A single-window coordination mechanism would allow concurrent processing and materially shorten project timelines.

Third, it would align rail connectivity with commercial commissioning. MMLPs derive their economic values from seamless modal transfer. When rail spur connectivity lags operational launch, throughput assumptions weaken and private financial models become less viable. Government-led completion of critical rail links before financial closure would significantly improve project bankability.

Global experience supports this approach. China accelerated logistics hub development by embedding freight infrastructure into measurable national planning targets, i.e. the 11th five-year plan (2006-10). Beijing municipal government structured

its logistics strategy into a three-layer framework - Logistics Bases (such as Tongzhou and Shunyi), Integrated Logistics Zones, and Specialised Logistics Zones. Beijing planned to build 10 integrated logistics zones. Simultaneously, provinces such as Hebei designated five logistics hub cities during the same period, with each hub assigned national-level planning priority and coordinated central-provincial investment. The mechanism to integrate logistic hub development with five-year plan targets converted China's aspirational objectives into binding inter-agency performance obligations with measurable timelines.

India need not replicate the exact China model, but it can apply the same principle through stronger accountability and structured monitoring under agency such as PM Gati Shakti.

The first phase should prioritise projects already under implementation, i.e. Jogighopa, Chennai, Bengaluru, Nagpur, and Indore, followed by high-impact future gateways such as Delhi-NCR, Mumbai, Hyderabad, Visakhapatnam etc. Delivery performance at these first sites will shape investor confidence for the remaining pipeline. For private capital, execution credibility is more persuasive than policy announcements, and successful delivery at these gateway MMLPs would provide the strongest possible signal that India's multimodal logistics transformation is commercially real and institutionally reliable.

This fragmentation carries significant commercial consequences. When logistics parks become operational before rail connectivity is completed, they default into functioning as road-fed warehouses rather than true multimodal freight nodes. This weakens asset utilization, suppresses modal shift, and reduces returns on public investment already committed through Dedicated Freight Corridor Programme and MMLP development. India also faces an estimated shortage of 150–200 modern freight terminals capable of providing the consolidation, switching, and storage infrastructure required to make rail commercially viable for industrial shippers. Closing this gap requires coordinated public action.



(ii) Deploy CPSE freight as an anchor demand instrument during MMLP ramp-up

India's MMLP program has made steady progress in creating the physical backbone for integrated freight movement. The next policy priority should be to ensure the assets under development achieve commercially sustainable utilisation during their early years of operation.

A common feature of multimodal logistics infrastructure globally is the lag between commissioning and commercial freight maturity. MMLPs begin incurring fixed operational costs immediately upon commissioning, which includes maintenance, staffing, and concession servicing obligations, while freight migration from established road-based routing patterns to multimodal rail-linked systems typically occurs gradually as users adapt supply chains, build confidence in service reliability, and optimise network economics.

This creates a predictable ramp-up phase during which utilisation certainty becomes central to project bankability. International logistics park experience suggests that facilities with access to stable anchor cargo during this period generally achieve commercial scale more quickly and attract stronger long-term private participation. For instance, as documented by China's national logistics park programme, post program evaluation by NDRC found that 60% of parks operated below commercially viable scale, with insufficient originating cargo during ramp-up identified as a primary cause of underperformance. While integrated logistics parks such as those in Zhengzhou, Chengdu, Tianjin, were more financially viable they had captive cargo since early operational period, directed through policy instruction before commercial volumes arrive. Parks that did not have this instrument defaulted to road-fed warehousing regardless of how much rail infrastructure had been built.

Adoption of such measure is relevant for India as its MMLP

network transitions from construction to operation. India is well-positioned to address this through the freight ecosystem of Central Public Sector Enterprises (CPSEs).

Indian Railways recorded originating freight loading of approximately 1,700 mn tonnes in FY 2026, reflecting continued growth in bulk commodity movement across coal, steel, fertilisers, petroleum products, cement, and foodgrains. Coal and iron-ore continue to account for 55% of this movement, while industrial and container traffic are also expanding as dedicated freight capacity improves.

A significant portion of these freight flows is generated or influenced by large public-sector entities such as Coal India, Steel Authority of India, Indian Oil Corporation, NTPC, and Food Corporation of India. These organisations already manage high-volume logistics through structured procurement and operational planning systems, making them natural anchor participants for multimodal network development.

A calibrated CPSE freight participation framework could therefore serve as a transitional demand-support instrument during the first five years of MMLP operations. Under such a framework, relevant CPSEs operating within an MMLP's freight catchment would be encouraged to route a defined share of operationally suitable freight through the facility during the ramp-up period. The objective would not be mandatory rerouting irrespective of commercial viability, but structured alignment of eligible freight flows where multimodal routing is operationally efficient and economically rational. Also, a defined sunset clause of about five years would ensure that the CPSE participation functions as transitional market development support rather than a permanent routing preference.

This approach compares favourably with conventional de-risking instruments, as anchor freight participation strengthens commercial confidence through throughput visibility while leveraging existing logistics flows rather than requiring substantial new public expenditure.

The institutional architecture to support this already exists. The Department of Public Enterprises regularly incorporates operational priorities into CPSE performance frameworks, while India's broader logistics coordination architecture under PM Gati Shakti increasingly enables cross-ministerial infrastructure alignment. Extending this coordination to include multimodal freight participation targets would represent a practical evolution of existing governance mechanisms rather than a new regulatory layer.

Therefore, as India's MMLP programme enters its operational phase, the policy focus should move from asset creation to network activation. A structured CPSE anchor-demand framework would provide early utilisation stability, improve concession confidence, strengthen private participation quality, and accelerate the emergence of commercially self-sustaining multimodal freight ecosystems across India's logistics network.



(iii) Strengthen first and last mile connectivity to logistic parks

The first and last mile connectivity gap has been identified as one of the primary reasons hindering freight modal shift from road to rail. Although India has built massive trunk infrastructure over the last few years, the feeder connectivity is still inadequate. For instance, a freight from a factory in Chakan or an automotive component plant in Sriperumbudur, still moves the first 30-50 kms to the nearest rail/DFC connected terminal by road, as the feeder rail siding, access road junction, or intermodal transfer infrastructure connecting the industrial cluster to the freight network is inadequate. In 2023, the Comprehensive Port Connectivity Plan formally mapped 107 last mile rail and road infrastructure gaps across manufacturing clusters. The reason for this gap is structural as infrastructure is developed and managed by multiple agencies, thus building challenges in connectivity.

This fragmentation carries significant commercial consequences. When logistics parks become operational

before rail connectivity is completed, they default into functioning as road-fed warehouses rather than true multimodal freight nodes. This weakens asset utilization, suppresses modal shift, and reduces returns on public investment already committed through Dedicated Freight Corridor Programme and MMLP development. India also faces an estimated shortage of 150-200 modern freight terminals capable of providing the consolidation, switching, and storage infrastructure required to make rail commercially viable for industrial shippers. Closing this gap requires coordinated public action.



Conclusion

In this study, we indicate that India's logistics transformation has reached a critical implementation stage. While substantial progress has been made through sustained public investment in transport infrastructure expansion and modernisation and digital coordination systems, its integration into an efficient multimodal freight system. The rail freight modal share remains constrained at approximately 27-28%, indicating that line-haul efficiency gains have not yet translated into broad-based commercial accessibility for non-bulk freight.

The analysis suggests that the principal challenge is no longer infrastructure creation, but the commercial activation of existing capacity through effective network integration. In this context, MMLPs are significant as the operational layer required to connect dispersed industrial freight with high-capacity rail corridors. Their strategic relevance lies in their ability to aggregate fragmented industrial cargo, reduce terminal dwell, improve handling efficiency, and enable seamless interchange between road and rail networks. By converting dispersed freight flows into rail-compatible volumes, MMLPs operationalise the commercial potential of DFC infrastructure and expand rail's viability beyond traditional bulk commodities.

Beyond infrastructure provision, the long-term success of the MMLP programme will depend on institutional coordination and commercial execution discipline. International experience demonstrates that multimodal assets achieve systemic impact only when supported by predictable freight flows, standardised operational design, and coordinated first- and last-mile integration. For India, this necessitates a calibrated implementation framework combining accelerated gateway project delivery, structured anchor-demand participation during ramp-up, and stronger alignment between industrial cluster planning and freight infrastructure deployment. The effectiveness with which these measures are executed will determine whether MMLPs evolve into high-throughput multimodal interchange nodes or remain underutilised warehousing assets. In this regard, the MMLP programme must be viewed not as a standalone infrastructure initiative, but as the principal instrument through which India can translate corridor-level rail investments into sustained modal rebalancing, lower logistics costs, and a structurally more competitive freight economy.



Annexure 1

Category	Indicator	Unit	2030 Target	FY 2016	FY26/ latest available	Weighted Operational Infrastructure Index (Index to 2030 targets)	
						FY 2016	FY 2026
Road Infra	% of 4/6-lane NHs	%	100	24	31	0.02	0.03
	Avg truck speed (km/h)	km/h	60	25	47	0.04	0.08
	Length of national highways	km	200,000	101,011	146,572	0.05	0.07
Rail Infra	Avg freight train speed	km/h	75	23	23	0.02	0.02
	Freight modal share of rail	%	45	18	28	0.02	0.04
	Speed of DFCs	km/h	75	-	48	0.00	0.04
	Running track length	kms	120,000	92,081	111,641	0.05	0.06
	No.of wagons	Nos	1,100,000	251,256	346,366	0.01	0.02
Port Infra	Avg turnaround time	hours	24	93	49	0.02	0.03
	Container handling capacity	mn tonnes	250	123	194	0.03	0.05
	Port connectivity (% connected by rail)	%	114	5	50	0.00	0.03
Airport	Domestic Cargo handled	000 tonnes	10,000	2,704	3,719	0.02	0.02
	Custom Clearance_Import release time	hours	48	59	39	0.05	0.08
	Custom clearance_Export Clearance	hours	24	35	31	0.05	0.05
						0.39	0.62

Key Contacts

Shishir Baijal

International Partner, Chairman and Managing Director
shishir.baijal@in.knightfrank.com

Advisory & Valuation

Gulam Zia

International Partner
Senior Executive Director - Research, Advisory
Infrastructure, and Valuation
gulam.zia@in.knightfrank.com

Rajeev Vijay

Executive Director
Government and Infrastructure Advisory
rajeev.vijay@in.knightfrank.com

Saurabh Mehrotra

Executive Director
Valuation & Advisory
saurabh.mehrotra@in.knightfrank.com

Occupier Strategy and Solutions

Viral Desai

International Partner, Senior Executive Director
Occupier Strategy & Solutions, Industrial & Logistics, Capital Markets and Retail Agency
viral.desai@in.knightfrank.com

Capital Market

Harry Chaplin-Rogers

Director of International Capital Markets
harry.cr@in.knightfrank.com

Industrial & Logistic

Balbirsingh Khalsa

Executive Director
balbirsingh.khalsa@in.knightfrank.com

Pinkesh Teckwani

National Director
pinkesh.teckwani@in.knightfrank.com

Project Management Services

Deben Moza

International Partner, Senior Executive Director
deben.moza@in.knightfrank.com

Facilities & Asset Management Services

Pawan Koyal

Executive Director
pawan.koyal@in.knightfrank.com

Research

Vivek Rathi

National Director
vivek.rathi@in.knightfrank.com

Ankita Sood

National Director
ankita.sood@in.knightfrank.com

Corporate - Marketing & Public Relations

Piyali Dasgupta

National Director
piyali.dasgupta@in.knightfrank.com

Ahmedabad

Rumit Parikh

Senior Director
rumit.parikh@in.knightfrank.com

Bengaluru

Viral Desai

International Partner
Senior Executive Director
viral.desai@in.knightfrank.com

Chennai

Joseph Thilak

National Director
joseph.thilak@in.knightfrank.com

Hyderabad

Joseph Thilak

National Director
joseph.thilak@in.knightfrank.com

Indore

Rumit Parikh

Senior Director
rumit.parikh@in.knightfrank.com

Kolkata

Joydeep Paul

Senior Director
joydeep.paul@in.knightfrank.com

NCR

Mudassir Zaidi

Executive Director - North
mudassir.zaidi@in.knightfrank.com

Pune

P Vilas

National Director
p.vilas@in.knightfrank.com

Report Author

Shilpa Shree Venkatesh

Vice President - Research
shilpa.shree@in.knightfrank.com

Graphics & Design

Mahendra Dhanawade

Assistant Vice President- Graphic & Design
mahendra.dhanawade@in.knightfrank.com



KNIGHT FRANK INDIA PVT LTD

Authors

Shilpa Shree Venkatesh

Vice President

Research

+91 80 6818 5600

shilpa.shree@in.knightfrank.com

Siri Jois

Associate Consultant

Research

+91 80 6818 5601

siri.jois@in.knightfrank.com

For further information contact

Gulam Zia

International Partner, Senior Executive Director

Research, Advisory, Infrastructure, & Valuation

+91 22 6745 0152

gulam.zia@in.knightfrank.com

Rajeev Vijay

Executive Director

Government and Infrastructure Advisory

+91 124 478 2712

rajeev.vijay@in.knightfrank.com

Ankita Sood

National Director

Research

+91 124 478 2700

ankita.sood@in.knightfrank.com

Knight Frank LLP is a leading independent, global property consultancy. Headquartered in London, Knight Frank has 20,000+ people operating from over 600+ offices across more than 50 territories. The Group advises clients ranging from individual owners and buyers to major developers, investors, and corporate tenants. For further information about the Company, please visit www.knightfrank.com

Knight Frank India is headquartered in Mumbai and has more than 1,900 experts across Bangalore, Delhi, Pune, Hyderabad, Chennai, Kolkata, Ahmedabad, Indore and Kochi. Backed by strong research and analytics, our experts offer a comprehensive range of real estate services across advisory, valuation and consulting, transactions (residential, commercial, retail, hospitality, land, and capitals), facilities management and project management. For more information, visit www.knightfrank.co.in

CONFEDERATION OF INDIA INDUSTRY (CII)

Nidhi Verma

Director

Confederation of Indian Industry

+91 98103 42666

nidhi.verma@cii.in

Puja devi

Executive, Infrastructure

Confederation of Indian Industry

puja.devi@cii.in

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society through advisory and consultative processes.

For more than 130 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. With its extensive network across the country and the world, CII serves as a reference point for Indian industry and the international business community.

In the journey of India's economic resurgence, CII facilitates the multifaceted contributions of the Indian Industry, charting a path towards a prosperous and sustainable future. With this backdrop, CII has identified "Accelerating Competitiveness: Growth, Resilience, Inclusion, Sustainability, Trust" as its theme for 2026-27, prioritising five key pillars. During the year, CII will align its policy advocacy, institutional initiatives, partnerships, and outreach to support Indian industry in strengthening these five interconnected pillars of competitiveness.

Confederation of Indian Industry

The Mantosh Sondhi Centre, 23, Institutional Area, Lodi Road, New Delhi - 110 003 (India) T: 91 11 45771000; E: info@cii.in • W: www.cii.in

No part of this publication may be reproduced, stored in, or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise), in part or full in any manner whatsoever, or translated into any language, without the prior written permission of the copyright owner. CII has made every effort to ensure the accuracy of the information and material presented in this document. Nonetheless, all information, estimates and opinions contained in this publication are subject to change without notice, and do not constitute professional advice in any manner. Neither CII nor any of its office bearers or analysts or employees accept or assume any responsibility or liability in respect of the information provided herein. However, any discrepancy, error, etc. found in this publication may please be brought to the notice of CII for appropriate correction.

Published by Confederation of Indian Industry (CII), The Mantosh Sondhi Centre; 23, Institutional Area, Lodi Road, New Delhi 110003, India, Tel: +91 11 45771000; mail: info@cii.in; Web: www.cii.in

The statements, information, data, views, projections, analysis, and opinions expressed or provided herein are provided on "as is, where is" basis and the concerned parties clients are required to carry out their own due diligence as may be required before signing any binding document. Knight Frank (India) Private Limited (KFIPL) makes no warranties, expressed or implied, and hereby disclaims and negates all other warranties, including without limitation, implied warranties or conditions of merchantability, fitness for a particular purpose, or non-infringement of intellectual property or other violation of rights including any third party rights. The statements, information and opinions expressed or provided in this presentation / document/ report by KFIPL are intended to be a guide with respect to the purpose for which they are intended, but in no way shall serve as a guide with regards to validating title, due diligence (technical and financial), or any other areas specifically not included in the presentation/document/ report. Neither KFIPL nor any of its personnel involved accept any contractual, tortious or other form of liability for any consequences, loss or damages which may arise as a result of any person acting upon or using the statements, information, data or opinions in the publication in part or full. The information herein shall be strictly confidential to the addressee and is not to be the subject of communication or reproduction wholly or in part. The document / presentation / report is based on our understanding of the requirement, applicable current real estate market conditions and the regulatory environment that currently exists. Please note any change in anyone of the parameter stated above could impact the information in the document / presentation/ report. In case of any dispute, KFIPL shall have the right to clarify.