Unlocking growth: Railway freight portfolio diversification in India

July 2025

Foreword

Vimal Kejriwal

Chairman

FICCI Committee on Transport Infrastructure and

Managing Director & CEO, KEC International

I am happy to share with you the **FICCI-PwC** knowledge report on **'Unlocking growth: Railway freight portfolio diversification in India'** at **Future Rail India 2025, the sixth edition of the Smart Railways Conclave**, organised by the Federation of Indian Chambers of Commerce and Industry (FICCI).

Indian Railways has been central to powering our country's economic growth, serving as a key enabler of not just people connectivity but also large-scale, cost-efficient freight transfer. With the railways having set an ambitious target of achieving 3,000 million tonnes (MT) of freight movement, it is increasingly clear that the sector's future growth will require it to tap into new non-traditional commodities beyond conventional bulk segments such as coal, cement and iron ore. Expediting critical projects such as multitrack congested routes, achieving 100% electrification, and upgrading speeds to 160 kmph on various routes are some of the efforts that have been made towards the sector's expansion.

With India's economy rapidly evolving, the logistics landscape is undergoing a fundamental transformation. To reduce logistics costs and sustain economic momentum, it is imperative to diversify the freight portfolio by including high-value, time-sensitive cargo. This shift will be essential to support growth in sectors like manufacturing, retail and e-commerce, while also strengthening the railways' revenue base and building a future-ready, globally competitive logistics ecosystem.

This FICCI-PwC knowledge report offers a comprehensive, data-backed analysis of India's current rail freight composition, the pressing need for diversification, and the strategic roadmap required to unlock this potential. It highlights emerging opportunities in high-value, lightweight and distribution-intensive commodities, while also addressing operational, infrastructure and pricing-related gaps that need to be bridged. The report also provides an extensive study of some critical aspects such as private investments, the transformative role of technology and skill development in advancing rail infrastructure.

I hope this report serves as a valuable resource for industry stakeholders and policymakers, facilitating informed dialogue. We welcome your suggestions and feedback.

Foreword

Vivek Lohia

Co-Chairman (Railways), FICCI Committee on Transport Infrastructure &

Managing Director, Jupiter Wagons Limited

It is a privilege to share with you the **FICCI-PwC knowledge report on 'Unlocking growth: Railway freight portfolio diversification in India'**, released **at Future Rail India 2025, the sixth edition of the Smart Railways Conclave, organised by FICCI.**

Indian Railways has long served as a critical pillar of India's economic progress and continues to play a foundational role in powering India's freight movement, carrying over 1.58 billion tonnes of goods in 2023–24 alone.[1] Yet, the composition of this volume remains dominated by conventional bulk commodities, with coal alone accounting for over INR 829 billion of the INR 1,650 billion freight revenue.[2] While this underscores operational reliability, it also reflects a long-standing dependency that must be rebalanced to align with emerging industrial and consumption-led sectors.

India's transition towards a high-value, service-oriented economy demands a freight ecosystem that is agile, technology-enabled and customer-centric. Rolling stock must adapt accordingly, shifting from static designs to modular, container-compatible and sector-specific solutions. Containers have emerged as a strategic enabler, providing flexibility, cargo security, and intermodal efficiency. They make it possible to accommodate a wider range of commodities and support the growth of new freight segments.

This report explores the complex challenges of freight diversification, ranging from infrastructure readiness to asset utilisation, while also providing a roadmap for boosting freight efficiency. For rolling stock manufacturers and logistics providers, the opportunity lies in delivering agile, future-ready solutions that drive **efficiency, sustainability and private sector collaboration** across India's logistics landscape.

Appreciably, Indian railways has substantial research data to establish a long-term vision and achieve short-term targets for elevating its contribution in both the freight and passenger sections. Actionable points include doubling the average speed of freight trains and commissioning multimodal cargo terminates as well as building up rolling stock assets in the private sector. This report will endeavour to present various insights on the above.

I hope this report fosters meaningful collaboration across stakeholders to reimagine the role of Indian Railways in tomorrow's freight landscape. We welcome your views and look forward to working together towards a more balanced and future-ready transport system.

1 Indian Railways Year Book 2023-24

2 Ibid.

Message from PwC

Manish R Sharma

Partner and Leader

Infrastructure, Transport and Logistics, Real Estate, Global Ports CoE

PwC India

It is with great pleasure that PwC, in collaboration with FICCI, presents this knowledge paper titled 'Unlocking growth: Railway freight portfolio diversification in India'. As India continues to advance its economic ambitions, Indian Railways remains a cornerstone of the nation's logistics ecosystem – investing in capacity addition and facilitating the movement of goods across the country. This is also aligned with the decarbonisation commitments of the nation and Indian Railways' commitment to net zero carbon emissions by 2030.

In recent years, Indian Railways has demonstrated steady growth in freight volumes, moving over 1,500 million tonnes in 2023–24.[3] However, the aspirations set forth – reaching 3,000 million tonnes by 2027 and achieving a modal share of 45% by 2030 – require a transformative approach beyond infrastructure expansion.

While initiatives such as the National Rail Plan, PM Gati Shakti, dedicated freight corridors, and 100% electrification are laying a robust foundation, it is increasingly evident that infrastructure alone cannot unlock the full potential of rail freight. A strategic shift in the freight portfolio – diversifying beyond select traditional commodities comprising coal, iron ore, cement, iron and steel, food grains, fertilisers – is essential to enable an increase in freight modal share and meet national logistics and sustainability goals.

This paper delves into the imperative of freight diversification, outlining the challenges that needs to be addressed to attract new commodity segments that have higher growth estimates to rail. It offers a comprehensive analysis of the current freight landscape and identifies opportunities for modal shifts for stakeholders across the value chain.

At PwC, we are committed to supporting India's journey toward a more efficient, sustainable and inclusive logistics framework. We hope this paper serves as a valuable resource for policymakers, industry leaders, and logistics professionals, and contributes meaningfully to the dialogue on transforming India's freight transport landscape.

We look forward to continued dialogue on enabling diversification of the rail freight portfolio and shaping future growth in modal share for Indian Railways.

3 Indian Railways Year Book 2023-24

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Introduction

The Indian Railways (IR) plays a pivotal role in India's economic growth by facilitating the movement of freight across the country. As of 2023–24, IR holds a modal share of approximately 25%–27%[4] in national freight transport, translating to 1,588 million tonnes (MT) of cargo movement.[5]

Recording a growth of 4.5%[6] in the last five years, IR has set ambitious targets to increase its freight business – it aims to reach 3,000 MT by 2027[7] and achieve a modal share of 45% by 2030.[8] This aspiration aligns with national priorities to reduce logistics costs and promote sustainable transport.

A range of initiatives, including the National Rail Plan (NRP), PM Gati Shakti, dedicated freight corridors, electrification and multi-tracking, have been implemented to strengthen infrastructure and enhance operational capacity. These measures are designed to create a physical and systemic foundation for scaling freight movement by rail.

However, infrastructure augmentation alone is insufficient to meet development targets. Achieving a higher modal share also requires a strategic shift in freight portfolio composition. The current reliance on a limited set of bulk commodities presents constraints because the growth potential of such commodities is limited due to sectoral trends and operational bottlenecks. Therefore, due to inherent limitations in rail-based logistics, pushing the modal share of these commodities beyond a certain threshold is often impractical.

Diversifying the freight basket emerges as a critical lever to unlock growth, capturing high-value, containerised and time-sensitive cargo. This approach has been acknowledged at the policy level, notably in the NRP, which advocates for including new commodity segments within balance other goods (BOG), such as automobiles and consumer durables.

4 https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1883514

5 Indian Railways Year Book 2023-24

6 Railways year book 2023-24 and Railways year book 2018-19

7 www.pib.gov.in/PressReleasePage.aspx?PRID=1883514#:~:text=The%20National%20Rail%20Plan%20envisages,of%20its%20following%20operational%2Fdesign%20features

8 www.pib.gov.in/PressReleasePage.aspx?PRID=1883514#:~:text=The%20National%20Rail%20Plan%20envisages,of%20its%20following%20operational%2Fdesign%20features

A comprehensive analysis of the national freight landscape must be undertaken to enable this diversification. This process includes understanding the existing freight basket, identifying low rail-share commodities with growth potential, assessing their logistics requirements and addressing barriers that currently deter their movement by rail.

This paper aims to explore these dimensions in detail, providing insights into the rationale for diversification and outline structural and operational demands. The objective is to provide insights to stakeholders and influence policy and operational decisions that can enable IR to achieve its freight growth aspirations.

Current freight portfolio in India

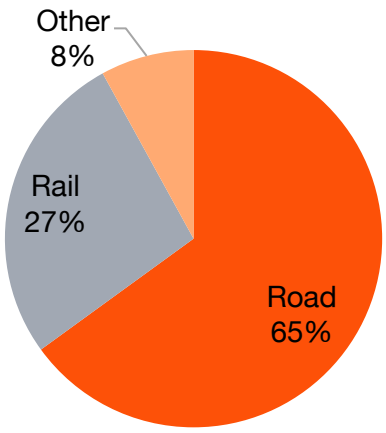
India transports approximately 6.3 billion tonnes of freight annually,[9] which is categorised into bulk and non-bulk types, which account for 70% and 30% of the total freight, respectively.[10] Bulk commodities include coal; bulk cement (cement in loose form); iron and steel; petroleum, oil and lubricants (POL); and food grains and loose fertilisers. Meanwhile, non-bulk goods comprise a broad array of products such as electronics, e-commerce, consumer goods, edible oils, paper products, automotive supplies, bagged cement, bagged fertilisers and other agricultural products. Figure 1 shows the freight transport share of road, rail and other modes.

In India, more than 90% of the non-bulk freight market is transported by road. By contrast, in developed countries such as the United States, 66% of non-bulk freight is moved by road, with rail or rail-intermodal systems accounting for a substantial 30%.[11]

This modal imbalance presents a strategic opportunity for IR to expand its footprint in the non-bulk segment.

Rail transport, particularly over long distances, offers inherent cost efficiencies compared with road transport. A comparative analysis of per tonne-kilometre costs across transport modes illustrates the economic advantage of rail transport, reinforcing its potential to reduce overall logistics costs while supporting sustainable growth.

Figure 1: Freight transport share amongst different modes



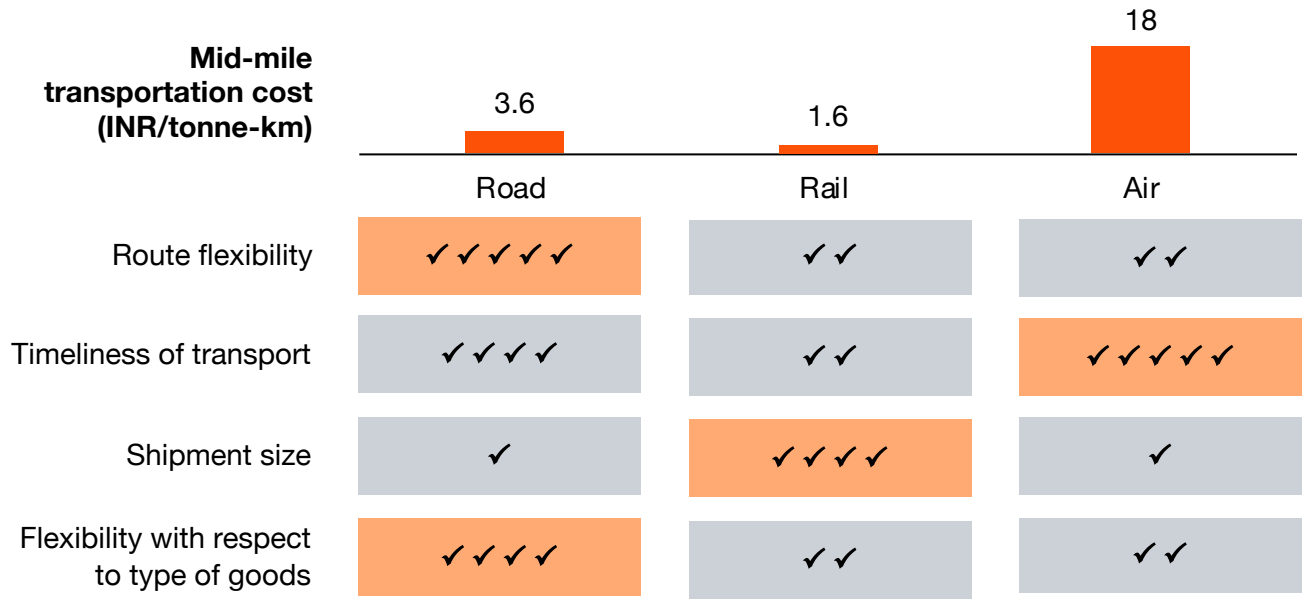
Source: PIB press release 2022 and NRP

9 NITI Aayog's request/invitation for expression of interest for research project on 'Augmenting rail container freight movements to the hinterland: Policy challenged and way forward'

10 https://www.niti.gov.in/sites/default/files/2021-06/FreightReportNationalLevel.pdf

11 https://www.niti.gov.in/sites/default/files/2021-06/FreightReportNationalLevel.pdf

Figure 2: Mid-mile costs and characteristics of different modes of transportation



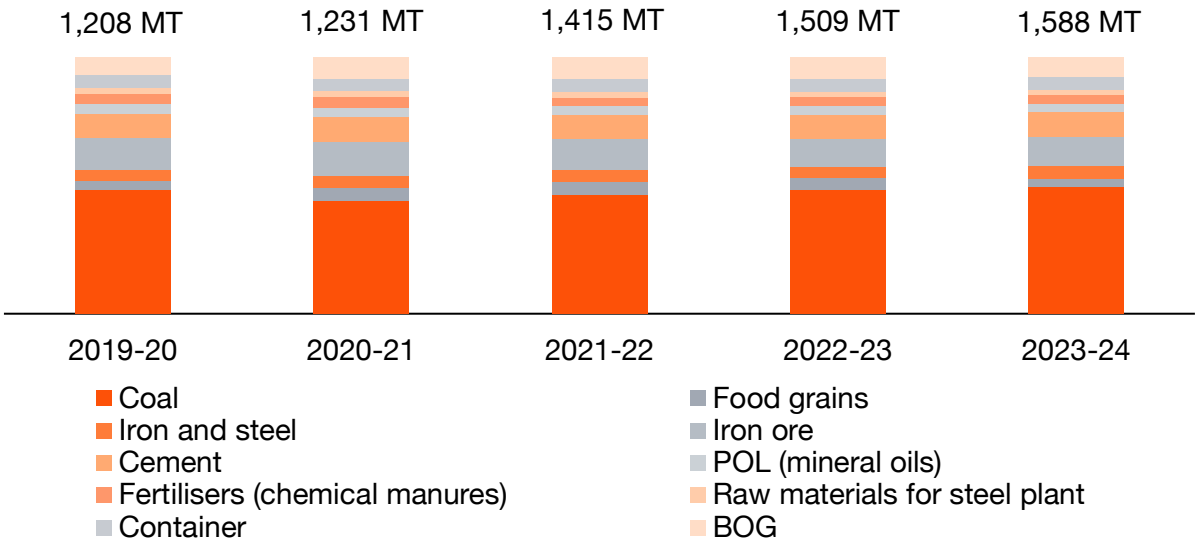
Source: NITI Aayog - https://www.niti.gov.in/sites/default/files/2021-06/FreightReportNationalLevel.pdf

Figure 2 highlights the strategic advantages of IR in freight transport, particularly in terms of its significantly lower mid-mile cost per tonne-kilometre and capacity to handle large shipment volumes over long distances. These characteristics make rail transport an economically attractive freight option.

However, IR faces limitations in route flexibility, reliability and timeliness when compared with road and air transport. Addressing these challenges presents a clear opportunity to expand IR's modal share.

2.1. Freight composition on rail and historical trends

Figure 3: Historical IR freight basket



Source: Railway Year Book from 2019–20 to 2023–24

In the past five years, IR's freight volumes have grown at a compound annual growth rate (CAGR) of 5.6%. However, this growth has been largely concentrated in a narrow set of traditional bulk commodities. Coal continues to dominate the freight basket, accounting for approximately 50% of the total rail freight, followed by cement and iron ore, which contribute approximately 10% each.

Other key contributors include fertilisers (4%), food grains (3%), and iron and steel products, including pig iron and finished steel (5%). Collectively referred to as traditional rail freight segments, these commodities have maintained a consistent share with limited diversification over time. Their physical characteristics, such as high density, low value and minimal handling needs, have shaped infrastructure and logistics systems.

In contrast, non-traditional commodities, including consumer durables, fast-moving consumer goods (FMCG) products, pharmaceuticals and automobiles, have historically had a low presence in the rail freight basket. These goods are typically lighter in weight but higher in volume and often require faster, more flexible and more efficient logistics solutions. These commodities demand more flexible, time-sensitive, door-to-door logistics, which road transport is better equipped to provide, rendering rail less competitive for such segments. The BOG segment, which has grown at a CAGR of 6.7% over the past five years, includes lightweight commodities.

2.2. Impact of reliance on select traditional commodities

As outlined in section 2.1, IR's freight growth over the past decade has been largely focused on a narrow set of traditional commodities. Although this focus has supported consistent volume growth, it has shaped the structural and operational orientation of the rail freight ecosystem in ways that constrain diversification.

Network planning and asset allocation are key factors. The historical reliance on traditional commodities, including bulk freight, has driven targeted investments into specific corridors and infrastructure, such as dedicated freight lines and specialised rolling stock for coal transport between mines and power plants. Although this ensures capacity and efficiency for core bulk flows, it has led to the under-development of facilities and services for other cargo types, especially those requiring containerisation, time-sensitive delivery or flexible routing.

Innovation in rolling stocks has also focused on traditional commodities, limiting the availability of suitable options for emerging freight segments. For bulk commodities, IR has developed an array of specialised wagons, such as BOXN variants for coal, BTPN for POL and BCNA for high-tonnage commodities such as cement. By contrast, the total options for lighter-weight and high-value goods are limited to modified LHB coaches or a small fleet of NMG and BCACBM wagons used for automobile transport. This imbalance restricts operational flexibility and discourages adoption by industries with distinct handling needs. In addition, inefficient wagon design makes the overall logistics cost less attractive for rail.

Additionally, IR has **under-served some major market segments**, including e-commerce, pharmaceuticals, FMCG, consumer durables and automobiles. These sectors typically demand increased reliability, faster transit times and flexibility with respect to the type of goods, particularly in areas where rail has lagged road and air transport. The continued dependence on traditional commodities not only limits growth potential but also exposes IR to competitive pressures from other modes, such as pipelines for petroleum and coastal shipping for coal.

This narrow freight portfolio also influences the agility of the rail network. IR faces challenges in adapting its infrastructure and services as logistics demand evolves, particularly with rising expectations for multi-modal and just-in-time delivery models. A network that is optimised for bulk train operations may struggle to accommodate growing demand for parcel/lightweight goods or automobile transport, leading to capacity mismatches and service shortfalls.

IR must address these structural constraints to unlock new freight opportunities and build resilience against market shifts. The next section explores the handling requirements and infrastructure needs associated with different commodity types. By highlighting the distinct logistical demands of bulk and non-bulk goods, this paper aims to illustrate the gaps in the current system and the adjustments required to support a more diversified freight portfolio.

2.3. Growth constraints in non-bulk freight

Table 1: Logistics requirements for the different commodities

Commodity	Handling requirement	Required infrastructure
Containers	• Intermodal handling using gantry cranes or reach stackers enables efficient loading/unloading with minimal direct cargo handling.	• Well-equipped terminals with adequate rail sidings at ports and inland container depots are essential to avoid congestion and ensure smooth intermodal transfer.
Automobile	• Vehicles are either driven or lifted into specially designed wagons. Secure lashing and gentle handling are crucial for preventing damage. • End-loading ramps or side-access wagons are used, and multi-point unloading is now allowed to improve distribution flexibility.[12]	• Dedicated automobile terminals with paved yards, loading ramps, parking areas and pre-shipment storage are required. • For example, the Gati Shakti Multi-Modal Cargo Terminal at a leading automobile company's Manesar plant, connected via a 10-km rail link, can handle approximately 4.5 lakh cars annually.
FMCG	• Typically handled by consignors or consignees through a combination of manual labour and mechanised equipment.	• Upgraded terminals with covered goods sheds and raised platforms for cross-docking • Warehousing and cold storage facilities at terminals

[12] www.pib.gov.in/PressReleseDetailm.aspx?PRID=1649281#%3A~%3Atext=to%20boost%20%C2%A0Freight%20Operations%3A

Commodity	Handling requirement	Required infrastructure
Pharmaceutical	• Require minimal manual handling and high levels of mechanisation. • Pharmaceuticals are treated as temperature-sensitive cargo and are shipped in sealed, stabilised packaging.	• Medicines and vaccines must be maintained within regulated temperature and humidity ranges. • For example, specialised rail assets developed by IR to support long-distance transport of perishable and pharmaceutical goods.[13] Each van has a capacity of approximately 17 tonnes and can be attached to freight or passenger trains. However, the fleet is currently very limited.
Durable goods	• These goods are loaded using forklifts or cranes due to their size and fragility. Full-rake shipments may use flat wagons or containers, whereas smaller loads are carried in parcel vans. Protection from shocks and moisture is critical.	**Terminals and warehousing** • Requirements: Upgraded goods sheds and dedicated freight terminals featuring the following: – **Covered handling areas:** Protection during loading/unloading – **Warehousing with value-added services:** Secure storage, inventory management, labelling, minor assembly/testing and reverse logistics handling – **Material handling equipment:** Forklifts (including reach trucks for high stacking), pallet jacks and conveyor systems for efficient and damage-free movement – **Proper docking bays:** Level access between wagons and warehouse/platform – Cargo consolidation/ deconsolidation areas in case of less-than-container-load shipments

[13] PIB press release

This diversity in handling and infrastructure requirements highlights the need for IR to adopt and accommodate a commodity-specific approach to terminal planning, asset deployment and service design. Tailoring its logistics solutions to the unique needs of each commodity group is essential for enabling a modal shift to rail and expanding its freight portfolio beyond traditional commodity segments.

Rationale for freight diversification

India's freight ecosystem comprises a diverse mix of commodities that are transported across various modes. This section explores the composition of the national freight basket to identify the growth potential of commodities that are currently primarily served by rail and those that are not. By comparing these segments, this section highlights the untapped growing commodity segments that IR can leverage to expand its freight share.

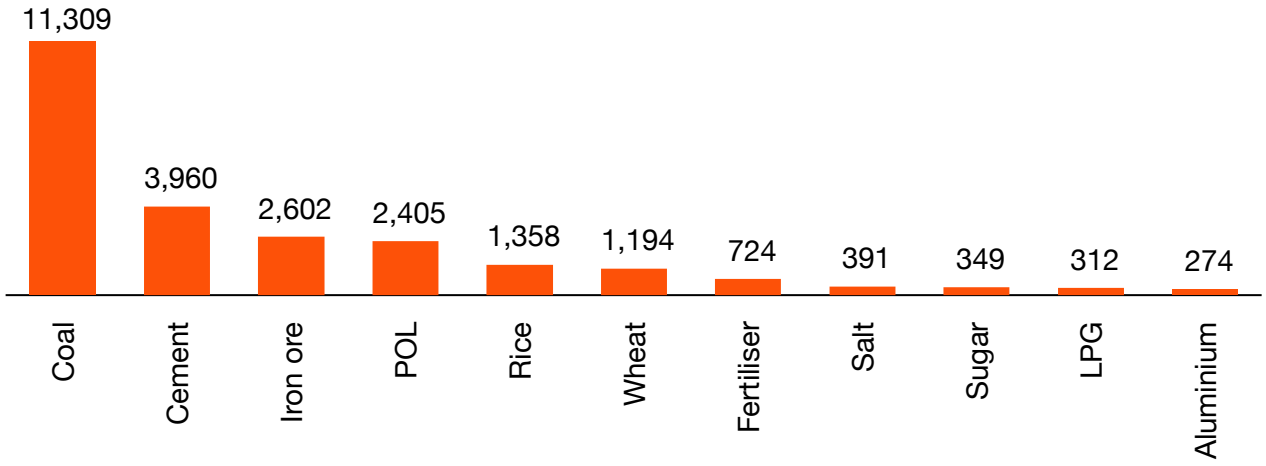
3.1. Commodities in the all-India freight basket

India's freight basket is broadly divided into bulk and non-bulk goods. The former account for approximately 70% of the total freight volume, and the latter constitute the remaining 30%.[14]

Bulk freight refers to unpackaged goods transported in large quantities, typically in raw or unprocessed form. It is further categorised into dry and liquid bulk. Dry bulk encompasses commodities such as coal, bulk cement (cement in loose form) and iron ore, whereas liquid bulk comprises petroleum products (POL) and chemicals.

[14] https://www.niti.gov.in/sites/default/files/2021-06/FreightReportNationalLevel.pdf

Figure 4: Bulk goods production and import volume for FY23 (lakh tonnes)



Source: Ministry of Coal,[15,16,17] Indian Bureau of Mines,[18] Ministry of Mines,[19] Department of Promotion of Industry and Internal Trade,[20] Ministry of Petroleum and Natural Gas,[21] Salt Commissioner Office,[22] PIB data,[23] Directorate General of Commercial Intelligence and Statistics,[24] Ministry of Agriculture & Farmers Welfare,[25]NRP 2020, Economic Survey, [26] Department of Promotion of Industry and Internal Trade[27] and PwC research

Figure 4 presents the major components of the freight segment, excluding commodities such as farm produce (excluding wheat and rice) and other ores and minerals.

Coal and cement dominate the select traditional commodities segment, accounting for approximately 60% of the volume in Figure 5. Iron ore and POL each contribute approximately 10%.

Beyond the above freight portfolio, the remaining portion of India's freight basket consists of key non-bulk commodities. These are typically finished products that are packaged for shipment, including electronics, clothing and consumer goods.

15 https://coal.gov.in/sites/default/files/2021-01/Production-of-Coking-Non-Coking.pdf

16 https://coal.gov.in/sites/default/files/2021-01/Production-of-Raw-Lignite-coal.pdf

17 https://iced.niti.gov.in/energy/fuel-sources/coal/import#coal-type

18 https://ibm.gov.in/writereaddata/files/17454767536809dc9139ba8IMYB_BOOK_2023.pdf

19 https://mines.gov.in/admin/storage/app/uploads/6433da09a9f741681119753.pdf

20 https://dpiit.gov.in/sites/default/files/DPIIT_AnnualReportE_03March2023.pdf

21 https://mopng.gov.in/files/TableManagements/IPNG-Annual-Report-2022-23-web.pdf

22 https://saltcomindia.gov.in/Pdf/SailentFeatures.pdf

23 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1892246

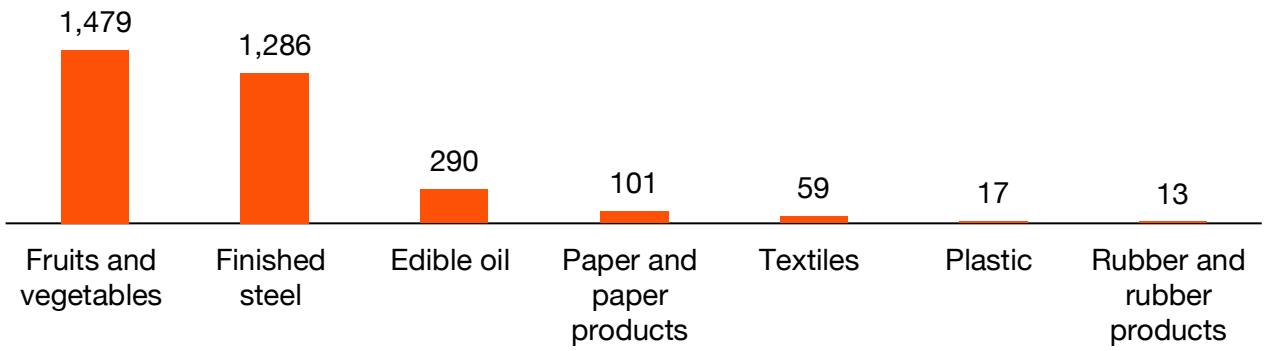
24 https://www.dgciskol.gov.in/writereaddata/Downloads/20240808163758A%20brief%20report%20on%20Export%20of%20Rice%20by%20India.pdf

25 https://agriwelfare.gov.in/Documents/CWWGDATA/Agricultural_Statistics_at_a_Glance_2022_0.pdf

26 https://www.indiabudget.gov.in/economicsurvey/doc/stat/tab122.pdf

27 https://imgs.mongabay.com/wp-content/uploads/sites/30/2024/03/27110514/salt-report-2022-23.pdf

Figure 5: Key commodities comprising non-bulk production and volume of imported goods in FY23 (lakh tonnes)



Sources: Ministry of Steel,[28] Textile Ministry,[29,30,31,32] Ministry of Commerce and Industry,[33] Department of Chemicals and Petrochemicals,[34] Research and Markets[35] and PwC research

In addition to the commodities in Figure 5, non-bulk freight includes items measured in units rather than weight, such as passenger vehicles, two-wheelers and consumer durables (televisions, refrigerators and air conditioners).

Figure 6: Other non-bulk goods volume in FY23 (lakh units)

Source: Society of Indian Automobile Manufacturers[36] and PwC research

The non-bulk commodities segment is led by packaged finished products such as fruits and vegetables, electronics, and clothing, as well as high-value goods measured in units, including automobiles, two-wheelers, and consumer durables like televisions and refrigerators. Other commodities include pharmaceuticals, stationery, furniture and kitchenware.

28 https://steel.gov.in/sites/default/files/Annual%20Report%202023-24%20Final.pdf

29 https://texmin.nic.in/sites/default/files/Annexure-6.pdf

30 https://texmin.nic.in/sites/default/files/Sericulture%20Statistics_0.pdf

31 http://jutecomm.gov.in/Documents/Import%20of%20Raw%20Jute%20and%20Jute%20Goods/Import%20of%20Raw%20Jute%20and%20Jute%20Goods%20-%202020-21.pdf

32 http://jutecomm.gov.in/Import_of_Raw_Jute_and_Jute_Goods.html

33 https://tradestat.commerce.gov.in/eidb/icomq.asp
https://chemicals.gov.in/sites/default/files/Reports/Annual%20Report_2022-23_1.pdf

34 https://chemicals.gov.in/sites/default/files/Reports/Annual%20Report_2022-23_1.pdf

35 https://www.researchandmarkets.com/report/india-chlorides-market#:~:text=The%20total%20capacity%20of%20PVC,the%20other%20four%20leading%20players.

36 https://www.siam.in/statistics.aspx?mpgid=8&pgidtrail=13

3.2. Restricted growth potential in rail share for select traditional commodities

Historically, traditional commodities have dominated the IR freight portfolio. In recent years, however, there has been a gradual shift towards incorporating other goods, particularly automobiles, supported by initiatives such as the Automobile Freight Train Operator (AFTO) scheme and the Liberalized Special Freight Train Operator scheme.

Figure 3 shows that coal, cement, and iron and steel collectively account for approximately 70% of the total freight volume carried by rail. This concentration indicates a strong dependence on specific commodities.

Therefore, to expand its freight portfolio, IR must either increase its modal share within the existing select traditional commodity portfolio or diversify into new segments, particularly lightweight goods.

Table 2 illustrates the rail modal share with associated growth constraints across the select traditional commodities.

Table 2: Rail modal share of traditional commodities moving by rail

Industries	Rail modal share	Growth constraints
Fertiliser	87%	These commodities exhibit a strong rail modal share; however, further growth is constrained by structural limitations within rail logistics, such as the lack of first- and last-mile connectivity, high short-distance costs, rake shortages and market fragmentation. These factors make road transport more viable for smaller consignments and decentralised supply chains.
Coal	62%	
Iron ore	64%	
Finished steel	54%	
Cement	36%	Historically, cement has been a major contributor to rail freight. However, its share has declined over the past 10 years due to the relocation of production centres closer to consumption hubs, reducing the need for long-haul transport. Additionally, cement is sensitive to moisture during the monsoons, prompting a shift towards road transport for better protection and flexibility.
POL	15%	Although POL has a notable presence in rail freight, its growth is limited by the dominance of pipeline infrastructure. India's pipeline network spans over 24,900 km, with development of approximately 10,805 km under execution. This extensive network significantly reduces the reliance on rail for POL transportation.

Source: Railways Year Book 2023–24, NRP 2020, PIB,[37] and PwC research

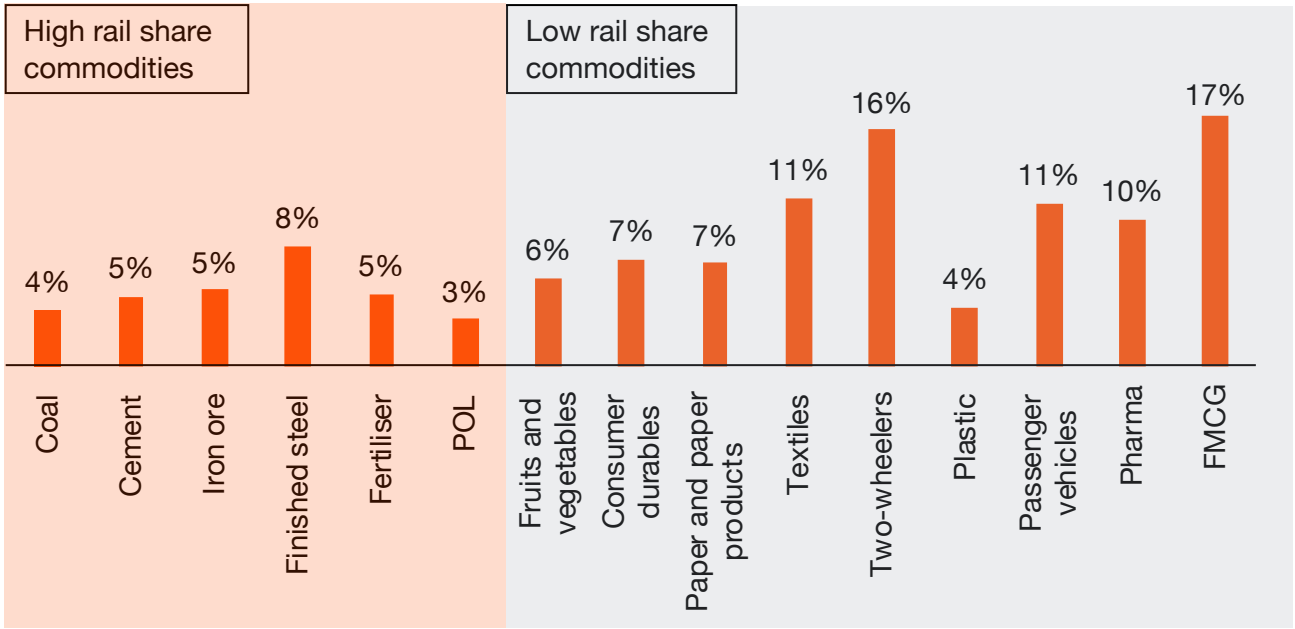
[37] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2090844

Table 2 highlights that certain commodities already have a high modal share in rail transport. However, their future growth potential is limited because of structural and logistical constraints, including infrastructure saturation, proximity of production to consumption centres and competition from alternative modes such as pipelines and roads.

3.3. Future freight basket growth from lightweight commodities

Given the composition of the railway freight basket and the limitations of rail as a mode of transport, substantial interventions are needed to expand the modal share of existing rail-served commodities. Assessing the growth potential of select traditional rail commodities and commodities with low or negligible modal share on rail is also essential.

Figure 7: Future growth percentage (FY 2025–30) of major commodities



Source: NRP,[38] National Steel Plan,[39] IBEF[40,41,42,43,44,45] and PwC research

Figure 7 shows that commodities with low/negligible rail modal share are projected to grow at an average CAGR of approximately 10%, whereas traditional rail commodities are estimated to grow at an average CAGR of approximately 5%.

38 NRP 2020

39 https://steel.gov.in/sites/default/files/draft-national-steel-policy-2017.pdf

40 https://www.ibef.org/industry/paper-packaging#:~:text=Industry%20Overview,for%20paper%20and%20paperboard%20production.

41 https://www.ibef.org/industry/automobiles-presentation

42 https://www.ibef.org/industry/textiles

43 https://www.ibef.org/industry/fmcg

44 https://www.ibef.org/industry/pharmaceutical-india

45 https://www.ibef.org/industry/indian-consumer-market

This growth in low/negligible rail share commodities is primarily driven by lightweight, high-volume goods such as consumer durables, paper and paper products, pharmaceuticals, textiles and FMCG. In recent years, IR has introduced schemes such as the Joint Parcel Product–Railways Cargo Service (JPP-RCS) and the Parcel Cargo Express Train (PCET) to promote this segment. However, the modal share for parcel-based cargo by rail remains low, necessitating additional interventions for a modal shift from road to rail.

Another opportunity lies in the automobile sector, specifically two-wheelers and passenger vehicles, which fall under the low rail share category but exhibit strong growth forecasts. IR has focused on this segment by modifying the AFTO scheme, introducing modern rolling stock (e.g. NMG and BCACBM coaches) and assisting the development of new automobile loading terminals. Haulage charges remained unchanged from 2013 to 2023,[46] indicating cost stability. These efforts have increased the modal share of rail in automobile transport from 1.2% in FY14 to approximately 20% in FY24.[47] However, there remains substantial potential for further expansion in modal share given the projected growth in this segment.

Despite these initiatives, the railway freight basket remains dominated by traditional commodities, which have contributed to modest overall growth in railway freight volumes, with a CAGR of only 5.6% in the past five years.[48] To meet its target volume of 3000 million tonnes by 2027[49] and modal share of 45% by 2030, IR needs to evaluate and rethink approach.

In this context, diversifying the rail freight portfolio is not only a strategic objective but is also essential to enhance rail modal share and overall rail freight growth. Expanding into high-growth, underrepresented commodity segments is critical for achieving its medium- and long-term objectives.

46 https://auto.economictimes.indiatimes.com/news/passenger-vehicle/industry-wary-of-rate-revision-for-transport-of-vehicles-via-railways/100273420

47 https://www.business-standard.com/industry/auto/indian-railways-now-transports-20-of-cars-produced-across-the-country-125061701429_1.html

48 Railways year book 2023-24

49 https://www.teriin.org/research-paper/roadblocks-indian-railways-mission-3000-mt

Characteristics of lightweight commodities and scope for enhancing freight diversification

As established in section 3, commodities with low rail modal share, such as consumer durables, pharma, two-wheelers and automobiles, exhibit higher growth trajectories compared with traditional rail commodities. This case underscores the strategic importance of these segments in diversifying IR's freight portfolio and enhancing its modal share.

Historically, IR has not transported these goods in significant volumes. Their logistics requirements differ from commodities such as coal, iron ore and cement due to their physical attributes.

Understanding the distinct characteristics of these commodities is essential for identifying barriers to rail adoption. The following sections examine these key challenges, focusing on the infrastructure gaps, service limitations and market expectations that hinder modal shift.

4.1. Physical attributes of low rail share commodities and handling needs

Low rail share commodities differ from traditional bulk freight and bagged cements in terms of physical characteristics and handling requirements. These differences directly influence the design and adaptation of infrastructure, rolling stocks and terminal operations to efficiently accommodate such cargo.

Table 3: Characteristics of low rail share commodities

Aspect	Lightweight commodities	Automobiles
Density and volume	Low density (less weight and high volume)	Large size, non-stackable
Value and fragility	High value, prone to damage	High value, damage-sensitive
Packaging	Cartons, crates, pallets (unitised)	Secure lashings and protective enclosures
Temperature sensitivity	Required for pharmaceuticals and processed foods	Not typically required
Shipment size	Smaller, fragmented shipments	Full-rake, multi-point deliveries
Handling method	Mechanised (forklifts, conveyors) or cross-docking	Drive-on ramps with minimal lifting
Wagon requirements	Covered or containerised wagons	Fully covered, multi-deck auto carriers
Terminal infrastructure	Covered goods sheds, cold storage and consolidation space	Dedicated terminals with ramps and paved yards
Special facilities	Temperature-controlled storage and sorting	Pre-shipment parking and en-route unloading points

Source: PwC research

4.2. Opportunities for diversifying the rail freight portfolio

IR has made significant efforts to expand its freight basket. However, certain gaps remain that must be addressed to attract and retain a larger share of non-bulk commodities. These opportunities span infrastructure, operations, connectivity and commercial practices, and leveraging them is key towards making rail a more competitive transport mode for emerging and high-growth sectors.

Furthermore, understanding and addressing certain systemic barriers are essential to enable meaningful diversification. The following section outlines the major gaps that must be addressed to unlock the potential of low rail share commodities and support IR's long-term freight growth strategy.

4.2.1. Need for full-rake loading

IR's freight operations are optimised for full-rake (full train) loads to maximise efficiency and economies of scale. Thus, shippers are incentivised (through lower rates) only when they can offer an entire train's cargo.

However, many commodities in the emerging commodity segment have smaller shipment sizes and cannot fill the entire rake. Low-volume shippers avoid rail in the absence of convenient less-than-trainload options.[50] Therefore, the high tonnage threshold excludes many potential customers, pushing them towards road transport, which is more flexible.

4.2.2. Dispersed consumption centres

Unlike traditional commodities such as coal or iron ore, goods such as FMCG, consumer durables, e-commerce shipments and automotive products have consumption centres that are geographically dispersed. This distribution demands greater flexibility in freight operations, particularly in the capacity to serve multiple unloading points within the same trip.

The two-point/mini rake concept allows a freight train to divide its wagons between two destinations – typically half the rake for each – enabling one train to serve multiple terminals. Although this model supports smaller load volumes and has a broader reach, it introduces operational complexities.[51]

Two-point loading requires coordination between two separate terminals, as any delay at one location can hold up the train's departure. It also depends on both consignees being prepared for prompt unloading upon arrival to avoid demurrage charges. These dependencies can create inefficiencies and diminish rail's attractiveness for time-sensitive and fragmented cargo flows.

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50 https://www.globalrailwayreview.com/article/179525/indian-railways-overhauling-its-parcel-business-towards-improved-logistics-efficiency/#:~:text=the%20capacity%20of%20the%20network

51 https://www.irfca.org/faq/faq-freight.html#:~:text=Bulk%20freight%20transport%20rates%20also,two%20loading%20or%20unloading%20locations

4.2.3. Potential to build a robust consolidation ecosystem

Unlike road logistics, where freight consolidation is well-established, IR has the potential to build a robust consolidation ecosystem for third-party aggregators. Ideally, moving non-traditional commodities by rail requires an efficient freight forwarding ecosystem, common user terminals and logistics partners to aggregate small shipments.[52]

The current landscape presents a significant opportunity to expand consolidation services for rail transport. Currently, small shippers often face limitations in combining loads with others because no widely standardised process exists to aggregate smaller loads for booking individual or partial wagons. This case makes rail less accessible for businesses with high-value, low-volume freight, which prefer road transport for its door-to-door convenience and flexible load combinations.

Strengthening infrastructure at rail goods sheds can further unlock this potential. Many of these facilities have yet to be optimised with the space, facilities, operational flexibility and dedicated areas for sorting and aggregation required to support efficient cargo consolidation. With targeted upgrades, these facilities can better support these activities and enhance the competitiveness of rail for non-traditional freight.

4.2.4. Reliable transit time and end-to-end tracking

One of the key enablers for increased adoption of lightweight and automobile freight on rail is improving transit time predictability. Freight trains in India often operate at low average speeds, approximately 27 and 24 kmph for diesel and electric locomotives in FY 2023–24,[53] respectively. One reason is shared track usage, where passenger trains are prioritised, causing freight trains to be frequently rescheduled for crew/loco availability or be delayed, especially in congested corridors.

Beyond speed, the key is improving reliability. Reducing delays caused by network congestion, rake availability and terminal readiness can significantly strengthen rail's role in supply chain planning, particularly for high-value, time-sensitive goods such as FMCG, pharmaceuticals and consumer durables. Greater predictability in delivery windows will enhance inventory management, distribution efficiency and customer satisfaction, making rail a more cost-efficient option for these sectors.

Although IR uses the Freight Operations Information System to track train movements, the platform currently seeks a more comprehensive end-to-end visibility. This system provides positional updates but requires reliable indicate rake placement times, which are critical for planning loading and unloading operations.

52 NITI Aayog: Improving Rail Efficiency and Share in India's Freight Transport
53 Indian Railways Year Book FY 2023-24

4.2.5. Wagon suitability and the need for innovation incentives in wagon design

Diversifying IR's freight portfolio can be further strengthened by advancing rolling stock suited for non-traditional commodities. Although existing wagons are well-optimised for traditional bulk cargo, there is a growing momentum towards introducing wagon designs tailored for lightweight, high-volume goods and 24odernize24d cargo such as automobiles. Recent efforts to encourage private sector participation and 24odernize rolling stock manufacturing may further accelerate this transition, opening new avenues for attracting diverse freight segments to rail.

For instance, LHB parcel vans, commonly used for lightweight goods, have a payload capacity of 24 tonnes but often carry only around 22 tonnes due to volume constraints. Shippers must carefully optimise their cargo mix to avoid dead weight loss — an issue that road transport addresses more effectively through various vehicle configurations. Similarly, in the automobile segment, the widely used BCACBM double-decker wagons are suitable for hatchbacks but provide limited accommodation to taller vehicles such as SUVs due to height limitations, restricting their utility with evolving market preferences.

Innovating wagon designs requires an efficient, time-sensitive and low-cost approval process. Currently, proposals for new designs must pass through the Committee on Wagon Design, involving the RDSO, railway board officials and industry experts. Depending on the complexity and RDSO's capacity, approvals can take up to three years.[54] Additionally, RDSO levies consultancy and testing charges, including a design evaluation fee of approximately 2% of the prototype cost, all of which must be borne by the proposer.

The Railway Board's 'New Wagon Design Policy' lays a strong foundation for wagon design. However, with faster approvals, financial incentives and collaborative development models, private participation and innovation in wagon design can be accelerated. This approach will further enhance IR's ability to effectively cater to emerging freight segments.

54 NITI Aayog, Improving rail efficiency and share in India's freight transport

4.2.6. Leveraging IR's freight tonnage strength to expand cargo diversity

IR's policy centres on volume-first orientation, which has successfully driven a freight mix based on high-tonnage commodities. For many years, coal alone has contributed approximately half of the total tonnage, offering efficiency in rake movements and helping IR meet its tonnage targets. Building on these strengths, there is significant scope to complement the existing freight basket by attracting lightweight, high-growth commodities, which currently have a low rail modal share but hold immense potential to diversify and strengthen IR's freight portfolio.

Currently, IR does not hold a large portfolio in terms of fast-growing lightweight commodities. The BOG category, which includes miscellaneous manufacturing, consumer and intermediate goods, constitutes approximately 40%[55] of the country's freight market by volume, yet IR's share in this segment is only about 7%.[56]

4.2.7. Cost economics

Cost and transit time are critical factors in mode selection for lightweight, high-volume commodities, such as consumer durables, pharmaceuticals, textiles and FMCG – segments driven by retail and e-commerce inventory optimisation.

Road transport has adapted with faster, premium services, whereas rail continues to face challenges. Schemes such as PCET and JPP-RCS offer competitive costs over long distances (>2,000 km); however, rail's total transit time, including handling time, delays and first-/last-mile gaps, remains higher, leading to a loss in overall movement timeline. For instance, transport from Delhi to Bengaluru takes approximately 72 hours by road compared with 90–115 hours through dedicated parcel trains.[57]

Parcel vans attached to passenger trains reduce transit time to approximately 50 hours but are 1.3–2 times more expensive than road.[58] In addition, these trains have a limited parcel capacity of one to two parcel vans and/or SLRs, typically 3.9 tonnes per SLR coach and up to 24 tons per parcel van, restricting the cargo volume that can be moved through one passenger train. Freight charges need to be aligned with the volume loss while determining the pricing and making design innovations to utilise the full volume.

55 https://ia600109.us.archive.org/25/items/mission-3000-mt-of-railways/Mission-3000MT-of-Railways.pdf#%3A~%3Atext=is%20severely%20limiting%20the%20IR%E2%80%99s%2Cfinished%20Metals%2C%20zinc%2C%20manganese%2C%20agriculture – Report of the multidisciplinary committee for planning various measures to meet future demand of freight loading of 3000 MT per annum

56 Indian Railways year book 2023-24

57 PwC research

58 PwC research

The automobile sector, another price- and handling-sensitive segment, can be leveraged through more efficient operations and increased space at goods sheds. Even small changes in transport cost through innovation such as a double stack automobile carrying wagon can immediately influence rail modal choice. These measures also align with India's decarbonisation commitments in the supply chain of global auto manufactures.

Road transport benefits from competitive pricing and dynamic market rates, whereas rail operates under a much less agile pricing structure with limited flexibility in pricing. Additional cost components, such as advance payment for railway rake placement as per the tariff policy of IR, along with additional handling with first- and last-mile logistics costs, further reduce rail's competitiveness.

4.2.8. Room for handling operations

As noted in section 4.1, these BOG commodities are highly valued and therefore require minimal manual handling as well as dedicated spaces due to their sensitivity to damage. Currently, most of this cargo that is shipped via rail is transported via passenger trains to meet time-sensitive delivery requirements. However, handling operations at passenger stations require automation, more comprehensive infrastructure and adequate space. Cross-docking facilities can also reduce the number of handling stages, thereby reducing the risk of damage during transfer.

In the case of automobile freight, the industry requires an upgrade of **loading/unloading mechanisms** to reduce the time taken, which currently stands at eight hours per rake. In practice, car-loading often exceeds this. Railways even levy 'stabling' penalties if unloading goes beyond eight hours. Strict penalties and unpredictable locomotive supply (with priority often given to other trains) cause vehicles to wait for hours before loading/unloading.[59]

[59] https://indianrailways.gov.in/railwayboard/uploads/directorate/traffic_comm/Rates_Master_Circulars/2024/Free%20time%20for%20loading%20and%20unloading%20of%20consignment%20handled%20by%20crane%20for%20EOL%20terminals(2).pdf

Way forward

IRs has, so far, focused on select commodities such as coal, food grains, fertilisers, cement, and iron and steel, which have traditionally comprised a major share of their freight portfolio. This is also driven by IR's targets, which are measured in terms of tonnage and lead to more preference and planning for high-tonnage commodities.

Meanwhile, lightweight shipments and non-traditional commodities, such as consumer durables, FMCG products, electronics, e-commerce goods, automobiles (including four- and two-wheelers), paper products and pharmaceuticals, continue to move predominantly via road. These high- growth sectors represent the future of freight logistics, with several of these segments projected to grow at nearly twice the pace of the traditional commodities that currently dominate rail transport.

Therefore, IR has strong potential to recalibrate its operational and commercial frameworks to actively tap into these high-growth freight basket segments. Greater contribution from these lightweight commodity segments will be key to supporting IR's efforts to achieve its targets of 3,000 MT in annual loadings by 2027 and a rail modal share of 45% by 2030.

For lightweight commodities to become an integral part of long-term supply chains for end users and logistics providers, IR needs to ensure efficient operations, reliable services, availability of suitable wagons, competitive pricing, a supportive ecosystem and technology-driven, consumer-centric services.

Significant investments in wagon designs, supported by incentives, are required to invite innovative designs. This approach can further enable the diversification of the railway freight portfolio. Developing efficient freight terminals and intermodal wagons would also bring efficiency and contribute to freight intermodality, enabling a shift from road to rail for lightweight commodities and contributing to an increased rail modal share and freight growth for IR.

Major investments have been made to create additional infrastructure and capacity in the railway network over the last 10 years. However, to fully realise the desired growth in rail modal share, these efforts must be complemented by targeted interventions that promote the movement of lightweight commodities and enable greater diversification of the rail freight portfolio.

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Contacts

Neerja Singh

Assistant Secretary General
Email: neerja.singh@ficci.com

Komal Sharma

Additional Director – Infrastructure
Email: komal.sharma@ficci.com

Tushar Sharma

Senior Assistant Director – Infrastructure (Transport)
Phone: +91-895018278
Email: Tushar.sharma@ficci.com

Akshay Mittal

Assistant Director – Infrastructure (Transport)
Phone: +91-99719 26200
Email: akshay.mittal@ficci.com

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Contact us

Manish R Sharma

Partner and Leader
Infrastructure, Transport and Logistics, Real Estate, Global Ports CoE
PwC India
Email: manish.r.sharma@pwc.com

Jaffrey Thomas

Partner
Logistics and Transport Infrastructure
PwC India
Email: jaffrey.thomas@pwc.com

Nitin Kumar

Director
Logistics and Transport Infrastructure
PwC India
Email: nitin.n.kumar@pwc.com

Contributors

Gaurav Singla

Prashant Jain

Ayush Bhatia

Editorial: Dion D'Souza

Design: Kanagavathi Murugaiah

Notes

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