



Industry Report on Railway Coach Interior and Furnishing Solutions in India

September 2025

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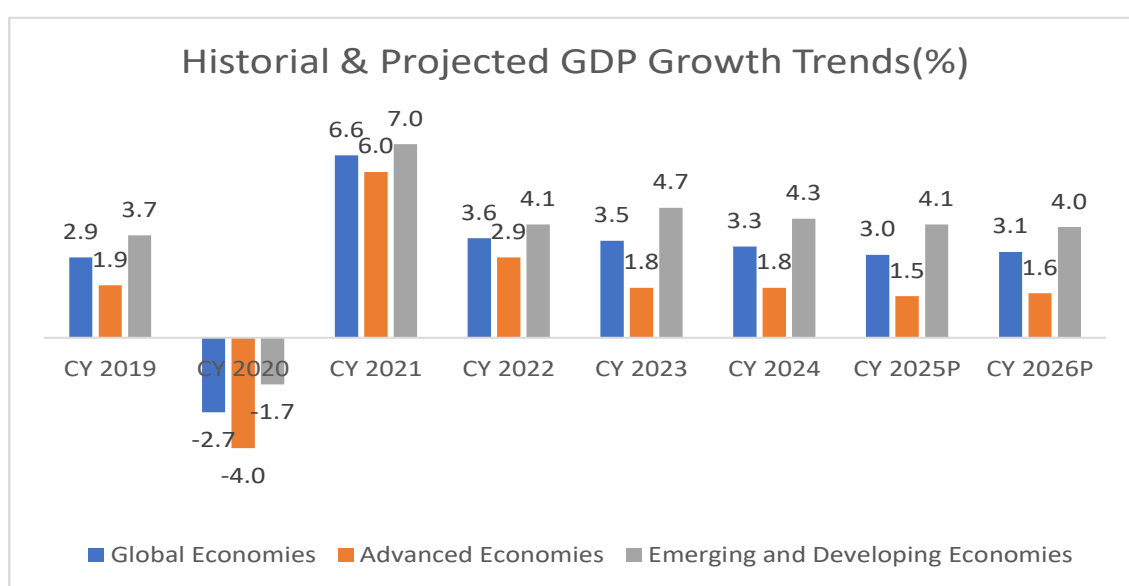
Table of Contents

Global Macroeconomic Scenario.....	5
Historical and Projected GDP Growth	5
Global Economic Outlook.....	6
Global Growth Projection.....	7
Historical GDP and GVA Growth trend.....	9
Sectoral Contribution to GVA and annual growth trend	10
Annual & Monthly IIP Growth	11
Annual and Quarterly: Investment & Consumption Scenario.....	12
Inflation Scenario.....	14
Growth Outlook.....	16
Passenger Railway Segment in India	18
Current scenario.....	18
Passenger Traffic in India.....	18
Suburban vs. Non-Suburban Passenger Traffic	19
Metro Railway Network.....	20
Key Factors Driving Passenger Growth in Indian Railways.....	22
Rolling Stocks: Passenger Coach scenario.....	23
Coach Construction:.....	24
Types of Coaches in Indian Railways.....	24
Passenger Coaches Growth in Indian Railways	27
Furnishing & Refurbishment of Passenger Coaches	28
Furnishing and Interior Fittings Mandated by Indian Railways.....	28
Passenger Amenities and Safety Features.....	30
New Coaches Capacity Expansion	34
Planned Coach Additions	34
Metro Expansion Plans.....	35
Refurbishment Plans for Existing Coach.....	37
Addressable Market Opportunity	39
Surveillance & Monitoring Systems	40

Toilet Upgradation	42
Maintenance: Engine & Coach	43
Key Highlights of the Railway Capex for 2025-26.....	44
Indian Railways Budget Allocation for 2025-26: Focus on Customer Amenities and Rolling Stock	45
Railways Infrastructure.....	47
Railway modernization in India: focus on expansion / modernization of railway station network..	47
Signalling & Electrification Infrastructure of Indian Railways:	53
Technology Development in Track & Signalling Infrastructure:	60
Digital Transformation Initiatives in Railway:	61
Competitive Scenario:	63

Global Macroeconomic Scenario

The global economy, which recorded GDP growth at 3.3% in CY 2024, is expected to show resilience at 3.0% in CY 2025. This marks the slowest expansion since 2020 and reflects a -0.3%point downgrade from January 2025 forecast. Moreover, the projection for CY 2026 has also reduced to 3.1%. This slowdown is majorly attributed due to numerous factors such as high inflation in many economies despite central bank effort to curb inflation, continuing energy market volatility driven by geopolitical tensions particularly in Ukraine and Middle East, and the re-election of Donald Trump as US President extended uncertainty around the trade policies as well as overall global economic growth. High inflation and rising borrowing costs affected the private consumption on one hand while fiscal consolidation impacted the government consumption on the other hand. As a result, global GDP growth is projected to slow down from 3.3% in CY 2024 to 3.0% in CY 2025.



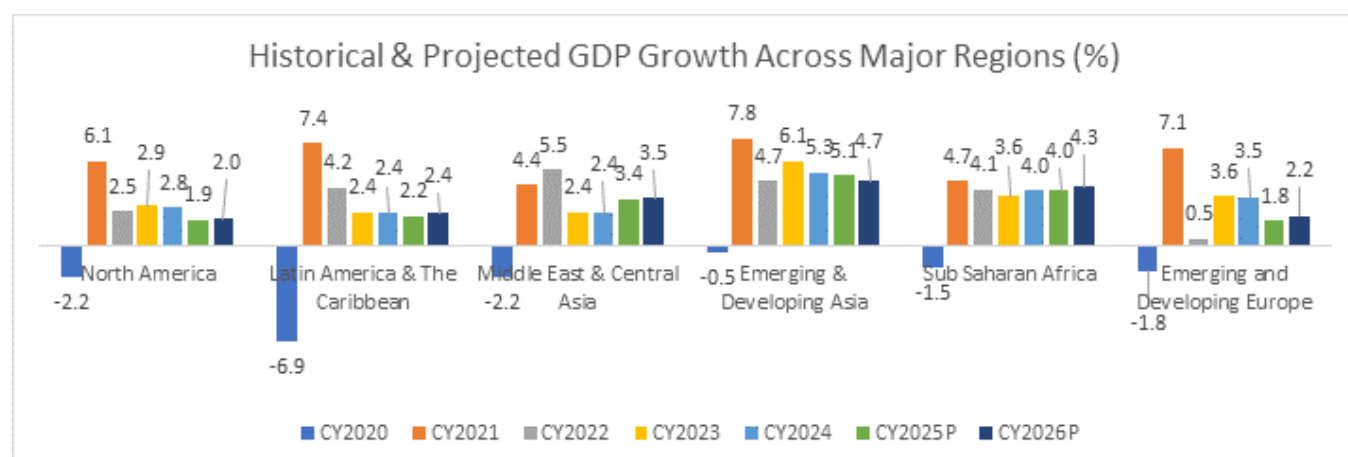
Source – IMF Global GDP Forecast Release July 2025

Note: Advanced Economies and Emerging & Developing Economies are as per the classification of the World Economic Outlook (WEO). This classification is not based on strict criteria, economic or otherwise, and it has evolved over time. It comprises of 40 countries under the Advanced Economies including the G7 (the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada) and selected countries from the Euro Zone (Germany, Italy, France etc.). The group of emerging market and developing economies (156) includes all those that are not classified as Advanced Economies (India, China, Brazil, Malaysia etc.)

Historical and Projected GDP Growth

GDP growth across major regions exhibited a mixed trend between 2022-23, with GDP growth in many regions including North America, Emerging and Developing Asia, and Emerging and Developing Europe slowing further in 2024. In 2025, GDP growth rate in Emerging and Developing Asia (India, China, Indonesia, Malaysia, etc.) is expected to moderate further to 5.1% from 5.3% in the previous year, while in the North America, it is expected to moderate to 1.9% in CY 2025 from 2.8% in CY

2024. Similarly in Emerging and Developing Europe is expected to moderate further to 1.8% from 3.5% in the previous year.



Source-IMF World Economic Outlook July 2025 update.

Except Middle East & Central Asia, all other regions like Emerging and Developing Asia, Emerging and Developing Europe, Latin America & The Caribbean, Sub Saharan Africa and North America, are expected to record a moderation in GDP growth rate in CY 2025 as compared to CY 2024. Further, growth in the United States is expected to come down at 1.9% in CY 2025 from 2.8% in CY 2024 due to lagged effects of monetary policy tightening, gradual fiscal tightening, and a softening in labour markets slowing aggregate demand.

Global Economic Outlook

The global macroeconomic environment remains shaped by divergent regional trends and continued geopolitical and policymaking uncertainties. A wave of new U.S. tariffs, mostly effective from August 7, has shaken markets and raised costs for global trade. On August 1, the U.S. announced higher tariff rates for countries from which it imports goods, with most of the rates effective from August 7. A 15% rate will act as a baseline floor for countries with which the U.S. has a trade deficit; a 10% rate applies for those with which the U.S. has a trade surplus. However, there are some countries that are subject to higher U.S. tariffs.

In North America, the United States continues to engage in trade negotiations with multiple countries and has announced plans to introduce sector-specific tariffs, targeting industries such as copper and pharmaceuticals. However, talks with Canada have stalled, despite Canada's decision to withdraw its Digital Services Tax in an effort to ease tensions. As a result, the U.S. imposed a 35% tariff on Canadian goods that do not meet USMCA compliance standards, effective August 1. This move has further strained bilateral relations and added complexity to the regional trade landscape.

By August 7, the U.S. had announced increased tariffs of 15-50% on Asian economies, with most rates around 20%. Although these tariffs are lower than the levels announced in April, they remain higher

than those applied to most Western counterparts, impacting exporters such as Taiwan Region (20%) and India (25%, with the U.S. saying this could rise to 50% at the end of August). Moreover, On July 28, the US imposed a 15% tariff on most EU imports under a new trade agreement, impacting Nordic countries such as Denmark, Finland, and Sweden. Key exemptions include aircraft parts and semiconductor equipment, while steel and aluminum continue to face 50% tariffs.

Tariffs and their unpredictable application have weighed on consumer and business sentiment, sunk global stock markets, raised recession risks, and made a global slowdown more likely. Our latest Global Business Optimism Insights report for indicates a further decline in business optimism as firms continue to grapple with trade-related policy uncertainty and its broader economic implications. Export-driven sectors reported sharp declines in optimism. Financial risk perceptions remain elevated as businesses contend with high borrowing costs and persistent inflation expectations. More broadly, the uncertainty is reflected in delayed capital expenditure and a pullback in hiring.

Tariffs have begun to exert pressure on central banks by contributing to inflationary pressures and increasing financial market volatility. Central banks are adjusting forward guidance and policy frameworks and may begin to consider the likelihood of softer growth being a bigger priority than high inflation by starting to cut interest rates to support economies. For businesses, this uncertainty translates into unpredictable cost structures, fluctuating credit availability, and the management of operational costs through diversified supply networks.

The latest Dun & Bradstreet Global Business Optimism Insights report reveals a further decline in business optimism, though at a more moderate pace than in the prior quarter, as businesses continued to grapple with trade-related policy uncertainty and its broader economic implications. Export-driven sectors such as automotives, electricals, and metals saw sharp declines in optimism, particularly in the U.S., Mexico, South Korea, and Japan, where rising tariffs and shifting trade policies have fueled cost pressures and demand volatility. Financial risk perceptions remain elevated.

Global Growth Projection

At broader level, the global economy is expected to experience a slowdown in 2025, with GDP growth projected to decline to 3.0%, down from 3.3% in 2024. This deceleration reflects persistent inflationary pressure, geopolitical uncertainties and tightened monetary policies. However, a slightly recovery is anticipated in 2026, with growth projected to improve to 3.1%. Global inflation is expected to decline steadily, to 4.2% in 2025 and to 3.6% in 2026. Inflation is projected to converge back to the target earlier in advanced economies, reaching 2.2% in 2026, whereas in emerging market and developing economies, it is anticipated to decrease to 4.6% during the same period. Trade tariffs function as a supply shock for the countries imposing them, leading to a decrease in productivity and an increase in unit costs. Countries subject to tariffs experience a negative demand shock as export demand declines, placing downward pressure on prices. In each scenario, trade uncertainty introduces an additional

layer of demand shock since businesses and households react by delaying investment and spending, and this impact could be intensified by stricter financial conditions and heightened exchange rate volatility. Moreover, Global trade growth is expected to slow down in 2025 to 1.7%. This forecast reflects increased tariff restrictions affecting trade flows and, to a lesser extent, the waning effects of cyclical factors that have underpinned the recent rise in goods trade. Geopolitical tensions as seen in the past such as the wars in Ukraine and the Middle East could exacerbate inflation volatility, particularly in energy and agricultural commodities.

India Macroeconomic Analysis

India emerged as one of the fastest growth economies amongst the leading advanced economies and emerging economies. In CY 2024, even amidst geopolitical uncertainties, particularly those affecting global energy and commodity markets, India continues to remain one of the fastest growing economies in the world and is expected to grow by 6.4% in CY 2025.

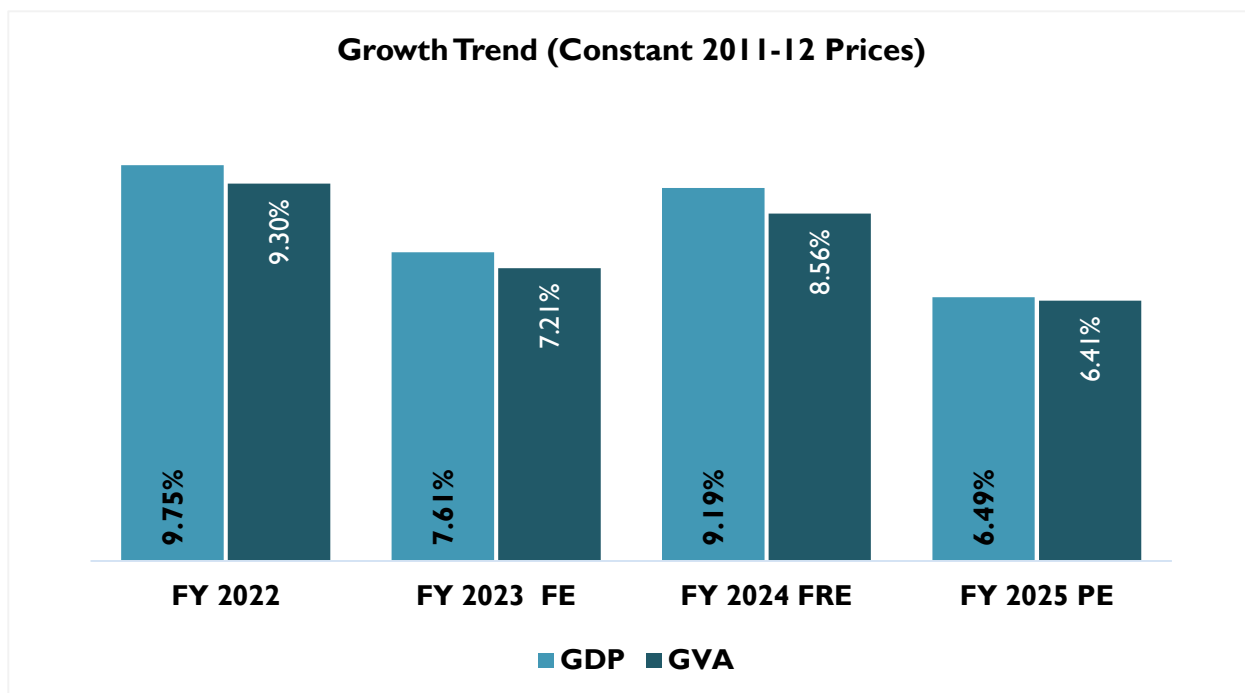
Country	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025 P	CY 2026 P
India	– 5.8%	9.7%	7.6%	9.2%	6.5%	6.4%	6.4%
China	2.3%	8.6%	3.1%	5.4%	5.0%	4.8%	4.2%
United States	-2.2%	6.1%	2.5%	2.9%	2.8%	1.9%	2.0%
Japan	-4.2%	2.7%	0.9%	1.4%	0.2%	0.7%	0.5%
United Kingdom	- 10.3 %	8.6%	4.8%	0.4%	1.1%	1.2%	1.4%
Russia	-2.7%	5.9%	-1.4%	4.1%	4.3%	0.9%	1.0%

Source: World Economic Outlook, July 2025

The Government stepped spending on infrastructure projects to boost the economic growth had a positive impact on economic growth. The capital expenditure of the central government increased by average 26.52% during FY 2023-FY 2024 which slowed to 7.27% in FY 2025 which is expected to translate in moderating GDP growth of 6.4% in CY2025. In the Union Budget 2025-2026, the government announced INR 11.21 billion capex on infrastructure (10.12% higher than previous year revised estimates) coupled with INR 1.5 trillion in interest-free loans to states. This has provided much-needed confidence to the private sector, and in turn, expected to attract the private investment.

Historical GDP and GVA Growth trend

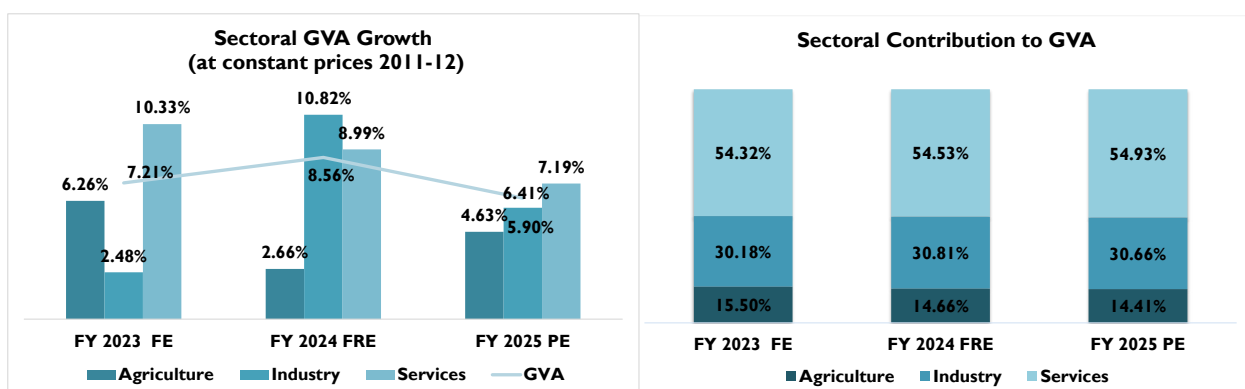
As per the latest estimates, India's GDP at constant prices is estimated to grow to INR 187.96 trillion in FY 2025 (Provisional Estimates) with the real GDP growth rates estimated to be 6.5% for FY 2025. Similarly, real Gross Value Added (GVA) growth stood is estimated to have moderated to 6.4% in FY 2025. Even amidst global economic uncertainties, India's economy exhibited resilience supported by robust consumption and government spending.



Source: Ministry of Statistics & Programme Implementation (MOSPI), National Account Statistics: FY2025.

FE is Final Estimates, FRE is First Revised Estimate and PE is Provisional Estimates

Sectoral Contribution to GVA and annual growth trend



Source: Ministry of Statistics & Programme Implementation (MOSPI)

FE is Final Estimates, FRE is First Revised Estimate and PE is Provisional Estimates

Sectoral analysis of GVA reveals that the industrial sector experienced a moderation in FY 2025, recording a 5.90% y-o-y growth against 10.82% year-on-year growth in FY 2024. Within the industrial sector, growth moderated across sub sector with mining, manufacturing, and construction activities growing by 2.69%, 4.52%, and 9.35% respectively in FY 2025, compared to 3.21%, 12.30%, and 10.41% in FY 2024. Growth in the utilities sector too moderated to 6.03% in FY 2025 from 8.64% in the previous year. The industrial sector's contribution to GVA moderated marginally from 30.81% in FY 2024 to 30.66% in FY 2025.

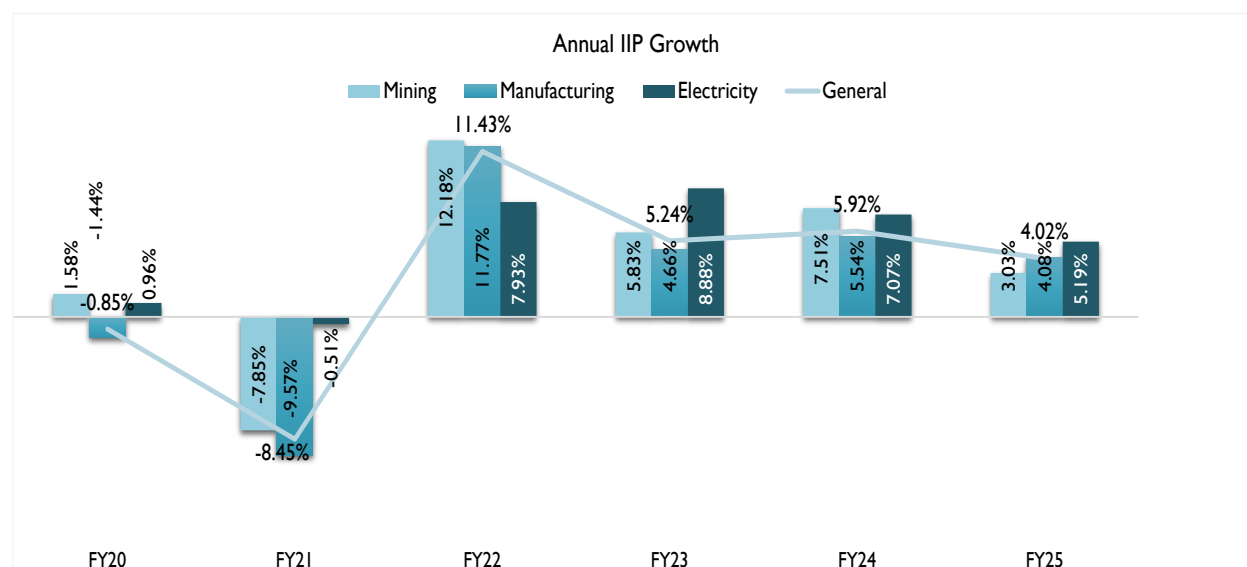
The services sector continued to be the main driver of economic growth, although its pace moderated. It expanded by 7.19% in FY 2025 from 8.99% in FY 2024. The services sector retained its position as

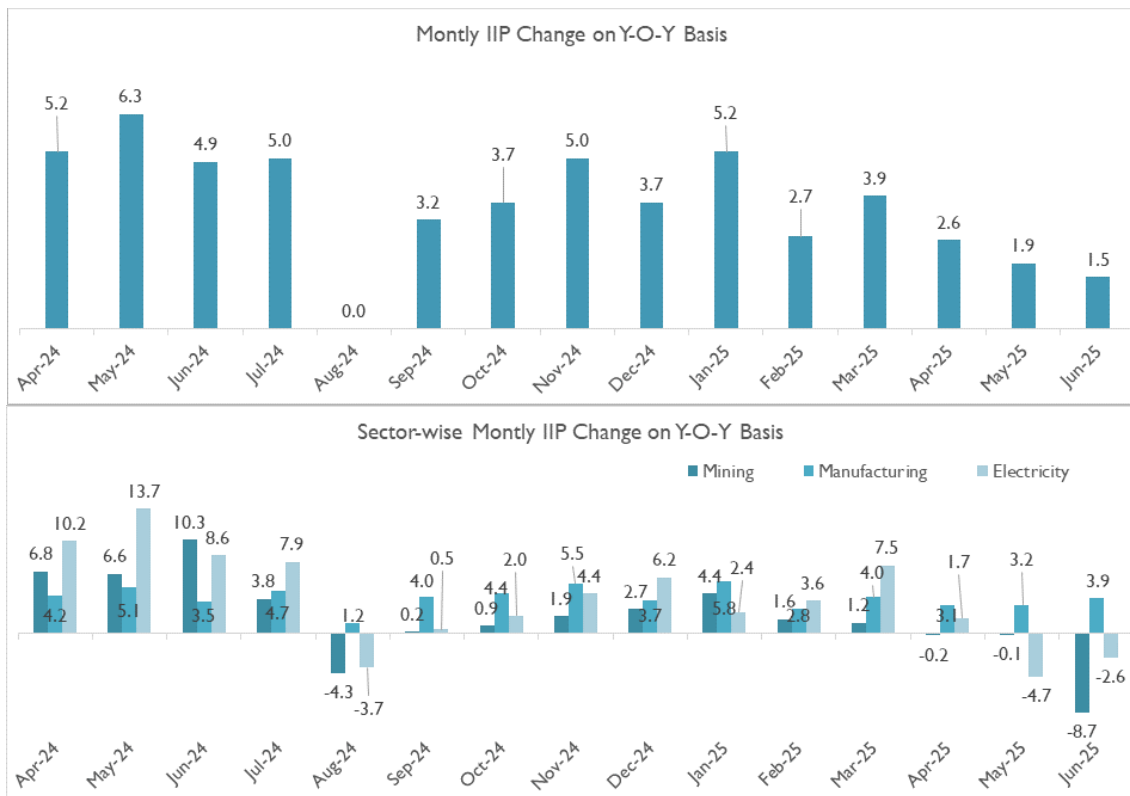
the largest contributor to GVA, rising from 54.32% in FY 2023 to 54.53% in FY 2024, with a further increase to 54.93% in FY 2025.

The agriculture sector saw an acceleration, with growth increasing from 2.66% in FY 2024 to 4.63% in FY 2025. However, its contribution to GVA declined marginally from 14.66% in FY 2024 to 14.41% in FY 2025. Overall, Gross Value Added (GVA) growth moderated to 6.41% in FY 2025 from 8.56% in FY 2024

Annual & Monthly IIP Growth

Industrial sector performance as measured by IIP index exhibited moderation in FY 2025, recording a 4.02% y-o-y growth against 5.92% increase in the previous year. The manufacturing index showed moderation and grew by 4.08% in FY 2025 against 5.54% in FY 2024. Mining sector index too moderated and exhibited a growth of 3.03% in FY 2025 against 7.51% in the previous years while the Electricity sector Index, also witnessed moderation of 5.19% in FY 2025 against 7.07% in the previous year.



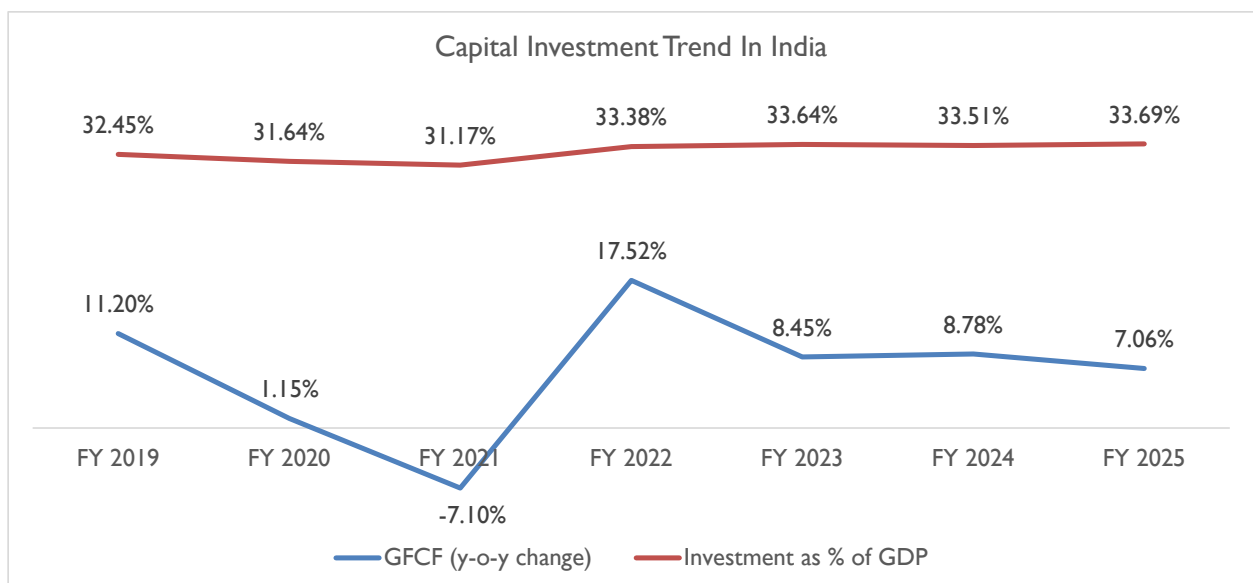


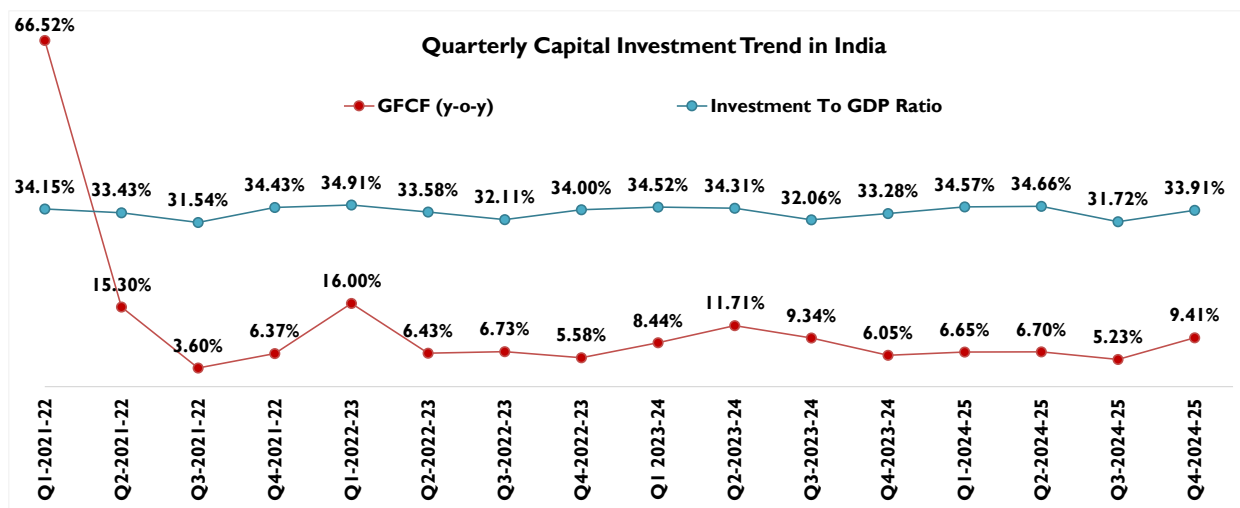
Source: Ministry of Statistics & Programme Implementation (MOSPI)

The IIP growth rate for the month of June 2025 is 1.5% which was 1.9% in the month of May 2025. The growth rates of the three sectors, Mining, Manufacturing and Electricity for the month of May 2025 are (-)8.7%, 3.9% and (-)2.6% respectively.

Annual and Quarterly: Investment & Consumption Scenario

Other major indicators such as Gross fixed capital formation (GFCF), a measure of investments, has shown fluctuation during FY 2025 as it registered 7.06% year-on-year growth against 8.78% yearly growth in FY 2024, taking the GFCF to GDP ratio measured to 33.69%.

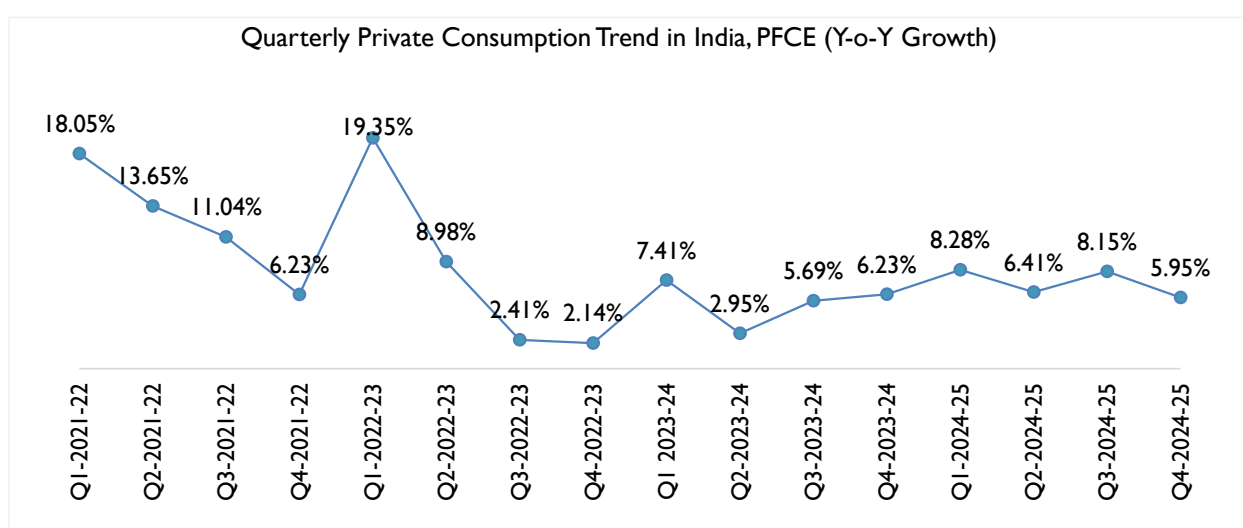
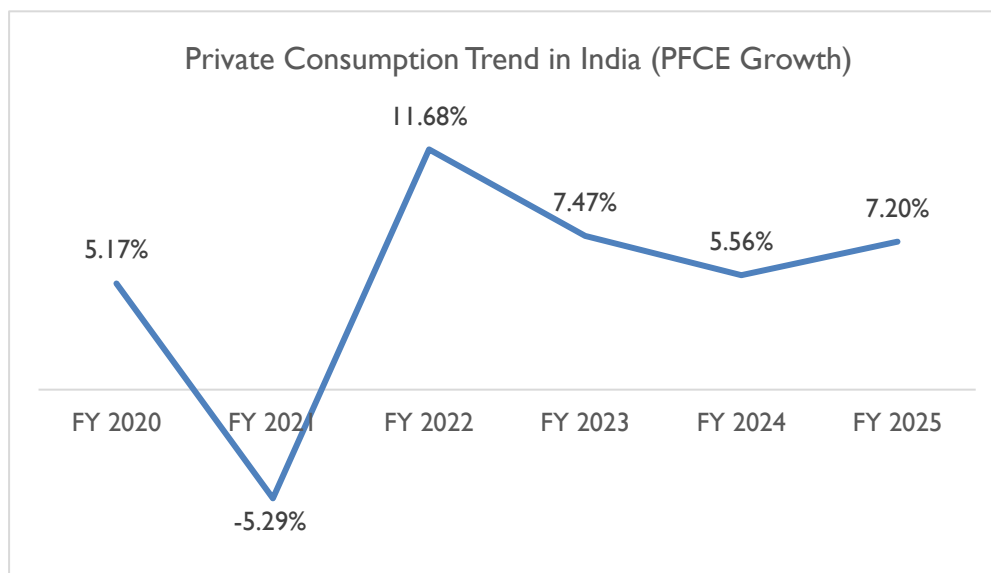




Source: Ministry of Statistics & Programme Implementation (MOSPI)

On quarterly basis, GFCF exhibited a fluctuating trend in quarterly growth over the previous year same quarter. In FY 2024, the growth rate moderated to 6.05% in March quarter against the previous two quarter as government went slow on capital spending amidst the 2024 general election while it observed an improvement in Q1 FY 2025 by growing at 6.65% against 6.05% in the previous quarter and moderated in the subsequent two quarter. On yearly basis, the growth rate remained lower compared to the same quarter in the previous year during FY 2025. The GFCF to GDP ratio measured 33.91% in Q4 FY 2025.

Private Consumption Scenario



Sources: MOSPI

Private Final Expenditure (PFCE) a realistic proxy to gauge household spending, observed growth in FY 2025 as compared to FY 2024. However, quarterly data indicated some improvement in the current fiscal as the growth rate improved over the corresponding period in the last fiscal.

Inflation Scenario

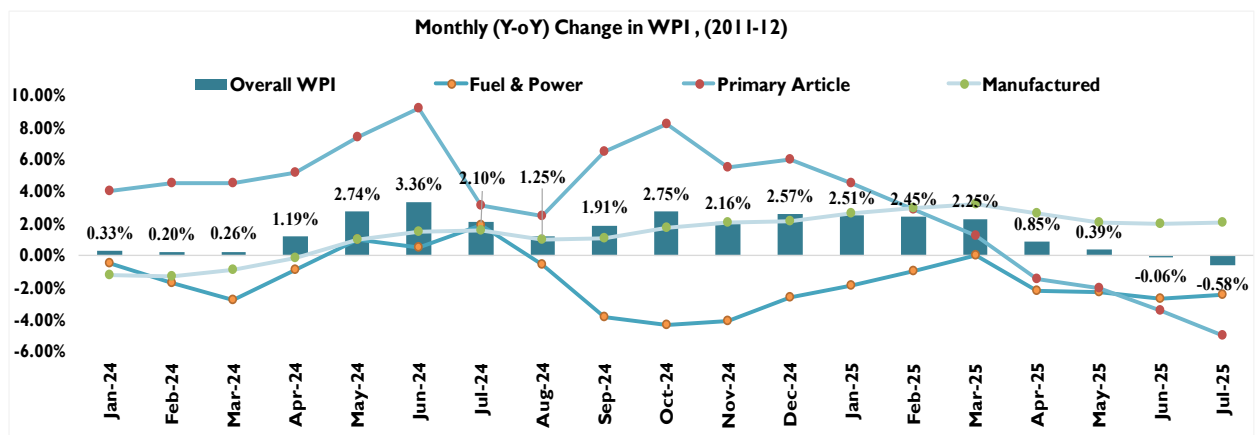
The inflation rate based on India's Wholesale Price Index (WPI) exhibited significant fluctuations across different sectors from January 2024 to July 2025. The annual rate of inflation based on All India Wholesale Price Index (WPI) number is (-) 0.58% (provisional) for the month of July, 2025 (over July, 2024). Negative rate of inflation in July 2025 is primarily due to increase in prices of manufacture of food products, electricity, other manufacturing, chemicals and chemical products, manufacture of other transport equipment and non-food articles etc.

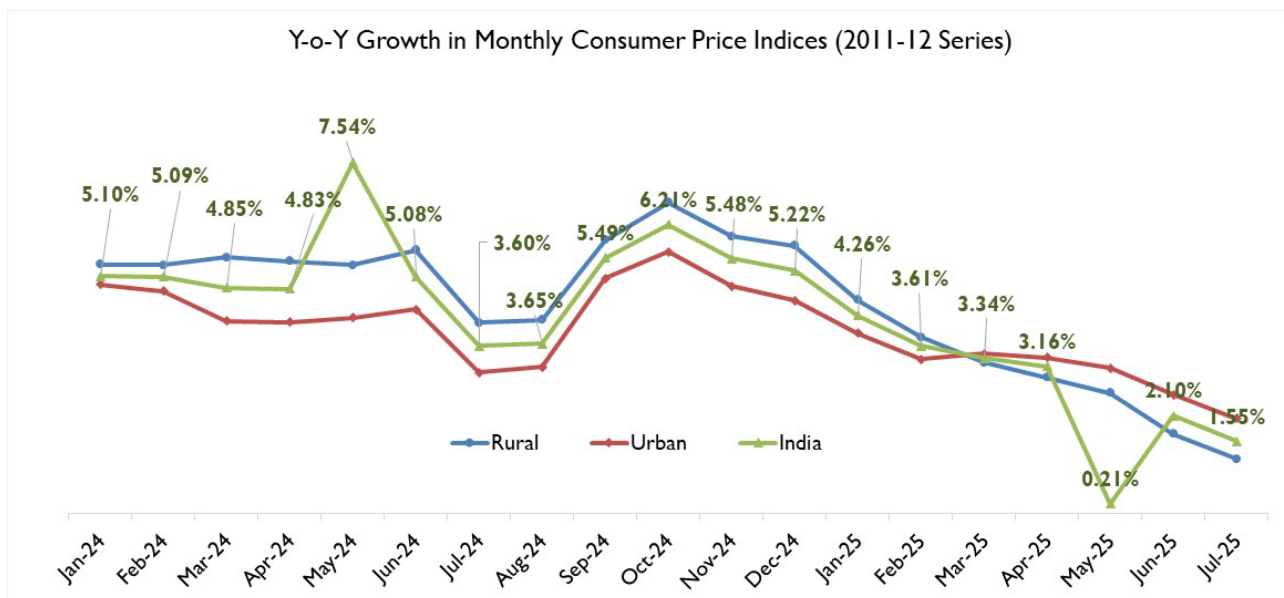
By July 2025, Primary Articles (Weight 22.62%), - The index for this major group increased by 1.18 % from 185.8 (provisional) for the month of June 2025 to 188.0 (provisional) in July, 2025. Price of Crude

Petroleum & Natural Gas (2.56%), non-food articles (2.11%) and food articles (0.96%) increased in July, 2025 as compared to June, 2025. The price of minerals (-1.08%) decreased in July, 2025 as compared to June, 2025.

Moreover, power & fuel, the index for this major group increased by 1.12% from 143.0 (provisional) for the month of June, 2025 to 144.6 (provisional) in July, 2025. The price of mineral oils (1.98%) increased in July, 2025 as compared to June, 2025. Price of coal (-0.44%) and electricity (-0.36%) decreased in July, 2025 as compared to June, 2025.

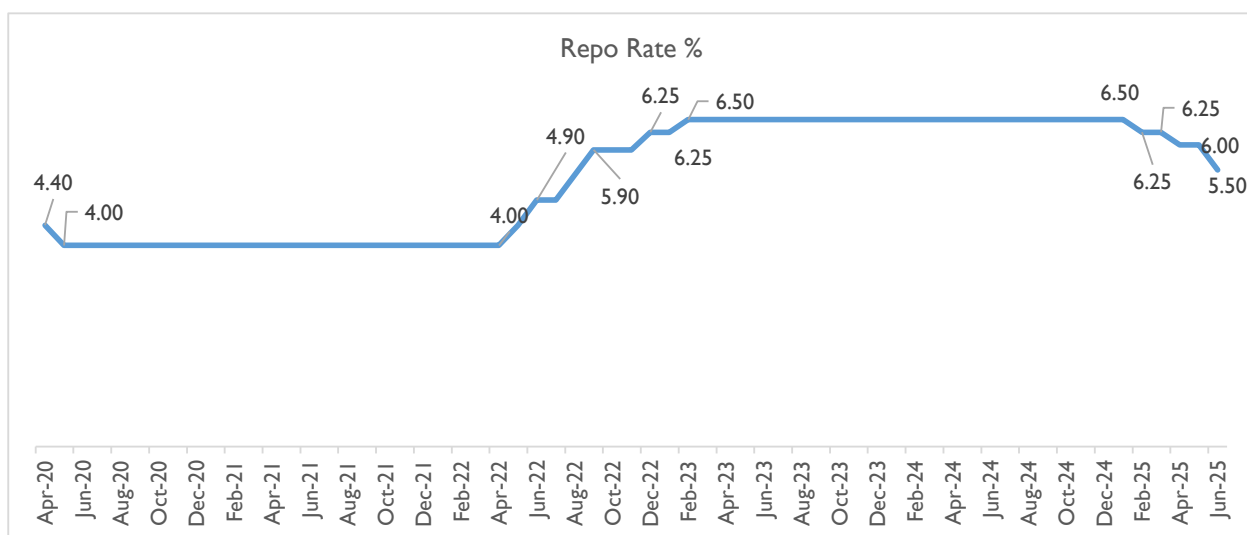
Furthermore, Manufactured Products (Weight 64.23%), The index for this major group declined by 0.14% from 144.8 (provisional) for the month of June, 2025 to 144.6 (provisional) in July, 2025. Out of the 22 NIC two-digit groups for manufactured products, 9 groups witnessed an increase in prices, 9 groups witnessed a decrease in prices and 4 groups witnessed no change in prices. Some of the important groups that showed month-over-month increase in prices were other manufacturing; other transport equipment; motor vehicles, trailers and semi-trailers; other non-metallic mineral products and furniture etc. Some of the groups that witnessed a decrease in prices were manufacture of basic metals; fabricated metal products, except machinery and equipment; food products; chemicals and chemical products and paper and paper products etc in July, 2025 as compared to June, 2025.





Source: MOSPI, Office of Economic Advisor

Retail inflation rate (as measured by the Consumer Price Index) in India showed notable fluctuations between January 2024 and July 2025. Overall, the national CPI inflation rate moderated to 1.55% by July 2025, indicating a gradual easing of inflationary pressures across both rural and urban areas. Rural CPI inflation peaked at 6.68% in October 2024, declining to 1.18% in July 2025. Urban CPI inflation followed a similar trend, rising to 5.62% in October 2024 and then dropping to 2.05% in July 2025. CPI measured above 6.00% tolerance limit of the central bank since July 2023. As a part of an anti-inflationary measure, the RBI has hiked the repo rate by 250 bps since May 2022 and 8 Feb 2023 while it held the rate steady at 6.50 % till January 2025. On 6th June 2025, RBI reduced the repo rate by 50 basis points which currently stands at 5.50%.



Sources: CMIE Economic Outlook

Growth Outlook

The Union Budget 2025-26 has laid the foundation for sustained growth by balancing demand stimulation, investment promotion and inclusive development. Inflation level is reaching within the

central bank's target; the RBI may pursue further monetary easing that will support growth. The medium-term outlook is bright, fueled by the emphasis on physical and digital infrastructure spending. With a focus on stimulating demand, driving investment and ensuring inclusive development, the budget introduces measures such as tax relief, increased infrastructure spending and incentives for manufacturing and clean energy. These initiatives aim to accelerate growth while maintaining fiscal discipline, reinforcing India's long-term economic resilience. The expansion of tax relief i.e zero tax liability for individuals earning up to INR 12 lacs annually under the new tax regime is expected to strengthen household finances and, consequently, boost consumption.

The external sector remains resilient, and key external vulnerability indicators continue to improve. However, tariff-related uncertainty is likely to weigh on exports and investment, prompting us to cut our CY26 GDP growth forecast to 6.4%.

Passenger Railway Segment in India

India's passenger railway segment is the lifeline of the nation, forming the backbone of its transportation network. As the world's largest railway network in terms of electrification and the second largest in terms of routes, it carries billions of passengers annually. Offering a diverse range of trains from budget-friendly to high-speed options, Indian Railways caters to a vast populace. While challenges such as overcrowding and infrastructure bottlenecks persist, ongoing modernization efforts, including electrification, track upgrades, and introduction of advanced trains like Tejas and Vande Bharat, aim to enhance passenger experience and capacity. The segment plays a pivotal role in connecting urban and rural India, boosting economic growth, and facilitating social mobility, making it a cornerstone of the country's development.

Current scenario

India's passenger railway segment is grappling with a post-pandemic recovery, carrying significantly fewer passengers than pre-COVID levels. While still the world's largest railway network in terms of electrification, the system is operating below capacity. Despite this, the Indian Railways transported a staggering 8.44 billion passengers in 2018-19, emphasizing its importance as a mass transit backbone.

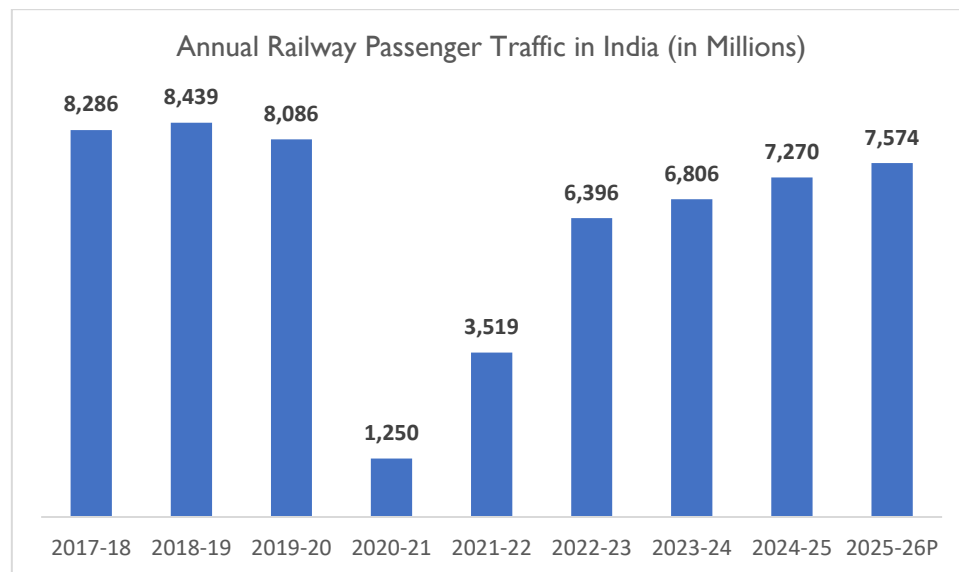
Infrastructure-wise, the network spans over 126,000 kilometers with 7,335 stations, undergoing rapid electrification and modernization. This massive infrastructure enables the operation of 13,523 passenger trains and 9,146 freight trains daily, transporting millions of people and goods across the country. The railway system is undergoing significant expansion. As of March 2025, an impressive 34,000 kilometers of new track was laid across the country. This accelerated pace of construction signifies a substantial investment in improving connectivity and efficiency. Furthermore, the railways have demonstrated their pivotal role in the economy by handling over 1,617.38 million tonnes of freight during the same period. This highlights the system's capacity to support trade and industrial growth.

The backbone of India's transportation infrastructure, the railway network spans vast distances, connecting countless cities, towns, and villages. Its electrification is a commendable achievement, positioning India as a global leader in this domain. However, the sheer volume of passengers coupled with an aging infrastructure has led to chronic overcrowding and operational inefficiencies. The government's focus on high-speed rail projects like the Mumbai-Ahmedabad corridor and initiatives like the Dedicated Freight Corridor aim to enhance capacity and efficiency. While recovery is underway, the sector faces hurdles in restoring passenger confidence and optimizing resource utilization.

Passenger Traffic in India

Indian Railways has historically been the backbone of the country's transportation network, carrying billions of passengers annually. The period preceding the COVID-19 pandemic witnessed a steady

growth in passenger traffic. Between 2017-18 and 2019-20, the total passenger traffic increased from 8,286 million to 8,439 million and then to 8,086 million, respectively. This indicates a generally upward trend with a slight dip in the final pre-pandemic year.



Source: CMIE Industry Outlook

The onset of the COVID-19 pandemic in early 2020 brought about a catastrophic decline in passenger traffic. With nationwide lockdowns and restrictions on movement, rail travel plummeted to a mere 1,250 million passengers in 2020-21, marking a staggering 84.5% decrease compared to the previous year. This unprecedented drop highlighted the critical role of railways in the country's economy and social fabric.

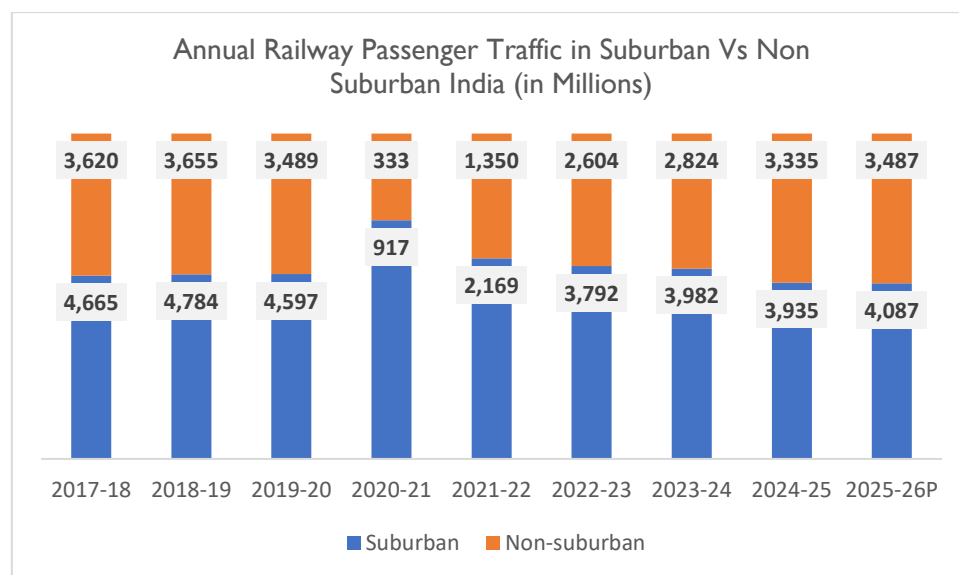
As the nation began to unlock and relax COVID-19 restrictions, the railway passenger traffic gradually recovered. In 2021-22, it rebounded to 3,519 million, indicating a significant improvement but still significantly lower than pre-pandemic levels. The subsequent years saw a continued upward trajectory, with traffic reaching 6,806 million in 2023-24 and further increasing to 7,270 million in 2024-25. While the industry is on a path to recovery, it is evident that it will take several more years to reach pre-pandemic levels.

Suburban vs. Non-Suburban Passenger Traffic

Suburban traffic, primarily catering to daily commuters in metropolitan areas, has consistently contributed to a larger share of the total passenger volume. Between 2017-18 and 2019-20, suburban traffic grew steadily, from 4,665 million to 4,784 million passengers. The pandemic, however, dealt a severe blow to suburban travel as lockdowns and work-from-home arrangements reduced the need for daily commutes. Consequently, suburban traffic plummeted to 917 million in 2020-21.

The recovery of suburban traffic has been slower compared to non-suburban traffic. While it rebounded to 2,169 million in 2021-22, it has been gradually increasing since then, reaching 3,935

million in 2024-25. The projected figure of 4,087 million for 2025-26 suggests continued growth in this segment.



Source: CMIE Industry Outlook

Non-suburban traffic, encompassing long-distance and intercity travel, also experienced a sharp decline during the pandemic. It dropped from 3,4889 million in 2019-20 to a mere 333 million in 2020-21. However, the recovery in this segment has been relatively faster. By 2024-25, non-suburban traffic had reached 3,335 million, and it is projected to further increase to 3,487 million in 2025-26.

In conclusion, the Indian Railways passenger traffic sector has undergone a tumultuous journey in recent years. While the industry is gradually recovering from the pandemic-induced shock, it faces challenges in restoring passenger confidence and adapting to evolving travel patterns. The distinction between suburban and non-suburban traffic highlights the varying impacts of the pandemic on different segments of the railway network.

Metro Railway Network

Metro railway systems, often referred to as subways or underground railways, are high-capacity public transport systems primarily found in urban areas. These networks typically consist of trains that operate on exclusive right-of-way tracks, often underground but also elevated or at-grade. Their primary purpose is to efficiently move large numbers of people within a city, reducing traffic congestion and improving air quality.

Metro systems are characterized by their speed, reliability, and frequency of service. They are often integrated with other public transport modes like buses and trams to create a comprehensive urban transportation network. Modern metro systems employ advanced technologies such as automatic fare collection, signalling systems, and surveillance to enhance passenger experience and safety.

The concept of underground railways originated in the 19th century, with London's Underground being a pioneering example. Since then, metro systems have proliferated globally, becoming essential components of many major cities. They have been instrumental in shaping urban development patterns, facilitating economic growth, and improving quality of life.

India's metro rail network has witnessed a phenomenal growth in recent years, emerging as a vital component of urban transportation infrastructure. This rapid expansion is driven by the increasing population, urbanization, and the need for efficient and sustainable public transport solutions. The daily ridership across metro systems in the country crossing the 10.2 million marks, it is further expected to exceed 12.5 million in a year or two.

Delhi Metro, inaugurated in 2002, was a pioneering step in this direction. Its success spurred the development of metro systems in other major cities. Today, India boasts a sprawling metro network across multiple cities, including Mumbai, Bengaluru, Hyderabad, Chennai, Kolkata, Jaipur, Lucknow, Kochi, Ahmedabad, Nagpur, Pune, and Kanpur. These metro systems have significantly improved connectivity, reduced traffic congestion, and enhanced the overall quality of life for millions of commuters.

The metro rail systems in India are not only extensive but also technologically advanced. They incorporate modern features such as air-conditioned coaches, smart card ticketing, escalators, and elevators. Many metro stations are aesthetically designed, blending seamlessly with the urban landscape. The emphasis on safety and security is paramount, with CCTV surveillance, emergency buttons, and trained personnel deployed across the network.

Beyond the operational systems, India is actively expanding its metro rail infrastructure. Numerous cities are in the process of constructing new lines or extending existing ones. This expansion is aimed at catering to the growing population and reducing dependence on private vehicles. Additionally, there is a focus on developing metrolite and light rail systems for smaller cities to provide affordable and efficient mass transit options.

Key Factors Driving Passenger Growth in Indian Railways

Economic Growth and Rising Disposable Incomes

India's burgeoning economy has led to a significant rise in disposable incomes. As people have more money to spend, they are increasingly opting for convenient and affordable modes of transportation. Railways, being a relatively inexpensive mode of travel, have benefited immensely from this trend. Moreover, the growing middle class is a significant contributor to passenger growth, as they seek comfortable and reliable travel options.

Urbanization and Migration

The rapid pace of urbanization in India is driving a substantial increase in passenger numbers. People are moving to cities in search of better job opportunities, leading to a surge in intra-city and inter-city travel. Railways, with their extensive network, are well-positioned to cater to the transportation needs of these urban migrants.

Affordability and Accessibility

Indian Railways has always been synonymous with affordability, making it a preferred choice for a large section of the population. The vast network of railway stations ensures accessibility to even remote areas, further boosting passenger numbers. Additionally, various fare categories and concessions cater to the diverse needs of passengers, making rail travel inclusive.

Infrastructure Development

The Indian government's focus on infrastructure development has positively impacted the railway sector. Investments in new lines, track upgrades, and station modernization have enhanced the overall travel experience. The introduction of high-speed trains and improved amenities have attracted a new segment of passengers who prioritize comfort and speed.

Government Initiatives and Policies

Several government initiatives have contributed to passenger growth. Subsidies on passenger fares, especially for students and senior citizens, have made rail travel more accessible. The introduction of passenger-friendly schemes like IRCTC and online ticket booking has simplified the booking process, attracting more passengers. Furthermore, the government's emphasis on safety and security has instilled confidence among travellers.

Changing Lifestyle and Preferences

The evolving lifestyle of Indians has also influenced passenger growth. With increasing awareness of health and fitness, many people prefer to travel by train to avoid traffic congestion and pollution. Moreover, the growing trend of leisure travel has led to a surge in demand for tourist trains and special packages, contributing to overall passenger numbers.

Demographic Dividend

India's young and growing population is a significant factor driving passenger growth. The youth, with their increasing disposable incomes and desire to explore, are contributing to the rising demand for rail travel. Students rely heavily on railways for commuting to educational institutions.

In conclusion, a combination of economic growth, urbanization, affordability, infrastructure development, government policies, and changing lifestyle preferences are collectively propelling passenger growth in Indian Railways.

Rolling Stocks: Passenger Coach scenario

Indian Railways operates one of the world's largest rail networks, transporting billions of passengers annually. The backbone of this colossal operation is its passenger coach fleet. However, a stark contrast exists between the older Integral Coach Factory (ICF) coaches and the newer Linke-Hofmann-Busch (LHB) coaches. While ICF coaches have been the mainstay for decades, they are gradually being phased out due to their inherent limitations in terms of safety, speed, and comfort. Their design lacks anti-climbing features, which could potentially lead to coaches telescoping onto each other in the event of a collision. This characteristic can exacerbate casualties in train accidents. Additionally, their lower speed compared to newer coach designs contributes to increased overall journey times.

The LHB coaches, on the other hand, represent a significant leap forward. Engineered with advanced safety features like anti-telescopic design, these coaches are far less likely to derail or cause casualties in accidents. The superior ride quality, better ventilation, and enhanced amenities offered by LHB coaches have led to increased passenger satisfaction.

Despite the advantages of LHB coaches, the transition from ICF to LHB is a mammoth task. The sheer size of the Indian Railways network, coupled with the substantial investment required for manufacturing and replacing coaches, has slowed down the process. Moreover, the railway infrastructure, such as tracks, needs to be upgraded to accommodate the higher speeds and longer length of LHB coaches.

In recent years, Indian Railways has also ventured into innovative coach designs. Vistadome coaches, with their panoramic glass roofs, offer a unique travel experience, especially for tourist routes. The Vande Bharat Express, a semi-high-speed train, is a flagship project that showcases India's capability to build world-class rolling stock. These initiatives aim to enhance passenger comfort and attract a wider segment of travellers.

However, numerous challenges persist. Coach maintenance is a critical area that requires attention to ensure the safety and reliability of the fleet. Overcrowding during peak hours remains a persistent issue, necessitating strategies to improve capacity utilization.

In conclusion, the Indian Railways passenger coach scenario is a complex interplay of legacy and progress. While the transition to LHB coaches is underway, the railway faces the challenge of balancing modernization with the vast scale of operations. Continuous efforts are required to address issues related to coach maintenance, overcrowding, and infrastructure development to provide a world-class travel experience to its millions of passengers.

Coach Construction:

Integral Coach Factory (ICF) Coaches

The Integral Coach Factory (ICF) coaches have been the backbone of Indian Railways for decades. Characterized by their distinctive bolstered design, these coaches are recognizable for their curved roofs and sides. They are constructed primarily using Corten steel, which offers a balance of strength and weight. While durable, ICF coaches have certain limitations. They are relatively heavier, which impacts train speed and energy consumption. Additionally, their design can contribute to higher levels of noise and vibrations within the coaches. Despite these drawbacks, ICF coaches continue to form a significant part of the Indian railway fleet. The manufacturing of ICF coaches was discontinued from April 1, 2018, paving the way for a full-fledged shift to the safer LHB coaches.

Linke Hofmann Busch (LHB) Coaches

Introduced as a more modern alternative, Linke Hofmann Busch (LHB) coaches represent a significant advancement in railway coach technology. Originating from Germany, these coaches are constructed primarily using stainless steel, making them lighter and stronger than their ICF counterparts. The LHB design emphasizes passenger safety and comfort. With a lower center of gravity and improved shock absorption, LHB coaches are less prone to overturning. They also offer superior insulation, reducing noise levels and providing a more comfortable interior. The lighter weight of LHB coaches allows for higher speeds and reduced energy consumption. As a result, Indian Railways has been gradually replacing ICF coaches with LHB coaches to enhance the overall passenger experience and operational efficiency.

Types of Coaches in Indian Railways

Indian Railways operates a vast network with a diverse range of coaches to cater to different passenger needs and budgets. Broadly, these coaches can be classified based on their amenities, comfort levels, and purpose.

Passenger Coaches:

Air-conditioned Coaches

Air-conditioned coaches offer a respite from India's often sweltering temperatures, providing varying levels of comfort and luxury to suit different preferences and budgets.

First AC (1A)

For the ultimate in luxury, 1A coaches offer private cabins, akin to first-class hotel rooms. Equipped with plush bedding, spacious layouts, and ensuite bathrooms, these coaches cater to discerning travellers seeking maximum comfort and privacy.

Executive Anubhuti (EA)

A newer addition to the Indian Railways fleet, EA coaches offer a premium travel experience. With spacious reclining seats, gourmet meals, and attentive service, these coaches are designed to pamper passengers and elevate their journey.

AC 2-Tier (2A)

A widely preferred choice, 2A coaches offer air-conditioned compartments with four berths per cabin. Suitable for families or groups of friends, these coaches provide a comfortable and convenient travel experience.

AC 3-Tier (3A)

The most common AC class, 3A coaches feature air-conditioned compartments with six berths arranged in three tiers. Offering a good balance of comfort and affordability, these coaches are a popular choice for budget-conscious travelers.

AC 3-Tier Economy (3E)

Introduced to accommodate more passengers, 3E coaches offer an economical air-conditioned option. However, they feature an additional middle berth, resulting in slightly more crowded conditions compared to standard 3A coaches

Chair Car (CC)

Ideal for shorter journeys, chair cars offer air-conditioned seating with reclining chairs. Providing a comfortable and relaxed seating arrangement, these coaches are perfect for day trips or short overnight journeys.

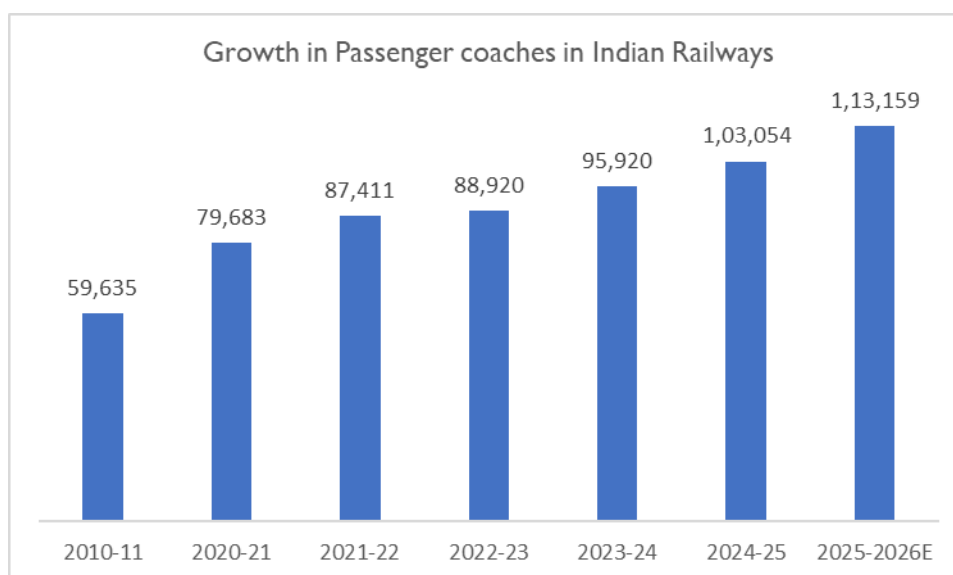
Non-Air-conditioned Coaches	
For budget-conscious travellers, non-air-conditioned coaches offer a more economical option.	
Sleeper (SL)	The most common type of non-air-conditioned coach, sleeper coaches feature open compartments with berths arranged in three tiers. While basic in terms of amenities, they provide a social and affordable way to travel long distances.
Second Sitting (2S)	Second Seater (2S) is a non-air-conditioned class with comfortable seating arrangements, suitable for day trips.

Special Coaches:

Types of Special Coaches	
Special coaches offer diverse travel experiences tailored to different passenger needs. From the opulent luxury of high-speed trains to the efficient practicality of urban commutes, these coaches cater to a wide range of preferences.	
Luxury Coaches	Luxury coaches represent the pinnacle of rail travel, offering an unparalleled level of comfort and service. Often found on high-speed or premium trains like the Vande Bharat Express, these coaches are meticulously designed to cater to the discerning traveler. Passengers can expect a range of top-tier amenities such as spacious and ergonomically designed seats, ample legroom, and world-class dining options. Additional features may include in-seat entertainment systems, power outlets, and dedicated attendants to ensure a seamless and indulgent journey. Luxury coaches are the epitome of opulence on rails, promising an unforgettable travel experience.
Suburban and Passenger Mainline Coaches	Suburban and passenger mainline coaches are designed for the practical needs of daily commuters traveling short distances within urban areas. These coaches prioritize efficiency and passenger capacity over luxury. As such, they typically feature non-air-conditioned interiors to optimize energy consumption and accommodate a larger number of passengers during peak hours. While comfort is not compromised, the focus is on providing reliable and affordable transportation for the masses. These coaches are essential for the smooth functioning of urban transportation networks, facilitating the daily commute of millions of people.

Passenger Coaches Growth in Indian Railways

Indian Railways has witnessed a substantial growth in its passenger coach fleet over the past decade. This expansion is a testament to the increasing passenger traffic and the government's focus on improving rail infrastructure and connectivity.



Source: Ministry of Railways, D&B Research

A consistent upward trend in the number of passenger coaches is witnessed over the years. In the financial year 2010-11, the total count stood at 59,635. This figure marked a significant milestone but also indicated the need for expansion to cater to the rising passenger demand. The subsequent years saw a steady increase in the number of coaches. By 2020-21, the fleet had grown to 79,683, signifying a considerable expansion to accommodate the burgeoning passenger base.

The growth trajectory continued to accelerate in the following years. In 2021-22, the number of passenger coaches reached 87,411 and this figure further climbed to 88,920 in 2022-23. Similarly, in 2023-24, the passenger coaches reached to 95,920. This consistent upward trend highlights the Indian Railways' commitment to enhancing passenger comfort and capacity. Looking ahead, the estimated number of passenger coaches for 2025-2026 stands at 1,13,159 promising even better connectivity and travel experiences for millions of Indians.

This expansion of the passenger coach fleet is a crucial step towards modernizing Indian Railways and meeting the growing transportation needs of the country. It not only ensures better accessibility but also contributes to the overall economic development by facilitating seamless movement of people and goods. As India continues its journey of progress, the railway sector, with its expanding fleet, is poised to play an increasingly vital role in the nation's development story.

Furnishing & Refurbishment of Passenger Coaches

India has one of the world's largest railway networks and due to its socio-economic importance, the Indian government is investing heavily in the revamping of the railway overall infrastructure, making it an attractive market for investors and entrepreneurs alike. This also involves modernization of the railway coaches, including refabrication of railway furniture and other interior furnishing to raise passenger satisfaction and make their travel experience comfortable and enjoyable.

The furnishing and modernization of railway coaches involved improvement and modernization of seating area in the passenger coach including seats, seats fabric (textiles, sustainable leathers, and alternative materials), ceiling, Flooring, lights, HVAC, gallery equipment, passenger infotainment system, washroom facilities, door system, safety system, fire safety and protections and others.

The Indian railway interiors and furnishings can be thus broadly divided into two categories: **components** and **associated products**. The components primarily include partitions, doors cabins, frames, seating systems, flooring systems and ceiling systems, lighting systems, and other miscellaneous items such as audio/visual systems while associated products include mattresses, curtains, dustbins etc.

Furnishing and Interior Fittings Mandated by Indian Railways

Railway being critical mode of transport and to ensure passenger safety and comfort, the Indian railway has specified comprehensive guidelines for furnishing and interior fittings within passenger coaches which are discussed below:

Amenity Fittings

A dedicated and detailed schedule exist for amenity fittings across various types of coaches, including Non-AC, First Class, Sleeper, Day Coach, and General compartments. Key specifications include:

- **Seat Dimensions:** Seat dimensions in Indian Railways are meticulously determined by considering the anthropometric data of the Indian population. This ensures optimal comfort for approximately 95% of passengers across various coach types. Detailed measurements are provided for both seating and sleeping arrangements, accounting for factors like shoulder width, hip breadth, leg length, and torso length. These dimensions are crucial in designing seats and berths that offer adequate legroom, shoulder space, and overall comfort during journeys of varying durations.
- **Lavatory Amenities:** The manual specifies the inclusion of various fixtures such as flushing commodes, wash basins, and towel rails, with guidelines for their installation and maintenance.

Furnishing Materials

- **Roof Paneling:** Roof panels must comply with stringent RDSO standards and meet international fire safety regulations to ensure passenger safety and structural integrity.

- **Side Wall Paneling:** Utilizes pre-laminated shaded compreg boards, which are designed to provide aesthetic appeal and thermal insulation while accommodating various amenity fittings.
- **Other Plastics:** The use of Fiber Reinforced Plastic (FRP) is emphasized for its lightweight and durable properties, suitable for a range of applications such as wall panels, ceiling panels, and seat frames within the coach.

Workshop Procedures

- **Inspection and Repair:** Regular inspections should address issues such as corrosion and damage. Damaged panels must be replaced in full, ensuring colour, and design consistency. Additionally, insulation materials should be examined and replaced as necessary during comprehensive overhauls.
- **Anti-Pilferage Measures:** Workshops are mandated to implement anti-theft measures for critical items like mirrors, soap dishes, and push cocks during Periodic Overhauls (POH), as directed by the Chief Mechanical Engineer or RDSO.

Windows: There are three types of windows used in LHB coaches

- **Fixed Windows:** Feature sealed glass units for standard visibility and insulation.
- **Emergency Openable Windows:** Designed for passenger evacuation, equipped with handles and restraining chains to prevent glass breakage.
- **Hopper-Type Windows:** Installed in lavatories, made of durable materials to withstand frequent use.

Maintenance Guidelines: Regular maintenance includes replacing cracked or damaged glass, ensuring airtight seals, and verifying the operation of window mechanisms. The manual also details procedures for applying sun control film and maintaining rubber beading.

Seats and Luggage Racks

- **Chair Car Coaches:** Seats are ergonomically designed with features such as adjustable footrests, foldable tables, and magazine nets. Each seat is part of a welded steel frame and includes a gas spring for adjustable backrests.
- **Luggage Racks:** Constructed from aluminium extrusions and tempered safety glass, the racks are designed to handle specified loads, ensuring durability and safety for passenger belongings.

Lavatory Fittings

The lavatory fittings, including flush commodes, wash basins, and towel rails. Maintenance protocols include checking for leaks, blockages, and ensuring all fixtures are in proper working condition.

Safety Features

- **Alarm Pulls:** Installed in compartments and corridors to facilitate emergency response.
- **Internal Latches:** Required on body side doors and compartment sliding doors to enhance security.
- **Safety Bars:** Must be installed on all window openings to prevent accidental falls.

Examination and Repair Practices

- **Routine Inspections:** Includes examining window shutters for smooth operation, checking safety catches, and ensuring cleanliness and functionality of lavatory fittings.
- **Repair Protocols:** Detailed procedures are provided for addressing issues with window frames, safety catches, and glass panes. Regular maintenance tasks include cleaning and painting components as needed.

The maintenance procedures for passenger coaches focus on a detailed approach to preserving and upgrading interior fittings. Emphasis is placed on adhering to specified standards for materials, dimensions, and maintenance practices to guarantee passenger safety, comfort, and overall satisfaction.

Passenger Amenities and Safety Features

Indian Railways has made substantial investments in passenger amenities and safety features, reflecting a strong commitment to improving travel experience and ensuring passenger security. The 2025-26 budget allocations underscore a focus on modernizing infrastructure, enhancing services, and reinforcing safety measures across the railway network.

Passenger Amenities

- **Comfortable Seating:** Coaches are designed with ergonomically arranged seating to enhance passenger comfort during travel.
- **Sanitation Facilities:** Bio-toilets in coaches significantly enhance hygiene and environmental sustainability. These eco-friendly systems convert human waste into odorless, non-corrosive effluent, preventing any discharge onto the tracks. Regular maintenance and cleaning protocols ensure both toilets and coaches remain in optimal condition.
- **Catering Services:** Enhanced catering services offer a diverse menu featuring regional and international cuisines, aiming to improve the dining experience on trains.
- **Information Systems:** Digital displays in coaches provide real-time updates on train schedules, stops, and other announcements. Mobile applications are available for ticket booking and train status updates.
- **Accessibility Features:** Provisions for differently abled passengers include designated seating areas and accessible toilets.
- **Enhanced Lighting:** LED lighting is used in coaches to ensure better visibility and energy efficiency.

- **Customer Amenities Budget:** For the 2025-26 fiscal year, an allocation of INR 121 Bn is designated to enhance passenger amenities.

Safety Features

- **Kavach System:** The Kavach automatic train protection system is being implemented to prevent collisions and enhance operational safety. For the financial year 2025-26, INR 16.73 Bn has been allocated for the installation of this Automatic Train Protection (ATP) system.
- **Track and Infrastructure Safety:** Regular track renewals and upgrades are conducted to ensure safety and reliability. The budget allocation for track renewals in 2025-26 is INR 228 Bn.
- **Signalling Improvements:** Upgrades to signalling systems aim to enhance safety and reduce accident risks. The allocation for signalling and telecom improvements in 2025-26 is INR 68 Bn.
- **Level Crossing Safety:** The construction of road over bridges (ROBs) and road under bridges (RUBs) is prioritized to eliminate level crossings and improve safety. The budget for ROBs and RUBs in 2025-26 is INR 70 Bn.
- **Fire Safety Measures:** Fire-resistant materials are used in coach interiors, and fire detection systems clubbed with automatic brake system are installed to bolster safety.
- **Emergency Preparedness:** Regular drills and training for railway staff are conducted to ensure readiness for emergency situations.
- **Safety Enhancements Budget:** An allocation of INR 1,160 Bn is set aside for safety enhancements in the fiscal 2025-26, covering various safety-related works.

Surveillance System (CCTV)

In the pursuit of enhancing safety and operational oversight, Indian Railways has prioritized the deployment of a comprehensive Video Surveillance System (VSS) across its network. This system is a critical security requirement, designed to monitor and analyze activities at key locations such as waiting halls, platforms, foot overbridges, reservation counters, parking areas, railway yards, workshops, and station entrances/exits. The primary objective of VSS is to capture real-time images and video footage of commuters and public areas, enabling authorities to conduct security analysis, crowd management, and incident response. It acts as both a preventive and investigative tool, helping deter criminal activities and providing valuable evidence when needed.

Components of the Video Surveillance System

The system comprises a robust mix of indoor and outdoor surveillance technologies, including:

- Fixed cameras for continuous monitoring of static zones
- Pan-Tilt-Zoom (PTZ) dome cameras for dynamic coverage and zoom capabilities
- IP cameras (both indoor and outdoor) for high-resolution digital imaging

- Single/multi-channel video encoders for integrating analog feeds into digital systems
- Video management hardware and software for centralized control and analytics
- Recording servers for secure data storage and retrieval
- Network switches and color monitors for seamless connectivity and display

These components are strategically installed to ensure comprehensive coverage of railway stations and other railway establishments. The system is managed from a centralized surveillance room, allowing Railway Protection Force (RPF) personnel and station authorities to monitor multiple locations simultaneously.

Indian Railways has significantly strengthened its passenger safety infrastructure by installing CCTV cameras in 11,535 coaches across various zones. This initiative is part of a broader modernization strategy aimed at enhancing security, deterring criminal activities, and improving surveillance during train operations.

Among the zones, Western Railway (WR) leads the deployment with 1,679 coaches equipped with CCTV cameras, followed by Central Railway (CR) with 1,320, and Southern Railway (SR) with 1,149. Other major zones such as Eastern Railway (ER) and Northern Railway (NR) also show strong adoption, each exceeding 1,100 installations. In contrast, zones like West Central Railway (WCR) and South-East Central Railway (SECR) have fewer than 300 equipped coaches, highlighting areas for potential expansion.

According to industry sources, Indian Railways plans to install 3.84 lakh CCTV cameras across its entire fleet of 74,000 coaches and 15,000 locomotives. Each coach will be fitted with four dome-type cameras, positioned at both entrances. Locomotives will feature six cameras—covering the front, rear, both sides, and each cab—along with two desk-mounted microphones per cab. All equipment will comply with the latest specifications, be STQC-certified, and capable of functioning in low-light conditions and at speeds up to 100 km/hr.

Distribution of Upgradation Work for Toilets in Railway Coaches

The Indian Railways, a vital backbone of the nation's transportation network, has undertaken a significant initiative to enhance passenger comfort and hygiene by upgrading toilets in its extensive fleet of coaches. This ambitious project involves the upgradation of toilets in 20,000 coaches, with an estimated cost of INR 10 lakhs per coach, aimed at improving sanitation standards across the railway system. The distribution of this work has been meticulously planned across various Zonal Railways, with the task to be executed in both AC and Non-AC coaches.

Sr. No.	Zone	Coaches AC	Non-AC Coaches	Total
1	CR	500	1160	1660
2	ECR	980	1210	2190
3	NR	1060	1430	2490
4	NER	1090	910	2000
5	NWR	1030	940	1970
6	SCR	930	820	1750
7	SR	1100	0	1100
8	NCR	520	440	960
9	ER	0	940	940
10	WR	1000	1000	2000
11	SWR	870	1000	1870
12	NFR	1050	0	1050
	Total	10130	9850	19980

Source: Indian Government Railways

The distribution of the toilet upgradation work across Indian Railways involves assigning coaches to various Zonal Railways. Central Railway (CR) is tasked with 500 AC coaches and 1160 non-AC coaches, while East Central Railway (ECR) manages 980 AC coaches and 1210 non-AC coaches. Northern Railway (NR) oversees 1060 AC coaches and 1430 non-AC coaches, whereas Northeastern Railway (NER) takes on 1090 AC coaches and 910 non-AC coaches. Northwestern Railway (NWR) is responsible for 1030 AC coaches and 940 non-AC coaches, and South-Central Railway (SCR) covers 930 AC coaches and 820 non-AC coaches. Southern Railway (SR) focuses on 1100 AC coaches, while North Central Railway (NCR) handles 520 AC coaches and 440 non-AC coaches, and Eastern Railway (ER) manages 940 non-AC coaches.

Further allocations designate Western Railway (WR) with the responsibility of upgrading 1,000 AC coaches and 1,000 non-AC coaches. In comparison, Southwestern Railway (SWR) has been assigned 870 AC coaches and 1,000 non-AC coaches. Northeast Frontier Railway (NFR) has been entrusted with 1,050 AC coaches. In aggregate, the plan covers 10,130 AC coaches and 9,850 non-AC coaches, bringing the total to 19,980 coaches. Zonal Railways have been mandated to achieve the overall target of 20,000 coaches. The total financial outlay earmarked for the upgradation of toilets in these 20,000 railway coaches stands at INR 2,000 crore (Rs. 20 billion).

Market Opportunities for Passenger Coach Furnishing

The Indian government focus effort on improving the railway coaches, has made the Railway furnishing segment one of the most attractive markets for international companies looking to invest in the sector. The industry holds sizable growth potential with several opportunities to capitalize on emerging trends in technology and innovation in this segment.

New Coaches Capacity Expansion

The Indian Railways currently operates approximately over 1,03,054 coaches. Between 2020-21 to 2024-25, coach inventory has grown at a compound annual growth rate (CAGR) of 7%, a trend expected to continue due to rising demand for passenger rail services, particularly with the advent of bullet train corridors. The introduction of Vande Bharat trains and the expansion of metro systems are anticipated to further boost passenger traffic.

Indian Railways is focusing on standardizing its fleet with LHB (Linke Hofmann Busch) and Vande Bharat coaches to enhance efficiency. This move is aimed at reducing maintenance costs by 40%.

Regarding financing, approximately 85% of the coaches are funded through the Indian Railway Finance Corporation (IRFC), with the remainder financed directly by Indian Railways. Currently, no passenger coaches are owned by the private sector.

Indian Railways is undertaking significant capacity expansion through the addition of new passenger coaches to meet rising demand and improve passenger comfort. Here are the key insights regarding planned coach additions:

Planned Coach Additions

Indian Railways has achieved a significant milestone in the 2024–25 financial year by producing 7,134 coaches, marking a 9% increase over the previous year's output of 6,541 coaches. This achievement is supported by its three major coach manufacturing units: the Integral Coach Factory (ICF) in Chennai, Rail Coach Factory (RCF) in Kapurthala, and Modern Coach Factory (MCF) in Rae Bareilly.

In line with its commitment to equitable mobility and affordable infrastructure, the Ministry of Railways has announced plans to manufacture 17,000 general-class and non-air-conditioned (non-AC) sleeper coaches over the next five years. These coaches are vital to the Indian Railways network, which currently operates a fleet of approximately 82,200 coaches, with 57,200 (around 70%) being non-AC. Non-AC coaches provide nearly 78% of the 6.9 million daily seats, serving as the backbone of budget-friendly rail travel.

To meet rising demand, 1,250 general-class coaches were added to long-distance services in 2024–25. Passenger usage in unreserved coaches rose to 651 crores, up from 609 crore the previous year, highlighting the growing reliance on affordable travel options.

As part of this initiative, Indian Railways is deploying Amrit Bharat Express trainsets, which are fully non-AC and designed with modern amenities for budget travelers. Each trainset includes 11 general

coaches, 8 sleeper coaches, 1 pantry car, and 2 luggage-cum-guard vans with accessible compartments. Currently, 14 Amrit Bharat trains are operational, with plans to introduce 100 more, significantly enhancing capacity and comfort for lower-income passengers.

This comprehensive strategy reflects Indian Railways' dedication to expanding infrastructure, improving accessibility, and supporting inclusive growth across the country.

Conversion of Rail Bogies: According to the Interim Budget 2025, Indian Railways plans to upgrade 40,000 conventional coaches to Vande Bharat standards, which represents approximately 42% of the existing coach fleet. The Vande Bharat standard includes enhanced safety features such as semi-permanent couplers, as well as improved passenger amenities, including more comfortable seating, charging points, CCTV surveillance, GPS, and upgraded toilet sanitation facilities.

The strategic focus on increasing the number of non-AC and general coaches reflects Indian Railways' commitment to addressing overcrowding and improving passenger experience. This planned expansion is crucial for accommodating the growing number of passengers and enhancing the overall efficiency of the rail network.

Metro Expansion Plans

The expansion of metro rail systems across India is set to include significant additions of new coaches to enhance capacity and improve service. Here are the key insights regarding planned coach additions in various metro projects:

Chennai Metro

- **New Coach Procurement:** Chennai Metro Rail Ltd (CMRL) has invited bids for 32 new train sets as part of the Phase 2 project, which spans 116.1 km. This includes the procurement of coaches that are 2.9 meters wide, designed for standard gauge tracks, and will be configured as DMC+TC+DMC (Driving Motor Car + Trailer Car). The initial prototype train is expected to be produced within 630 days, with subsequent trains delivered in a phased manner over the next three years.

Delhi Metro

- The Delhi Metro Rail Corporation (DMRC) has announced plans to launch India's first metro corridor featuring three-coach trains. These trains will run on the Lajpat Nagar to Saket G

Block route, part of the Phase-IV expansion of the metro network. The initiative is aimed at improving last-mile connectivity and ensuring seamless integration with existing metro lines.

Bhubaneswar Metro

- **Rolling Stock Contract:** The Delhi Metro Rail Corporation (DMRC) has invited tenders for 39 new standard gauge coaches for Bhubaneswar Metro's Phase I project. These coaches will form 13 train sets and are designed to accommodate a fully loaded capacity of 972 passengers per train. The contract includes a provision for local manufacturing to support the "Make in India" initiative.

Hyderabad Metro

- **Future Coach Additions:** Hyderabad Metro Rail (HMRL) has announced plans to expand its fleet. Over the past seven years, HMRL has operated with 57 trains, comprising 171 coaches. To ease congestion during peak hours, the authority will procure 10 new three-coach trains, boosting the total fleet to 67 trains and 201 coaches. This move addresses long-standing passenger requests for six-coach configurations and reflects HMRL's commitment to enhancing capacity and commuter convenience.

Bengaluru Metro

- **Bengaluru Metro Rail Corporation Limited (BMRCL)** has signed a contract extension agreement with BEML Ltd. to procure an additional 7 train-sets of 6 coaches for Pink Line (Reach-6) of the 73.92 km Bangalore Metro Phase 2 project. This 42 coach contract for the 21.38 km Pink Line (Kalena Agrahara – Nagawara) is worth Rs. 405 crore and takes the total number of trainsets under Package 5RS-DM from 53 trains (318 coaches) to 60 trains (360 coaches).

Pune Metro

Pune Metro is set to expand its operations with the addition of 15 new trains, comprising 45 extra coaches. This initiative by MahaMetro aims to improve commuter convenience and bolster the city's public transportation network. The move comes in response to rising passenger numbers and the recent approval of two new metro corridors. At present, Pune Metro runs 34 trains with a total of 102 coaches. With the planned expansion, the fleet will grow to 49 trains and 147 coaches, as each new train will include three coaches. This upgrade is expected to alleviate congestion during peak hours and reduce overall travel time for passengers.

Chandigarh Tricity Metro

- The forthcoming Tricity Metro project will feature a two-coach system, extending the first phase from 66 km to 77 km. This expansion is designed to enhance connectivity across

Chandigarh, Mohali, and Panchkula, addressing significant traffic congestion in the region. The first phase of development is scheduled to occur between 2027 and 2037, with plans for approximately 30 stations.

The planned coach additions across various metro systems in India reflect a concerted effort to enhance urban transit capacity and improve passenger experience. With significant investments and expansions underway, these initiatives aim to meet the growing demand for efficient public transportation in urban areas.

Refurbishment Plans for Existing Coach

Indian Railways is investing significantly in refurbishing and modernizing its coaches to improve passenger experience and safety. Despite budgetary constraints and shifts in priorities, the ongoing efforts under various projects reflect a strong commitment to enhancing the quality of rail travel in India.

Project Utkrisht

Project Utkrisht was announced in 2018 with the objective of upgrading 66,000 coaches over a span of three years. The key features of this project include improved interiors, LED lighting, modular toilets, better seating, and mobile charging points, with an estimated cost of approximately INR 6 Mn per coach. As of mid-2023, several thousand coaches have been upgraded under this project, marking significant progress in enhancing passenger comfort and amenities.

Tejas-Type Coaches

Announced in 2019, the introduction of Tejas-type coaches aims to bring modern, state-of-the-art facilities to Indian Railways. These coaches are equipped with infotainment systems, Wi-Fi, CCTV surveillance, automatic doors, and GPS-based passenger information systems. The Tejas Express on the Mumbai-Goa route was the first to deploy these coaches, and the initiative is being expanded to more routes, reflecting the commitment to providing a premium travel experience.

LHB Coaches

The transition to Linke Hofmann Busch (LHB) coaches has been an ongoing process since the early 2000s, with accelerated adoption in recent years. The primary objective is to replace the older Integral Coach Factory (ICF) coaches with LHB ones, which offer better safety features, an anti-telescopic design, and improved ride comfort. Rail Coach Factory (RCF) recorded a 22% rise in LHB coach production in 2024–25, manufacturing 1,926 coaches and pushing its total output beyond 46,000 units. This significant increase in production underscores the Indian Railways' commitment to modernizing its fleet and enhancing passenger safety.

Smart Coaches

Introduced in 2018, the smart coach's initiative aims to incorporate advanced technology into the railway system. These coaches are equipped with sensors and smart devices for predictive maintenance and passenger information systems. Initially, deployed on premium trains such as the Rajdhani and Shatabdi Express, smart coaches have received positive feedback for significantly improving passenger experience and safety.

Bio-Toilets

The bio-toilets initiative began in 2010 and saw significant acceleration after 2014. The goal is to install bio-toilets in all coaches to enhance hygiene and reduce environmental pollution. This initiative is not only crucial for environmental sustainability but also for improving the sanitation standards in Indian Railways. The provision of Bio-toilets in coaches have been increased from 3647 coaches in year 2006-2014 to 88,812 coaches in year 2014-2024 (Upto September 2024).

Repainting and Branding

Starting in 2019, Indian Railways embarked on a mission to give coaches a fresh look and promote tourism and state culture through thematic branding. This initiative includes vinyl wrapping and other branding efforts to highlight cultural heritage, adding an aesthetic and informative layer to the travel experience. Various campaigns have been launched to reflect this cultural promotion through coach branding.

Retrofitting and Upgradation

Ongoing since 2018, retrofitting and upgradation efforts aim to modernize older coaches by incorporating features such as charging points, better lighting, improved berth designs, and air conditioning systems. Thousands of coaches are slated to be retrofitted over the next few years, ensuring that older rolling stock meets modern standards of comfort and efficiency.

Improved Safety Features

Focused intensively post-2016, the drive to enhance safety features in coaches includes the installation of fire safety measures, emergency lighting, better emergency exit windows, and smoke detection systems. These features are being gradually implemented across all types of coaches to ensure passenger safety and preparedness in case of emergencies.

Railway Board Directive (2018)

On 18 July 2018, the Railway Board issued a directive limiting the refurbishment to air-conditioned (AC) coaches in Phase-I, with a refurbishment cost cap of INR 10 lakh per coach. This refurbishment is scheduled every sixth year along with periodic overhauls. The decision, influenced by fund constraints, prioritizes AC coaches to retain high-paying passengers by providing luxurious interiors.

This marked a shift from the 2017 plan, which had aimed to refurbish 40,000 coaches at a cost of INR 30 lakh per coach, underlining a more selective and budget-conscious approach.

Addressable Market Opportunity

Indian Railways operates a vast network with a substantial fleet of passenger coaches. These coaches, with an average lifecycle of 25-30 years, undergo significant wear and tear. To maintain passenger comfort and safety, regular refurbishment is essential. This presents a substantial opportunity for the coach furnishing and refurbishment industry.

Refurbishment:

As of FY 2025, the total number of passenger coaches is approximately 1,03,054. Given the refurbishment cycle of 10–12 years, it can be inferred that roughly 8,588 coaches require refurbishment annually. Considering an average refurbishment cost of ₹30 lakhs per coach, as outlined in the Mission Retrofitment, the potential Total Addressable Market (TAM) for coach furnishing and refurbishment stands at a substantial ₹25,760 million or ₹2,576 crore. This figure represents the total revenue opportunity available to players in this market.

Total Addressable Market for Refurbishment	
Total number of Passenger Coaches in FY' 25	1,03,054
Average coach lifecycle	25-30 years
Refurbishment cycle	Every 10-12 years
Average refurbishment cost	Rs. 30 lakhs per coach (as per Mission Retrofitment)
Total number of coaches requiring refurbishment every year	8,588
Potential TAM annually	INR 2,576 Crore

Turnkey Furnishing:

The Total Addressable Market (TAM) for furnishing new passenger coaches in India is also substantial. With 8,684 new coaches produced annually, and an average turnkey furnishing cost of ₹45 lakhs per coach, the potential market size for turnkey furnishing stands at INR 39,080 million or ₹3,908 crore annually.

Total Addressable Market (Turnkey Furnishing)	
Annual production of new passenger coaches	8,684
Average furnishing cost	Rs. 45 lakhs per coach
Potential TAM	INR 3908 Crore

Market Potential and Growth Drivers

Aging Coach Fleet: The significant number of coaches nearing or exceeding their 25–30year lifecycle implies a consistent demand for refurbishment. As the railway network expands and passenger traffic grows, the number of coaches requiring refurbishment is likely to increase.

Government Initiatives: Government programs like Mission Retrofitment signal a strong push for improving passenger amenities. This, coupled with the focus on modernization, creates a favorable environment for the industry.

Passenger Expectations: Rising passenger expectations in terms of comfort and hygiene will drive demand for high-quality refurbishment services.

Technological Advancements: Innovations in materials, design, and manufacturing processes can lead to improved refurbishment solutions, opening up new market segments.

Surveillance & Monitoring Systems

VSS (Video Surveillance System)

The Video Surveillance System (VSS) for Indian Railways is an IP-based security solution that primarily uses CCTV cameras, along with Network Video Recorders (NVRs), display units, storage devices, and monitoring software. It is designed to enhance passenger safety, security, and operational monitoring inside coaches, covering passenger saloons, entry/exit points, and gangways.

As per Railway Board's directives (2025), VSS is to be retrofitted in existing passenger coaches and installed in all newly manufactured coaches from September 2025 onwards. Each coach will be equipped with 4 dome-type CCTV cameras 2 at each entrance way to provide comprehensive coverage and monitoring. With an average lifecycle of about 7 years, VSS requires timely replacement or upgrades to ensure continued reliability and compatibility with evolving technologies.

Identified Addressable Market (VSS) Installation -Retrofit Coaches (Initiated)	
Number of Coaches	69,121
Average Cost per coach	Rs 6 lakh per coach
Identified Opportunity for VSS-Retrofit Coaches	INR 4147.26 Crore

Total Addressable Market (VSS) -Retrofit Coaches (Remaining)	
Total number of Passenger Coaches in FY' 25	1,03,054
Number of coaches in progress (identified)	69,121
Remaining Coaches	33,933
Average Cost per coach	Rs 6 lakh per coach
Total Addressable Market (VSS) -Retrofit Coaches (Remaining)	INR 2035.98 Crore

The Total Addressable market for (VSS) Installation in existing coach translate into the opportunity worth INR 6183.24 crores.

CVVRS (Crew Voice & Video Recording System)

The **Crew Voice & Video Recording System (CVVRS)** is a safety and monitoring solution designed for locomotive cabins in Indian Railways. It records both **video footage of crew activities** and **voice communications inside the driver's cab**, along with instrument panel visuals, to ensure operational transparency and enhance accident investigation. Integrated with the Recording and Data Acquisition System (RDAS), CVVRS helps railway authorities analyse crew performance, detect human errors, and maintain compliance with safety protocols.

As per the Railway Board's directive a total of **14,615 CVVRS units (2,975 for diesel and 11,640 for electric locomotives)** have been sanctioned under the Bulk RSP (PH-21), reflecting the government's push towards technology-driven railway safety measures.

Diesel Locomotives:

Total Addressable Market (CVVRS) (Initiated)	
Locomotives in progress	2,975
Cost per locomotive	Rs 7.8 Lakh
Total Addressable Market (CVVRS) (Ongoing)	INR 232.05 Crore

Total Addressable Market (CVVRS) (Remaining)	
Total Number of Diesel locomotives in FY' 25	4163
Locomotives in progress	2,975
Remaining locomotive	1,188
Average cost per locomotive	Rs 7.8 Lakh
Total Addressable Market (CVVRS) (Remaining)	INR 92.67 Crore

The Total Addressable market for CVVRS Installation in existing diesel locomotive translates into the opportunity worth INR 324.72 crores.

Electric Locomotives:

Total Addressable Market (CVVRS) (Initiated)	
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Locomotives in progress	11,640
Average Cost per locomotive	Rs 7.8 lakh
Total Addressable Market (CVVRS) (Ongoing)	INR 907.92 Crore

Total Addressable Market (CVVRS) (Remaining)	
Total Number of Electric locomotives in FY' 25	12,371
Locomotives in progress	11,640
Remaining locomotive	731
Average cost per locomotive	Rs 7.8 lakh
Total Addressable Market (CVVRS) (Remaining)	INR 57.02 crore

The Total Addressable market for CVVRS Installation in existing electric locomotive translates into an opportunity worth INR 964.94 crore.

Total Market - (Diesel + Electric)

Total Addressable Market (CVVRS) (Ongoing)	
Segment	TAM
Diesel	INR 232.05 Crore
Electric	INR 907.92 Crore
Grand TAM	INR 1139.97 Crore

Total Addressable Market (CVVRS) (Remaining)	
Segment	TAM
Diesel	INR 92.67 Crore
Electric	INR 57.02 Crore
Grand TAM	INR 149.69 Crore

The Total Addressable market for CVVRS Installation in existing locomotives including both diesel and electric translates into an opportunity worth INR 1289.66 crore.

Toilet Upgradation

The Government of India, through the Ministry of Railways, has launched a major initiative to upgrade toilets across passenger coaches to improve hygiene, safety, and passenger comfort. Under this program, toilets in **20,000 coaches** are being modernized at an estimated cost of **INR 10 lakh per coach**, with works distributed zone-wise across Indian Railways. The upgradation aims to replace outdated facilities with modern, user-friendly systems equipped with better sanitation, odour control, and water efficiency, in line with the Railways' broader mission to enhance passenger amenities and align with national cleanliness and Swachh Bharat goals.

Total Addressable Market (Toilet Upgradation Announced)	
Total coaches for Upgradation in progress	19,980
Cost Per coach	10,00,000
Potential TAM	INR 1,998 Crore

Total Addressable Market (Toilet Upgradation Remaining)	
Total number of Passenger Coaches in FY' 25	1,03,054
Total coaches for Upgradation in progress	19,980
Total coaches for Upgradation Remaining	67,431 ¹
Cost Per coach	10,00,000
Potential Remaining TAM	INR 6,743.1 Crore

The Total Addressable market for toilet upgradation for imitated and remaining work translate into an opportunity worth INR 8,741.1 crore.

Maintenance: Engine & Coach

Indian Railways follows a well-structured schedule for the maintenance of its coaches, wagons, and locomotives to ensure safety, reliability, and operational efficiency. Maintenance activities include routine preventive inspections, cleaning, lubrication, minor repairs, and major periodic overhauls, while specialized maintenance is carried out for modern trains such as Vande Bharat, where components like traction systems, signalling equipment, HVAC, and coach interiors require expert handling. Traditionally, these activities have been performed in government-owned workshops and depots, which are equipped to manage both regular and periodic maintenance.

Despite this infrastructure, Railways faces resource constraints due to limited skilled manpower, capacity limitations at workshops, and the technical complexity of modern rolling stock. To address these challenges, Railways has increasingly adopted outsourcing as a strategic solution. Engaging private players enables Railways to leverage specialized expertise, adopt advanced technologies, and ensure faster turnaround times for coaches and locomotives, all while retaining ownership and operational control. This approach focuses on optimizing maintenance efficiency rather than privatizing assets.

Private sector participation can span multiple areas. Depot maintenance presents opportunities for private players to handle bogie overhauls, wheelset reconditioning, and refurbishment of coach interiors. Annual Maintenance Contracts (AMCs) allow private vendors or OEMs to provide end-to-end services for high-tech trains like Vande Bharat or MEMU/EMU trains. Public-Private Partnership (PPP) workshops enable private players to operate and manage maintenance depots while Railways provides infrastructure. Additionally, technology-driven maintenance, including IoT-enabled predictive maintenance, AI-based diagnostics, and energy-efficient retrofits, offers significant scope for private expertise. Component-level maintenance of systems such as braking units, traction motors, and HVAC equipment further broadens the avenues for private involvement.

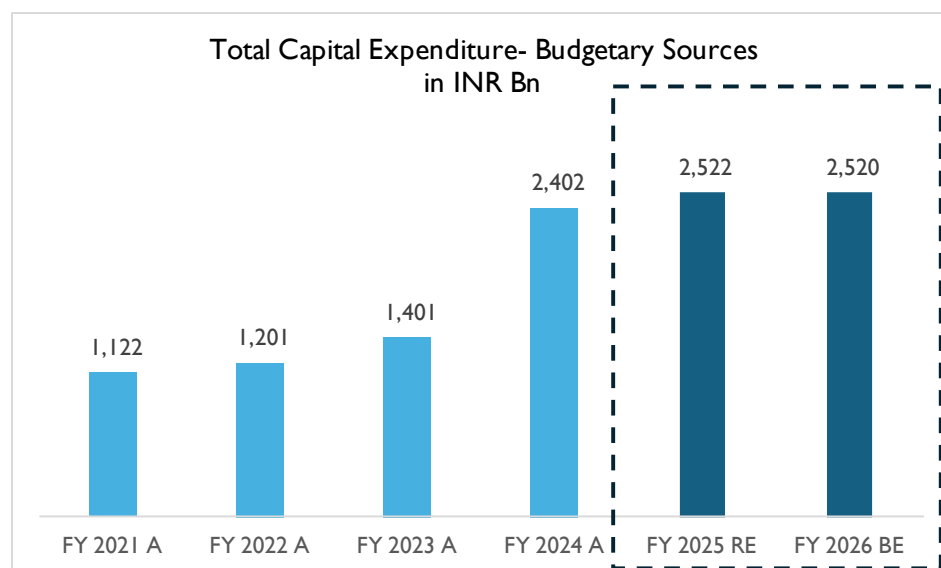
By strategically outsourcing maintenance activities, Railways can efficiently meet the growing demands of its expanding and modernizing fleet. Private players bring technical know-how, operational

¹ Exclude coaches added in the last 3 year and 19,980 for which upgradation has already been announced.

efficiency, and advanced technology, which help improve service quality, reduce downtime, and ensure safety. This approach allows Railways to focus internal resources on core operations while leveraging private capabilities for specialized or high-volume maintenance tasks, creating a mutually beneficial arrangement that strengthens the overall maintenance ecosystem.

Government Budgetary Allocation to the Railway Sector

From FY 2021 to FY 2026, the union budget has significantly ramped up its allocation toward railway sector. The total outlay provided for Capital Expenditure in Budget Estimate 2025-26 of INR 2,652 Bn. The Gross Budgetary Support for Railways in FY 2025-26 stands at INR 2,520 Bn, which has reduced in compare of previous year, however the budget has significantly rise from the level of INR 1,122 Bn in FY 2021. The railway will continue to utilize the money in essential infrastructure projects like rail track expansion, rolling stock procurement, electrification, signalling improvements, and station modernisation. The Government also provided for INR 100 Bn from extra budgetary resource to meet its expenses & modernize. The total outlay also includes Nirbhaya fund of INR 2 Bn and INR 30 Bn for internal resources.



Source: Union Budget, Expenditure Profile

Note: A – Actual Capex over the years and BE – Budgeted figures

Key Highlights of the Railway Capex for 2025-26

For the financial year 2025-26, Indian Railways has maintained a strong focus on infrastructure development, safety, and modernization. Here are the key highlights:

Capital Expenditure: The total Capex allocation remains at INR 2,520 Bn, consistent with the previous year, extra budgetary: Rs.100 Bn, and internal resource: INR 30 Bn.

Manufacturing Plans: Approval for manufacturing 200 Vande Bharat trains, 100 Amrit Bharat trains, and 50 Namo Bharat train. Focus on enhancing short-distance connectivity between cities.

Safety Enhancements: The budget allocates INR 1,160 billion this year to bolster the safety of Indian Railways through various projects, reflecting a significant increase in investment in safety measures. This includes the continued rollout of the Kavach system, an advanced train protection technology.

Electrification: Continued 100% efforts towards complete railway electrification by the end of the financial year

Rolling Stock: Approval for manufacturing 200 Vande Bharat trains, 100 Amrit Bharat trains, 50 Namo Bharat rapid rail, and 17,500 general non-AC coaches to enhance travel experience and connectivity.

Freight and Revenue Growth: Indian Railways aims to reach a cargo capacity of 1.6 billion tonnes, positioning itself as the second-largest cargo-carrying railway globally.

Infrastructure Upgrades: Significant projects valued at INR. 460 bn, including new lines, doubling, quadrupling, station redevelopment, and infrastructure improvements.

For the financial year 2025-26, Indian Railways has outlined a comprehensive capital expenditure (Capex) plan with specific allocations for various activities.

Category	Allocation (INR Bn)	Description
Safety Enhancements	1,160	Upgrading tracks, signalling, flyovers, underpasses, Kavach system
Doubling of Rail Lines	320	Enhancing capacity and reducing congestion
Gauge Conversion	46	Improving connectivity
Laying New Rail Lines	322	Expanding the network
Rolling Stock	589	Procurement and manufacturing of coaches and locomotives
Construction of ROBs and RUBs	70	Enhancing safety at level crossings

Source: Ministry of Railway, Expenditure Budget 2025-2026

Indian Railways Budget Allocation for 2025-26: Focus on Customer Amenities and Rolling Stock

In the 2025-26 budget, Indian Railways has earmarked INR 121 Bn for customer amenities. This allocation is directed towards enhancing passenger comfort and convenience across various touchpoints of the railway network. Key investments include improved seating arrangements in coaches, enhanced sanitation facilities with bio-toilets, and upgraded waiting areas at stations equipped

with comfortable seating and additional amenities. Furthermore, digital displays for real-time information on train schedules and platforms will be installed, alongside the development of mobile applications for ticket booking and service access. Provisions for differently abled passengers, such as designated seating areas and accessible toilets, as well as improved catering services offering a diverse menu, are also part of this comprehensive plan.

In addition to customer amenities, Indian Railways has allocated INR 589 Bn for rolling stock. This budget covers the procurement, manufacturing, furnishing, and refurbishment of coaches and locomotives. The rolling stock budget focuses on acquiring new coaches and locomotives, refurbishing, and upgrading existing rolling stock, enhancing the interior fittings of coaches to improve passenger comfort, and enhance number of tracks during FY 2025-26. Maintenance and repairs of rolling stock are also prioritized to ensure the operational efficiency and safety of trains.

This will result in increased efficiency for both freight and passenger service. Together, these allocations reflect Indian Railways' commitment to improving the travel experience for passengers. The significant investment in customer amenities aims to provide a more comfortable, hygienic, and accessible journey, while the focus on rolling stock ensures that the infrastructure supporting these services is modern, reliable, and safe. These budgetary provisions underscore a strategic approach to enhancing both passenger satisfaction and operational excellence in the railway network.

Railways Infrastructure

Ranked fourth globally, India possesses an extensive railway system, trailing only the United States, Russia, and China. The affordability and efficiency of railways persist as the favoured choice for long-distance travel among the majority of Indians.

Acknowledged as one of the world's largest railway systems under unified management, India's railway network excels in facilitating extended journeys and transporting bulk goods. Beyond being an economical mode of conveyance, it stands out as an energy-efficient means of transport.

During the financial year 2023–24, a total of 2,806 kilometers of new railway lines were completed, 259 kilometers of track were converted from meter/narrow gauge to broad gauge, and 2,244 kilometers of double or multiple lines were commissioned.

The railway infrastructure further encompasses 13,523 passenger trains and 9,146 freight trains operating daily. As of March, 2025, the Indian Railways recorded its highest-ever loading of 1,617.38 MT, showcasing the system's efficiency and capacity growth.

With approximately 7,335 railway stations spread across 17 zones and 68 divisions, India's railway network stands as a testament to its scale, efficiency, and crucial role in the nation's transportation landscape.

Railway modernization in India: focus on expansion / modernization of railway station network

India's railway journey began in 1832 with proposals in Madras. The first passenger train ran between Bombay and Thane on April 16, 1853, covering 34 kilometers with 400 passengers. The country's first electric passenger train operated between Victoria Terminus (VT) and Kurla on February 3, 1925. The reorganization of India's railways into regional zones began in 1951. In 1952, fans, lights, and sleeping accommodations were mandated across all classes of passenger accommodations.

Today, it has come very far. India's railway network is one of the largest in the world, serving millions of passengers and transporting goods across vast distances every day. As the backbone of the country's transportation infrastructure, Indian Railways plays a crucial role in connecting people, businesses, and regions. In recent years, there has been a concerted effort towards modernizing and expanding the railway station network to meet the evolving needs of passengers and freight traffic.

The modernization of railway stations in India encompasses a wide range of initiatives aimed at enhancing infrastructure, amenities, and services to provide passengers with a world-class travel

experience. This includes the construction of modern waiting halls, waiting rooms, restrooms, and passenger lounges equipped with amenities such as Wi-Fi connectivity, charging points, and digital display boards providing real-time information about train schedules and arrivals. Additionally, efforts are underway to improve accessibility for passengers with disabilities by installing ramps, elevators, and other facilities to ensure equitable access to railway services. Some of the developments are as mentioned below:

As of July 8, 2025, the Ministry of Railways has entrusted the Rail Land Development Authority (RLDA) with the redevelopment of 90 railway stations across India. These projects are being executed under two primary models: EPC (Engineering, Procurement, and Construction) and PPP (Public-Private Partnership). Of the 90 stations, 82 are under the EPC model, while 8 are being considered under PPP, reflecting a strong preference for direct execution.

The Western Railway zone leads the redevelopment effort with the highest number of stations, followed by the Southern, Northern, and South-Central zones. In terms of state-wise distribution, Maharashtra tops the list with 16 stations, followed by Tamil Nadu (13), Gujarat (11), Delhi (9), and Uttar Pradesh (7). This pattern highlights a strategic focus on regions with high population density and economic significance.

Execution responsibilities are shared among RLDA, various Zonal Railways, and in some cases, SITCO. RLDA is the key player, especially in high-profile stations, handling both tendering and execution. Out of the 90 stations, over 60 have their Detailed Project Reports (DPRs) finalized, and more than 40 have moved into the execution phase following tender awards. Meanwhile, around 15 stations remain in the master planning or tender invitation stages.

Notably, stations like Rani Kamalapati and Gandhinagar Capital have already been completed and commissioned, while Gomtinagar has entered its second phase of development, indicating sustained progress. This comprehensive and phased approach underscores Indian Railways' commitment to enhancing passenger experience, operational efficiency, and urban connectivity through modernized infrastructure.

The redevelopment of railway stations across India is set to revolutionize the passenger experience by integrating all essential amenities into a single, well-planned space. These upgraded stations will feature retail outlets, cafeterias, food courts, waiting lounges, and recreational facilities, ensuring convenience and comfort for travelers. A key design element is the segregation of arriving and departing passengers, which will streamline movement and reduce congestion. To enhance navigability, the stations will be equipped with modern infrastructure such as illumination systems, clear wayfinding signage, acoustic enhancements, lifts, escalators, and travellers. A comprehensive master plan has been developed to facilitate smooth traffic flow, supported by adequate parking facilities. These redeveloped stations aim to offer airport-like amenities, elevating the standard of public transport hubs in India.

In line with the government's vision of promoting sustainable development and green transportation, the modernization of railway stations in India also emphasizes environmental sustainability and energy efficiency. This includes the adoption of eco-friendly practices such as rainwater harvesting, solar power generation, and energy-efficient lighting systems to reduce the carbon footprint of railway operations. Furthermore, Indian Railways has demonstrated a strong commitment to environmental sustainability by achieving significant milestones in green certification and environmental management system implementation. A total of 32 railway stations and 32 railway buildings, including schools and hospitals, have been awarded "GreenCo" certification, highlighting compliance with rigorous environmental sustainability standards. Additionally, approximately 700 railway stations have been certified for the implementation of the Environment Management System ISO: 14001, reflecting a holistic approach to environmental stewardship and resource management within the railway ecosystem.

Aligned with the overarching objectives of the "Digital India" initiative of the Government of India, Indian Railways has implemented Wi-Fi internet services at 6,102 stations through RailTel's RailWire Wi-Fi network, including 15 stations in the Kashmir valley. This initiative constitutes one of the world's largest and fastest public Wi-Fi networks. Notably, 70% of the commissioned stations are situated in rural areas, thereby providing free high-speed Wi-Fi access to a significant portion of the rural population.

Furthermore, RailTel is actively deploying an IP camera-based Video Surveillance System at over 5000 railway stations, significantly enhancing passenger safety and security across the Indian Railways network. This initiative includes the integration of standalone video surveillance systems installed by respective zonal railways at various stations, enabling centralized monitoring of video recordings at the Divisional and Zonal headquarters. The system incorporates high-capacity storage devices at stations to archive CCTV footage for a specified duration. Phase-I of this project has already been completed at 303 stations.

A variety of amenities are available at stations to cater to the diverse needs of passengers, including 1926 Water Vending Machines, 1365 Multi-Purpose Stalls, 362 Book Stalls, 44 Miscellaneous/Curio Stalls, 03 exclusive Chemist Stalls, and 01 Book Stalls cum Chemist Corners. These facilities ensure the availability of essential items required by travellers during their journey.

Overall, the focus on expansion and modernization of the railway station network in India reflects a comprehensive approach towards transforming the country's railway infrastructure to meet the needs of the 21st century. By investing in infrastructure upgrades, enhancing passenger amenities, promoting environmental sustainability, and unlocking commercial potential, Indian Railways aims to create a modern and efficient railway network that serves as a catalyst for economic growth and development across the country.

Flagship Government Policies

Amrit Bharat Station Scheme

Recognizing the widespread preference for railways as the primary mode of transportation, the Indian government has underscored the significance of delivering top-notch facilities at railway stations. Aligned with this vision, the Amrit Bharat Station Scheme was initiated to revamp 1309 stations across the country.

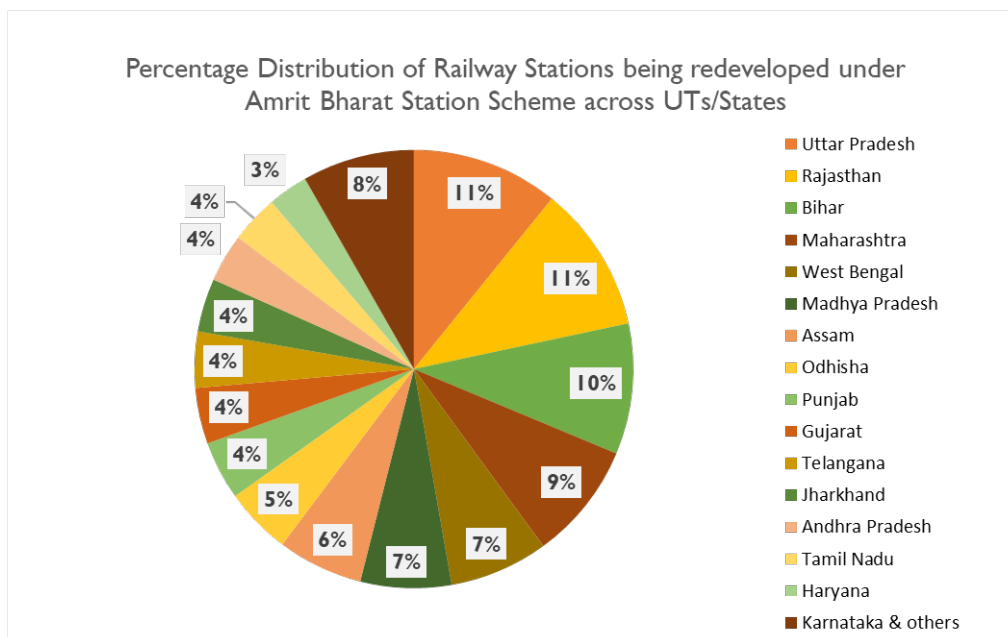
With a long-term perspective on station development, the Amrit Bharat Station scheme entails crafting Master Plans and implementing them progressively to enhance various station amenities. These improvements encompass bettering station accessibility, waiting areas, restroom facilities, installation of lifts and escalators as necessary, cleanliness initiatives, provision of free Wi-Fi, establishment of kiosks for local products through initiatives like 'One Station One Product', improvement of passenger information systems, creation of Executive Lounges, allocation of spaces for business meetings, incorporation of landscaping, and tailoring solutions to the unique needs of each station.

Moreover, the scheme underscores the refurbishment of station structures, integration of stations with surrounding urban areas on both sides, promotion of multimodal connectivity, provision of facilities for individuals with disabilities (Divyangjans), implementation of sustainable and eco-friendly measures, introduction of ballastless tracks, inclusion of 'Roof Plazas' when necessary, and careful consideration of the feasibility and phasing of enhancements. The overarching objective is the transformation of these stations into vibrant city centres over the long term.

Under this scheme, redevelopment work has commenced for 508 railway stations at a cost exceeding Rs 24,470 crores. Comprehensive Master Plans are being devised for the evolution of these stations into 'City Centres,' with seamless integration on both sides of the city. This integrated approach aligns with the holistic vision of overall urban development centered around the railway station.

These 508² stations are spread across 27 states and union territories, including 55 each in Uttar Pradesh and Rajasthan, 49 in Bihar, 44 in Maharashtra, 37 in West Bengal, 34 in Madhya Pradesh, 32 in Assam, 25 in Odisha, 22 in Punjab, 21 each in Gujarat and Telangana, 20 in Jharkhand, 18 each in Andhra Pradesh and Tamil Nadu, 15 in Haryana, 13 in Karnataka among others.

² No definitive information is currently available to confirm whether the 181 stations earmarked for redevelopment under the RLDA's purview are included within the 508 stations targeted by the Amrit Bharat Station Scheme.



Source: Amrit Bharat Station Scheme

The redevelopment will provide modern passenger amenities along with ensuring well-designed traffic circulation, inter-modal integration and signage for the guidance of passengers. The design of the station buildings will be inspired by local culture, heritage and architecture.

As of May 2025, Prime Minister Narendra Modi recently inaugurated 103 revamped railway stations under the Amrit Bharat Station Scheme, marking a major milestone in India's railway modernization efforts. These stations span 86 districts across 18 states and union territories, and are part of a broader plan to redevelop 1,309 stations nationwide

One Station One Product (OSOP) Scheme

The One Station One Product scheme, unveiled in the Union Budget 2022-23, aligns with the 'Vocal for Local' vision of the Government of India, aiming to create a market for local/indigenous products and generate additional income opportunities for marginalized segments of society. This initiative seeks to enhance livelihood prospects for local artisans, potters, weavers/handloom weavers, craftsmen, etc., by establishing sales outlets at railway stations nationwide. The pilot project, launched on 25.03.2022 for 15 days at 19 stations, informed the formulation of the OSOP policy on 20.05.2022.

Within this framework, Indian Railways provides uniquely designed sales outlets with a distinct appearance and logo at stations, developed by NID/Ahmedabad, to showcase, sell, and give heightened visibility to indigenous/local products for a nominal registration fee of Rs 1000/- for 15 days. Allotment occurs to applicants meeting the scheme's objectives on a rotational basis through draw of lots at stations.

As of 30.11.2023, 1189 OSOP outlets are operational at 1083 stations, allocated to local beneficiaries, including 184 artisans, 630 craftsmen, 147 weavers, 202 agricultural/forest product producers, among

others. Up to November 2023, a total of 41,280 direct beneficiaries have availed themselves of the opportunities presented by the OSOP scheme.

As of June 2025, Since the launch of the scheme on March 25, 2022, total sales amounting to INR 22.08 crore have been generated in Tamil Nadu. Indian Railways continues to encourage active participation from Self Help Groups (SHGs), Micro, Small and Medium Enterprises (MSMEs), Non-Governmental Organisations (NGOs), and other local producers under this initiative.

National Railway Plan (NRP)

The National Rail Plan (NRP) for India, set for realization by 2030, is a strategic blueprint aimed at forging a 'future-ready' railway system. It seeks to proactively create capacity exceeding demand by 2030, fostering efficiency and profitability while accommodating periodic peaks and year-on-year growth in traffic demand with minimal future capital investment. The NRP envisions sustaining a 44% modal share for railways up to 2051, signifying a substantial role in the country's transportation landscape.

Emphasizing both operational capacities and commercial policy initiatives, the plan targets an increase in the railway's freight modal share from the current 28% to an ambitious 44% by 2051. The objective is to establish capacity ahead of demand, enabling the railway system to support a 44% modal share in freight traffic while maintaining sustainability. Diverse financial models, including Public Private Partnership (PPP), are under consideration to achieve these goals.

Recognizing Indian Railways as a growth engine, the NRP seeks to transform it into an efficient, greener, and modernized entity, offering cost-effective, safer, and reliable transportation for passengers and freight. The plan outlines a two-step transformation, with the first leap targeted by 2024 and the comprehensive vision for 2030.

The "Vision 2024/2024" framework identifies critical projects for completion by 2024, including 100% electrification, multi-tracking of congested routes, speed upgrades on key routes, and the elimination of level crossings. Indian Railways' impressive 7.5% increase in cargo transport in 2022, reaching 1,497 million tonnes, aligns with the NRP's goal of raising rail's freight share from 31% to 44% by 2051.

Key features of the NRP include formulating strategies for freight modal share, reducing transit time, launching Vision 2024 for accelerated project implementation, identifying new Dedicated Freight Corridors and High-Speed Rail Corridors, assessing rolling stock and locomotive requirements, and involving the private sector in operations and infrastructure development. This comprehensive plan reflects a commitment to shaping India's railway future with foresight, efficiency, and sustainability.

Green Initiatives

Indian Railways is committed to becoming a Net Zero Carbon Emitter by 2030 and has implemented a series of initiatives to reduce carbon emissions. These include the adoption of energy-efficient technologies such as fully transitioning to the production of three-phase electric locomotives with regenerative features, implementing head-on generation (HOG) technology, installing LED lights in buildings and coaches, using star-rated appliances, and promoting afforestation.

Additionally, the railway is tapping into the vast potential of renewable energy, particularly solar power, by utilizing the expansive land parcels available along the railway tracks. By October 2023, approximately 211 MW of solar plants, both rooftop and ground-mounted, and about 103 MW of wind power plants have been commissioned. Moreover, the railway has secured commitments for an additional 2150 MW of renewable energy capacity.

As part of its Net Zero Carbon by 2030 mission, Indian Railways has launched Mission 100% Electrification. This mission aims to electrify the entire Broad Gauge network in a focused effort to provide an environmentally friendly and clean mode of transport.

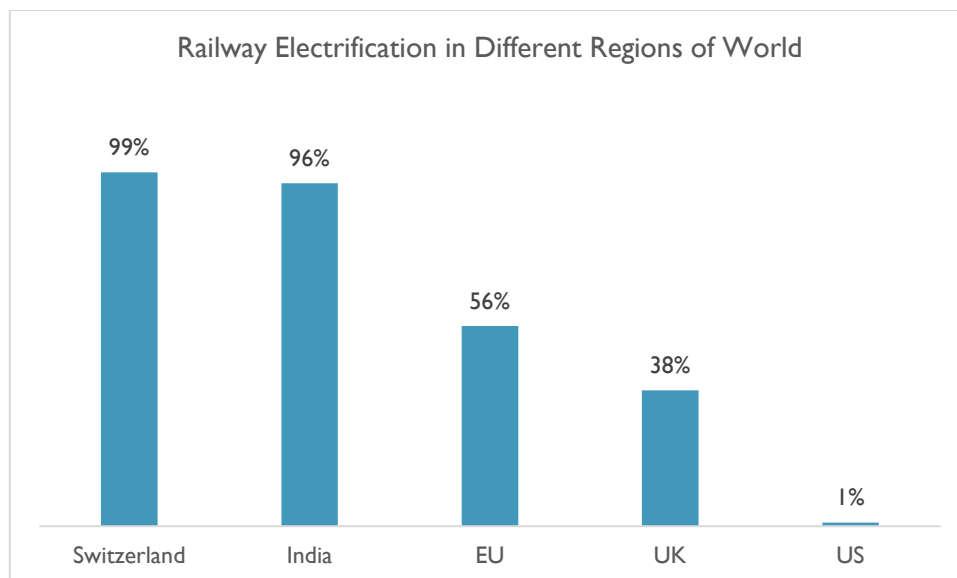
Indian Railways has achieved remarkable progress in electrification, with 21,801 KM of the broad gauge network electrified by 2014. As of July, 2025, 69,102 km of the total Indian Railway Broad Gauge (BG) network of 69,800 km has been electrified, representing 99% of the total BG network. Twenty-five states and Union Territories have achieved 100% electrification of their rail tracks, including Chandigarh, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Madhya Pradesh, Meghalaya, Odisha, Puducherry, Uttar Pradesh, and Uttarakhand.

Signalling & Electrification Infrastructure of Indian Railways:

Indian Railways: Electrification

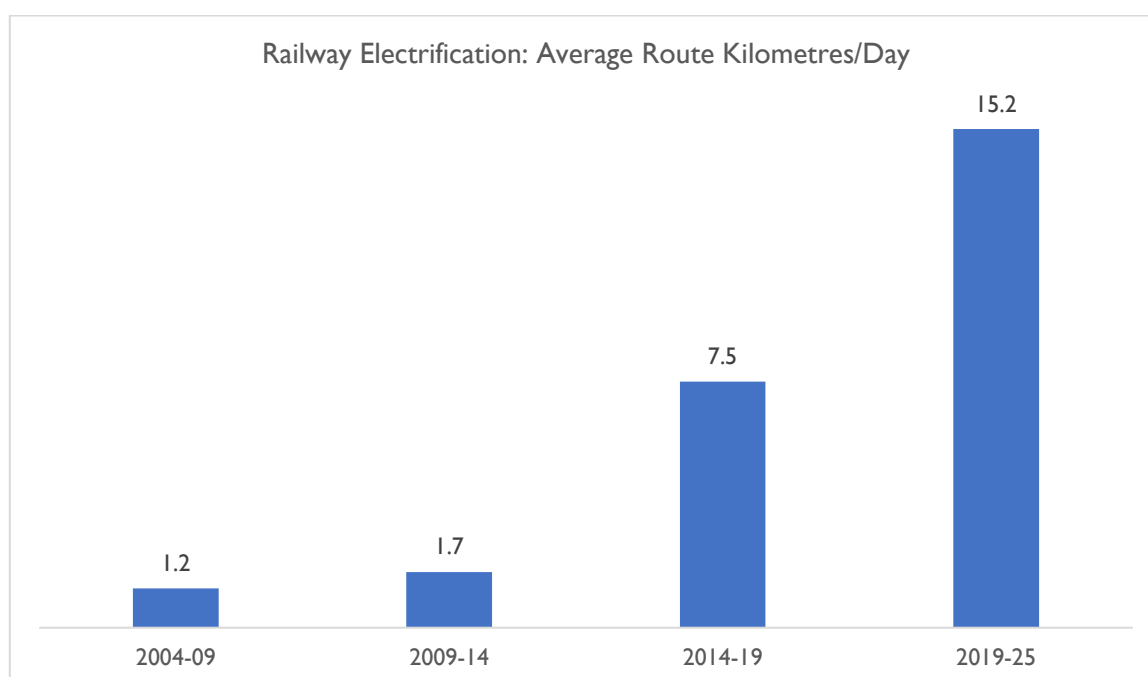
In recent years, Indian Railways has embarked on an ambitious journey to electrify its vast network, significantly enhancing efficiency and sustainability. This push towards electrification is part of the broader National Rail Plan, Vision 2024, which aims to accelerate the implementation of critical projects, including the multitracking of congested routes and achieving 100% electrification. The Vande Bharat service, a symbol of modern, high-speed rail travel, now operates 51 trains across the electrified broad-gauge network, seamlessly linking various states. Moreover,

The rate of railway electrification in India has increased significantly, from 1.7 kms per day between 2009-2014 to approximately 15.2 kms per day between 2019-2025. According to the Indian Railways, India outpaces the European Union, the UK, and the US in rail electrification, with 96% of its railways electrified, compared to 56% in the EU, 38% in the UK, and just 1% in the US. Switzerland, however, leads with 99% electrification. This milestone signifies a remarkable leap towards reducing reliance on diesel engines and promoting a greener future for rail transport in India.



Source – D&B Research

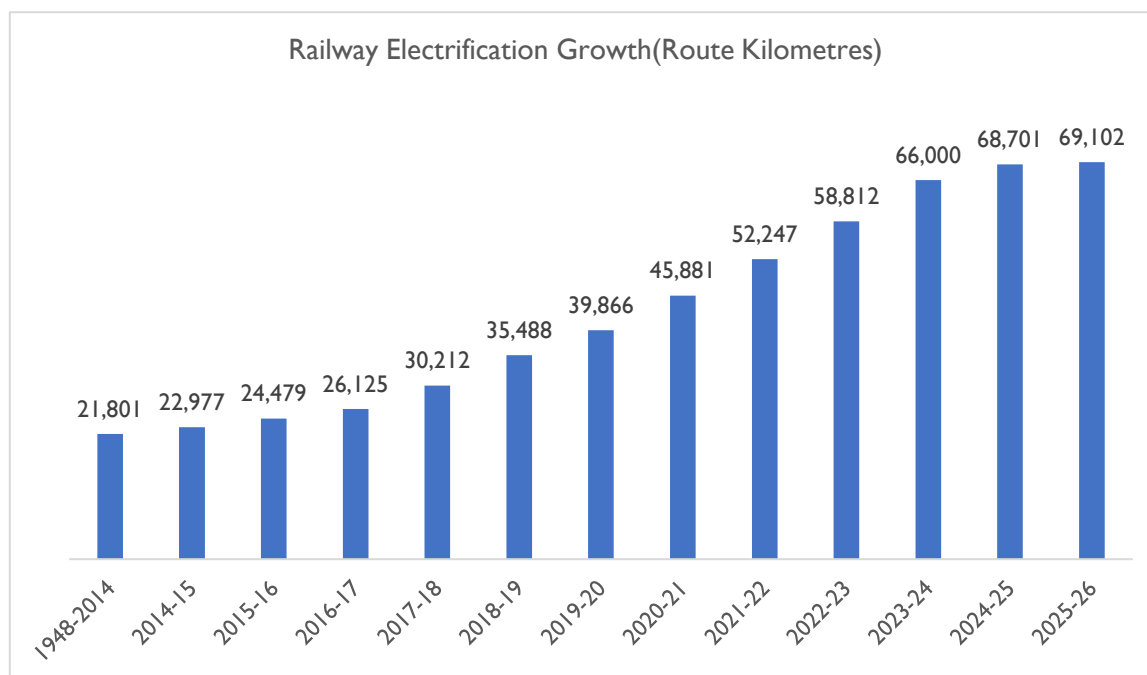
In FY 2025-26, Indian Railways received a dedicated budget of INR 61.5 billion to help complete the rail network's electrification. The total electrified network reaches 99% of the broad-gauge network, underscoring India's commitment to sustainability. The electrification program is not just about environmental benefits; it catalyzes economic growth. It creates jobs during construction, reduces dependence on imported fossil fuels, and positions Indian Railways as a modern and efficient engine of the nation's economy.



Source – Indian Railways

The progress in railway electrification has been rapid and remarkable in the last fiscal also. In 2023-24 alone, Indian Railways electrified 4,644 route kms, marking a historic accomplishment with immense potential for the nation's economic and environmental well-being. In India railway, 69,800 board gauge

of RKM is available throughout the country out of which 69,102 route kms of the broad-gauge network have been electrified as of FY 2025-2026, positioning Indian Railways on the brink of achieving 100% electrification and establishing itself as the largest green railway network in the world.



Source – Indian Railways

Electrification Growth Across Zones:

Sn	Zone	Total BG RKM	Electrified (As of July 2025)	% Electrified
1	CR	4,035	4,035	100%
2	ECOR	3,060	3,060	100%
3	ECR	4,381	4,381	100%
4	ER	2,832	2,832	100%
5	KRCL	738	738	100%
6	Metro	50	50	100%
7	NCR	4,369	4,369	100%
8	NER	3,225	3,225	100%
9	NR	7,590	7,590	100%
10	SCR	6,244	6,244	100%
11	SECR	2,462	2,462	100%
12	SER	2,753	2,753	100%
13	WCR	3,143	3,143	100%
14	WR	6,051	6,051	100%

15	NWR	6,146	6,053	98%
16	SR	5,062	4,893	97%
17	SWR	3,463	3,296	95%
18	NFR	4,196	3,927	94%
	Total	69,800	69,102	99%

Source – Indian Railways

In the vast and diverse landscape of Indian Railways, a remarkable transformation has been unfolding in railway zones. As of July 2025, the journey towards electrification has reached an impressive milestone, reflecting years of dedicated effort and technological advancement. As of July, 2025, 14 zones have achieved 100% electrification. Significant progress has also been made by NWR (98%), SR (97%), SWR (95%) and NFR (94%). This achievement underscores the commitment to modernizing India's rail infrastructure and enhancing operational efficiency.

Electrification Across Indian State & Union Territories:

Sn.	States	Total BG RKM	Electrified BG RKM (As of July 2025)	% Electrified
1	Andhra Pradesh	3,841	3,841	100%
2	Arunachal Pradesh	12	12	100%
3	Bihar	4,023	4,023	100%
4	Chandigarh	16	16	100%
5	Chhattisgarh	1,313	1,313	100%
6	Delhi	183	183	100%
7	Haryana	2,026	2,026	100%
8	Himachal Pradesh	67	67	100%
9	J&K	413	413	100%
10	Jharkhand	2,580	2,580	100%
11	Kerala	1,046	1,046	100%
12	Madhya Pradesh	4,984	4,984	100%
13	Maharashtra	5,938	5,938	100%
14	Meghalaya	9	9	100%
15	Nagaland	11	11	100%
16	Odisha	2,961	2,961	100%
17	Puducherry	21	21	100%
18	Punjab	2,369	2,369	100%
19	Telangana	1,942	1,942	100%
20	Tripura	271	271	100%
21	Uttar Pradesh	9,639	9,639	100%

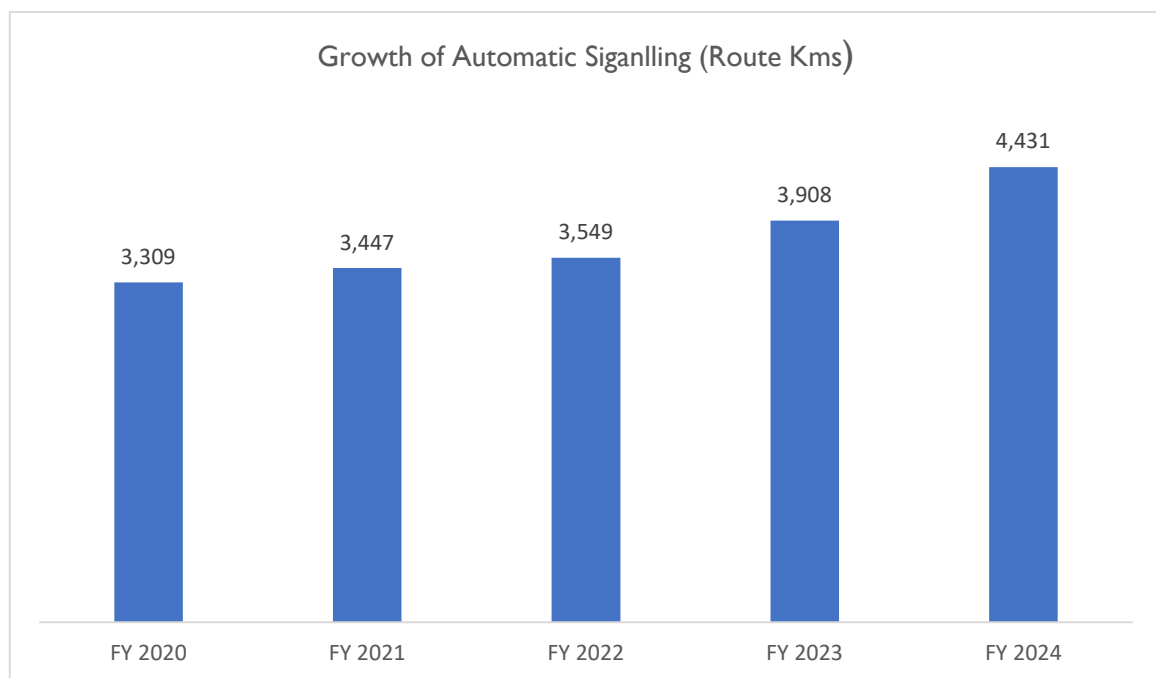
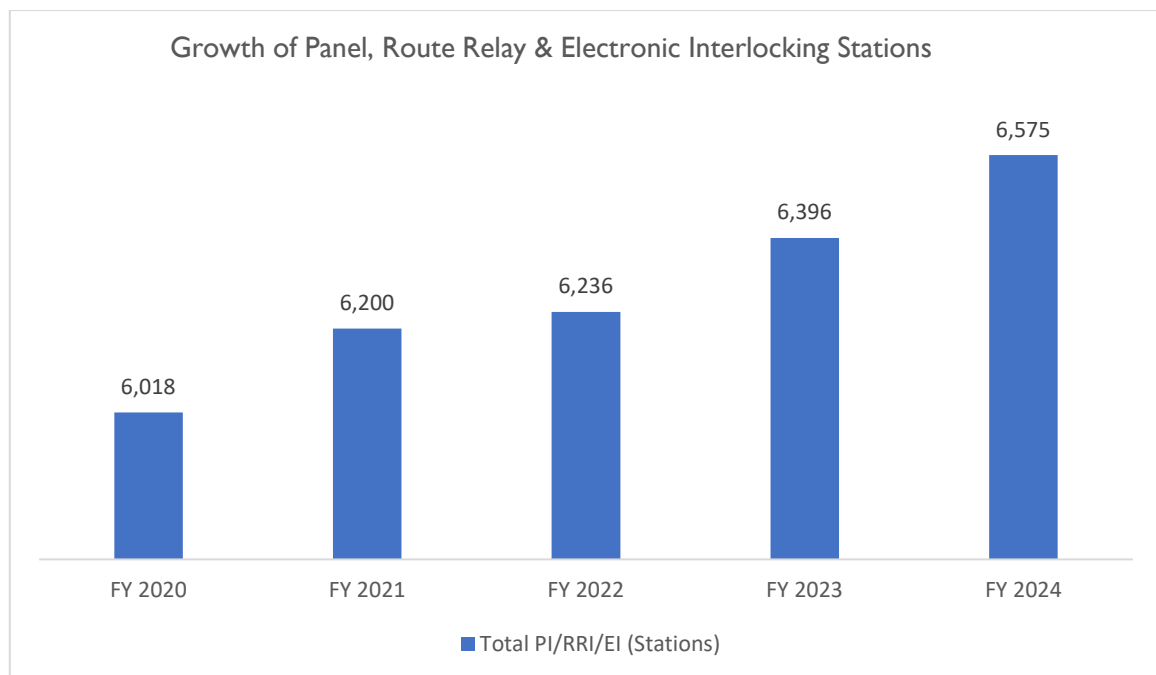
22	Uttarakhand	378	378	100%
23	Gujarat	4,777	4,777	100%
24	Mizoram	2	2	100%
25	West Bengal	4,042	4,042	100%
26	Rajasthan	6,514	6,421	99%
27	Karnataka	3,737	3,586	96%
28	Tamil Nadu	3,920	3,751	96%
29	Goa	187	171	91%
30	Assam	2,578	2,309	90%
	Total	69,800	69,102	99%

Source – Indian Railways

Indian Railways has made significant strides in electrification across states and union territories. Twenty-five regions, including major states like Andhra Pradesh, Bihar, Maharashtra, and Uttar Pradesh, have achieved full electrification of their broad-gauge routes. Significant progress is also noted in states like Rajasthan, Karnataka, and Tamil Nadu. However, some northeastern states, such as Assam, still have considerable work ahead. Electrification across the states & territories reflecting a substantial advancement in modernizing the railway infrastructure across India

Indian Railways: Signalling

In the quest to enhance safety and efficiency in train operations, Indian Railways has embarked on a significant modernization journey, particularly in the domain of signalling systems. Over the past decade, Indian Railways has progressively replaced the outdated Multi Cabin Mechanical Signalling System with Modern Signalling Systems. These include Panel Interlocking (PI), Route Relay Interlocking (RRI), and Electronic Interlocking (EI), complemented by Multi Aspect Colour Light Signals (MACLS).



Source – Indian Railways

As of March 2024, 6,575 stations, which account for about 99.07% of interlocked Broad-Gauge stations, are equipped with these advanced systems. This transition has not only optimized operational costs but also enhanced safety by reducing human intervention.

In a pivotal move in 2016, Indian Railways decided to implement Electronic Interlocking in all future installations. By March 31, 2024, 3,424 stations had been outfitted with Electronic Interlocking Systems.

Item	FY2020	FY2021	FY2022	FY2023	FY2024
Panel Interlocking (Stations)	383	3,747	3,438	3,134	2,950
Route Relay Interlocking (Stations)	228	247	226	217	201

Electronic Interlocking (Stations)	1,927	2,206	2,572	3,045	3,424
Total PI/RR/El (Stations)	6,018	6,200	6,236	6,396	6,575
Block Proving by Axle Counter (Block sections)	5,663	5,805	6,003	6,364	6,058
Automatic Signalling (Route Kms)	3,309	3,447	3,549	3,908	4,431
Intermediate Block Signalling (Block sections)	602	628	666	727	756
Interlocked level Crossing Gates (Nos.)	11,639	11,710	10,854	11,079	11,062

Source – Indian Railways

Track Circuiting and Block Proving by Axle Counter (BPAC):

Track circuiting, a vital component for ensuring track occupation verification, has also seen extensive implementation. By March 31, 2024, track circuiting was completed at about 35,743 locations across various routes, covering 99.39% of the 6,597 stations. Additionally, Block Proving by Axle Counter (BPAC) has been adopted to automatically verify the complete arrival of trains at stations, enhancing safety and improving mobility. As of the same date, BPAC was implemented on 6,058 block sections.

Intermediate and Automatic Block Signalling:

Intermediate Block Signalling (IBS) has proven instrumental in enhancing line capacity without incurring extra recurring revenue expenses. By March 31, 2024, IBS had been implemented in 756 block sections. Similarly, Automatic Block Signalling, which augments line capacity and reduces headway on high-density routes, has been provided on 4,431 route kms.

Enhancing Safety at Level Crossings & Self-Sufficiency in Signalling Equipment

Safety at level crossings has also been prioritized, with interlocking signals provided at 11,062 level crossing gates. Additionally, 7,667 busy interlocked gates have been equipped with Sliding Booms, minimizing disruptions caused by damage to level crossing gates.

To achieve self-sufficiency in signalling equipment, Indian Railways' workshops at various locations, including Podanur, Mettuguda, Gorakhpur, Howrah, Byculla, Sabarmati, Kharagpur, and Ghaziabad, manufacture specialized signalling items such as Electric Point Machines, Tokenless Block Instruments, Double Line Block Instruments, Axle Counters, and various types of relays. This initiative ensures a steady supply of essential components for smooth and safe train operations. The concerted efforts in modernizing signalling systems underscore Indian Railways' commitment to safety, efficiency, and technological advancement, marking a significant milestone in the history of railway growth and development.

For the development of railway infrastructure, Indian Railways allocated INR 41.9 billion for signalling works in FY 2023-24, emphasizing the railway's dedication to providing a safe and reliable travel experience.

Technology Development in Track & Signalling Infrastructure:

Emerging Smart Technologies & features in Railway Track & Management:

Indian Railways has embarked on an extensive modernization of its track and signalling infrastructure to enhance safety, efficiency, and capacity. The shift from traditional mechanical signalling to advanced digital technologies has been a significant focus. The implementation of Electronic Interlocking (EI), Panel Interlocking (PI), and Route Relay Interlocking (RRI) systems now covers approximately 99.07% of interlocked Broad-Gauge stations. These systems provide more reliable and efficient control over train movements. Additionally, the widespread deployment of Track Circuiting and Block Proving by Axle Counter (BPAC) ensures accurate train detection, enhancing safety and operational efficiency.

Advanced Signalling Technologies

Indian Railways is integrating several advanced technologies to further improve signalling infrastructure. The European Train Control System (ETCS) is one such innovation, which enhances safety and punctuality by monitoring train speeds and ensuring they are within allowed limits. The Automatic Train Protection (ATP) system, known as Kavach, is another notable advancement. Kavach automatically applies brakes if the train driver fails to do so, particularly in adverse weather conditions. Since its national adoption in July 2020, Kavach has been deployed on 1,465 route kms and 139 locomotives, with ongoing projects aiming to cover approximately 3,000 kms.

In regions experiencing high rail traffic, such as Bengaluru, Automatic Block Signalling (ABS) systems are being introduced to increase train frequencies and reduce collision risks. Investments totalling INR 8.74 billion have been allocated for these projects, significantly improving the capacity and efficiency of key routes.

Centralized Traffic Control and Train Management Systems

Centralized Traffic Control (CTC) represents a major leap forward in signalling technology, enabling the management of multiple signalling installations from a centralized location. CTC systems, which include real-time simulation of railway traffic, have been operational on 322 route kms of the Aligarh-Kanpur route, with plans for expansion to about 14,660 route kms. Train Management Systems (TMS) complement CTC by providing real-time updates on train positions and movements, thus enhancing operational efficiency. Implementations in suburban sections of Mumbai and Howrah are already yielding improvements, with further installations planned for other critical routes.

Integration of Digital Technologies

The integration of digital technologies, such as the Real-Time Train Information System (RTIS) and Remote Monitoring and Management of Locomotive System (REMMLOT), is revolutionizing train operations. RTIS utilizes GPS sensors for real-time tracking of trains, which improves the accuracy of estimated times of arrival (ETAs) and integrates with passenger information systems to provide precise

updates. RTIS is being deployed across 4,000 electric locomotives, significantly enhancing automated train management and charting.

REMMLOT, which incorporates GPS tracking and sensors into locomotives, enables continuous data monitoring and real-time adjustments. This system supports accurate train recording and operational efficiency. The Modern Train Control system, featuring LTE-based Mobile Train Radio Communication (MTRC), further enhances the signalling infrastructure, ensuring more reliable and efficient train operations.

These comprehensive modernization efforts, including advancements in signalling technologies and the integration of digital systems, are poised to transform Indian Railways into a more efficient, safe, and reliable transportation network. By embracing these technologies, Indian Railways not only improves safety and minimizes human error but also supports economic growth through a robust and modernized rail infrastructure.

Digital Transformation Initiatives in Railway:

Indian Railways is undergoing a significant digital transformation to modernize its operations and enhance service delivery. This shift is driven by the need to adapt to the digital economy and advancements in information and communication technologies (ICT). It is estimated that India plans to invest INR 50,000 million (equivalent to USD 715.41 billion) by 2030. Key elements of this transformation include the adoption of digital tools and systems that align with Industry 4.0 and Railway 4.0 principles.

Advanced Manufacturing and Infrastructure Maintenance

Indian Railways is embracing Industry 4.0 practices to boost productivity in its manufacturing processes, particularly in passenger car factories. The integration of advanced technologies such as drones and 3D scanning is revolutionizing infrastructure maintenance, including bridge inspections. These innovations reflect a commitment to utilizing cutting-edge solutions for enhanced safety and operational efficiency. Furthermore, the digitization of procurement procedures has streamlined processes from request processing and tender finalization to material assessment and online transactions, fostering greater transparency and efficiency.

Digital Ticketing and Passenger Experience Enhancements

The modernization of the Unreserved Ticketing System (UTS) is another significant development, facilitating automated ticketing at stations and improving passenger access while reducing wait times. This enhancement aligns with the broader digital transformation goals of Indian Railways, which aims to provide a seamless and user-friendly experience for passengers.

By integrating these advanced technologies and digital systems, Indian Railways is positioning itself at the forefront of modern transportation, ensuring greater efficiency, safety, and service quality across its network.

Integrated Tunnel Radio Communication System

Indian Railways is enhancing operational safety and communication in challenging terrains with the installation of the Integrated Tunnel Radio Communication System. RailTel is deploying this advanced system in critical railway tunnels to ensure uninterrupted radio communication between handheld radios within the tunnels, base stations in control rooms, and Station Masters at nearby stations. This system is pivotal in maintaining seamless train operations and ensuring safety in these crucial areas.

SMART Coaches and Technological Advancements

Indian Railways is revolutionizing passenger comfort and safety with the introduction of approximately 100 SMART Coaches. These coaches are equipped with modern features such as Smart Public Address and Passenger Information Systems, Smart HVAC (Heating, Ventilation, and Air Conditioning), and Smart Security and Surveillance Systems. This innovation underscores the commitment to enhancing the passenger experience through technology, including facial recognition, automated systems, and region-specific designs.

International Technology Integration and Startup Collaboration

Indian Railways is leveraging global technologies to modernize its operations. This includes adopting international best practices in areas like coach manufacturing, signalling, and freight management. The railway sector is also actively collaborating with startups and private enterprises to address challenges, enhance transit efficiency, and improve infrastructure. Policies support startups with seed funding and development resources, fostering innovation and driving a holistic transformation in Indian Railways through global technology integration and local entrepreneurial engagement.

Overall, Indian Railways' digital transformation efforts are aimed at modernizing its infrastructure, optimizing operations, and enhancing the overall travel experience for passengers, positioning itself at the forefront of technological advancement in the global rail industry.

Competitive Scenario:

In India's evolving railway sector, the furnishing and refurbishing of passenger coaches play a crucial role in updating and maintaining the country's extensive rail infrastructure. This industry is predominantly led by large, established companies that possess the necessary resources, state-of-the-art technology, and extensive expertise to handle significant contracts. These industry leaders are responsible for transforming outdated coaches into modern, comfortable, and efficient units that meet stringent safety and quality standards. Their work involves not only the renovation of old coaches but also the furnishing of new ones, ensuring that each coach integrates the latest advancements in technology and design to enhance passenger experience and operational performance.

Entry Barriers:

- Entering this industry is no small feat, as it requires significant capital investment, advanced technical knowledge, and the ability to navigate complex regulatory approvals and certifications.
- New entrants have to build robust relationships with Indian Railways and establish a reliable supply chain for materials and components.
- The industry demands a high level of technical knowledge and expertise in both mechanical and electrical systems. Developing and maintaining this expertise requires skilled labor and ongoing training, which can be a barrier for new entrants.
- Existing players often have established connections and a proven track record, which new entrants must work to develop. Building strong relationships with Indian Railways and securing long-term contracts can be challenging.
- The Research Design and Standards Organization (RDSO) plays a crucial role as a technical consultancy in the Indian Railway, setting and validating standards for railway products through rigorous testing.
- Companies in the railway furnishing and refurbishing sector must adhere to strict regulations and quality standards established by Indian Railways. This includes obtaining certifications such as IRIS (International Railway Industry Standard).
- The process involves rigorous testing and validation to ensure that all products comply with safety and performance standards. Indian Railways conducts thorough inspections to ensure that all furnishing and refurbishing activities meet these high standards.
- New entrants face significant challenges in navigating these quality assurance processes, which demand detailed inspections, testing, and adherence to specific railway requirements.

Success in this field depends on a blend of technological innovation, rigorous quality compliance, and strong project management capabilities, making it both a challenging and rewarding industry for those

who can successfully navigate its complexities. Some key players operating in this segment are as follows:

Chennai Radha Engineering Works Pvt Ltd (CREW)

Chennai Radha Engineering Works (CREW), established in 1961, is a leading provider of comprehensive mechanical and electrical furnishing services for railway coaches, including those manufactured by the Integral Coach Factory (ICF). Specializing in both interior furnishing and technical operations, CREW manages around two-thirds of ICF's rail coach production. Their extensive services encompass complete mechanical and electrical furnishing, load testing, engine, and alternator alignment, and the fabrication and installation of hydraulic and coolant pipelines. Beyond railway applications, CREW also engages in industrial engineering and fabrication, designing and manufacturing components for sectors such as defence and aerospace, demonstrating their expertise in handling complex projects across various industries.

Hindustan Fibre Glass Works Pvt Ltd

Hindustan Fibre (HF) has been working with the Indian Railways since 1949, initially providing timber products like sleepers and wooden windows for coach manufacture and maintenance. Over the years, HF has expanded its role, using its experience to develop and supply composite components, including FRP windows for passenger coaches, even for Bangladesh Railways since 1997. HF focuses on designing, manufacturing, supplying, and overseeing the installation of furnishings and fittings for railway coaches, aligning with current demands for lightweight and environmentally friendly solutions. HF now offers a range of products such as FRP windows, composite modular toilets, traction components, pultruded sections, and aerodynamic profiles. The company has the necessary manufacturing capabilities and facilities to produce these components and support the development of modern railway coaches.

ACME India Industries Limited

ACME is a leading and rapidly growing company in India specializing in modern and premium passenger rail coach furnishing. Renowned for offering world-class products and services, ACME delivers advanced, durable, and aesthetically pleasing solutions that adhere to global quality standards, including IR and EN norms. The company operates in two key areas including refurbishment of old coaches and interior furnishing of new ones. In the refurbishment model, ACME revitalizes conventional (NON-LHB) coaches, completely restructuring them to enhance functionality and comfort. For new coaches, ACME's furnishing model involves designing and outfitting LHB coaches with state-of-the-art materials and technology at production units like RCF, MCF and ICF.