

Original Article

Evolution of Indian Railways and Related Dilemmas: A Case Study

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ABSTRACT: Transportation has been an integral part of mankind and human development. Whether it means transporting people for the people at large or transporting goods and materials, Railways have been supporting this momentum since ages. Established in 1853, when the first passenger train made the dream come true for the People at large, Indian Railways gradually demonstrated its excellence with multiple versions of passenger coaches in the Railways and the respective amenities. Indian Railways experienced massive growth over the years, and certainly it is one of the preferred means of Transport. Today, Indian Railways is the world's fourth-largest national railway system by size, spanning over 68,000 route kilometres. This case study on Indian Railways highlights the several strategies adopted by Indian Railways. It further refers to the various challenges experienced by Indian Railways and demonstrates the success stories of Indian Railways. The Case creators have discussed the dilemma associated with Indian Railways. Overall, the Case study, based on the support of secondary data, states about Indian Railways and its overall operations.

KEYWORDS: Indian Railways, Means of Transport, Railways, Indian Railways Dilemma.

1. INDIAN RAILWAYS: EVOLUTION AND DATA FACTS

The history of Indian Railways (IR) began on April 16, 1853, when the first passenger train traversed a 34-kilometre stretch between Bori Bunder (Mumbai) and Thane. Operating with three steam locomotives, i.e., Sahib, Sindh, and Sultan, this modest run laid the foundation for one of the world's most extensive transportation networks. Post-independence in 1947, the network underwent nationalisation and rapid expansion, transitioning from steam engines to diesel power, and eventually toward large-scale electrification. Today, Indian Railways is the world's fourth-largest national railway system by size, spanning over 68,000 route kilometres. Forming the backbone of India's economy and transporting more than 24 million passengers and carrying out freight (3.8 million tonnes) each day, it works as a subordinate under the Ministry of Railways, headed by a minister of state or an independent charge railway cabinet minister. It appears to be informed of modernisation efforts impacting and improving IR, such as the 'PM Gati Shakti' initiative. Among the important ongoing initiatives are commissioning of home-grown semi-high-speed Vande Bharat Express trains, near-100 per cent route electrification, automatic train protection systems (Kavach), Dedicated Freight Corridors (DFCs) and Mumbai–Ahmedabad High-Speed Rail Corridor construction. Indian Railways: Re-inventing nation-building from a colonial and post-colonial era logistical tool to a 21st-century high-tech engine of Indian economic growth.

TABLE 1 Indian Railways Data Facts

Daily Passenger Usage Across India	
Particular	Value
Average passengers carried per day	23 million (2.3 crore)
Passenger journeys in 2025–26	741 Crores
Passenger journeys in 2023–24	690.5 Crores
Route Network Length	68,000+ km
Route Electrification	Near 100%

Source: www.pib.gov.in

2. DEPARTMENTALISATION OF RAILWAYS

2.1. CHAIRMAN, RAILWAY BOARD AND CHIEF EXECUTIVE OFFICER (CEO)- CRB

- HR
- Safety
- Security
- Health
- Planning
- Infrastructure

- Vigilance
- Efficiency and Research
- Public Relations
- Heritage
- Secretary's Branches
- Transformation Cell
- Corporate Co-ordination

2.2. MEMBER (INFRASTRUCTURE), RAILWAY BOARD

- Works,
- Civil Engineering
- Bridges
- Signal and Telecom
- Land and Amenities
- Station Development and
- Railway Electrification

2.3. MEMBER (TRACTION AND ROLLING STOCK), RAILWAY BOARD- M/TRS

- Production Units
- Mechanical Workshops
- Coaches
- Locomotives
- Train sets
- Environment and Housekeeping
- Electrical Maintenance of Coaching Stock
- Traction Distribution
- Power Supply
- Renewable Energy
- Materials Management

2.4. MEMBER (OPERATIONS AND BUSINESS DEVELOPMENT), RAILWAY BOARD-M/OANDBD

- Traffic Transportation
- Coaching
- Tourism and Catering
- Commercial
- Non-Fare Revenue
- Marketing and Business Development and
- IT

2.5. MEMBER (FINANCE), RAILWAY BOARD- MF

- Accounts
- Finance
- Budget
- Revenue,
- Stat. and Econ and
- Economic Unit.

Source: <https://railministry.com/revised-organizational-structure-of-railway-board/>

3. ORGANISATIONAL STRUCTURE: INDIAN RAILWAYS

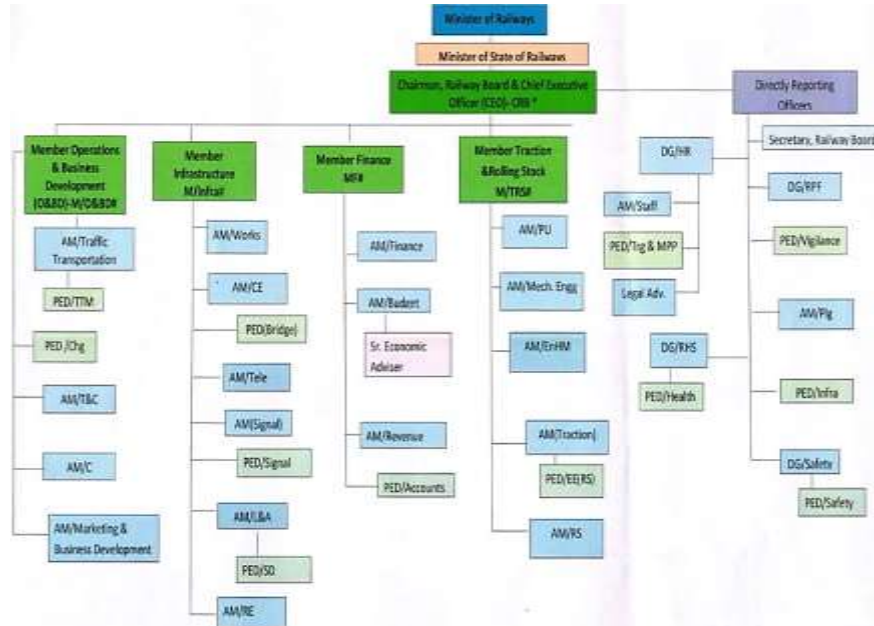


FIGURE 1 Organizational Structure of the Indian Railways

Source: <https://railministry.com/revised-organizational-structure-of-railway-board/>

4. STRATEGIES ADOPTED BY INDIAN RAILWAYS

- Capacity Augmentation and Decongestion: Dedicated Freight Corridors and other capacity-enhancement projects create additional paths and help reduce pressure on conventional routes.
- Electrification and Energy Efficiency: A faster way to reduce diesel traction is through electrifying large parts of the route network, since this provides a supporting low-carbon energy supply for moving towards cleaner railway operations, providing an efficient service.
- Technology-driven Safety: A number of measures are being undertaken to improve safety and operational reliability, including Kavach automatic train protection system, Automatic signalling + Digital Train Control, in addition to modern maintenance practices.
- Modernisation driven by Passenger Comfort: Initiatives such as the Vande Bharat services, Amrit Bharat Station redevelopment scheme to redevelop over 1,200 stations, and Railways' focus on improved digital services with upgraded facilities will help strengthen passenger comfort.
- Multimodal Logistics and Freight Growth: PM Gati Shakti and Gati Shakti cargo terminals are aimed at addressing first- to last-mile connectivity issues as well as improving the cost competitiveness of rail freight.
- Sustainability and Green Railways: Deploying renewable energy, energised traction use and our long-term net-zero carbon goals are part of the effort to lessen rail transport's impact on natural resources.
- Local Manufacturing and innovation: Indigenously developed locomotives, modern train technology, as well as safety systems would create a self-sufficient environment in the railway's technical capabilities.

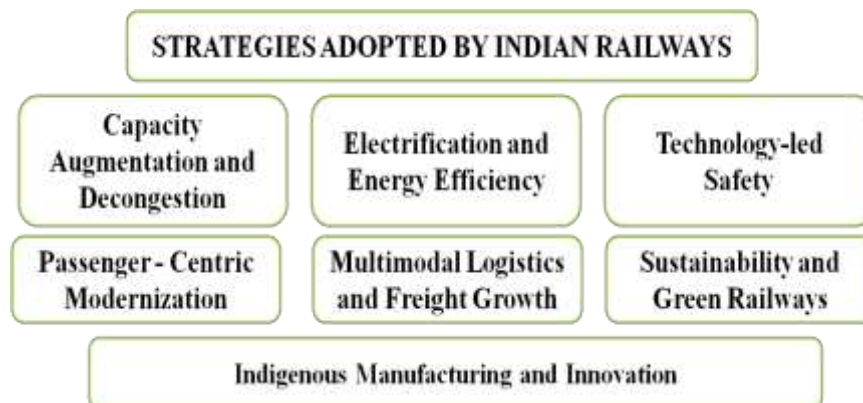


FIGURE 2 Strategies Adopted by Indian Railways

Source: Author's Study

5. SUCCESS STORIES OF INDIAN RAILWAYS

- Vande Bharat Express: The introduction and expansion of indigenous semi-high-speed Vande Bharat services represents a shift toward faster, modern and passenger-focused rail travel.
- Freight Corridors: Eastern and Western DFCs differentiated freight traffic supply from congested conventional routes, enhancing logistics movement speed.
- Kavach Safety System: an automatic train protection system that has been indigenously developed to enhance the safety of rail operations against human errors when they are on track.
- Electric traction: The growing reach of electric traction has diminished the reliance on locomotives running on diesel and is largely a means to achieve a more energy-efficient, environmentally friendly system.
- Amrit Bharat Station Scheme: Over the last few years, station redevelopment works have resulted in improved passenger amenities through improved circulation areas; lifts and escalators; waiting facilities, etc., in a clean and modern setting.
- Gati Shakti and freight modernisation: Development of cargo terminals and enhanced multimodal linkages have augmented the contribution of railways in national logistics along with reduction in transport time and cost.
- Engineering and Connectivity Milestones: Major projects like the Chenab Rail Bridge and new Pamban Bridge demonstrate Indian Railways' capability to undertake technically challenging infrastructure projects under difficult geography.

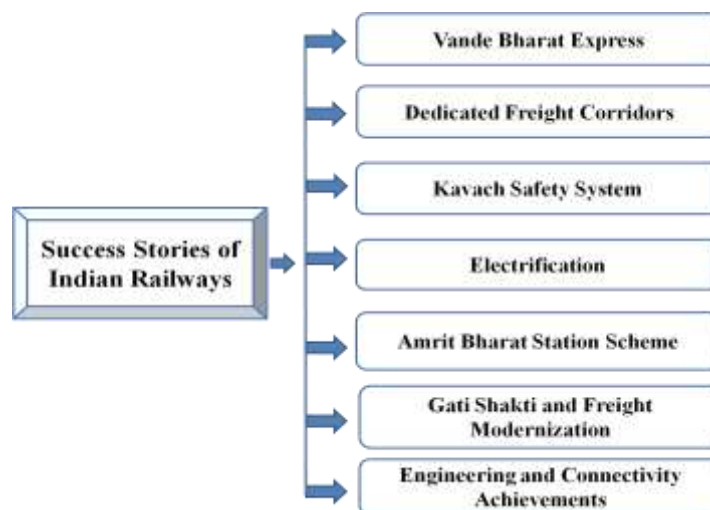


FIGURE 3 Success Stories of Indian Railways

Source: Author's Study

6. CHALLENGES OF INDIAN RAILWAYS

Today, however, Indian Railways (IR) is not only massive in scale but also vital to the economy and faces serious operational, financial or structural issues. Among these are network congestion and track capacity limitations. More specifically, passenger traffic on some lines coincides with significant freight operations leading to extreme delays, lower average train speeds and operational chokepoints.

On the financial front, IR has consistently high Operating Ratio (95%) primarily due to a large wage bill and pension liabilities. This freight rate system inadvertently steers cargo customers towards road transport.

Safety and infrastructure upkeep is another urgent challenge to tackle. Yes, sophisticated anti-collision technologies such as 'Kavach' are being implemented, but to cover all the 68,000-plus route kilometres of our railways with these ionised shields within a minimum period will need huge capital investments along with swift execution. Workhorse dangers, like track derailments and ageing signalling systems compounded by human error, continue to be constant threats on the job.

Finally, IR is also seeing increasing competition from rapidly growing national highways and expressways complemented by budget airlines. Passenger loyalty can be sustained by modernising customer-facing amenities, which include station cleanliness, booking efficiency and punctual service. The balance between socio-economic service obligations and financial self-sustainability remains the biggest present-day challenge for Indian Railways.

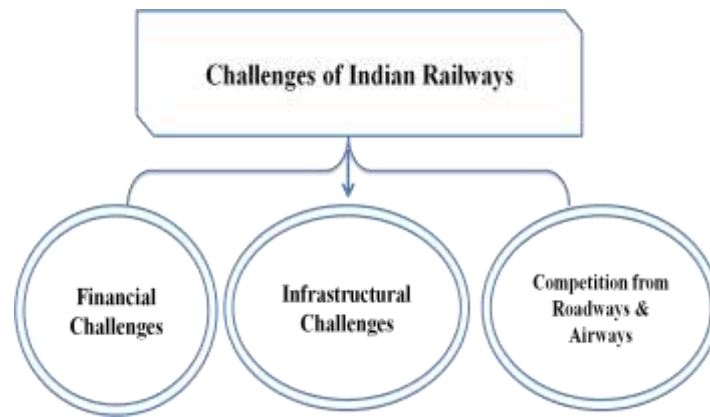


FIGURE 4 Challenges of Indian Railways

Source: Author's Study

7. DILEMMA ASSOCIATED

- Railways Vs Road Transport: With India's rapidly expanding highway network, the construction of expressways, luxury buses and private vehicles ensures that road transport is a fierce competitor to rail for short and medium distances. Also, as electric buses and cars become more widespread, railways may lose market for medium-distance travel.
- Railways Vs Air Travel: Domestic airlines, with their low-cost fares and huge time savings over rail travel, have stolen business travellers from the railways while they continue to lose long-distance passengers.
- Affordability Vs Financial Viability: The passenger fare is very low, based on a social welfare aspect, stifling revenue. Without freight earnings to subsidise passenger services, Indian Railways depends on commercial revenues.
- Modernisation Vs Very High Capital Investment: Massive capital investment is needed for projects like Bullet Train, Vande Bharat, Dedicated Freight Corridors and at the same time to maintain existing infrastructure.
- Demand for Passengers Vs Controlled Capacity: Rapid growth in the Indian population has created a great demand for travelling by railways, thereby causing congestion on the rail, unending waiting lists, as well as pressure on railway Infrastructure.
- Climate Change and Natural Disasters Vs Aiming to Reduce Costs: Railway tracks are often affected by various climate-related phenomena such as floods, landslides, cyclones and extreme heat, which damage the rail track, adversely affecting train operations and escalating what's already a costly maintenance burden.

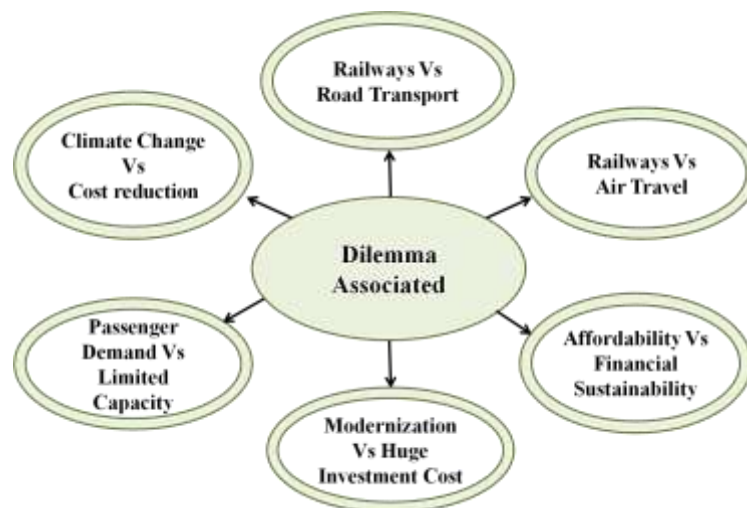


FIGURE 5 Dilemma Associated

Source: Author's Contribution

8. CONCLUSION

Indian Railways has evolved from a colonial-era transport network into a strategically important national system supporting passenger mobility, freight movement and economic development. Its modernisation through electrification, Vande Bharat, Kavach, Dedicated Freight Corridors, station redevelopment and multimodal logistics shows strong progress. However, congestion, high operating costs, safety and maintenance requirements, as well as limitations in capacity, climate-related disruptions, and competition from road and air transport still push for trade-offs that seem hard. The primary challenge is

achieving efficiency and financial sustainability while providing essential social services at an affordable cost. A balanced strategy based on capacity expansion, technology, safety, customer service, competitive freight pricing and sustainable infrastructure can help Indian Railways remain a reliable and future-ready backbone of India's transport system.

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APPENDIX

TEACHING NOTES:

OBJECTIVES FOR THE CASE INSTRUCTOR:

- To equip readers/participants with the domain understanding of the functioning of Indian Railways and the strategic skills associated with operating Indian Railways.
- To gain knowledge with respect to the dynamics of Indian Railways while highlighting the challenges.
- To discuss the success stories of Indian Railways while citing examples.

LEVEL OF ANALYSIS:

The current case is a Teaching case with the appraisal method. The case attracts the level of UG and PG Students who are willing to explore public affairs and transport mechanisms. The case will be helpful to the automotive industry and related aspirants.

BROAD QUESTIONS ON THE CASE:

- Q.1: Discuss the domain understanding of the functioning of Indian Railways and the strategic skills required for operating Indian Railways.
- Q.2: Explain the dynamics of Indian Railways while highlighting the challenges of Indian Railways.
- Q.3: Discuss the success stories of Indian Railways while citing examples.

POTENTIAL SOLUTION: (Responses to the Dilemma)

- Railways Vs Road Transport: The Railways need not panic based on the development of Roadways, as the motto of IR has always been safe travel, and the same will be the USP for Railways forever.
- Railways Vs Air Travel: Indian Railways should focus on speed, punctuality, comfort and competitive pricing on short- and medium-haul routes. Vande Bharat and future semi-high-speed services can strengthen rail's value proposition, while improved station-to-city connectivity can reduce total travel time.
- Affordability Vs Financial Sustainability: Railways need to ensure that the best affordable services remain common carrier and while doing so increase revenue by improving freight competitiveness (operation at more market-oriented cost), enhance ROCE through premium passenger services, station-side business development, parcel and logistics operations with efficient cost management. Any reduction of cross-subsidisation should be gradual and not affect the railway's social role.
- Modernisation Vs Huge Investment Cost: The projects which are to be undertaken by Railways should be based on safety, capacity, economic returns and impact on passengers. Mitigating the capital burden through public-private participation, institutional financing and phased implementation will help manage demands on resources without deferring critical modernisation.
- Passenger Demand Vs Limited Capacity: More tracks, station reconstruction, signalling modernisation and upgrading to longer platforms would effectively increase capacity, along with more accurate timetable planning, enabling dedicated corridors for passengers. Another approach to overcrowding and waiting lists is demand forecasting and scheduling based on data.

- Climate Change and Natural Disasters Vs Cost Reduction: They could utilise climate-resilient infrastructure, improved drainage and slope stabilisation systems; implement early-warning mechanisms; apply heat-resistant track practices and disaster-response plans. Preventive maintenance and technology-based monitoring can reduce long-term repair costs and service disruption.

CASE BENEFICIARIES:

- The representatives of the respective industry shall benefit from the case study.
- The UG and PG students, with special reference to Public Affairs and public administration, have strong potential to learn from the case.
- The start-ups in the Transport industry with respect to ancillary business profiles will have a good reference in the case.