

EXPLORING COLLATERAL EFFECTS OF INFRASTRUCTURE FINANCING IN INDIAN RAILWAYS

**Rajeev Ranjan Raju ^{1*}, Dr. Namita Sahay ²,
Dr. Aseervatham Achary ³ and Dr. Amit Kumar Pandey ⁴**

¹ Research Scholar, Amity International Business School, Amity University Noida.

*Corresponding Author

² Professor, Amity International Business School, Amity University Noida.

³ Professor, Akshayaa College of Arts and Sciences, Chengalpattu, Tamil Nadu.

⁴ Associate Professor, Amity Business School, Amity University Noida.

DOI: [10.5281/zenodo.12199382](https://doi.org/10.5281/zenodo.12199382)

Abstract

The Indian Railways, a vital component of the country's transportation network, has experienced significant infrastructure financing in recent years. While these investments aim to modernize and expand the rail system, this study examines the collateral effects that may arise from such financing. Through a comprehensive analysis, the research explores the social, environmental, and economic impacts of infrastructure projects, including the displacement of local communities, changes in land-use patterns, and the influence on regional development. The findings shed light on the complex tradeoffs and unintended consequences that policymakers and stakeholders must consider when planning and implementing railway infrastructure projects. This abstract provides a concise overview of the study's objectives, methodological approach, and the potential insights that can inform more sustainable and inclusive railway development strategies in India.

Keywords: Infrastructure Development, Indian Railways, Financing, Land Asset Monetization and Resources.

INTRODUCTION

Infrastructure related to railroads is essential to the development of economies, governments, and civilizations. A large portion of the existing railway network was built many years ago to accommodate the era's transportation demands, which included the transfer of both passengers and freight (Garmabaki, 2021). Within the embroidered artwork of India's financial scene, the Indian Railroads has long been an imperative string, weaving together the nation's tremendous scope and assorted people. As one of the largest railroad systems within the world, its supply routes extend over the length and breadth of the subcontinent, interfacing bustling cities, interesting towns, and farther towns alike. Over a long time, the Indian Railroads has not as it have been a mode of transportation but too an image of national solidarity, advance, and desire.

Examining infrastructure financing across China, India, Australia, and the United Kingdom reveals the diverse approaches governments adopt to facilitate infrastructure development. However, prevailing fiscal constraints often pose challenges for governments to solely fund both current and future infrastructure needs. Hence, there's a growing emphasis on encouraging private financing to supplement public funding. Traditionally, banks have been a primary source of private financing for infrastructure projects. However, in recent years, many banks have curtailed lending due to factors such as the global financial crisis, prompting exploration of alternative avenues like capital markets. Public financing typically involves allocating funds from general budget appropriations for infrastructure projects. In contrast, private financing entails capital injections from private investors or entities for infrastructure development. While some infrastructure assets, like mobile telephone networks, may

possess sufficient private value for exclusive private sector provision without public involvement, governments often play a pivotal role in infrastructure provision. They oversee strategic planning, regulatory frameworks, and may offer incentives to attract private investment. The distinction between public and private financing underscores the importance of leveraging diverse funding sources to address the intricate infrastructure needs of modern economies.

Asset monetization, a strategy aimed at leveraging assets to raise funds for financing new projects, is poised to play a crucial role in the development of infrastructure, particularly within the context of the railways sector. The National Monetization Policy (NMP), recently introduced by the Indian government, aims to mobilize ₹600,000 crore over the next four years (2022-2025) to address the infrastructure deficit. This initiative aligns with the broader vision of Atmanirbhar Bharat (self-reliant India) and the goal of achieving a \$5 trillion economy by 2024. In the realm of Indian Railways, asset monetization holds immense potential for unlocking value from both core and non-core assets. By strategically monetizing railway assets, such as land parcels, stations, and commercial spaces, Indian Railways can generate significant revenue streams to fund crucial infrastructure projects and modernization efforts. However, the successful implementation of asset monetization requires innovative approaches to attract private investment and strong political will. While the concepts of privatization, liberalization, and asset monetization may seem straightforward in theory, their execution demands careful planning and execution. Indian Railways must devise strategies to incentivize private sector participation and navigate regulatory complexities to ensure the success of asset monetization initiatives. By embracing innovative financing models and fostering a conducive environment for private investment, Indian Railways can harness the full potential of asset monetization to fuel its growth and contribute to the nation's economic development goals.

India's way of paying for big infrastructure projects is a mix of using public money and getting help from private companies. In the past, the government mostly paid for these projects using money from the budget or government-run businesses called GTEs. They used to spend about 3% to 5% of the country's money on infrastructure from 1990 to 2007. But during the 12th Five-Year Plan (2007-11), they spent more, about 7% of the money. But then, they saw that only using public money wasn't enough to build all the things they needed, so they started asking private companies to help out. Private companies started putting their money into these projects, especially through something called Public-Private Partnerships (PPPs). Back in 2000, only about 2% of the money for projects came from private companies, but by 2012, it went up to 14%. The government wants to make it even higher, aiming for almost half of the money to come from private companies by the end of the 12th Five-Year Plan. But there are some rules that stop banks from giving too much money to these projects, so the government is looking for other ways to get money, like from insurance companies or pension funds.

In India, financing mechanisms for infrastructure projects encompass a variety of approaches tailored to address the unique needs and challenges of each project. Historically, the government has been a major source of financing for infrastructure projects, providing capital investment and often partnering with the private sector for project execution and operation. This approach, known as government funding, involves funding projects entirely or partially, with the private sector contributing technical expertise and efficiency. Additionally, private operators may fund a portion

of the project's capital investment through their own balance sheets in a method referred to as corporate or on-balance sheet finance, commonly used for lower-value projects or when project financing mechanisms are not economically feasible. Project finance, another prevalent mechanism, involves lending to a special purpose vehicle (SPV) established specifically for the project, helping mitigate risks by isolating them from the project sponsor's balance sheet. Furthermore, viability gap funding (VGF) provides grants to infrastructure projects facing financing shortfalls, aiming to attract private investment by reducing financial risks. Take-out financing involves infrastructure lending institutions purchasing infrastructure loans from commercial banks, facilitating long-term financing for projects. Moreover, infrastructure investment trusts (InvITs) and real estate investment trusts (REITs) allow investors to pool funds and invest directly in infrastructure or real estate projects, respectively, providing income distributions and monetizing operational projects. Each mechanism offers its advantages and limitations, and leveraging a mix of these approaches, alongside a supportive regulatory environment, can effectively finance India's infrastructure development and drive sustainable economic growth. One big thing they did was to create a company called the India Infrastructure Finance Company Limited (IIFCL). This company helps bring in more private money for projects. They started something called the India Infrastructure Debt Fund, which lets long-term investors, like insurance companies, buy bonds to help pay for projects. But there are still problems. Sometimes, it takes a long time to get permission to start building, or to buy land, or to make sure the project won't hurt the environment. To fix these issues, a group of important people suggested making some changes, like making sure the prices for things and services are fair, making the rules for PPPs stronger, and looking at whether there should be more competition between government-owned companies.

In recent years, Indian Railways has undertaken a strategic initiative to monetize its extensive land holdings, aiming to unlock their potential value. As of 2021, Indian Railways boasts ownership of around 43,000 hectares of land nationwide, with an estimated value of ₹8.18 lakh crore. Acknowledging the lucrative nature of these land assets, Indian Railways has set ambitious targets, eyeing revenue generation of ₹50,000 crore by 2024-25 through various monetization avenues. A noteworthy project in this endeavor is the redevelopment of railway stations. Indian Railways intends to capitalize on land parcels surrounding 400 railway stations through its station redevelopment program. As of 2021, 123 railway stations have been earmarked for redevelopment, with an anticipated investment of ₹1 lakh crore. Moreover, Indian Railways seeks to monetize surplus railway land through leasing arrangements, outright sales, and collaborative ventures with private developers. The monetization drive of railway land is poised to catalyze the modernization and expansion of railway infrastructure significantly. This initiative not only promises to enrich passenger amenities and facilities but also forecasts substantial revenue generation for Indian Railways, thereby fostering overall economic growth and development in India. With the continued implementation of its land asset monetization strategy, Indian Railways is primed to emerge as a pivotal force propelling economic advancement and transformation across the nation.

Other countries like China mostly use public money for their big projects. They spend a lot on things like roads and railways, and the local government is mostly in charge of getting the money and doing the work. They sometimes even borrow money or sell land to get extra cash. But they're also starting to let private companies invest more,

to help build even more things. India is learning from China and trying to make it easier for private companies to invest and to make better rules for these kinds of projects. In later decades, recognizing the significant part of framework in cultivating financial development, progressive governments have set out on yearning activities to modernize and grow the Indian Railroads organize. Central to these endeavors has been a critical center on foundation financing, channeling assets into upgrading rail network, overhauling innovation, and making strides operational effectiveness. Whereas the essential point of such ventures is to support the capacity and productivity of the railroad framework, the collateral impacts of foundation financing in Indian Railroads expand distant past simple improvements to transportation framework. These speculations resound all through the economy, impacting different segments and aspects of Indian society. Railways were introduced to India during the colonial period. The British colonial administration in India initiated the construction of railways primarily for their economic and strategic benefits. The first railway line in India was built between Mumbai and Thane in 1853, during the Governorship of Lord Dalhousie. Over time, the railway network expanded rapidly, connecting different regions of the subcontinent, and transforming transportation, trade, and communication in India.

Indian Railways continues to be a cornerstone of India's transportation infrastructure, boasting a vast network spanning 121,407 kilometers of tracks, predominantly composed of broad-gauge tracks covering 108,706 kilometers. Notably, the focus on modernization and sustainability is evident in the substantial increase in electrified tracks, which now amount to 27,543 kilometers, reflecting the ongoing commitment of the Ministry of Railways towards advancing the rail sector (Agrawal, 2020). However, despite these advancements, the demand for rail services has surged significantly, surpassing the pace of infrastructure expansion. The average daily operation of passenger trains stands at approximately 13,500, while the number of passengers carried daily has soared to around 25 million. This exponential growth underscores the urgent need for further expansion and enhancement of the railway network to meet the evolving transportation needs of India's ever-expanding population (Agrawal, 2020).

Despite strides in electrification and gauge conversion, challenges persist, particularly in freight transport. The average speed of goods trains remains subpar at 25 kilometers per hour, lagging far behind global benchmarks such as the United States. This highlights the critical importance of prioritizing investments in infrastructure to enhance freight mobility and logistical efficiency, vital for bolstering economic growth and global competitiveness. In the fiscal year 2021-22, the Indian Railways witnessed a notable increase in revenue, reaching an estimated Rs 2,17,460 crore, marking a significant annual growth of 12% over the figures recorded in 2019-20. This growth trajectory was primarily fueled by a robust expansion in traffic revenue, with total revenue from traffic amounting to Rs 2,17,110 crore, reflecting a parallel increase of 12% compared to 2019-20. Notably, both freight and passenger traffic contributed to this surge, with revenues from both sectors expected to grow at an annual rate of 10% over the same period.

Despite the promising revenue figures, the Indian Railways also experienced a notable rise in expenditure. The total revenue expenditure for 2021-22 is projected to stand at Rs 2,10,899 crore, representing an annual increase of 10% over 2019-20. Capital expenditure, crucial for infrastructure development and modernization, saw a

substantial uptick, reaching Rs 2,15,058 crore in 2021-22, reflecting a remarkable annual increase of 21% over the figures recorded two years prior. One critical metric used to gauge the financial health of the Indian Railways is the Operating Ratio. In 2021-22, the Operating Ratio is estimated to be 96.2%, marginally improved from the ratio of 98.4% recorded in 2019-20. The Operating Ratio serves as a key indicator of the Railways' efficiency in managing expenses relative to its revenue, with a lower ratio indicative of improved financial performance.

Various models have been devised to facilitate alternate means of financing for railway projects, catering to diverse needs and project types. These include the non-government private line model, joint ventures, capacity augmentation through funding by customers, build-operate-transfer (BOT) arrangements, and capacity augmentation through annuity models. Each model is tailored to leverage strategic investors or customers' requirements, providing a clear revenue stream to make connectivity projects financially viable. The involvement of strategic investors and customers in the first three models allows for the leveraging of mutual interests in achieving last-mile connectivity, while the latter two models represent pure PPP arrangements. To ensure the bankability of these projects, Railways has laid down benchmarks for appraisal, acceptable to the market, to facilitate necessary financing. Model concession agreements have been developed and approved for the private line model, joint ventures, and BOT arrangements, with agreements for the remaining models in the approval pipeline. Through these innovative financing mechanisms and strategic partnerships, Indian Railways is not only addressing the funding gap but also accelerating the pace of infrastructure development, ultimately fostering economic growth, enhancing connectivity, and promoting sustainable development across the nation (White Paper on Indian railways, 2015).

Infrastructure Real Estate Investment Trusts (InfraREITs) are changing the game in funding big projects like roads and buildings in Turkey. In the past, the government handled all the expenses, but now, private companies are pitching in. These companies get financial support from big banks and investors to finance various infrastructure projects. They're gaining popularity because they offer stable returns, making them attractive to pension funds and other investors seeking secure investments. InfraREITs specifically focus on infrastructure projects, providing steady profits over time. However, it's essential to note that they also come with risks, such as potential problems during construction or errors in financial planning. Understanding the inner workings of these funds is crucial for investors looking to get involved. This provides a model potent for future exploration.

The argument regarding capital productivity highlights the substantial initial investment required for railway infrastructure, much of which cannot be quickly recovered. These initial costs, known as 'sunk costs,' are often disregarded when assessing profitability, falsely inflating incremental costs relevant to profit calculations. Additionally, the period of low returns persists due to the time lag between infrastructure construction and full utilization. Furthermore, given that transportation is a public good, keeping user costs low is crucial to maximizing social benefits, thereby constraining potential profits. The theory of natural monopoly contends that railway infrastructure exhibits technical indivisibilities, leading to increasing returns and decreasing unit costs as services expand. This creates a situation where a single provider can offer services at lower costs compared to other entities, establishing a natural monopoly. Consequently, public policy has become favorable, ensuring efficiency in service delivery, and

preventing the market from becoming chaotic due to the optimal scale of infrastructure provision. (Mukherjee).

This paper looks for to dive into the multifaceted collateral impacts of framework financing in Indian Railroads. By looking at the interaction between speculation in rail infrastructure and its broader socio-economic repercussions, it points to supply experiences into how such activities shape urbanization designs, invigorate financial improvement, cultivate work openings, and affect natural maintainability. Through this investigation, we point to pick up a comprehensive understanding of the transformative control of foundation financing inside the Indian Railroads environment, lighting up both its guarantees and challenges in exploring India's travel towards advance and thriving.

Objectives

- To evaluate the role of Infrastructure Financing in Indian Railways.
- To explore the importance of Land Asset Monetization in Indian Railways.

LITERATURE REVIEW

The collateral effects of infrastructural development within the Indian Railways system extend far beyond the realm of transportation infrastructure. A well-developed and modernized railway network can serve as a catalyst for economic growth, driving investment, facilitating trade, and fostering regional development. Improved rail connectivity can unlock access to markets, employment opportunities, and essential services for communities across the country, contributing to poverty alleviation and inclusive growth. Additionally, investments in railway infrastructure have the potential to enhance environmental sustainability by promoting modal shift from road to rail, thereby reducing carbon emissions and mitigating congestion on road networks. Therefore, addressing the financing gap identified in the National Rail Plan is not only crucial for the modernization of India's railway infrastructure but also holds the key to unlocking broader socio-economic benefits and fostering sustainable development across the nation.

India's Ministry of Railways is embarking on an ambitious journey with the formulation of the National Rail Plan 2030, a visionary roadmap aimed at enhancing the nation's railway infrastructure from 2021 to 2025. Recognizing the paramount importance of modernizing and expanding the railway network to cater to the escalating transportation demands of the country, this comprehensive plan is a beacon of hope for India's future connectivity. However, the initial draft of the National Rail Plan 2030, unveiled in December 2020, revealed a significant financing gap of over two lakh crore rupees for capital expenditure projects over the next five years. This financing shortfall underscores the urgent need for robust funding mechanisms to bridge the gap and ensure the timely execution of crucial infrastructure projects within the Indian Railways system.

As highlighted in the White Paper on Indian Railways (2015), this funding gap poses a considerable challenge to the implementation of the National Infrastructure Pipeline, which outlines infrastructure projects totaling Rs 102 lakh crore between 2019-20 and 2024-25. Within this pipeline, railway projects account for a substantial portion, amounting to Rs 13.7 lakh crore. Despite these financial challenges, the draft National Rail Plan envisages a significant increase in capital expenditure amounting to Rs 5.8

lakh crore during the 2021-2026 period. This infusion of capital is pivotal for driving critical infrastructure projects aimed at enhancing rail connectivity, improving operational efficiency, and meeting the escalating demand for passenger and freight transportation services across India. However, the successful implementation of these projects hinges on securing adequate funding and overcoming the financing constraints highlighted in the draft plan. It's imperative for India to explore innovative funding mechanisms, leverage public-private partnerships, and prioritize strategic investments to bridge the financing gap and propel the nation towards a more connected and sustainable future.

In May 2013, Indian Railways announced plans for the Sarai Rohilla project, spanning a 16-hectare land parcel in northern Delhi. Following a competitive process, an Indian real estate firm, in partnership with an investment group, secured rights to develop upscale residential units and a shopping complex. This endeavor illustrates the ongoing trend of leveraging public land by Indian Railways to stimulate economic growth and generate revenue. The project's implementation reflects contemporary dialogues on the privatization and commercialization of public land, illuminating avenues through which private entities acquire rights to public assets. The monetization of public land through various avenues like inventory management, sales, concessions, and real estate ventures is increasingly prevalent worldwide. Indian Railways, in alignment with this trend, seeks to optimize its extensive land holdings to bolster financial sustainability and upgrade infrastructure. This strategic shift mirrors broader discussions on urban land governance, particularly in emerging economies such as India, where the emphasis has shifted from public welfare to profit maximization for private investors. These initiatives underscore the impact of globalization and the financialization of land resources, emblematic of neoliberal economic ideologies (Christophers, 2018). Understanding the intricacies of public land redevelopment necessitates a closer examination of the internal mechanisms of organizations like Indian Railways. Analyzing their decision-making processes and responses to external mandates, whether historical or contemporary, provides valuable insights into the underlying motivations for land asset monetization. Through this lens, the reevaluation of railway land can be contextualized within the broader landscape of neoliberal reforms influencing public sector enterprises. This nuanced approach transcends simplistic dichotomies of "land appropriation" versus "development opportunities," offering a comprehensive understanding of land asset monetization within the realm of Indian Railways.

Public-private partnerships (PPPs) have played a significant role in the development of India's railway infrastructure. (Jain, 2009) highlights the major achievements including the construction of high-speed Passenger and Freight Corridors and projects like the Surendranagar-Pipavav line. Efforts have also been made to upgrade major railway stations like New Delhi, Mumbai, Patna, and Secunderabad to international standards. Karnataka's establishment of the Karnataka Rail Infrastructure Development Corporation further promotes PPPs in the rail sector. However, there are several concerns regarding the legal framework governing PPPs in railways. The Railways (Amendment) Act, 2005, which regulates railway operations, does not explicitly address PPPs, leading to ambiguity and conflicts with PPP initiatives. Questions about authority delegation, contractual freedom, and liability allocation have emerged. For instance, the Act grants sole authority to the railway administration for certain activities, posing challenges for private entities involved in PPP projects.

Despite guidelines from various public agencies and state-level legislation governing PPPs, there's a need for comprehensive central legislation to provide clear, binding, and enforceable regulations. Examples from countries like Brazil and Finland demonstrate the benefits of well-structured legal frameworks in promoting efficient PPPs. The success of legislation such as the Gujarat Infrastructure Development Act, 1999, highlights the importance of a robust legal framework in fostering infrastructure development through PPPs. While there were initial considerations for enacting PPP legislation in India, the current government stance leans towards relying on guidelines rather than legislation, which may not fully address the complexities and uncertainties surrounding PPPs in the railway sector.

The Indian Railroads has attempted noteworthy activities to invigorate rail network to urgent ports like Pipavav, Mundra, and Mangalore, among others, subsequently luring private capital influx into the railroad division. This collaborative endeavor has navigated different roads, counting plans for wagon speculation and renting, private operations of holder trains, and the foundation of private cargo terminals and sidings. Broadened endeavors have been made to catalyze private speculations, enveloping endeavors such as the foundation of train manufacturing plants and the revitalization of stations. All things considered, the successful execution of public-private association (PPP) ventures requires the fastidious assignment of dangers between the open and private spaces. Involvement underscores the private sector's trepidation toward expecting sole obligation for development, financing, and activity dangers inborn in rail framework ventures. The Konkan Railway Corporation (KRC) stands as a prominent case study in infrastructure financing, exemplifying a significant initiative aimed at reducing travel time and distance between Mumbai and the coastal regions of Karnataka and Kerala. Established in 1998 with a substantial investment of Rs. 3375 crore, of which Rs. 800 crore stemmed from equity capital provided by various state governments and the Central Government, KRC embarked on a mission to bridge the geographical gap known as the "Konkan Gap." Despite being a public sector entity under the Ministry of Railways, KRC operates under a Build-Operate-Transfer (BOT) model, albeit without private sector involvement. To finance its ambitious project, KRC has tapped into a diverse array of funding sources over the years, including public bonds, private placement, loans, and external commercial borrowings.

Tax-free bonds emerged as the primary financing instrument, constituting a significant portion (61.5%) of the total funds raised, signaling investor confidence in the project. However, during periods of liquidity constraints, KRC resorted to higher-cost financing options such as inter-corporate loans and bridge financing, resulting in substantial financial charges amounting to 28% of the total project cost. Despite its initial optimism with a projected concession period of 10 years and an Internal Rate of Return (IRR) of 14%, KRC faced challenges in attracting freight traffic, primarily due to stiff competition from road transport and coastal shipping. Customer preference for road transport, supported by a survey on customer satisfaction, underscores the challenges in transitioning traffic to rail. Additionally, internal competition within the Indian Railways system further exacerbates financial pressures, with declining market share adding to the strain. The precarious financial situation of KRC raises concerns about its long-term sustainability and potential implications for the broader railway system. This underscores the necessity for strategic interventions to effectively address operational and financial challenges, as highlighted in the research paper by Sriraman

(2009). Sriraman emphasizes the importance of strategic financing and operational decisions in sustaining transport infrastructure projects in India, shedding light on the complexities and challenges faced in the sector. Addressing these challenges requires a holistic approach encompassing financial management, operational efficiency improvements, and market positioning strategies to ensure the viability and sustainability of infrastructure initiatives like KRC in the long run.

Railways explore various avenues to bolster revenue generation, including Public Private Partnerships (PPPs), Joint Ventures (JVs), leveraging assets, and attracting Foreign Direct Investment (FDI). However, while PPPs have been endorsed in recent budgets, revenue generation has been limited due to unclear regulatory frameworks. The Kelkar Committee recommended simpler PPP projects like asset redevelopment and station development to establish market credibility. The establishment of the Rail Development Authority in 2017 aimed to improve PPP implementation. JVs, such as those with state governments and local companies, facilitate decision-making and project approvals, with initial capital limited to Rs 50 crore per state. Railways also capitalize on assets like right-of-way and real estate, such as selling optic fiber cables and auctioning land. The allowance of FDI in select activities since 2014, including suburban corridor projects and high-speed trains, attracted \$389.83 million in equity inflow between April 2014 and December 2017. These strategies underscore Railways' efforts to diversify revenue streams and enhance infrastructure development (State of Indian Railways, 2024).

In the context of infrastructure financing in Indian Railways, the collateral effects of privatization come under scrutiny, particularly concerning the role of government guarantees. While privatization is anticipated to diminish the necessity for recurrent financial assistance from the government, it doesn't entirely absolve the government of financial responsibility. Instead, it often substitutes recurrent liabilities with contingent liabilities, typically in the form of guarantees. These guarantees vary in nature, ranging from project-specific assurances like traffic guarantees for railways to broader guarantees related to macro-level parameters such as exchange rates and interest rates. Several pertinent questions arise regarding the appropriateness and significance of these guarantees, as well as the level of commitment they entail in the future. Drawing from experiences in developing countries, guarantees are viewed as potentially effective mechanisms to support private railway infrastructure initiatives, particularly as interim measures while broader market reforms are implemented to manage relevant risks. However, it's crucial to carefully consider the conditions under which these guarantees are appropriate and the level of commitment they entail, ensuring that they serve as enablers rather than sources of undue financial burden or moral hazard in the long term (Sriraman, 2009). Sriraman, S. (2009). "Financing Transport Infrastructure and Services in India." Department of Economic Analysis and Policy, Reserve Bank of India.

The historical narrative presented underscores that infrastructure cannot be viewed merely as a neutral concept; rather, its conceptualization has been shaped by various factors such as International Financial Institutions, government bodies, and global investors. The transformation of public works into a global asset class, facilitated by the broad legal definition of a nation's circulatory networks as infrastructure, highlights the convergence between the discourse on infrastructure within financial circles and its academic exploration in the social sciences. This convergence reveals the need for a critical genealogical engagement with the term "infrastructure," exposing hidden

rentier forms of extraction facilitated by private contract law. It also challenges the legitimacy of state institutions in endorsing financial market actions and accumulation. In the context of Indian Railways, this critical perspective urges a reevaluation of infrastructure financing to track wealth drains and reimagine public finances as political gifts of time, advocating for public-public partnerships. The current governance frameworks increasingly demand speculation from citizens, leading to a redistribution of capital into the hands of private financial institutions, transforming taxpayers into citizen-speculators. This complex interplay between visibility and invisibility in infrastructure financing intensifies speculation and may ultimately fuel demand for political accountability, questioning the role of circulatory networks as a global asset class within the Indian Railways context (Bear, 2020).

(Ghosh, 2017) The paper titled "Foreign direct investment in Indian railways – an analysis" highlights that Indian Railways, under the leadership of Prime Minister Narendra Modi's government, has been pivotal in bolstering transportation infrastructure across the Indian subcontinent, crucially contributing to India's presence in the international market. Embracing Foreign Direct Investment (FDI) through automatic routes, the government has enabled significant advancements in various railway sectors. FDI has been encouraged for projects ranging from suburban corridors to high-speed trains, dedicated freight corridors, electrification, signaling systems, and passenger terminals. This influx of investment has particularly fueled manufacturing endeavors for rolling stock, signaling equipment, and locomotives, enhancing both domestic production capabilities and technological expertise. Moreover, strategic collaborations with countries like China, France, Japan, and others have been established to foster cooperation in high-speed rail projects. The Memorandum of Cooperation with Japan for the Mumbai-Ahmedabad High-Speed Rail project exemplifies this, emphasizing technology transfer and the 'Make in India' initiative. Additionally, foreign governments and entities, including those from France and South Korea, have expressed keen interest in participating in India's ambitious station redevelopment program, showcasing the global recognition and potential of Indian Railways as a transformative force in modernizing transportation infrastructure.

Multilateral institutions such as the World Bank and Asian Development Bank (ADB) play a crucial role in supporting railway projects in India, as highlighted by Singh and Mandal (2020). Their study underscores the significance of multilateral funding, which offers long-term financing with favorable terms and conditions. Specifically, projects like the Eastern Dedicated Freight Corridor (EDFC) have benefited significantly from ADB financing, leading to improved connectivity, and expanded capacity within India's railway network. Beyond financial support, this partnership involves technical assistance and knowledge transfer, ensuring that projects adhere to global standards and effectively address the country's transportation needs (Singh, 2020). This literature review underscores the instrumental role of multilateral institutions in advancing railway infrastructure development in India, emphasizing the multifaceted benefits derived from their involvement, including financial backing, technical expertise, and knowledge exchange. The involvement of multilateral institutions not only mitigates fiscal constraints for the Indian government but also catalyzes economic growth and development. By investing in railway infrastructure, these institutions facilitate improved transportation efficiency, reduced logistics costs, and enhanced regional connectivity. Consequently, railway projects funded by multilateral institutions serve as catalysts for economic progress, job creation, and poverty alleviation in India,

reinforcing the crucial role of international partnerships in advancing the country's infrastructure agenda.

Infrastructure financing is essential for the growth and expansion of public utilities, and in India, the government is increasingly using asset monetization to fund these projects. Recently, the Indian Railways identified an 'Asset Monetization Pipeline' that includes private train operator projects, multifunctional complexes, railway colonies, and select rail land parcels. This initiative was discussed in a meeting chaired by NITI Aayog CEO Amitabh Kant, with key officials such as Railway Board Chairman Suneet Sharma and Secretary of the Department of Economic Affairs, Tarun Bajaj, in attendance. Asset monetization refers to the process of unlocking the value of investments made in public assets that have not yet generated significant returns. This approach is part of the government's broader disinvestment agenda, as outlined by Finance Minister Nirmala Sitharaman in her Budget speech. The Railways' plan to monetize assets, including the Dedicated Freight Corridor, aims to recycle operating assets for further infrastructure development.

Economic literature highlights the need for innovative financing mechanisms in infrastructure development, as traditional funding sources often fall short. Asset monetization offers a viable alternative by harnessing the intrinsic value of underutilized assets. For Indian Railways, extensive and strategically located land assets present a significant opportunity for monetization. Global examples, such as Japan and the United Kingdom, demonstrate the potential benefits of this approach. Japan's monetization of Japan Railways assets led to profitable real estate ventures, while the UK's experience with Rail track and Network Rail underscores both opportunities and challenges. However, asset monetization also has collateral effects on public service delivery. While it can improve financial stability and fund infrastructure improvements, it may also lead to reduced accessibility, increased costs for users, and potential neglect of less profitable routes. In India, careful planning and regulatory oversight are essential to ensure that asset monetization benefits do not compromise public service quality. The Indian Railways' move towards asset monetization, supported by strategic government directives and NITI Aayog, represents a significant shift in infrastructure financing. By unlocking the value of its extensive land and asset holdings, the Railways aim to generate revenue for further development. Balancing financial objectives with the goal of maintaining and enhancing public service delivery is crucial. Lessons from global experiences and a robust regulatory framework will be vital for achieving sustainable and inclusive growth. (NITI., 2022)

"Effective monetization of land assets is crucial for enhancing infrastructure and generating significant revenue," states the NITI Aayog in its 2022 report on Matching Monetization Models to Revenue Streams. For Indian Railways, this strategy involves innovative approaches like station redevelopment, leasing of railway land for commercial purposes, and developing multi-functional complexes (MFCs). These methods leverage the vast land assets of Indian Railways to attract private investments and improve passenger services without direct public expenditure. Station redevelopment focuses on transforming railway stations into modern hubs, integrating commercial spaces with passenger amenities. Projects are awarded to private players who invest in redevelopment in exchange for a lease over the commercial spaces for a specified period. This not only enhances passenger experience but also generates revenue through commercial leases and improves

station infrastructure. Leasing parcels of railway land to private entities for commercial development provides a steady revenue stream and fosters economic activity around railway infrastructure while retaining land ownership. However, these approaches come with inherent risks. Demand risk, for instance, involves the variability in demand for commercial spaces or services developed on railway land. This can be mitigated by ensuring projects are located in high-demand areas and offering competitive lease terms. Operational efficiency is another crucial factor, which can be ensured by partnering with experienced private players and setting clear performance benchmarks. Moreover, changes in government policies or regulatory frameworks can impact projects, necessitating clear contractual terms and proactive engagement with policymakers. Government initiatives have been instrumental in facilitating these monetization efforts. Establishing bodies like the Indian Railway Stations Development Corporation (IRSDC), though dissolved in 2021, highlighted the focus on station redevelopment. Policy reforms, including amendments in tax and regulatory frameworks, have made land monetization more attractive to private players. Encouraging investments from domestic and international players through favorable policies and transparent bidding processes ensures that projects attract high-quality and committed partners. By strategically managing these elements, Indian Railways can maximize the value from its extensive land assets, aligning with the recommendations outlined in the NITI Aayog report.

C.M Lewis in his pioneering work “British Railways in Argentina, 1857-1914: a case study of foreign investment” follows the advancement of Argentina's railroad organization from its beginning within the 1850s to its maturation leading up to the Primary World War. It highlights the essential part played by both neighborhood and British ability and fund within the foundation and extension of the railroads. At first, the state played a critical entrepreneurial part, but by the early 20th century, there was a move towards London dominance and productivity for British firms, fueled by worldwide venture patterns. This period saw the union of territorial railroad endeavors and the weakening of nearby possession as London-based sheets took control. One critical perspective of railroad financing investigated is the utilize of benefit ensures, which were common in mid-19th century railroad improvement. These ensures, at first set at 7 percent and afterward decreased to 6 percent, given steadiness but moreover became a burden on the treasury due to broad development. Their abuse contributed to abroad concerns almost Argentina's open funds around 1890, in spite of the fact that recuperation in product costs and wilderness development made a difference reestablish productivity and state funds. The collateral impacts of railroad framework financing were twofold: they encouraged financial development and integration whereas moreover actuating modernization and effectiveness advancements. This permitted Argentina to have one of the world's biggest rail frameworks by 1910, contributing altogether to the country's financial stature (Lewis, 2015). As India's railroads look for financing for their extension and modernization, lessons can be gathered from Argentina's encounter, especially in guaranteeing dependable monetary administration and leveraging foundation venture for maintainable financial improvement.

As India's railroads endeavor to secure financing for their extension and modernization, there are important lessons to be drawn from Argentina's encounter. Argentina's travel highlights the significance of adjusting state-led activities with private division association in railroad advancement. The beginning entrepreneurial

part played by the state, taken after by a move towards London dominance, underscores the requirement for a vital approach to financing that considers both household and worldwide financial specialists. In addition, the utilize of benefit ensures in railroad financing presents a cautionary story for India. Whereas these ensures can give soundness and draw in speculation, they must be carefully overseen to dodge burdening the treasury and welcoming concerns almost open funds. India seem advantage from receiving straightforward and responsible financing components to guarantee the capable allotment of assets and moderate the chance of money related strain. Moreover, India can learn from Argentina's involvement in leveraging railroad foundation venture for broader financial improvement objectives. The effective development and modernization of Argentina's rail framework not as it were encouraged financial development and integration but moreover initiated modernization and effectiveness advancements. India seem investigate comparable techniques to maximize the socio-economic benefits of railroad venture, adjusting foundation improvement with broader national improvement goals. In substance, by considering Argentina's railroad financing history, India can gather experiences into viable monetary administration hones, the significance of private segment engagement, and the potential collateral impacts of foundation venture. These lessons can educate India's approach to financing its railroads, contributing to economical financial improvement and improved network over the nation.

Infrastructure financing is pivotal for driving the development and modernization of Indian Railways, as highlighted by (Mishra, 2018). Investments in railway infrastructure, including track modernization and station upgrades, are essential for improving operational efficiency, safety measures, and passenger comfort. These investments, exemplified by initiatives like high-speed trains and advanced signaling systems, directly enhance the quality and reliability of railway services, propelling the sector forward. Moreover, enhanced railway infrastructure serves as a catalyst for broader economic growth beyond transportation. Streamlined rail networks facilitate seamless movement of goods and people, fostering trade, industrial development, and tourism. For instance, projects like the Eastern Dedicated Freight Corridor not only boost freight transportation efficiency but also spur economic development along its route, creating employment opportunities in previously underserved regions. Additionally, well-connected railways, as seen in initiatives like the Delhi-Mumbai Industrial Corridor, attract investments and stimulate economic growth in remote areas, underscoring the transformative role of infrastructure financing in shaping India's economic trajectory.

Data Interpretation and Analysis

This study is moving around the infrastructure development and loan liability in Indian railways. A qualitative exploration has been done wherein several factors which are dealing with the moderating variables are playing an important role. Economic environment and strategic planning is the key superlative factors which have been explored after the extensive literature review. A theoretical framework has been developed which is depicted here.

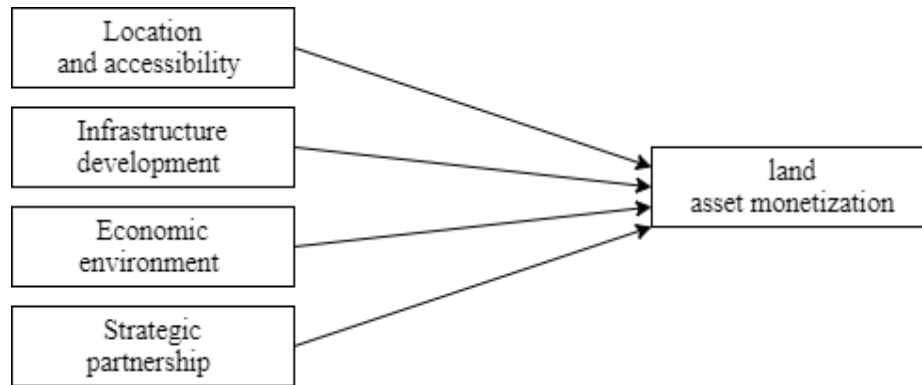


Figure 1: Proposed research model

Based on the above figure a hypothesis has been proposed for the testing. Hypothesis has been proposed based on the objectives of the study. A descriptive proposition of the explored variables has been defined with the suitability of the study parameters.

H1: Location and accessibility have a positive impact on land asset monetization

H2: Infrastructure development has a positive impact on land asset monetization

H3: Economic environment has a positive impact on land asset monetization

H4: Strategic partnership has a positive impact on land asset monetization

Scale reliability assessment

Reliability is the measure of the internal consistency of the constructs in the study. A construct is reliable if the Alpha (α) value exceeds 0.70. Construct reliability was assessed using Cronbach's Alpha. The results revealed that Location and accessibility with four items ($\alpha = 0.901$), Infrastructure development with four items ($\alpha = 0.799$), Economic environment with six items ($\alpha = 0.876$), Strategic partnership with four items ($\alpha = 0.853$) were all found reliable. The dependent variable, Land asset monetization with four items ($\alpha = 0.88$), was also found reliable. Reliability results are summarized in Table 1.

Table 1: Reliability Results

Construct	Number of items	Cronbach's alpha (α)
LA	4	0.901
ID	4	0.799
EE	6	0.876
SP	4	0.853
LAM	4	0.888

Hypothesis assessment

The hypothesis under investigation posits that location and accessibility positively influence land asset monetization (LAM). To evaluate this hypothesis, the dependent variable, LAM, was regressed on the predictor variable, location and accessibility (LA), aiming to test the formulated hypothesis H1. The regression analysis yielded a significant predictive relationship between LA and LAM, indicated by the following statistical results: a beta coefficient (β) of 0.182, a t-value of 5.135, and a p-value of less than 0.001.

These findings robustly support the hypothesis that location and accessibility positively affect land asset monetization in the context of railway infrastructure development.

The model's explanatory power is further reinforced by the R-squared (R^2) value of 0.666, which indicates that approximately 66% of the variance in land asset monetization can be explained by the predictor variable, location and accessibility. This high R^2 value suggests a strong model fit, signifying that the independent variable is a substantial determinant of the dependent variable.

Table 2: Hypothesis Results

HN	Path	β	Std error	T-value	P-value	Result
H1	LA→ LAM	0.182	0.036	5.135	0	Supported
H2	ID→ LAM	0.495	0.029	17.297	0	Supported
H3	EE→ LAM	0.337	0.033	10.131	0	Supported
H4	SP→ LAM	0.101	.0 25	4.037	0	Supported
R square		F square				
		0.666	249.55			

Another hypothesis under investigation posits that infrastructure development exerts a positive influence on land asset monetization (LAM). To evaluate this hypothesis, the dependent variable, LAM, was regressed on the predictor variable, infrastructure development (ID), aiming to test the formulated hypothesis H2. The regression analysis yielded a significant predictive relationship between ID and LAM, indicated by the following statistical results: a beta coefficient (β) of 0.495, a t-value of 17.297, and a p-value of less than 0.001. These findings robustly support the hypothesis that infrastructure development positively affects land asset monetization in the context of railway infrastructure development, resulting in acceptance of H2.

Further, H3 assumed that economic environment exerts a positive influence on land asset monetization (LAM). To evaluate this hypothesis, the dependent variable, LAM, was regressed on the predictor variable, economic environment (EE), aiming to test the formulated hypothesis H3. The regression analysis yielded a significant predictive relationship between EE and LAM, indicated by the following statistical results: a beta coefficient (β) of 0.337, a t-value of 10.131, and a p-value of less than 0.001. These findings robustly support the hypothesis that economic environment positively affects land asset monetization in the context of railway infrastructure development, resulting in acceptance of H3.

Additionally, H4 assumed that strategic partnership exerts a positive influence on land asset monetization (LAM). To evaluate this hypothesis, the dependent variable, LAM, was regressed on the predictor variable, strategic partnership (SP), aiming to test the formulated hypothesis H4. The regression analysis yielded a significant predictive relationship between SP and LAM, indicated by the following statistical results: a beta coefficient (β) of 0.101, a t-value of 4.037, and a p-value of less than 0.001. These findings robustly support the hypothesis that strategic partnership positively affects land asset monetization in the context of railway infrastructure development, resulting in acceptance of H4.

RESULTS AND CONCLUSIONS

Investment in any project is the prime concern for the development of any infrastructure project. Especially, when this is coming for the Indian railways, infrastructure has led to significant improvements in connectivity and accessibility across the country. The expansion of the rail network and upgradation of existing lines have improved transportation links between urban and rural areas, fostering greater

economic integration. The financing of railway infrastructure projects has generated substantial direct and indirect employment opportunities. The construction and maintenance of railways has created jobs for skilled and unskilled workers, while the improved connectivity has enabled the growth of ancillary industries and services.

The modernization of railway infrastructure has enhanced operational efficiency, leading to reductions in travel time and transportation costs. This has had a positive impact on supply chain logistics and overall business competitiveness. The environmental impact of railway infrastructure projects has been mixed. While electrification of rail lines and use of energy-efficient technologies have reduced the carbon footprint, the expansion of the network has also led to some encroachment on ecologically sensitive areas. The financing model adopted for railway infrastructure, involving public-private partnerships and multilateral lending, has mobilized significant capital investment. However, concerns remain regarding the long-term debt sustainability and equitable distribution of project benefits.

The findings of this study highlight the multifaceted impacts of infrastructure financing in the Indian railway sector. While the investments have yielded tangible improvements in connectivity, employment, and economic efficiency, policymakers must also address the environmental implications and ensure the financial viability of the projects. To maximize the collateral benefits of railway infrastructure development, a holistic approach is needed that integrates economic, social, and environmental considerations. This would involve strengthening regulatory frameworks, improving project planning and execution, and fostering greater stakeholder engagement. By addressing these challenges, India can leverage its railway infrastructure investments to drive sustainable and inclusive growth, strengthening the foundations for long-term economic prosperity.

References

- 1) Agrawal, R. (2020). Review of infrastructure development and its financing in India. Paradigm.
- 2) Annez, P. C. (n.d.). India's Public Lands: Responsive, Transparent, and Fiscally Responsible Asset Management. I.D.F.
- 3) Bear, L. (2020). Speculations on infrastructure: From colonial public works to a post-colonial global asset class on the Indian railways . *Economy and Society*.
- 4) Bon, B. (2021). Making railway land productive: The commodification of public land in Kenyan and Indian cities. *Geoforum*, 118-128.
- 5) Christophers, B. (2018). *The new enclosure: The appropriation of public land in neoliberal Britain*. Verso Books.
- 6) Garmabaki, A. H. (2021). Adapting railway maintenance to climate change. *Sustainability*. Sustainability, MDP.
- 7) Ghosh, S. &. (2017). Foreign Direct Investment in Indian Railways: An Analytical Study. *Journal of Commerce and Management Thought*, 300-308.
- 8) Jain, S. (2009). Public-private partnerships in indian railways: Looking before we leap. *GNLU Law Review*.
- 9) Lewis, C. M. (2015). *British Railways in Argentina, 1857-1914: a case study of foreign investment*. London: Bloomsbury.
- 10) Lidén, T. (2015). Railway Infrastructure Maintenance - A Survey of Planning Problems and Conducted Research. *science Direct*, pp. 574-583.

- 11) Mishra, R. &. (2018). Impact of Infrastructure Investment in Indian Railways on Economic Development. International Journal of Scientific Research and Management, 345-350.
- 12) Mukherjee, S. R. (n.d.). Public Investment and Infrastructural Finance: The Case of the Indian Railways Revisited. Department Of Economics North Bengal University.
- 13) NITI., A. (2022). Matching Monetisation Models to Revenue Streams.
- 14) Sahai, V. &. (2019). Improving asset productivity: The key to revitalising the Indian Railways. Observer Research Foundation.
- 15) Singh, P. &. (2020). Multilateral Funding in Indian Railways: A Case Study of Eastern Dedicated Freight Corridor. Indian Journal of Transport Management, 52-59.
- 16) Sinha, M. (2021). Harnessing land value capture: Perspectives from India's urban rail corridors. Land Use Policy, 108.
- 17) Sriraman, S. &. (2009). Financing Transport Infrastructure and Services in India. Department of Economic Analysis and Policy, Reserve Bank of India.
- 18) State of Indian Railways. (2024). PRS Legislative Research.
- 19) (2015). White Paper on Indian railways. Government of India.