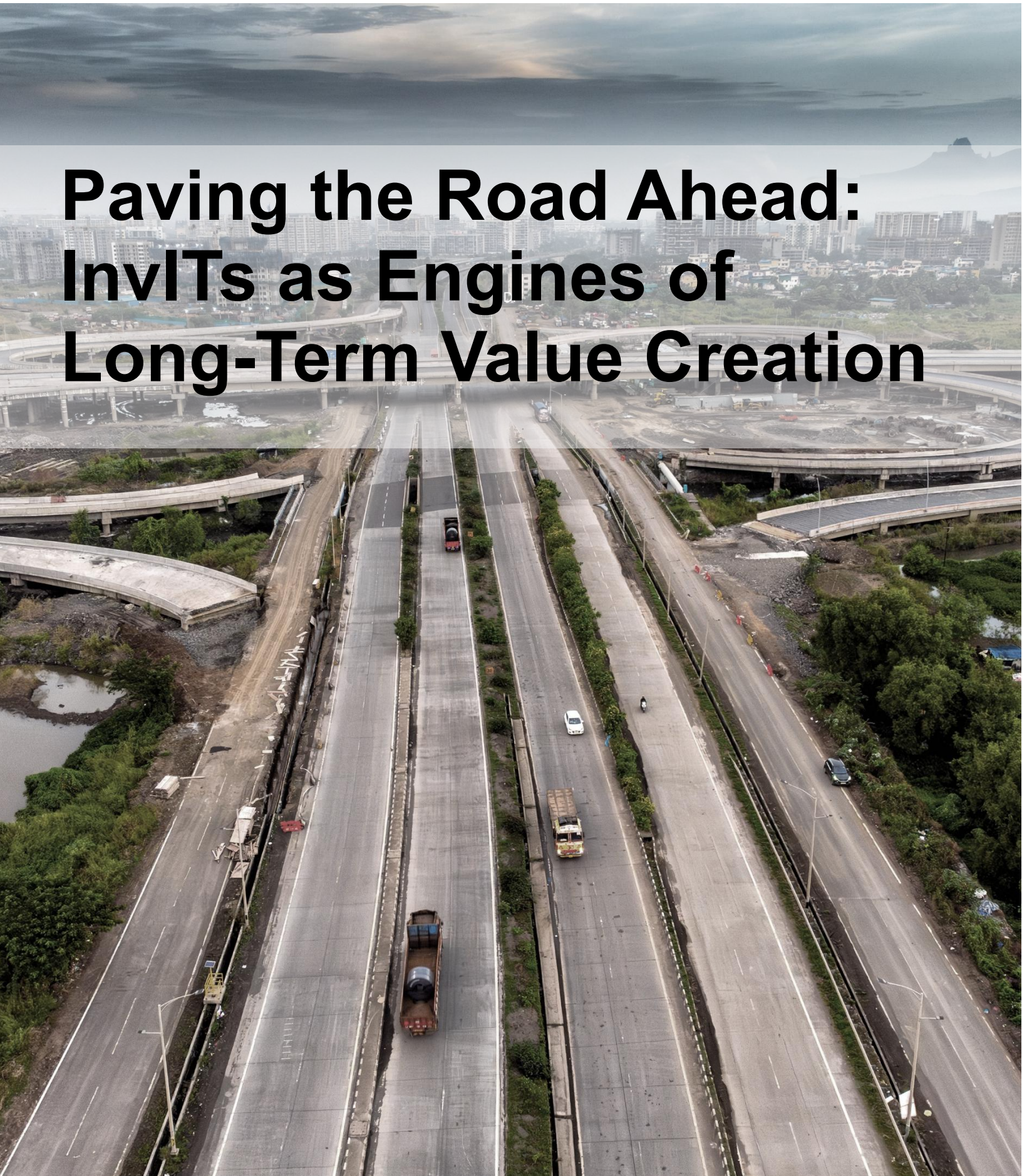
FICCI 100
100 YEARS OF BUILDING TOMORROW

Crisil
Intelligence



Paving the Road Ahead: InvITs as Engines of Long-Term Value Creation

Crisil
Intelligence

Contents

1 Unlocking latent value: The asset monetisation imperative 8

2 InvITs as strategic capital recycling vehicles 13

3 Roads in the fast lane: The rise of road InvITs 23

4 Lifecycle-based planning: Optimising maintenance spend and extending asset longevity 31

5 Digital-first infrastructure: IoT, AI-led asset monitoring and predictive maintenance 35

6 Gearing up InvITs for climate resilience and sustainable value creation 40

7 Way forward: Evolving InvITs from asset holders to long-term value creators 44

8 Annexures 48

Acronyms and Abbreviations

ATMS	Advanced Traffic Management Systems	NHIIMPL	National Highways Infra Investment Managers Private Limited
AUM	Assets Under Management	NHIT	National Highways Infra Trust
BOT	Build Operate Transfer	NIIF	National Investment and Infrastructure Fund
BRSR	Business Responsibility and Sustainability Reporting	NIP	National Infrastructure Pipeline
CAGR	Compounded Annual Growth Rate	NITI	National Institution for Transforming India
DAMS	Drone Analytics Monitoring System	NMP	National Monetisation Pipeline
DBFOT	Design Build Finance Operate and Transfer	NPC	Net Present Cost
ESG	Environmental, Social and Governance	NPV	Net Present Value
FHWA	Federal Highway Administration	OMDA	Operation, Management and Development Agreement
FPO	Follow-on Public Offer	PPP	Public Private Partnership
GDP	Gross Domestic Product	PSU	Public Sector Undertaking
GIS	Geographic Information System	ROFO	Right of First Offer
HAM	Hybrid Annuity Model	SEBI	Securities and Exchange Board of India
IPO	Initial Public Offering	SHM	Structural Health Monitoring
LCC	Lifecycle Costing	SLB	Sustainability-Linked Bonds
LCCA	Life-Cycle Cost Analysis	SPV	Special Purpose Vehicle
LLP	Limited Liability Partner	TOT	Toll Operate Transfer
LTIFR	Lost Time Injury Frequency Rate	USD	United States Dollar
NHAI	National Highway Authority of India	VMS	Variable Message Signs

Foreword



Mr S Paramasivan
Chair, FICCI Committee on Roads & Highways, and Managing Director, Afcons Infrastructure Ltd

I am pleased to present the **FICCI-Crisil Knowledge Report on 'Paving the Road Ahead: InvITs as Engines of Long-Term Value Creation',** which was unveiled at the Infrastructure Conclave 2026, organised by the Federation of Indian Chambers of Commerce and Industry (FICCI).

As India forges ahead with its infrastructure development agenda, asset monetisation has become an integral part of the financing framework. Infrastructure Investment Trusts (InvITs) have emerged as structured platforms that enable sponsors to unlock capital from operational road assets and redeploy it into new infrastructure creation. This model supports capital recycling and offers investors access to stable, yield-oriented assets backed by transparent governance frameworks.

The evolution of road InvITs in India reflects a broader shift toward disciplined asset management, performance benchmarking and lifecycle optimisation. As the market matures, greater focus is being placed on operational efficiency, prudent leverage, traffic risk management and the long-term sustainability of cash flows. Expanding institutional participation and improving secondary market liquidity will be important to strengthening price discovery and enhancing investor confidence.

This report provides a forward-looking assessment of the InvIT ecosystem, examining structural opportunities, regulatory considerations and emerging best practices that will shape its next phase of growth. It outlines how InvITs can evolve from being traditional income-generating instruments to active, technology-driven and sustainability-focused platforms that create long-term value.

As industry stakeholders committed to strengthening India's infrastructure financing architecture, we hope this report contributes meaningfully to policy dialogue and market development. We look forward to continued collaboration among sponsors, investors, regulators and policymakers to deepen and strengthen the InvIT ecosystem.

Message from Crisil



Mr Jagannarayan Padmanabhan
Senior Director, Consulting, Crisil Intelligence (Crisil Ltd)



Mr Anshuman Chauhan
Director- Transport, Logistics and Mobility (TLM), Crisil Intelligence (Crisil Ltd)

India's infrastructure ambitions are increasingly defined not just by the pace of asset creation, but by the ability to finance, manage and sustain those assets over their full economic life. As public balance sheets face competing demands, asset monetisation and capital recycling have become essential tools for maintaining investment momentum without compromising fiscal prudence.

InvITs have emerged as a key institutional innovation in this context. By aggregating operational assets into regulated, market-linked platforms, InvITs enable long-term capital participation while enhancing governance, transparency and professional asset management. In the road sector, InvITs have demonstrated particular relevance due to the sector's scale, asset homogeneity and stable cash-flow characteristics.

This report analyses the evolution of road InvITs within India's broader monetisation framework, comparing them with other instruments such as toll-operate-transfer (TOT) and securitisation. It also explores how advanced asset management practices, ranging from lifecycle costing and predictive maintenance to digital monitoring systems and Environmental, Social and Governance (ESG) integration, are strengthening the financial and operational foundations of InvIT portfolios.

Drawing on our sectoral expertise and analytical frameworks, the report highlights how road InvITs are transitioning from one-off monetisation vehicles to long-term infrastructure ownership platforms capable of supporting risk management, cost efficiency and investor confidence.

As India moves into the next phase of the NMP, such platforms will be critical in aligning public infrastructure objectives with global pools of patient capital.

We are confident that this report will ignite insightful and impactful deliberations, catalysing the structural strengthening of InvITs and unlocking their capacity for exponential growth as pivotal value creators. Our vision is for this report to serve as the definitive reference for stakeholders dedicated to advancing and scaling up the InvIT ecosystem in India, charting a bold course for a transformative decade of infrastructure development powered by the InvIT platform.

Preface

Infrastructure investment trusts: Anchoring capital recycling in India's road sector

India's infrastructure journey is entering a decisive phase, one that demands not just higher scale and speed in asset creation, but also financial sustainability, operational excellence and long-term value creation. As the country advances toward its goal of becoming a $7 trillion economy by 2030 and a developed nation by 2047, infrastructure will remain central to productivity, competitiveness and inclusive growth.

In this context, asset monetisation has emerged as a strategic enabler, supporting India's transition from a predominantly budget-funded infrastructure model to one anchored in capital recycling and institutional investment. By unlocking value from mature public assets and reinvesting the proceeds into new infrastructure, monetisation strengthens public balance sheets, reduces reliance on incremental borrowing and sustains investment momentum even under fiscal constraints.

Among the various monetisation instruments deployed in India, InvITs have assumed a particularly important role. Beyond serving as financing vehicles, InvITs represent a shift toward platform-based infrastructure ownership, characterised by professional governance, transparency and long-term capital alignment. In the road sector - defined by long concession lives, predictable cash flows and asset standardisation - InvITs are uniquely positioned to aggregate large portfolios and attract global pools of patient capital.

This report examines the evolution of road InvITs as anchor platforms for sustainable infrastructure investment, moving beyond one-time monetisation to a framework centred on lifecycle value creation. A key theme the report explores is the growing importance of artificial intelligence (AI) and machine learning-enabled, condition-based and predictive operations and maintenance (O&M). By shifting from fixed-schedule maintenance to data-driven, just-in-time (JIT) interventions, InvIT platforms can materially improve asset performance, extend service life and optimise lifecycle costs, creating durable value for investors while enhancing service reliability for users.

The report also addresses the risk management imperatives facing road InvITs, including traffic volatility, regulatory uncertainty, operational risks and financing constraints. It highlights how portfolio diversification, digital monitoring systems and institutional governance structures can mitigate these risks. The report also underscores the need to embed climate resilience and sustainability into InvIT management, recognising that increasing climate volatility makes resilience planning, predictive asset monitoring and ESG integration central to long-term asset performance and investor confidence.

Despite the rapid growth of InvITs, only a limited portion of India's operational road asset base has been monetised. This leaves a substantial runway for further capital mobilisation under the National Monetisation Pipeline (NMP), particularly as public authorities seek scalable, repeatable monetisation mechanisms that balance fiscal discipline with infrastructure expansion.

To guide the industry through a decade of transformation, the report proposes the PAVE framework: Policy and regulatory strengthening, Advancing operations through digital transformation, Value amplification via sustainability and climate resilience and Expansion through strategic corridor aggregation. Together, these pillars chart a pathway for InvITs to evolve from asset holders into long-term value creators that are capable of anchoring India's road infrastructure investment ecosystem over the coming decade.



1 Unlocking latent value: The asset monetisation imperative

India has an ambitious long-term growth vision, with the economy targeted to reach approximately USD 7 trillion by 2030 and USD 30 trillion by 2047. Infrastructure development is central to achieving these targets, since it can stimulate economic activity, generate employment, catalyse private investment in surrounding regions and improve quality of life.

The government of India has scaled up public infrastructure capital outlay to Rs 12.2 lakh crore in fiscal 2027 (Budget Estimate) from ~Rs 2.5 lakh crore in fiscal 2014. This represents an increase to about 3.3 % of gross domestic product (GDP) from roughly 1.7 %, underscoring infrastructure's elevation as a core policy priority.

Under the National Infrastructure Pipeline (NIP), the government has identified ~7,550 road projects with a cumulative capital outlay requirement of around Rs 54.5 lakh crore for the period between fiscal 2020 and February 2026. This investment portfolio represents a combined commitment from both Central and State Governments, alongside private sector participation. Notably, investments in the road sector account for nearly a third of the total NIP outlay, reflecting its role as the primary driver of India's logistics and connectivity goals.

According to the Report of the Task Force on the National Infrastructure Pipeline (2019), traditional sources of funding such as budgetary support, bank lending and market borrowing were expected to finance around 83-85% of the envisaged infrastructure capital expenditure (capex), while asset recycling and monetisation were projected to contribute 5-6% of aggregate investment.

However, limited fiscal space and budgetary constraints indicate that public funding alone cannot sustain this scale of infrastructure investment. It is, therefore, imperative to deepen participation by the private sector and establish robust mechanisms for recycling both public and private capital, thus broadening the pool of long-term funding available for infrastructure development.

India's road segment sits at the intersection of economic growth, fiscal sustainability and long-term capital formation. As one of the most capital intensive segments in infrastructure, road development requires significant upfront investment and sustained expenditure over the lifecycle of the asset.

Historically, this investment burden rested predominantly on public balance sheets. Over the last decade, however, India has begun relying on capital recycling through structured asset monetisation to sustainably fund infrastructure investment requirements.

This shift reflects a broader re-imagining of infrastructure as not merely a public good, but a cash flow generating economic asset that can attract long-term private capital and deliver public service outcomes. Roads, once constructed, generate predictable revenue streams through tolling, annuity payments and hybrid concession mechanisms. Asset monetisation enables the unlocking and redeployment of these cash flows, creating a self-reinforcing cycle of infrastructure expansion, balance sheet deleveraging and economic growth.

Asset monetisation in the Indian context is distinct from privatisation. Ownership of the underlying assets remains with the public authority, while defined operational or revenue rights are transferred for a finite period under concession agreements. This model preserves public control while introducing market discipline, transparency and performance accountability.

At its core, asset monetisation is a shift from episodic asset creation to continuous reinvestment, allowing India to expand its infrastructure footprint without proportionately increasing fiscal stress.

1.1 The macroeconomic imperative for asset monetisation

Roads support productivity by reducing logistics costs, enabling/improving market access and facilitating labour mobility. As the demand for enhanced infrastructure becomes more commonplace in conjunction with economic growth, the limits of traditional public financing - budgetary constraints, higher borrowing and debt servicing pressures - are becoming increasingly evident.

Over the past decade, aggressive capex programs spearheaded by agencies such as the National Highways Authority of India (NHAI) have contributed to the development roads. While the national highway capacity expanded successfully, it also resulted in a leveraged balance sheet for NHAI, increasing exposure to interest rate cycles and refinancing risk.

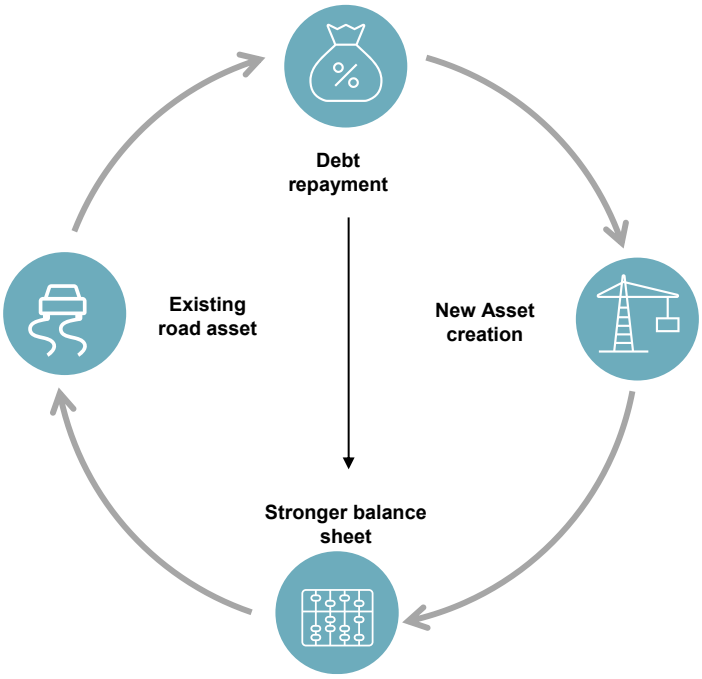
Asset monetisation addresses this structural challenge through capital recycling:

- Operational road assets with stable cash flows are transferred to private or quasi-private investment vehicles, unlocking value from past public investment and converting assets into investable cash flow streams
- Upfront monetisation proceeds are recycled into new construction, enabling continuous infrastructure expansion without incremental fiscal strain
- Legacy debt is reduced without compromising expansion momentum, strengthening public balance sheet resilience
- Private sector involvement makes operations, maintenance and customer service more efficient, improving the performance of the asset over the concession life
- Mobilising alternative pools of long-term patient capital from pension funds, insurance capital, sovereign wealth funds, reducing reliance on budgetary support and toll revenues

This approach delivers multiple benefits:

- **Fiscal efficiency:** Monetisation reduces reliance on both direct and indirect (off-balance sheet) borrowing
- **Growth acceleration:** Rapid infrastructure buildout and efficiencies resulting from private sector management, leading to productivity boost, logistics efficiency improvement and regional integration
- **Crowding-in private capital:** Long-term investors such as pension funds, insurers and sovereign wealth funds gain exposure to operational infrastructure with predictable returns

Asset monetisation mechanism



Source: Crisil Intelligence

As depicted above, asset monetization unlocks capital from existing road assets, enabling debt repayment and strengthening the balance sheet. This improved financial capacity allows the creation of new assets, which in turn generate additional revenues and create a continuous virtuous cycle of infrastructure development. NHAI, for instance, has facilitated Rs 72,000 crore of debt repayment between fiscals 2023 and 2025, supported by Rs 1.4 lakh crore monetised since 2020.

As India's infrastructure base continues to expand and mature, monetisation can play an important role in recycling capital from operational assets into new infrastructure creation. When implemented within a disciplined policy framework, it not only mobilises private capital and improves asset management practices, but also enables governments to prioritise public spending toward less commercially viable infrastructure and critical social sectors.

1.2 Progression from NMP 1.0 to NMP 2.0 (2021-2030)

The institutionalisation of asset monetisation in India has evolved gradually over the past decade rather than emerging with a single policy announcement. An early conceptual push came with the Kelkar Committee on Revisiting and Revitalising the PPP Model (2015), which highlighted the need for "asset recycling" by monetising operational public infrastructure to attract long-term institutional capital and finance new infrastructure creation.

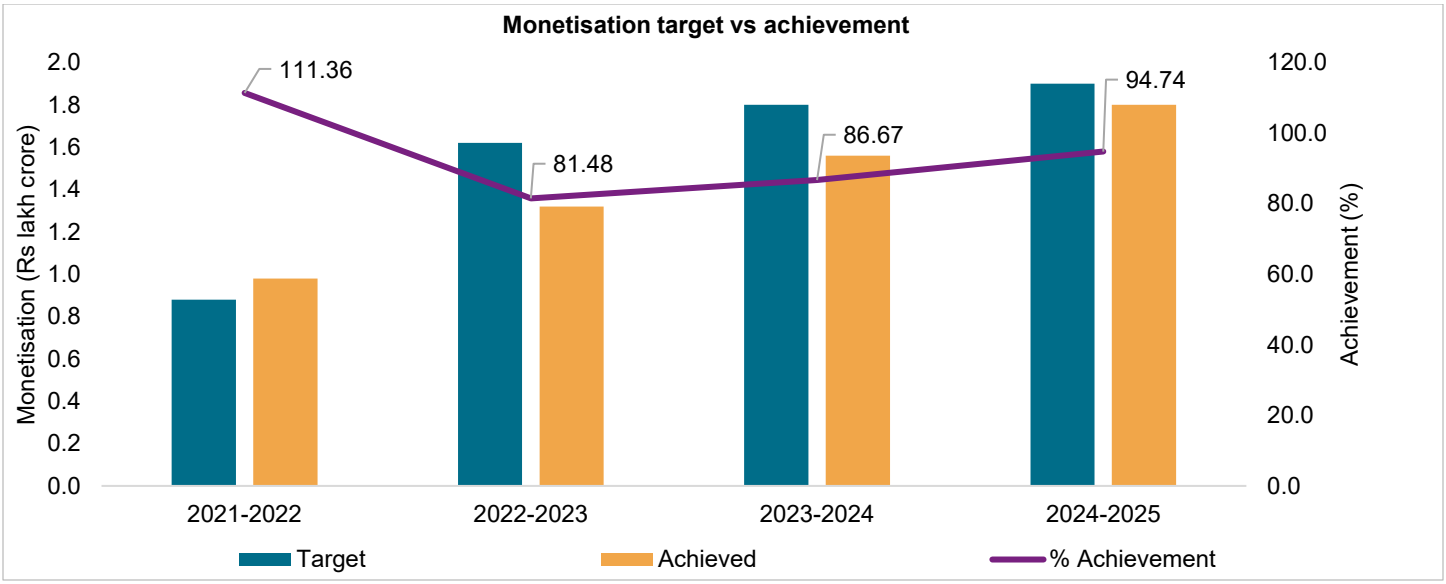
Building on these recommendations, sector agencies began operationalising monetisation frameworks. In the roads sector, NHAI pioneered the approach through the TOT model, with the first bundle of nine highway projects awarded in 2018 to private investors for a concession fee of about Rs 9,681 crore. This was followed by the introduction of InvITs as a platform based monetisation mechanism, with NHAI launching its InvIT structure in the early 2020s to attract long-term institutional capital into operational highway assets. NHAI launched its first National Highways Infra Trust (NHIT) in October 2021, successfully raising Rs 5,000 crore from institutional investors.

In parallel, the Government of India sought to systematise asset monetisation across infrastructure sectors through the NMP. Anchored by NITI Aayog, NMP was launched in 2021. NMP 1.0 has adopted a structured, asset led approach under which the program has identified brownfield infrastructure assets with stable operating histories and predictable revenue streams. These assets have been monetised through instruments such as concessions, InvITs and other market based platforms.

Of all the sectors, it was highways, railways, power petroleum and natural gas pipelines, and telecom that had the highest monetisation targets, totalling about Rs 4.3 lakh crore (72% of the total target). The remaining sectors included warehousing, coal mining, aviation, urban real estate, ports and stadiums. These had a monetisation target of about Rs 1.7 Lakh Crore.

In terms of achievement, NMP 1.0 achieved 89% of its target, amounting to Rs 5.3 lakh Crore (Rs 3.87 lakh crore during F22, FY23 and FY24 and Rs 1.43 lakh crore during FY25). The sectors with the highest performance included highways, coal, mines, petroleum and natural gas and ports.

NMP 1.0 targets vs achievements



Source PIB press releases

Road sector emerged as one of the largest contributors to asset monetisation, with the Ministry of Road Transport and Highways among the highest performing ministries. Power transmission and warehousing also showed strong uptake, reflecting investor appetite for stable and regulated infrastructure assets.

Outcomes of NMP 1.0 included:

- Successful deployment of monetisation instruments such as TOT bundles and InvITs
- Saw investor appetite for operational road assets
- Establishment of valuation benchmarks and transaction frameworks
- Progressive broadening of the investor base beyond developers to global institutional capital

At the same time, the first phase witnessed challenges ranging from investor concentration risks and transaction complexity to a need for deeper secondary market liquidity, providing valuable lessons for the next phase.

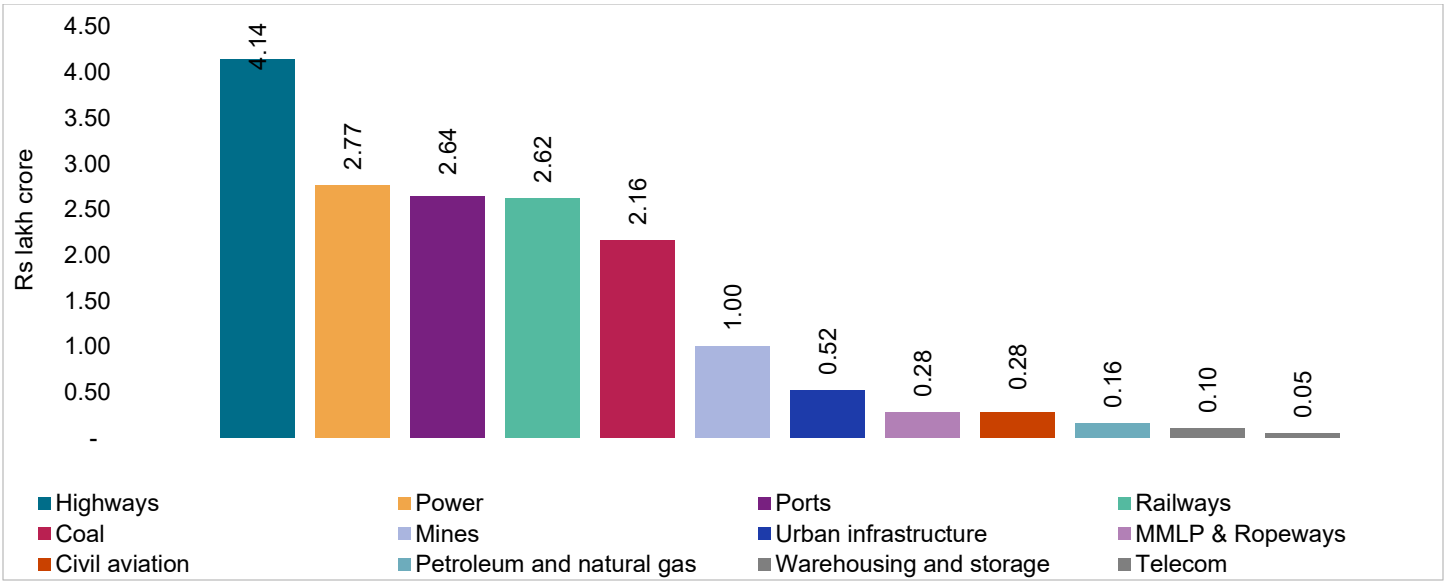
The scale and structure of NMP 2.0 highlight the growing need for a systematic, platform-based approach over transaction-led monetisation. This underscores the importance of InvITs as the backbone of India's long-term highway infrastructure financing and investment strategy.

Building on the momentum witnessed during NMP 1.0, the government launched the NMP 2.0 in February 2026, significantly scaling up the ambition and scope of asset monetisation for over fiscals 2026-2030. Under NMP 2.0, the aggregate monetisation potential is estimated at Rs 16.7 lakh crore, covering over 12 infrastructure sectors, including roads, railways, ports, power, pipelines, telecom, urban infrastructure and logistics.

Within this expanded framework, the government has articulated a core monetisation target of Rs 10 lakh crore over the five-year period, representing proceeds it expects to accrue directly through public sector led transactions and structured partnerships with private capital. The balance reflects additional private capital mobilisation enabled through Public Private Partnerships (PPPs), InvITs, securitisation and other market-based instruments.

Infrastructure assets are the mainstay of NMP 2.0, with the transport sector serving as the anchor. Highways, Multi-Modal Logistics Parks (MMLPs) and ropeways alone are estimated to contribute ~Rs 4.4 lakh crore, with highways accounting for Rs 4.14 lakh crore.

Sectoral allocation for NMP 2.0



Source: NITI Aayog

For the road sector, transition to NMP 2.0 is marked by:

- Need for deeper integration with domestic capital markets
- Need for stronger alignment between monetisation, asset management and lifecycle optimisation

NMP 2.0 also reflects a qualitative evolution in policy thinking: Monetisation is no longer viewed as an isolated financing tool, but as an ongoing strategy embedded within asset ownership and governance frameworks.

1.3 Roads as the anchor sector in India's monetisation strategy

As the program transitions from NMP 1.0 to the more ambitious NMP 2.0, the roads sector is at the forefront of this transformation. Among all infrastructure sectors, roads occupy a central position in India's monetisation framework. This prominence is not incidental, but reflects a convergence of structural advantages:

- Large operational asset base with predictable traffic and cash flow characteristics
- Standardised concession frameworks, enabling portfolio aggregation
- Strong demand fundamentals, driven by freight movement, urbanisation and economic integration
- High suitability for yield-seeking investors, particularly in low correlation asset classes

Road monetisation has also catalysed institutional innovation, most notably through the emergence of InvITs as scalable, investor-friendly vehicles that are capable of holding diversified portfolios across geographies, concession vintages and revenue models.

As subsequent chapters explore in detail, this evolution has transformed road assets from discrete projects into financial platforms underscoring the need for advanced asset management, digital monitoring, ESG integration, along with long-term value creation.



2 InvITs as strategic capital recycling vehicles

India's asset monetisation framework has evolved to a broader strategy of capital recycling, balance sheet optimisation and institutional asset management from a narrow focus on fiscal unlocking. Across sectors transport, power, logistics, energy and urban infrastructure the central objective has remained consistent: Convert mature, operational public assets into investable cash flow streams without diluting public ownership.

In its early phases, asset monetisation in India was largely transaction led. Instruments such as TOT, toll securitisation and long-term concessions were designed to mobilise capital through discrete, asset-specific transactions. These approaches proved effective in generating upfront receipts and reducing near-term funding pressure, particularly for agencies with leveraged balance sheets.

However, as the scale of infrastructure ambition expanded under the NMP, the limitations of purely transaction based models became evident. One-off monetisation events, while fiscally useful, offered limited scope for continuous reinvestment, portfolio optimisation or long-term governance enhancement.

This recognition has driven a gradual but deliberate shift toward platform based monetisation structures, most notably InvITs. Unlike episodic transactions, platform structures enable assets to be pooled, professionally managed, refinanced and expanded over time supporting repeatable capital recycling and broader investor participation.

List of monetisation modes prevalent across sectors in India

Monetisation mode	Indicative list of sectors leveraging this mode	Revenue share/proceeds	
		Type of monetisation proceeds	Estimation method
InvIT	Highways	Funds raised by National Highways Infra Trusts	Market approach
TOT	Highways	Upfront fee	Market approach
PPP user models (example: DBFOT, BOT, toll)	Highways, ports, railways, warehousing and storage, tourism	Premium/revenue share of the government	Market approach
OMDA/other O&M based concessions	Aviation, railways	Upfront fee, revenue share, concession fee	Market approach
IPO/ FPO/ private placement	Power, petroleum and natural gas, aviation,	Proceeds from the sale of equity	Market approach
Securitisation	Power	Proceeds to the PSU from securitisation of cash flows	Enterprise value approach
Lease	Telecom, petroleum and natural gas	Lease rental payment	Market approach
Land-based development	Railways, ports, urban, telecom	Lease rental/proceeds from sale of built-up area	Market approach
Commercial auction	Mines, coal	Royalty payment to the government (Centre and state)	Market approach

Source: Niti Aayog NMP 2.0

2.1 Comparing TOT, InvIT and securitisation models

India's asset monetisation toolkit today broadly comprises three principal instruments: TOT, InvITs and cash flow securitisation. While all three mechanisms seek to unlock value from operational public assets, they differ materially in structure, sectoral applicability, risk allocation and long-term strategic implications.

TOT is a roads-specific instrument deployed exclusively for monetising mature national highway assets through long-term concession transfers. In contrast, InvITs have evolved into a multi-sector monetisation platform, spanning roads, power transmission, renewable energy, gas pipelines and other core infrastructure segments. Cash flow securitisation has been applied across select infrastructure assets with predictable receivables.

Up to fiscal 2025, highway asset monetisation alone mobilised approximately Rs 1.42 lakh crore: Rs 48,995 crore via TOT, Rs 43,638 crore via road InvITs and Rs 50,125 crore through securitisation of highway cash flows.[1] Beyond highways, InvITs have mobilised cumulative capital of approximately Rs 1.38 lakh crore across sectors, reflecting their growing role as a preferred vehicle for institutional infrastructure ownership rather than a single-sector monetisation tool.[2]

The evolution of these instruments highlights a clear transition in monetisation strategy. TOT dominated early monetisation efforts by enabling large, one-off upfront receipts from mature toll assets. InvITs have expanded rapidly in recent years as policy focus has shifted from episodic transactions toward platform based monetisation structures that enable portfolio aggregation, professional asset management and repeatable capital recycling.

However, the role of securitisation as an asset monetisation instrument has become increasingly limited. Under the Reserve Bank of India's securitisation framework, structures based on future flow receivables are not permitted, effectively requiring the originating entity to

[1] Indian Govt raises Rs 1.42 lakh crore via asset monetization till FY25, Economic, August, 2025

[2] Crisil Intelligence

provide credit support to back such transactions. At the same time, the Ministry of Finance has discouraged public sector authorities from extending guarantees or letters of comfort that could create contingent fiscal liabilities.

In this context, InvITs are expected to play a progressively larger role under NMP 2.0 as the primary institutional platform for asset monetisation, while TOT may continue to be used selectively for mature highway assets.

2.1.1 TOT

A. Overview

TOT involves the upfront concessioning of a defined bundle of operational, revenue generating highway assets to a private concessionaire for a fixed period, in exchange for a lump-sum upfront payment. The model has proven to be effective in rapidly monetising mature, de-risked assets and generating immediate fiscal inflows for the government.

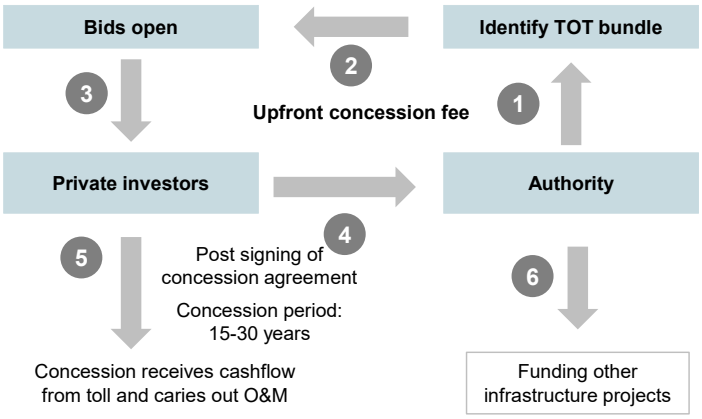
TOT transaction is structured to enable capital recycling only at the time of concession, with no provisions for ongoing capital recycling or portfolio expansion thereafter.

B. Structure

Under the TOT framework, the government primarily through the NHAI identifies operational national highway stretches that meet predefined traffic, condition and revenue stability criteria. These assets are bundled into concession packages and offered to private bidders through a competitive bidding process.

Bidders submit financial offers based on their assessment of toll revenue potential, operating costs and return expectations. The concession is awarded to the highest upfront bidder, who receives the right to operate, maintain and collect tolls on the highways for the concession period (typically 15-30 years). At the end of the concession term, all operational rights revert to the public authority.

TOT model



Source: Crisil Intelligence

C. Capital raised and market outcomes

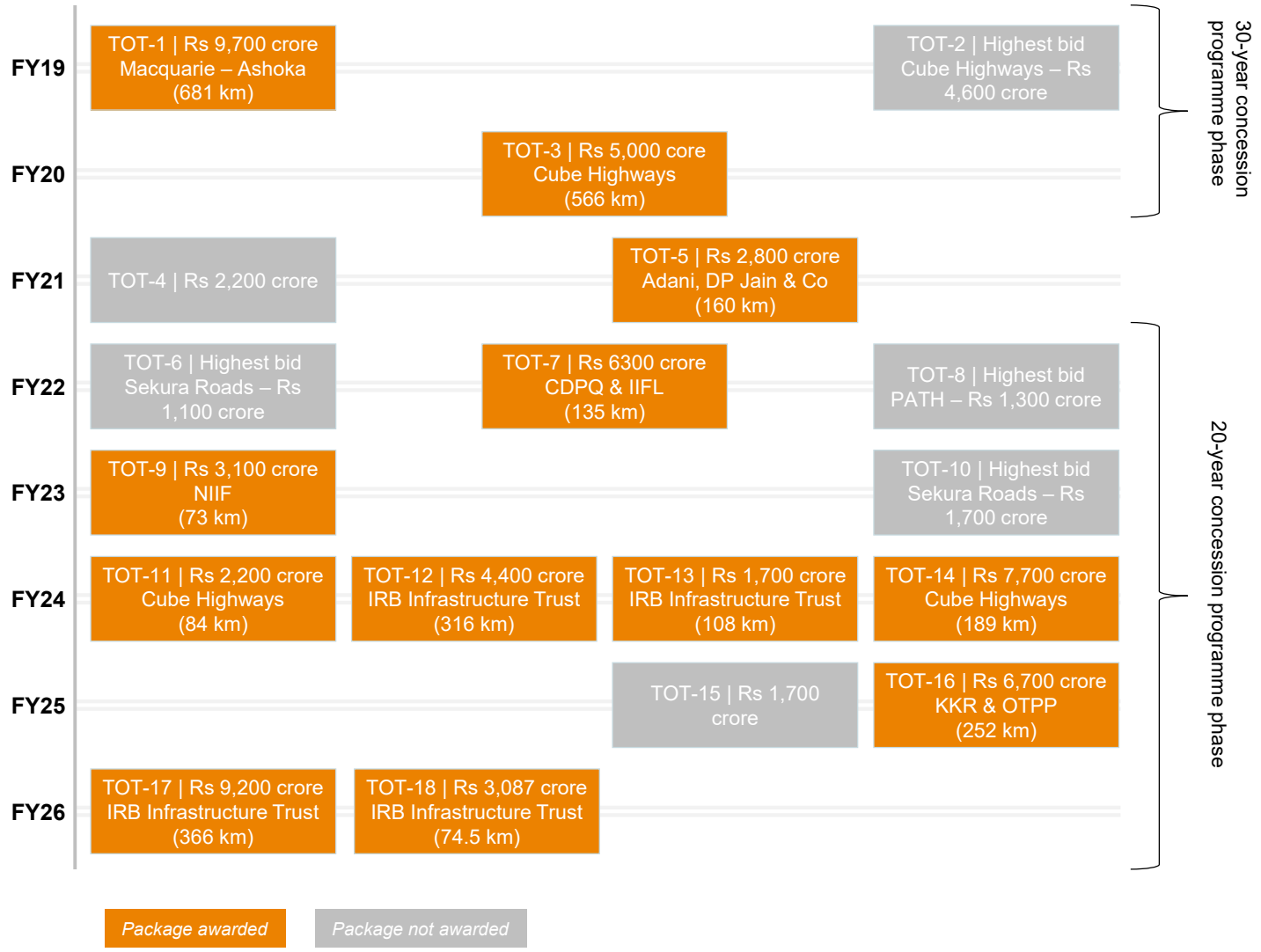
Between fiscals 2019 and 2025, the NHAI awarded 10 TOT bundles of 2,689 km, mobilising approximately Rs 49,000 crore[3] in upfront consideration. These transactions attracted a mix of global and domestic long-term infrastructure investors, including Macquarie-Ashoka, Cube Highways, IRB Infrastructure Trust, KKR-Ontario Teachers' Pension Plan (OTPP), CDPQ-IFC, NIIF, Sekura Roads and Adani-DP Jain & Co, among others, reflecting strong institutional interest in mature, de-risked road assets.

Concession periods under these bundles typically ranged from 20 to 30 years, calibrated to asset profile, traffic maturity and revenue visibility. The diversity of winning bidders underscores the appeal of the TOT model to pension capital, sovereign-linked funds and specialist infrastructure platforms seeking stable, inflation-linked cash flows.

Notably, several TOT packages were not awarded, highlighting bidder discipline and sensitivity to traffic risk, valuation expectations, financing conditions and macro-financial uncertainty. While the TOT framework has proven effective as a monetisation instrument, these outcomes underline its dependence on market timing and asset-specific risk appetite, reinforcing the case for complementary monetisation platforms such as InvITs that allow phased capital recycling and portfolio optimisati

[3] NHAI- Asset monetization strategy, June 2025

TOT model's track record



Source: Crisil Intelligence

2.1.2 InvITs

A. Overview

InvITs are trust-based investment vehicles regulated by SEBI, designed to hold and operate income-generating infrastructure assets. Unlike transaction based monetisation, InvITs enable platform-based capital recycling, allowing sponsors to monetise assets while retaining long-term economic participation and governance oversight.

InvITs distribute a substantial portion of cash flows to unit holders, making them particularly attractive to long-term yield-oriented investors such as pension funds, sovereign wealth funds, insurers and retail participants. Over time, InvITs have emerged as the preferred monetisation vehicle under the evolving NMP framework.

From a strategic standpoint, InvITs offer several advantages:

- **Continuity:** Assets remain within a managed platform rather than being monetised and exited
- **Scalability:** New assets can be periodically injected, enabling ongoing capital recycling
- **Transparency:** Regulatory oversight and disclosure requirements enhance investor confidence
- **Investor diversification:** InvITs attract a broader spectrum of investors, including pension funds,

sovereign wealth funds, insurance companies and retail participants

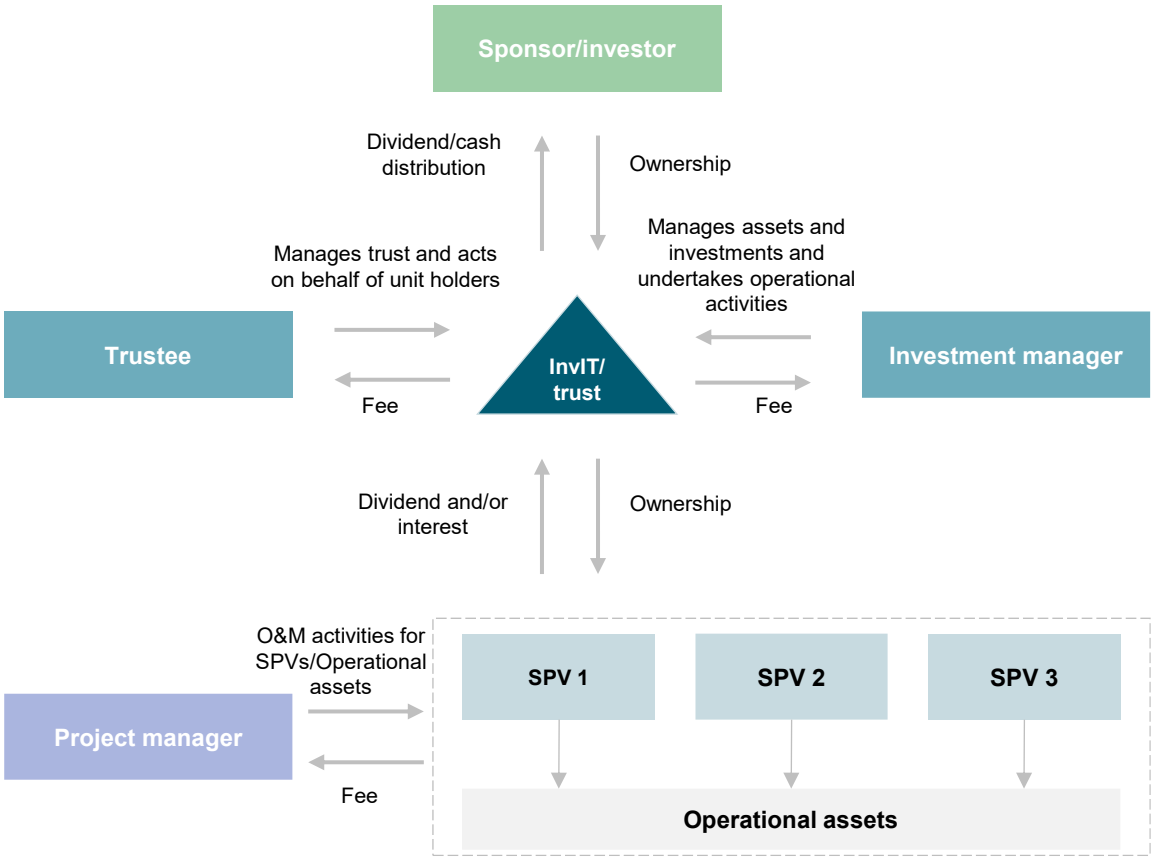
B. Structure

In a typical road InvIT structure, operational assets are transferred into a trust, which issues units to investors. The sponsor, often a public authority or infrastructure developer, may retain a strategic stake, while professional investment managers oversee asset operations, compliance and distribution.

InvITs benefit from:

- Regulatory oversight by SEBI
- Pass-through tax structure with income flowing directly to unitholders without being taxed at the trust level
- Mandatory distribution norms enhancing cash-flow transparency
- Flexibility to fully or partially induct new assets and refinance debt

InvIT structure and money flow



Source: Crisil Intelligence

C. Capital raised and market outcomes

As of March 31, 2025, the Indian InvIT ecosystem had 26 registered InvITs, of which 22 were listed (both public and private) on recognised stock exchanges. Based on the mode of fund-raising at inception, InvITs are classified into public-listed and private-listed structures. Public-listed InvITs offer units to all classes of investors through an initial public offering, while private-listed InvITs raise capital via private placements to institutional investors and body corporates, with listing planned subsequently.

The market has been predominantly driven by private-listed platforms. As on date, 29 InvITs are registered with SEBI out of which six are publicly listed, while 23 are

privately listed, [4]reflecting the strong participation of institutional capital in the asset class.

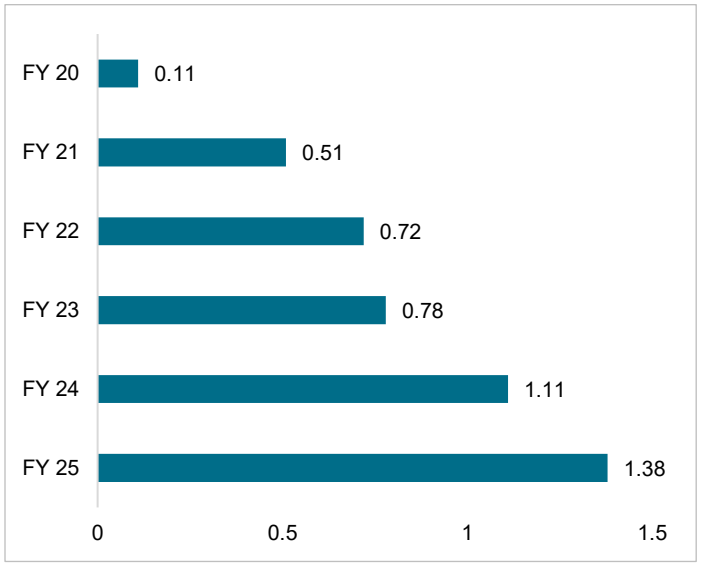
The IRB InvIT Fund, registered in 2016, marked the entry of InvITs into the Indian infrastructure landscape and set the foundation for subsequent market development.

Fund mobilisation through InvITs has accelerated sharply over the past five years, underscoring rising investor confidence and improved market depth. Cumulative funds mobilised increased from approximately Rs 0.11 lakh crore in fiscal 2020 to Rs 1.38 lakh crore in fiscal 2025, a compound annual growth rate (CAGR) of around 65%. This rapid scaling up highlights the growing role of InvITs as a preferred channel for monetising operational infrastructure assets.

Alongside capital mobilisation, InvITs have also recorded sustained growth in assets under management (AUM). Between fiscals 2021 and 2025, InvIT AUM expanded at a CAGR of approximately 18%, reaching around Rs 6.28 lakh crore. This near doubling of AUM reflects both portfolio acquisitions and incremental capital deployment across sectors, with roads forming a significant share.

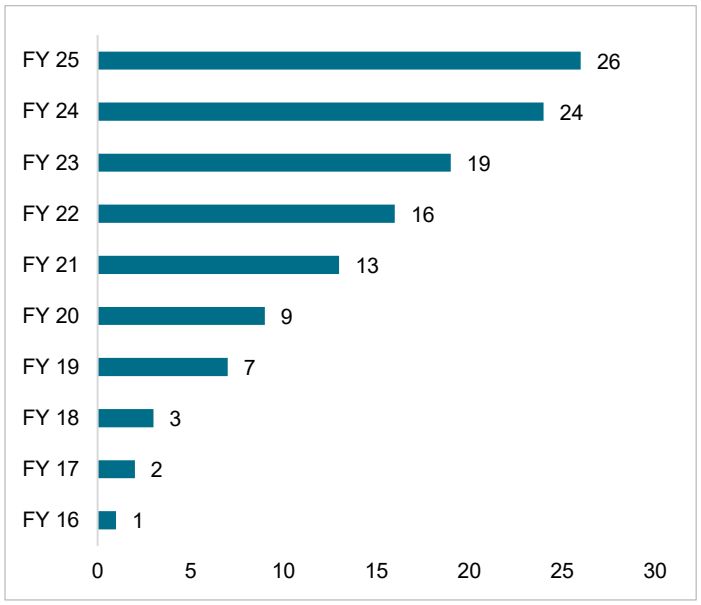
The steady increase in the number of registered InvITs, rapid growth in capital mobilisation and expansion of AUM collectively signal the institutionalisation of InvITs as a mainstream infrastructure investment vehicle. These trends reinforce the suitability of InvITs as a scalable, repeatable and transparent monetisation mechanism, capable of supporting the objectives of the NMP while broadening access to long-term domestic and global capital.

Cumulative funds mobilised by InvITs (Rs lakh crore)



Source: Crisil Intelligence

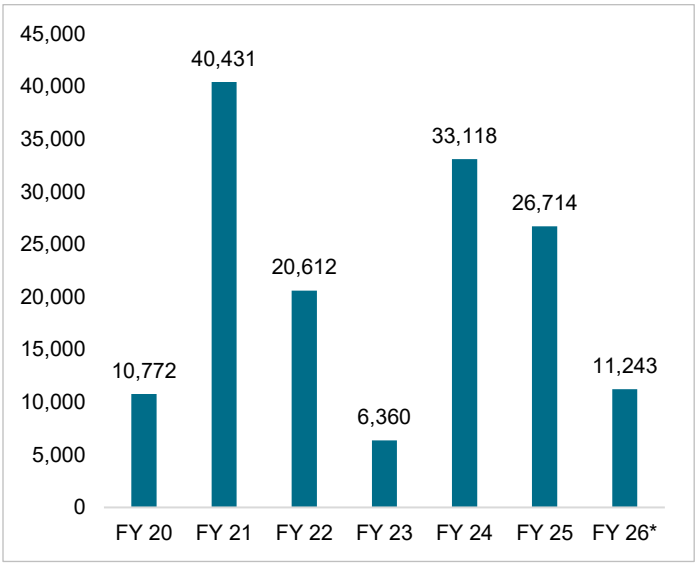
Cumulative number of InvITs registered with SEBI



Source: Crisil Intelligence

[4] Registered Infrastructure Investment Trust, SEBI

Annual funds mobilised by InvITs (Rs crore)



* Fiscal 2026 figures are till January 2026

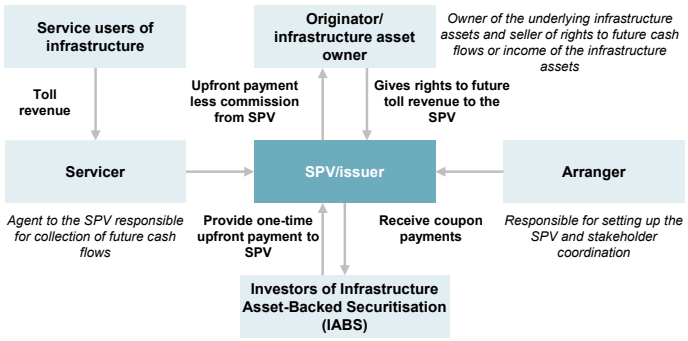
Source: SEBI

While TOT and securitisation remain valuable tools for selective monetisation and liquidity management, road InvITs have emerged as the most institutionally aligned vehicle for large-scale, repeatable capital recycling.

2.1.3 Toll securitisation

Toll securitisation involves monetising expected toll receivables by issuing debt-backed instruments against projected revenue streams, while retaining ownership and operational control of the underlying asset. In practice, this mechanism functions more as a financing tool rather than a true asset monetisation instrument, as it primarily raises debt against future cash flows without transferring asset risk or management.

Securitisation structure



Source: Crisil Intelligence

2.2 Strategic preference for InvITs over TOT

The increasing policy preference for road InvITs, particularly in the Ministry of Road Transport and Highways (MoRTH) and NHAI, reflects both financial and governance considerations.

Firstly, InvITs enable democratisation of infrastructure ownership. Unlike TOT transactions, which typically attract a narrow pool of large institutional bidders, InvITs have both domestic and global long-term investors, including retail participants, as they provide exposure to infrastructure assets. This diversification reduces investor concentration risk and deepens capital market participation in infrastructure financing.

Secondly, InvITs support balance-sheet optimisation without asset dilution. By transferring operational assets into an InvIT while retaining sponsor interests, public authorities or road developers can monetise assets, deleverage and still participate in future upside through sponsor units. This contrasts with TOTs, under which monetisation typically entails a full economic exit from the asset during the concession period.

Thirdly, the InvIT framework aligns closely with the evolving objectives of the NMP. As the scheme transitions from asset-by-asset transactions to portfolio-based monetisation under NMP 2.0, InvITs offer a repeatable platform capable of absorbing large volumes of assets over time without the execution friction associated with repeated TOT auctions.

Finally, InvITs embed professional asset management and lifecycle optimisation into the monetisation process. The ability to implement predictive maintenance, digital monitoring and portfolio-level risk management enhances asset longevity and cash flow stability attributes that are increasingly valued by long-term capital providers.

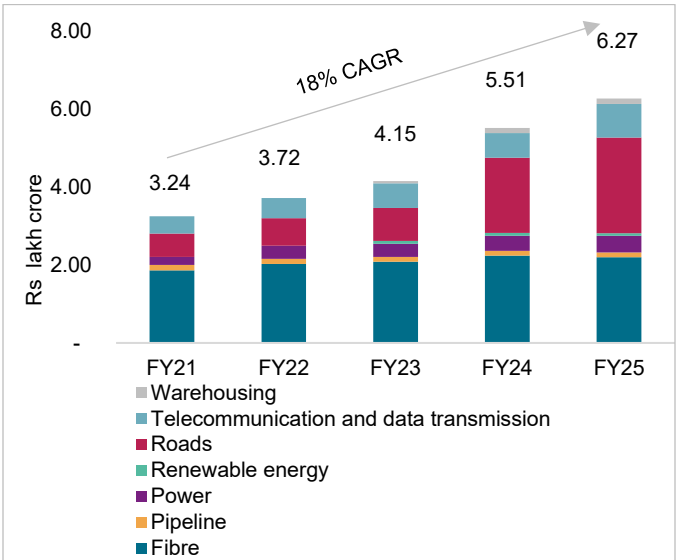
Taken together, these factors explain the strategic shift toward InvITs as the primary anchor vehicle for road sector monetisation. While TOT and securitisation will continue to play complementary roles, particularly for discrete asset bundles or short-term liquidity needs, InvITs are emerging as the central institutional mechanism through which India

seeks to align infrastructure development with long-term investment capital.

2.3 Factors driving growth of InvITs

InvITs are rapidly gaining traction as a vital investment vehicle in the infrastructure sector. Their growth is fuelled by supportive regulatory frameworks, increasing demand from investors for stable returns and the pressing need for infrastructure development in emerging economies. Additionally, the trend towards alternative investments is encouraging a broader acceptance of InvITs, making them an attractive option for diversifying investment portfolios.

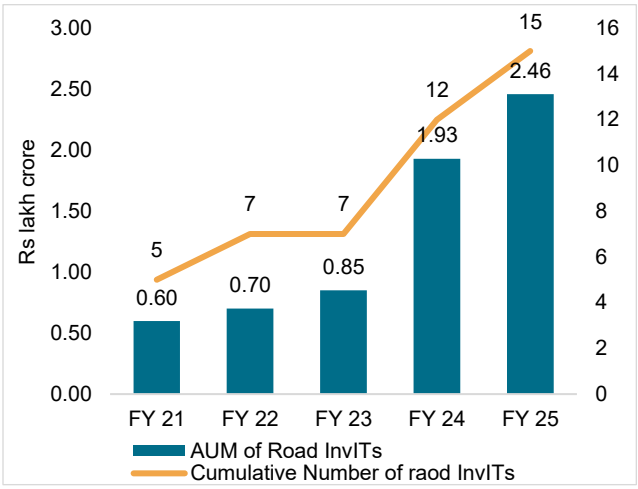
Sector-wise split of InvIT AUM



Source: Crisl Intelligence

Since their inception, InvITs have consistently expanded their asset base. Their AUM also saw significant growth. As of fiscal 2025, total AUM of InvITs stood at ~Rs 6.28 lakh crore, representing a CAGR of ~18% between fiscals 2021 and 2025. Total AUM of InvITs is expected to cross Rs 8 lakh crore by fiscal 2027, primarily driven by acquisition of mature assets.

AUM and cumulative number of road InvITs



Source: Crisil Intelligence

Road focused InvITs have emerged as the largest and fastest-growing segment within India's InvIT landscape, reflecting both the scale of the underlying asset base and increasing investor comfort with toll road cash flows.

Between fiscals 2021 and 2025, AUM of road InvITs expanded from Rs 0.60 lakh crore to Rs 2.46 lakh crore, clocking a CAGR of approximately 42%. The sharp increase underscores the rapid pace at which operational road assets have been transferred into InvIT structures, particularly following the launch of the National Highways Infra Trust (NHIT) in 2020 and the scaling up of private road InvIT platforms.

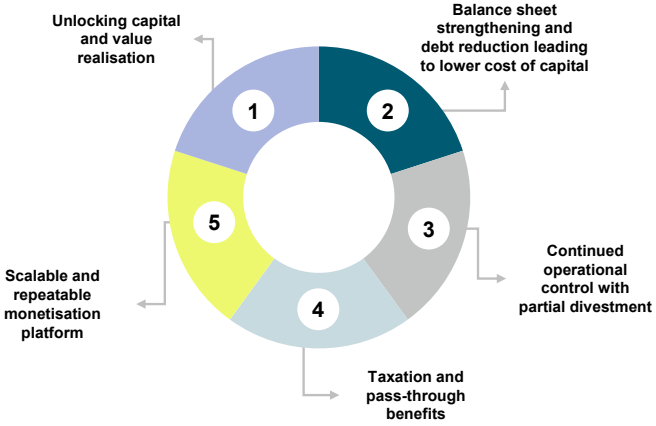
Importantly, the share of road assets within total InvIT AUM has increased steadily, rising to approximately 39% by March 2025 from 18.5% in March 2021, rendering roads as the single largest contributor to the InvIT universe. This reflects a structural shift in monetisation strategy, with roads increasingly favoured over other infrastructure sectors due to asset standardisation, predictable demand and repeatable portfolio aggregation.

The expansion in AUM has been accompanied by a rapid increase in the number of road InvIT vehicles. As of fiscal 2025, 15 out of 26 SEBI registered InvITs were road-focused, with the number of road InvITs having tripled since fiscal 2021 and more than doubled over the previous three fiscals. Enhanced asset diversification in terms of inclusion of different concession types, acquisition/n of more assets, geographically diversification assets has improved transaction velocity and strengthened the role of road InvITs as the primary long-term capital recycling mechanism under the National Monetisation Pipeline.

InvIT value proposition

InvITs have rapidly gained prominence as a preferred monetisation vehicle for infrastructure sponsors in India. By enabling efficient capital unlocking, balance sheet optimisation, and continued operational oversight, InvITs offer a compelling blend of financial and strategic benefits. Their structure also ensures access to cost-effective capital and significant tax advantages.

Below are the five factors which have contributed to the growth of InvITs.



Source: Crisil Intelligence

Unlocking capital and value realisation

- InvITs allow sponsors to generate revenue from operational and income producing assets without having to sell them entirely
- By transferring these assets to the trust and issuing units to investors, they can obtain immediate cash
- This process releases the value embedded in established assets and provides capital for new development projects or to pay off debts

Balance sheet strengthening and debt reduction

- The funds generated from InvIT monetisation enable sponsors to reduce their debt levels, which lowers their debt to equity ratio and enhances liquidity
- A more streamlined balance sheet strengthens their credit profile and increases their ability to compete for new projects

Continued operational control with partial divestment

- Sponsors typically maintain a stake in the assets and oversee their management or operation via an investment manager
- Frequently, the original developer (sponsor) continues to serve as the project manager, keeping operational and maintenance authority over the assets for a fee. This arrangement secures strategic control while freeing up capital

Lower cost of capital

- InvITs attract long-term institutional investors looking for consistent returns, providing access to more affordable capital than borrowing at the project level
- Since InvITs are perceived as lower risk due to their diversified, cash generating assets, they benefit from a lower cost of debt compared with independent developers

Scalable and repeatable monetisation platform

- After an InvIT is set up, sponsors have the opportunity to periodically incorporate additional assets, which establishes a sustainable monetisation pipeline. This approach offers a continuous capital recycling mechanism, in contrast to one-time asset sales

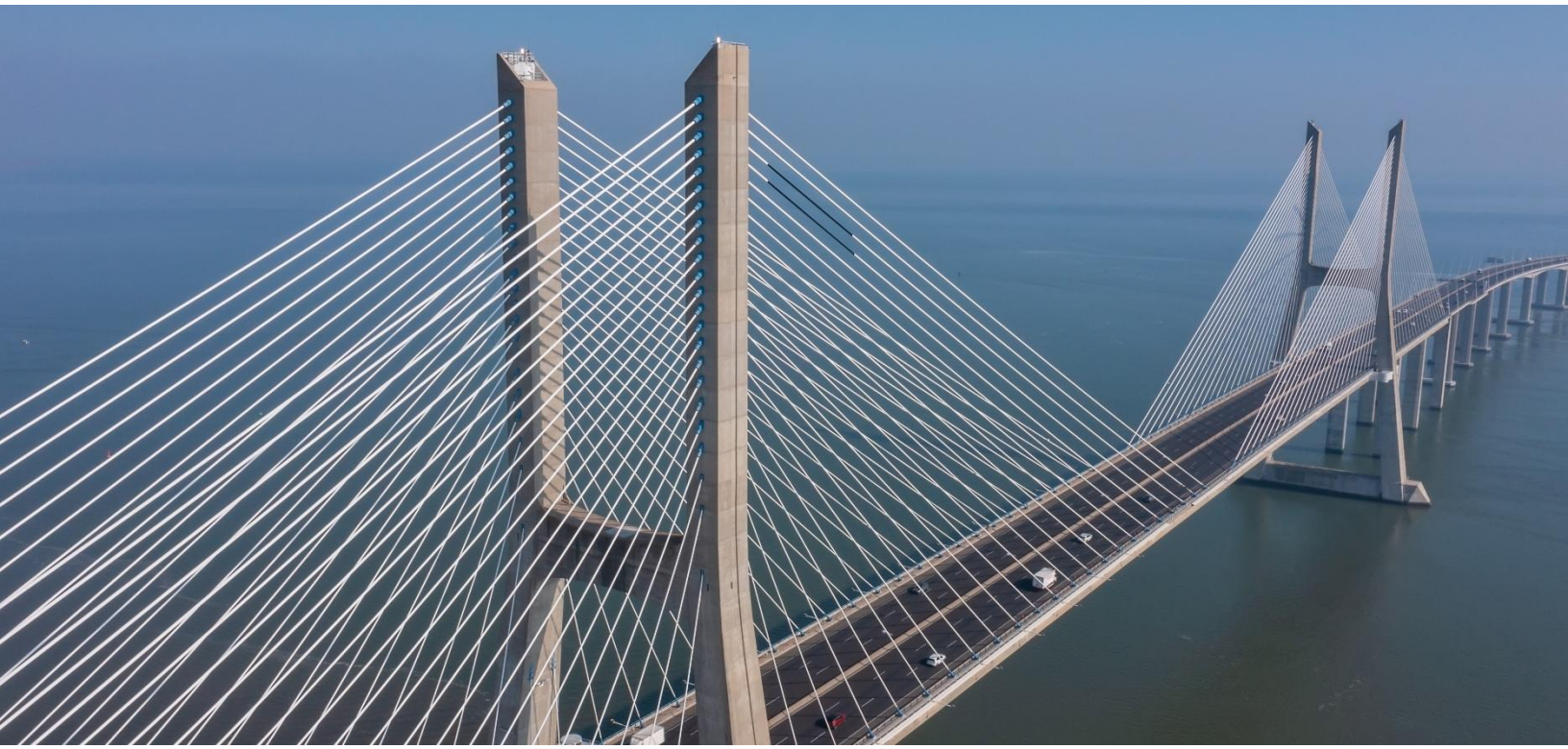
Taxation and pass-through benefits

- Indian InvITs function as pass-through entities, allowing income from underlying infrastructure projects to be distributed directly to unitholders without incurring taxes at the trust level. This arrangement boosts investor returns and offers infrastructure companies substantial tax advantages not available to conventional corporate structures

- The key benefits of pass-through taxation for InvITs include:
  - No tax on income at the trust level, which lessens the tax burden for investors
  - No dividend distribution tax on income allocated to unitholders at the trust level (subject to the corporate tax regime of the underlying special purpose vehicles)
  - No capital gains tax on the sale of infrastructure assets at the trust level

Operational efficiency and effective asset management are vital for InvITs to sustain investor confidence and enhance financial performance. Key elements such as robust governance, proactive maintenance and efficient cash flow management are essential. The trusts that focus on these aspects will set themselves apart, attract investors and retain market share. By optimising asset value, minimising risks and pursuing growth opportunities, they can achieve long-term success and competitiveness in the market. This focus on operational efficiency and asset management will be a significant differentiator among InvITs in the future.

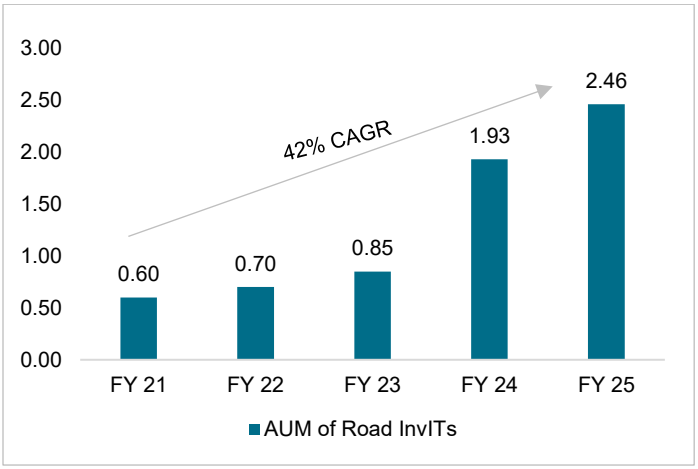
The next chapter examines the evolution of the road InvIT ecosystem in India, including the development of the NHIT, the emergence of private sector InvIT platforms and the profile of domestic and global investors shaping this market.



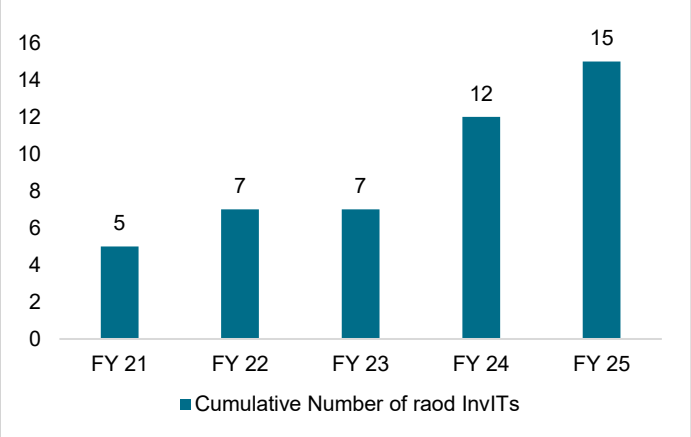
3 Roads in the fast lane: The rise of road InvITs

Over the last three fiscals, road InvITs experienced remarkable growth, a trend expected to persist in the medium term as well. The growth is expected to be fueled by the launch of new InvITs, expansion of the asset pool of existing InvITs and the emergence of new InvITs. The AUM growth has been accompanied by diversification in terms of geography and concession type, which helped build resilience. This, along with leverage levels being regulated by SEBI kept credit profiles of road InvITs strong.

AUM of road InvITs (in Rs crore)



Cumulative number of road InvITs



Source: Crisil Intelligence

The roads sector had a total of 15 InvITs as on March 31, 2025. Of them, 13 were listed (including public and private). The number of road InvITs has tripled in the last five years and more than doubled in the past three years. Road InvITs comprise of 39% of the overall InvIT AUM. AUM of road InvITs, logged a CAGR OF 42% to Rs 2.46 lakh crore over FY21-25.[5]

Sponsor profile and listing details

InvIT name	Sponsor name	Sponsor type
Anantam Highways Trust	Alpha Alternatives Fund Advisors LLP	Financial
Athaang Infrastructure Trust	National Investment and Infrastructure Fund (NIIF)	Financial
Citius TransNet Investment Trust (transport sector focused, with initial and ROFO assets comprising of road portfolio)	EPIC TransNet Infrastructure Pvt Ltd (formerly Watrak Infrastructure Pvt Ltd)	Financial
Cube Highways Trust (Cube)	Cube Highways and Infrastructure Pte. Ltd and Group	Financial
Interise Trust (Interise)	Interise Investment Managers Ltd (IIML; self-sponsored)	Financial
Maple Infrastructure Trust (Maple)	Maple Highways Pte. Ltd.	Financial
Nxt - Infra Trust (Nxt-Infra)	Actis Highway Infrastructure Ltd	Financial
Roadstar Infra Investment Trust (Roadstar)	Roadstar Infra Pvt Ltd (RIPL)	Financial
Vertis Infrastructure Trust (Vertis)	Galaxy Investments II Pte. Ltd	Financial
Capital Infra Trust	Gawar Construction Ltd	Infrastructure developer
Indus Infra Trust	Aadharshila Infratech private Ltd	Infrastructure developer
IRB Infrastructure Trust	IRB Infrastructure Developers Ltd	Infrastructure developer
IRB InvIT Fund	IRB Infrastructure Developers Ltd	Infrastructure developer

[5] Crisil Intelligence

InvIT name	Sponsor name	Sponsor type
National Highways Infra Trust	National Highways Authority of India	Infrastructure developer
Raajmarg Infra Investment Trust (RIIT):	National Highways Authority of India	Infrastructure developer
Oriental Infra Trust	Oriental Tollways Pvt Ltd (OTPL)	Infrastructure developer
Shrem Invit	Shrem Infra Invest Pvt Ltd	Infrastructure developer

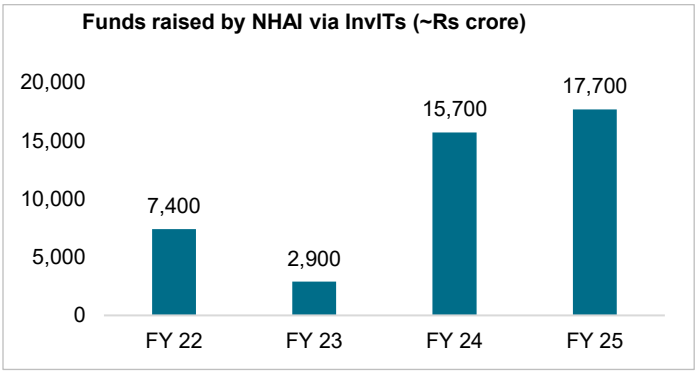
Source: SEBI, Crisil Intelligence

For InvITs, roads are a significantly attractive underlying because of their capacity to provide stable and predictable revenue, especially through toll collections. They are particularly appealing to investors looking for consistent returns.

The ownership structure of financial sponsor backed road InvITs indicates participation from a diverse set of investor classes, including alternative investment funds (AIFs), foreign portfolio investors (FPIs), insurance companies, provident funds (PFs), pension funds, mutual funds (MFs), retail investors and sponsors.

InvITs have become an attractive option for investors looking for stable and long-term returns. This segment has significant foreign investment, indicating global confidence in India's infrastructure sector. However, individual investors have been slow to participate in InvITs due to limited awareness and the high minimum investment requirement.[6]

NHAI has cumulatively raised Rs 43,638 crore via InvITs



Source: Crisil Intelligence

As a result, InvITs represent only a fraction of the nation's total operating toll assets, leaving a significant portfolio of monetisation opportunities ahead. As of August 2025, India had approximately 146,000 km of national highways and more than 6.6 million km of broader road network, making it the world's largest road system.

Despite the growth of InvITs, only around 15,700 km of tollable, revenue-generating national and state road assets had been brought under InvIT structures by FY25. The proportion of assets under InvITs remains substantially low compared to the total operational highways and expressways, indicating significant headroom for future transfers and expansion within the InvIT framework.

The government's current focus on infrastructure development is clearly aligned with the objectives outlined in its Vision 2047, which could potentially increase national highways to over 2 lakh km by the late 2030s, including expanded access-controlled and high-speed corridors that would catalyse further monetisation.

While the expansion is substantial, establishing a clear and stable regulatory framework is crucial for the growth of InvITs in the country, as it significantly influences the risk-return profile of these investment vehicles and forms the basis for investor confidence that is necessary to unlock broader participation across the institutional and retail segments.

3.1 InvIT ecosystem- Private sector

The InvIT ecosystem has emerged as a transformative force within the country's infrastructure financing landscape. Established to facilitate investment in infrastructure projects, the investment vehicle offers a unique opportunity for institutional as well as retail investors to participate in the growth of critical assets such as roads.

[6] Crisil Intelligence

IRB Infrastructure Trust India's first listed InvIT

The emergence of InvITs in India's road sector began with the launch of IRB InvIT Fund by IRB Infrastructure Developers in 2017, marking the country's first listed InvIT. The trust raised about Rs 4,745 crore through its IPO, including about Rs 2,100 crore from anchor investors, and transferred six operational toll road assets covering 3,645 lane-km across multiple states into the platform. Early institutional investors included the Government of Singapore, Deutsche Global Infrastructure Fund, Birla Sun Life Mutual Fund, and HDFC Standard Life Insurance, signalling strong interest from long-term global and domestic capital.

With the Indian government prioritising infrastructure development as a key driver of economic growth, InvITs are positioned to play a pivotal role in mobilising capital and enhancing the efficiency of infrastructure management.

Today, IRB Infrastructure Trust Developers Ltd, is one of the largest private road InvITs in India. The trust manages a diversified portfolio of more than 14 operational highway projects. Its asset mix includes toll and annuity concessions, supported by long concession tenures and institutional capital participation. The scale and maturity of IRB Infrastructure Trust illustrates how sponsor led InvITs can enable balance sheet deleveraging, capital recycling and long-term professional asset management in the road sector7

Over the years, the road sector has witnessed a steady rise in the establishment of new private trusts.

- **Cube Highways Trust** is one of India's largest and most diversified infrastructure investment trusts in the road sector. The trust manages a robust portfolio of 27 road assets, comprising approximately 8,754 lane km spread across 13 states and one Union Territory. Its portfolio features a strategic mix of 18 toll, 6 HAM, and 3 annuity projects, ensuring a healthy balance of 67% toll-based and 33% annuity-based AUM. This diversification provides stable, long-term cash flows while maintaining an average residual concession life of over 18 years. By aggregating geographically dispersed, high-quality assets into a single institutional platform, Cube Highways Trust demonstrates the strength of the InvIT model in delivering consistent value to global and domestic investors.
- **Interise Trust (formerly IndInfravit Trust)** is one of the most diversified private road InvITs in the country. The trust manages 17 road projects, comprising ~7,300 lane km spread across eight states. Its portfolio includes a mix of toll and annuity assets, providing stable and predictable cash flows while reducing exposure to single-asset or single-corridor risks. Interise Trust demonstrates the effectiveness of the InvIT structure in aggregating geographically dispersed assets into a single institutional investment platform[8]
- **Highways Infrastructure Trust,** sponsored by KKR along with global institutional partners, is a significant development, as it marked the entry of international long-term capital into India's road InvIT ecosystem. Launched with an initial portfolio of six road assets totalling ~450 km, the platform has since expanded rapidly to a network exceeding 8,000 lane km in over nine states. The trust's growth trajectory highlights strong investor confidence in India's road sector and underscores the scalability of InvIT as a vehicle for long duration infrastructure investment[9]

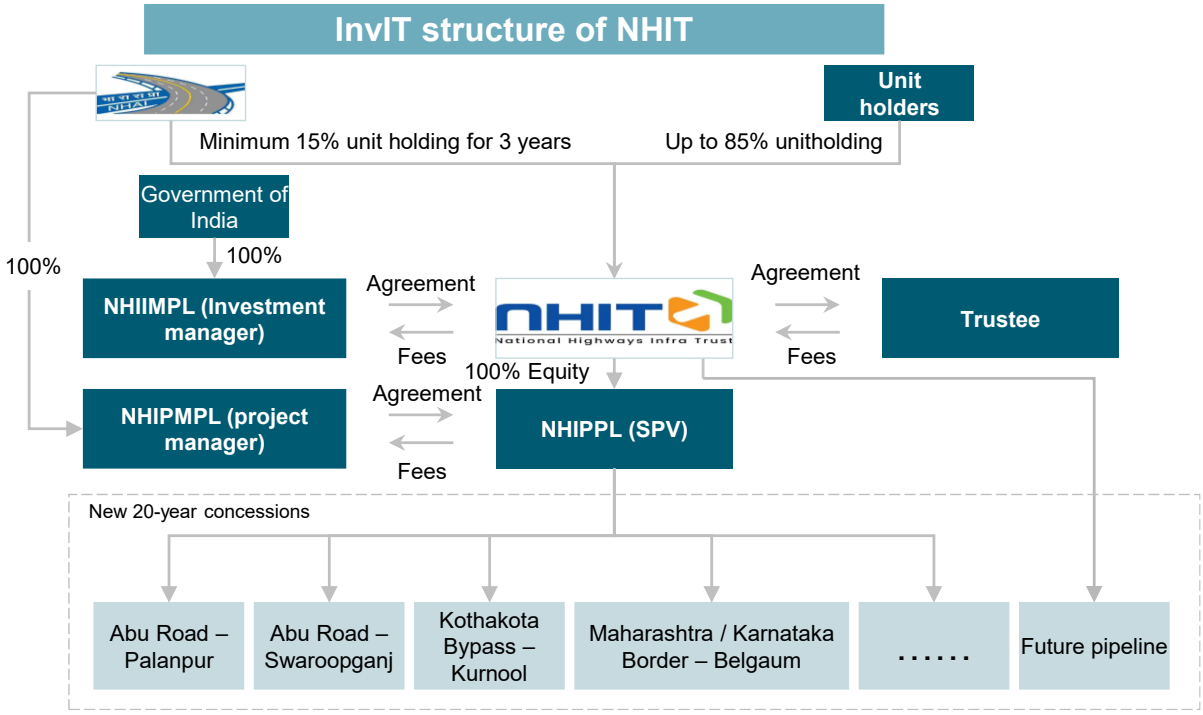
[7]IRB Infra trust, Valuation report, Dec'2025
[8] Interise Trust, Quarterly report, Dec'2025
[9] Highways Infrastructure Trust, Corporate-presentation, June 2025

3.2 InvIT ecosystem- Public sector

Alongside private-sector InvITs, government-sponsored monetisation vehicles, have emerged as a core component of India's road infrastructure investment ecosystem. This demonstrates the viability of the InvIT model for aggregating operational assets, unlocking sponsor capital and attracting long-term institutional investment at scale.

A. Evolution of the National Highways Infra Trust

The NHIT was set up by the NHAI on October 19, 2020 as a dedicated InvIT platform to monetise operational highway assets and recycle capital-an institutional shift from one-off concessions toward capital market-style infrastructure financing.

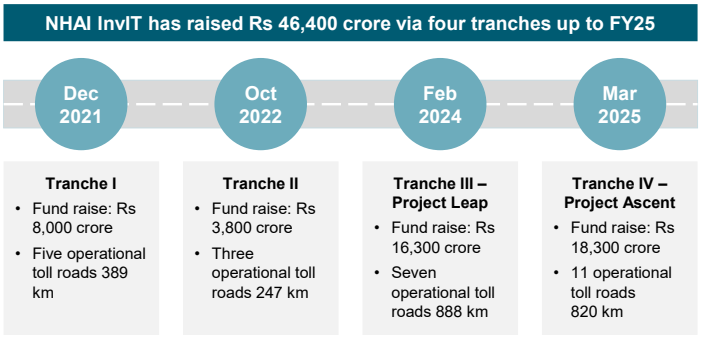


Herein, the NHAI acts as the sponsor of the NHIT, providing necessary oversight and strategic direction. The NHIT is managed by the National Highways Infra Investment Managers Pvt Ltd, which is responsible for the investment strategy and asset management.

It was initially backed by marquee institutional investors including the Canada Pension Plan Investment Board (CPPIB), Ontario Teachers' Pension Plan (OTPP) etc. Subsequently, other significant investors including Insurance companies, Mutual Fund, banks and other financial institutions invested in NHIT.

It holds a portfolio of toll road assets, which are primarily managed through SPVs. These SPVs are responsible for the operation and maintenance of the highway stretches, ensuring efficient management and revenue generation.

This structured approach allows the NHIT to effectively manage its assets while ensuring compliance with regulatory requirements and maintaining investor confidence. Also, as the NHIT evolves, its role in the country's infrastructure development will be crucial in meeting the growing demands for efficient transportation networks.



The NHIT is the flagship vehicle for road asset monetisation in India, having successfully completed four monetisation rounds between 2021 and 2025. In these rounds, the NHIT has monetised 26 highway projects spanning 2,345 km, raising over Rs 44,000 crore in gross proceeds.

The program has scaled progressively from the initial monetisation of five assets in 2021 to larger, multi-state portfolios under Project Leap (2024) and Project Ascent (2025), demonstrating growing investor confidence and execution maturity. As of September 2025, the NHIT's portfolio's enterprise value was Rs 48,371 crore, underscoring the role of InvITs as a credible and scalable platform for capital recycling in the road sector.

Hence, the NHIT represents a significant advancement in India's infrastructure investment landscape. By facilitating the efficient management and operation of national highways, it not only enhances connectivity but also stimulates economic growth and development.

The emphasis on a robust regulatory framework, operational efficiency and effective asset management will be crucial for attracting investors and ensuring long-term sustainability. As the demand for infrastructure continues to rise, the NHIT is poised to play a pivotal role in shaping the future of India's transportation network, ultimately contributing to the nation's progress and prosperity.

B. Raajmarg Infra Investment Trust (RIIT)

The RIIT is an InvIT registered under SEBI (Infrastructure Investment Trusts) Regulations. The trust is sponsored by the NHAI and has an AUM of Rs 9,500 crore[10]. It is the first government InvIT that will be made open for subscription by public investors, including retail investors. The RIIT has been assigned AAA; Stable rating by Care Ratings[11]

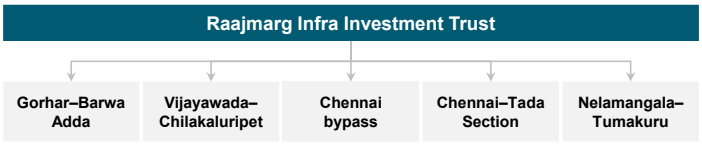
RAAJMARG
InvIT
An InvIT sponsored by NHAI

RAAJMARG INFRA INVESTMENT TRUST

The RIIT is expected to serve as a high-quality investment instrument, primarily targeting domestic and retail investors. As part of the structure, the NHAI had earlier incorporated Raajmarg Infra Investment Managers to act as the investment manager.

The company has been set up with equity participation from several major banks and financial institutions, including State Bank of India, Punjab National Bank, National Bank for Financing Infrastructure and Development, Axis Bank, HDFC Bank, ICICI Bank, IDBI Bank, IndusInd Bank, Yes Bank and Bajaj Finserv.[12]

The RIIT has a diversified asset pool, with five toll projects in Tamil Nadu, Karnataka, Andhra Pradesh and Jharkhand that form crucial portions of the Golden Quadrilateral-Gorhar-Barwa Adda (GBA), Vijayawada Chilakaluripet (VC), Chennai bypass, Chennai-Tada (CT) section, and Nelmangala-Tumakuru (NT) with average tolling history of over 15 years.



- The GBA stretch spans 80.522 km on NH-19, connecting Bihar and Jharkhand and facilitating traffic between major cities and industrial areas
- The VC section, which is 69.408 km on NH-16, is integral to the East Coast Corridor, linking Kolkata and

[10]NHAI's public InvIT wins five highway concessions, The Hindu Business Line, February, 2026
[11] Care Rating, Raajmarg Infra Investment Trust, December 2025
[12]NHAI Gets SEBI Nod For Raajmarg Infra Investment Trust As Public InvIT, Business World, December 2025

Chennai, and supporting trade and logistics between the southern and eastern states

- CB is 32.6 km on NH-32/NH-48 and is vital for national freight movement, connecting Bengaluru-Sriperumbudur-Chennai, and enhancing urban mobility
- The 33 km CT stretch on NH-16 is part of the eastern coast highway, crucial for the Golden Quadrilateral project, serving Bhubaneswar and Visakhapatnam
- The 44.6 km NT section on NH-48 links industrial hubs in Karnataka, facilitating freight traffic towards Bengaluru and western India, adapting to urban-industrial needs

The RIIT will enter into a concession agreement with the NHAI, such as a TOT concession, for 15 years for these projects[13]. The launch of RIIT, publicly listed InvIT backed by NHAI, marks a major step forward for road InvITs in India. By allowing retail participation, it broadens the investor base and enhances transparency and governance standards. NHAI's involvement boosts investor confidence, setting a strong precedent for growth and improved trust in the InvIT sector.

3.3 Major investors and stakeholder profiles

India's InvIT ecosystem is increasingly emerging as a credible and scalable platform for investors to participate in the country's long-term infrastructure growth. By offering exposure to operational, revenue-generating assets within a listed and regulated structure, InvITs provide an investment proposition that combines predictable cash flow, professional asset management and enhanced governance standards. As a result, road InvITs are steadily gaining relevance within institutional allocations to alternative assets.

Institutional investor participation

The ownership structure of Indian road InvITs reflects participation from a diverse set of institutional investors, spanning domestic and global capital pools. Financial sponsor-backed and developer-sponsored road InvITs have attracted investments from sovereign wealth funds, pension funds, insurance companies, AIFs, FPIs, mutual funds and provident funds, alongside continued sponsor ownership.

List of leading institutional investors in Indian InvITs

Category	Few examples of leading institutional investors
Sovereign Wealth Funds	GIC (Singapore), Abu Dhabi Investment Authority (ADIA)
Pension Funds	Canada Pension Plan Investment Board (CPPIB), Ontario Teachers' Pension Plan (OTPP)
Insurance Companies	Life Insurance Corporation of India (LIC), HDFC Life Insurance
Alternative Investment Funds (AIFs)	Kotak Infrastructure Yield Fund, Edelweiss Infrastructure Yield Plus Fund
Foreign Portfolio Investors (FPIs)	Brookfield, KKR, Macquarie, Blackstone

Source: Crisil Intelligence

Global long-term investors have played a particularly important role in anchoring the asset class. Sovereign wealth funds such as the Government of Singapore Investment Corporation and other international institutional investors have demonstrated confidence in India's road InvIT model through large equity commitments. Pension funds, including Canadian pension institutions, have also participated in road InvIT platforms, reflecting alignment with their long-duration liability profiles. Domestic insurers and long-term savings institutions have similarly emerged as important stakeholders, given the yield stability and cash flow visibility offered by operational road assets.

Industry analysis indicates that foreign capital accounts for a meaningful share of the investments in financial sponsor-backed road InvITs, underscoring global confidence in India's infrastructure policy framework and monetisation pipeline. At the same time, domestic institutional participation continues to deepen, as InvIT performance histories lengthen and portfolio scale improves.

Role of sponsors and developers

Sponsors-both financial investors and infrastructure developers-remain central stakeholders in the InvIT ecosystem. Developer-sponsored road InvITs, in particular, have enabled sponsors to recycle capital from mature

[13] India Ratings & Research, Raajmarg Infra Investment Trust, Jan 2026

assets while retaining strategic exposure to long-term infrastructure ownership. This alignment of sponsor interests with unitholders, combined with professionalised asset management structures, has strengthened governance and operational discipline across InvIT platforms.

Retail investor participation

While institutional participation has gained momentum, retail investor participation in InvITs remains relatively limited. This has been attributed to factors such as lower awareness of the InvIT structure, low retail investor awareness and perceived complexity.

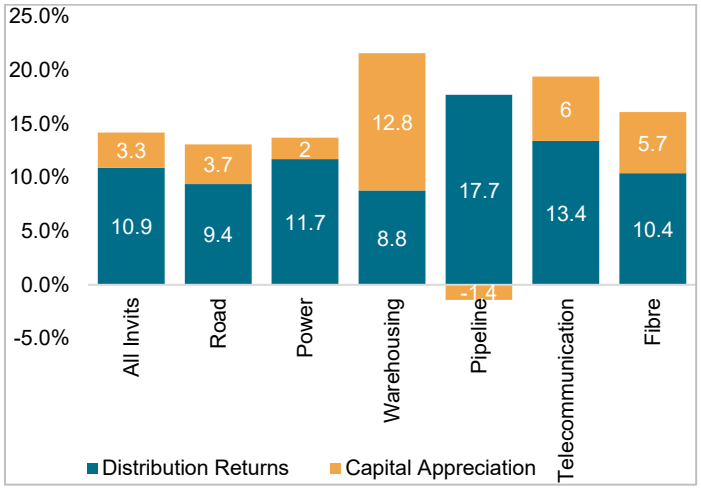
Nevertheless, well-managed InvITs have demonstrated consistent distribution performance and relatively low correlation with broader equity markets, highlighting their potential role as a diversification instrument for long-term retail portfolios.

As regulatory clarity improves and market familiarity increases, there is scope for broader retail engagement particularly in platforms that demonstrate stable distributions, transparent disclosures and prudent leverage.

Risk-return profile

From a portfolio construction perspective, road InvITs occupy a distinct position between traditional fixed income and listed equities. Although market-linked, their cash flows are underpinned by long-term concession agreements and regulated frameworks. Empirical performance data suggests that InvITs exhibit lower volatility and beta compared with listed infrastructure equities, while offering superior yield visibility relative to conventional debt instruments.

Distribution yield drives InvIT returns



Source: Crisil Intelligence

Looking ahead, the strongest opportunities are likely to reside with road InvITs that combine disciplined governance, proactive asset management, prudent leverage and transparent communication with unitholders.

3.4 Risk mitigation practices

Road InvITs operate over extended asset lifespan, within regulated structures and engage with diverse set of stakeholders. As a result, the risks they face are multi-dimensional, encompassing traffic demand volatility, revenue assurance risk, regulatory and policy uncertainty, operational execution risk and financial leverage discipline.

Unlike single-project SPVs, InvITs mitigate these risks through portfolio construction, regulatory oversight, transparency norms and standardised operational and financial frameworks, enabling predictable cash flows despite inherent infrastructure risks.

A. Traffic and revenue risk mitigation

Traffic and revenue risk can be mitigated through portfolio diversification, revenue assurance and development of ancillary revenue streams

Portfolio diversification: InvITs combine toll-based and annuity assets, balancing growth potential with stable, risk-insulated income. In additions InvITs diversify across geographies and asset types converts traffic risk into a more predictable portfolio outcome.

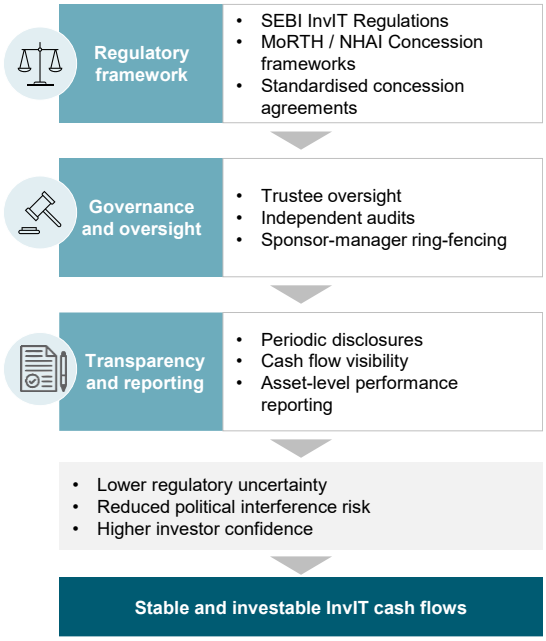
Revenue assurance: InvITs strengthen revenue assurance through electronic tolling, independent audits, and escrow-based cash flow management.

Development of ancillary revenue streams: InvITs enhance income by developing ancillary revenue streams and monetizing proprietary traffic data, while predictive analytics help anticipate revenue changes.

B. Regulatory, policy and political risks mitigation

Road infrastructure assets operate within a complex public policy environment, exposing InvITs to regulatory, policy and political risks over long concession tenures. These risks include changes in tolling frameworks, tariff revision mechanisms, concession renegotiations, tax treatment and capital market regulations. Given the long-dated nature of InvIT cash flows, regulatory predictability and governance transparency are critical determinants of investor confidence.

Regulatory and policy risk mitigation



C. Operational and credit risks

Operational execution and financial discipline are foundational to sustaining asset performance and preserving distributable cash flows over the life of a road InvIT. While InvITs predominantly hold operational assets, variability in operating practices, cost escalation and leverage management can materially affect returns if they are not proactively managed.

To mitigate operational risks, road InvITs increasingly adopt:

- Standardised O&M manuals applicable across the portfolio
- Centralised performance monitoring and reporting systems
- Lifecycle-aligned maintenance protocols linked to the asset condition
- Performance-based O&M contracts with defined service benchmarks

Credit risk within InvITs is managed through a combination of regulatory constraints and conservative financial structuring. Key mitigants include:

- Leverage caps, typically ranging from 49-70% of asset value, depending on credit ratings and distribution history
- Long-tenure, amortising debt aligned with concession life
- Predictable cash flow profiles supported by annuity assets and diversified toll revenue

These measures limit refinancing risks and ensure that InvITs retain sufficient headroom to absorb traffic shocks, cost escalations or temporary policy disruptions. Evidence from Indian road InvITs shows that conservative leverage policies have enabled the maintenance of investment-grade credit profiles even during periods of economic stress.

4 Lifecycle-based planning: Optimising maintenance spend and extending asset longevity

Road InvITs are inherently long-duration investment vehicles, typically holding assets over 15-30 years. Over such horizons, value creation is driven not only by traffic growth or tariff escalation, but critically by how effectively assets are maintained, rehabilitated and preserved across their lifecycle.

Traditional approaches to road asset management focused on minimising upfront capital expenditure or adhering to fixed maintenance schedules, often leading to deferred interventions, cost spikes and volatile operating expenditure. These outcomes are misaligned with the expectations of institutional investors seeking predictable, risk-adjusted cash flows.

Lifecycle based planning, anchored in lifecycle costing (LCC) and enabled by predictive and condition-based maintenance, offers a structurally superior framework. It enables road InvITs to optimise total cost of ownership, smoothen long-term cash flows, and enhance asset value while maintaining service quality.

4.1 About LCC

LCC is a quantitative economic framework that evaluates the total cost of an infrastructure asset over its service life, expressed in present value terms. Unlike conventional cost assessments that focus on initial construction costs, LCC incorporates:

- Initial construction and commissioning expenditure
- Routine and periodic maintenance costs
- Major rehabilitation and resurfacing interventions
- User costs arising from work zones (travel delay and vehicle operating costs)
- Residual or remaining service life value at the end of the analysis period

LCC strives to identify the maintenance and rehabilitation strategy that minimises net present cost (NPC) over the analysis horizon.

Deterioration curve and intervention timing

Pavement conditions deteriorate non-linearly. Late intervention leads to an exponential increase in rehabilitation costs, while early, preventive intervention restores condition at a significantly lower cost. LCC identifies the intervention point where the total discounted cost is minimised.

In practical terms, optimal intervention occurs before pavement condition crosses the rapid deterioration zone, where marginal deterioration costs exceed marginal maintenance costs.

Case Study: Preventive Maintenance Program - Michigan DOT (United States)

A frequently cited example of lifecycle cost optimisation through preventive maintenance comes from the Michigan Department of Transportation (MDOT). In the early 1990s, MDOT introduced a systematic pavement preservation program that prioritised timely preventive interventions-such as crack sealing, thin overlays, and minor concrete repairs-before pavements entered the rapid deterioration phase.

The program demonstrated substantial economic benefits. MDOT reported that an investment of approximately USD 80 million in preventive maintenance saved nearly USD 700 million in avoided rehabilitation and reconstruction costs over time. This represents savings of roughly eight to nine dollars for every dollar spent on preventive maintenance, illustrating the dramatic escalation in costs associated with delayed intervention.

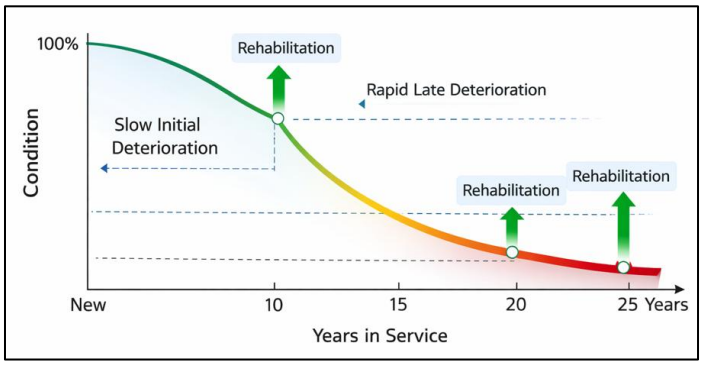
The Michigan case clearly illustrates the lifecycle principle that early, lower-cost treatments applied while pavements remain in good condition can significantly delay structural deterioration and defer major capital expenditure. Similar findings have been reported by other highway agencies, reinforcing the role of lifecycle cost analysis in determining optimal intervention timing.[14]

In addition, pavement management studies indicate that preventive maintenance treatments applied during early deterioration phases can significantly extend pavement service life. Guidance from the Federal Highway Administration notes that timely preventive maintenance can extend the useful life of highway pavements by approximately 5-10 years, while delaying the need for major rehabilitation interventions.[15]

Key implication

Early, preventive interventions minimise the total discounted lifecycle cost, whereas delayed interventions lead to sharply higher rehabilitation expenditure and greater disruption costs. This behaviour can be represented using a non-linear deterioration function.

Pavement deterioration curve and rehabilitation cycle



Source: Crisil Intelligence, Federal Highway Administration (FHWA), US Department of Transportation

As shown in the pavement deterioration curve above[16], early and timely rehabilitation restores condition and delays the onset of rapid late-stage deterioration. Road asset operators can use the minimum acceptable condition threshold to trigger major rehabilitation.

As the infrastructure sector matures, InvITs face increasing pressure to deliver sustainable returns while maintaining asset quality over extended horizons. Adopting LCC is, therefore, an imperative for InvITs, as it enables a holistic evaluation of all costs associated with an asset-from acquisition and construction through operation and eventual decommissioning. LCC approach encourages operators to adopt a comprehensive perspective by considering all costs associated with an asset throughout its entire lifespan-including maintenance, repairs, operational inefficiencies, and end-of-life disposal. This holistic approach not only reveals hidden expenses that traditional costing methods may overlook but also enables InvITs to optimise maintenance schedules, enhance asset longevity and minimise unexpected capital outlays. In an environment where institutional investor participation, investor scrutiny and regulatory expectations are intensifying, LCC supports more transparent and data-driven decision-making, ensuring value maximisation and risk mitigation across the asset lifecycle.

[14] Legislative Analyst Bill, California, Analysis of the 2004-05 Budget Bill
[15] Federal Highway Administration, US, Accelerating Infrastructure Innovations, 1999
[16] Conceptual illustration based on the Federal Highway Administration's (FHWA) 'Life-Cycle Cost Analysis Primer'; Transportation Research Board (TRB) pavement preservation studies; and World Bank road asset management guidance

For the road InvIT industry, embracing LCC is no longer optional, it is a strategic necessity to remain competitive, resilient and aligned with global best practices.

4.2 The shift to predictive and condition-based maintenance

Historically, road maintenance in India has relied on fixed, calendar-based schedules-for example, resurfacing every 5-7 years irrespective of actual pavement condition. While administratively simple, this approach frequently results in either premature intervention (inefficient capital deployment) or delayed intervention (accelerated deterioration and higher rehabilitation costs).

Predictive and condition-based maintenance systems enable 'just-in-time' maintenance, where interventions are executed precisely at the point of maximum economic efficiency. By intervening before pavement condition crosses critical thresholds, asset managers can restore performance at a fraction of the cost required under reactive regimes.

For road InvITs, predictive and condition-based maintenance improves:

- Accuracy of medium- and long-term maintenance forecasts
- Predictability of annual O&M expenditure
- Alignment between maintenance cycles and cash-flow availability

Adopting predictive and condition-based maintenance strategies can facilitate seamless identification of the optimal intervention point, enabling road asset operators to further optimise lifecycle costs.

Evolution of maintenance approaches in road asset management

Dimension	Reactive maintenance	Fixed-schedule maintenance	Condition/ predictive maintenance
Intervention trigger	Visible failure	Calendar-based	Asset condition thresholds
Data dependency	Low	Low to moderate	High (sensors, inspections, AI)
Timing logic	Late	Pre-defined	Just-in-time
Role of analytics	None	Limited	Central
Forecasting ability	Poor	Moderate	High
Suitability for long-term planning	Low	Moderate	High

Source: Crisil Intelligence, FHWA, US Department of Transportation

The adoption of lifecycle-based planning and predictive, condition-based maintenance delivers quantifiable economic benefits across the lifecycle of road assets. These benefits arise not only from lower direct maintenance expenditure, but also from extended asset life, reduced user disruption, and improved predictability of long-term cash flows-attributes that are particularly valuable for road InvITs with long holding periods.

Empirical evidence from highway operators and multilateral institutions indicates optimally timed preventive maintenance can reduce total lifecycle costs by double digit percentages, compared with deferred or reactive strategies. According to the Federal Highway Administration (FHWA), these savings are primarily driven by the avoidance of major rehabilitation and reconstruction activities, which account for a disproportionate share of total lifecycle expenditure.[17]

Lifecycle cost savings accrue through three channels:

1. Avoidance of structural failure, reducing the frequency of deep rehabilitation
2. Lower unit cost of intervention, as early treatments (e.g., overlays) are materially cheaper than late-stage

[17] The FHWA's Life-Cycle Cost Analysis Primer, US Department of Transportation, August 2002

rehabilitation. Preventive maintenance treatments applied early can delay or eliminate the need for rehabilitation.

3. Reduced cumulative user costs, since preventive works are shorter in duration and less disruptive

FHWA studies estimate that each dollar spent on preservation can save between $6 and $10 in future rehabilitation costs.[18]

FHWA lifecycle cost analysis (LCCA) also demonstrate that user costs often equal or exceed rehabilitation costs over long analysis horizons, making their reduction a critical component of total economic benefit.[19]

Asset life extension and capital deferral

Beyond immediate cost savings, advanced asset management delivers material extension of effective pavement service life. Pavement management studies synthesised by the Transportation Research Board indicate timely preventive interventions can extend pavement life by 5-10 years, depending on traffic loading, climate and design standards.[20]

From a financial perspective, asset life extension:

- Defers capital-intensive rehabilitation events
- Smooths long-term capital expenditure profiles
- Improves residual asset value at the end of the InvIT holding period

The engineering benefits of predictive maintenance translate directly into improved financial metrics for road InvITs. By lowering NPC and reducing volatility in annual O&M expenditure, advanced asset management enhances net present value (NPV) and stabilises distributable cash flows.

The World Bank transport asset management guidance[21] highlights the incremental cost of enhanced monitoring, analytics and inspection systems is small relative to avoided rehabilitation expenditure, resulting in strongly positive net economic returns when evaluated over long analysis horizons. For mature road InvIT portfolios, these outcomes support a lower perceived risk profile and can contribute to a reduced cost of capital over time.



[18] Federal Highway Administration, Pavement Preservation

[19] The FHWA's Life-Cycle Cost Analysis Primer, which demonstrates through LCCA applications that user costs-including delay and vehicle operating costs-often equal or exceed rehabilitation costs over long analysis horizons, particularly on high-traffic corridors

[20] Transportation Research Board (TRB), National Cooperative Highway Research Program (NCHRP), 'A Compendium of Strategies for Pavement Preservation'; and NCHRP Synthesis on Life-Cycle Cost Analysis for Highway Assets, the Michigan Department of Transportation and FHWA

[21] World Bank, Well Maintained: Economic Benefits from Reliable and Resilient Infrastructure (2021); World Bank Transport Global Practice, Road Asset Management: Overview and Case Studies

5 Digital-first infrastructure: IoT, AI-led asset monitoring and predictive maintenance

The digital transformation of India's road infrastructure has fundamentally altered how highways are financed, operated and governed. Traditionally viewed as static civil structures, roads are increasingly becoming data-driven infrastructure assets, capable of generating real-time information on traffic flows, revenue performance, asset condition and safety outcomes.

For road InvITs, this transformation is particularly consequential. Digital systems enhance revenue transparency, operational predictability and risk management, directly strengthening the reliability of cash flows and investor confidence. The shift from manual, fragmented oversight to integrated digital monitoring is, therefore, central to the maturation of road InvITs as an institutional asset class.

The nationwide rollout of FASTag has transformed India's road sector by digitising toll collections, reducing revenue leakage, and enhancing transparency and operational efficiency. For InvIT-held toll assets, this shift enables better revenue verification, forecasting and governance, fundamentally strengthening investor confidence and asset performance.

5.1 IoT, AI/ML-enabled condition-based predictive operations and maintenance

Traditionally, road condition assessments have relied on manual inspections, infrequent surveys and subjective engineering judgement.

Recent advances in sensors, artificial intelligence (AI), machine learning (ML) and remote monitoring technologies have enabled automated and digitally driven processes, helping the industry transition towards condition-based and predictive maintenance. Under this approach, maintenance actions are triggered by measured asset condition and forecast deterioration rather than pre-defined timelines.

Digital asset monitoring and maintenance require:

- **Automated pavement condition surveys:** These surveys use drone-based and vehicle-mounted imaging systems to capture high-resolution visual data on surface condition indicators such as roughness, rutting, cracking and distress. These systems replace manual visual inspections with repeatable, network-scale assessments, enabling more frequent condition updates and early identification of deterioration trends

Such approaches are widely adopted in pavement management systems globally to support objective condition scoring and lifecycle-based intervention planning.

- **Embedded and mobile sensors for structural and drainage monitoring:** Embedded sensors (e.g., strain gauges, accelerometers and temperature sensors) and mobile sensing platforms are increasingly used to monitor structural response, load effects, moisture ingress and drainage performance, particularly on bridges, elevated corridors and high-risk pavement sections. These sensors provide continuous or high-frequency data that allows asset managers to detect abnormal responses before visible damage occurs

This approach underpins the transition from reactive inspection to predictive, condition-based maintenance.

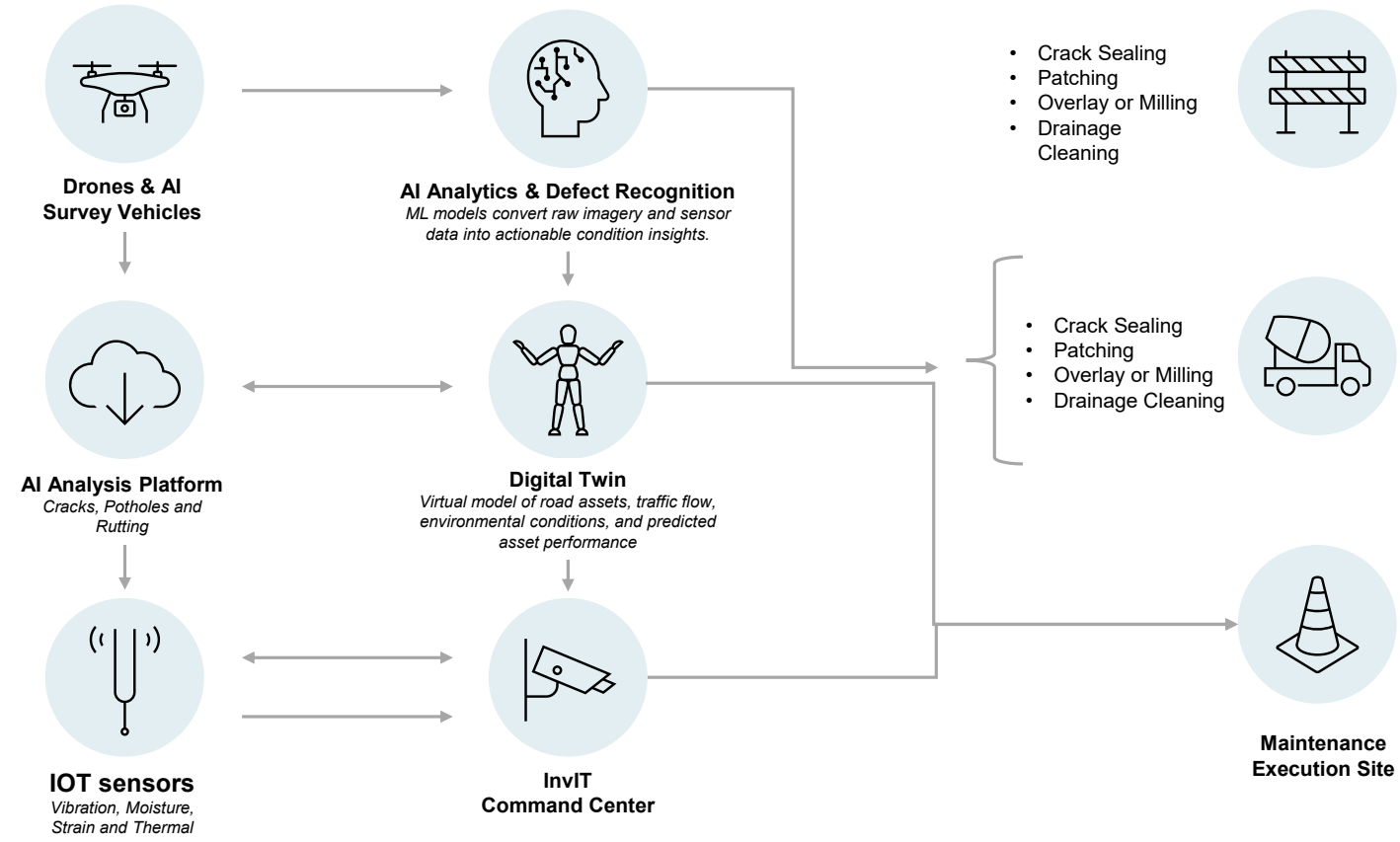
- **GIS-enabled asset mapping and spatial integration:** Geographic Information System (GIS) platforms serve as the spatial backbone of digital asset management by integrating asset location with condition data, traffic volumes, maintenance history and environmental exposure. GIS-enabled mapping allows operators to visualise deterioration patterns geographically, prioritise interventions corridor-wise, and coordinate maintenance planning across large, distributed portfolios

For InvITs holding multi-state road assets, GIS integration is critical for portfolio-level oversight and standardised decision-making.

- **Image and video analytics using AI and ML:** AI and ML algorithms are increasingly applied to image and video datasets collected from drones, survey vehicles and sensors to automatically identify pavement distress features such as cracks, rutting, potholes, edge failures and structural anomalies. These tools reduce subjectivity in condition assessment and enable scalable, repeatable defect detection across large networks

AI-driven analytics also support deterioration modelling by linking observed defects with traffic loading, climate and maintenance history.[22]

AI-enabled condition-based maintenance and digital twin workflow



Source: Crisil Intelligence, NHAI DAMS

Digital twin integration for portfolio-wide assessment and multi-scenario decision-making

Together, these capabilities create a strong pipeline from observed condition (surveys, sensors, AI/ML) to spatial context and decision support. However, to move from 'detect' to 'predict, simulate, stress-test and optimise', this stack should be strengthened by integrating digital twin technology-a continuously updated virtual representation of the road asset that assimilates field data and forecasts so that planners can run scenario-based analyses, validate predicted needs against real performance drivers, and prioritise interventions with greater confidence.

Further this should be done not only for individual roads or corridors, but also for the entire asset portfolio. By consolidating asset-level twins into a portfolio-wide view, InvITs can standardise performance metrics, compare 'what-if' outcomes across locations and centrally prioritise funding and interventions based on risk, lifecycle value and network impact. Such an effort would enable

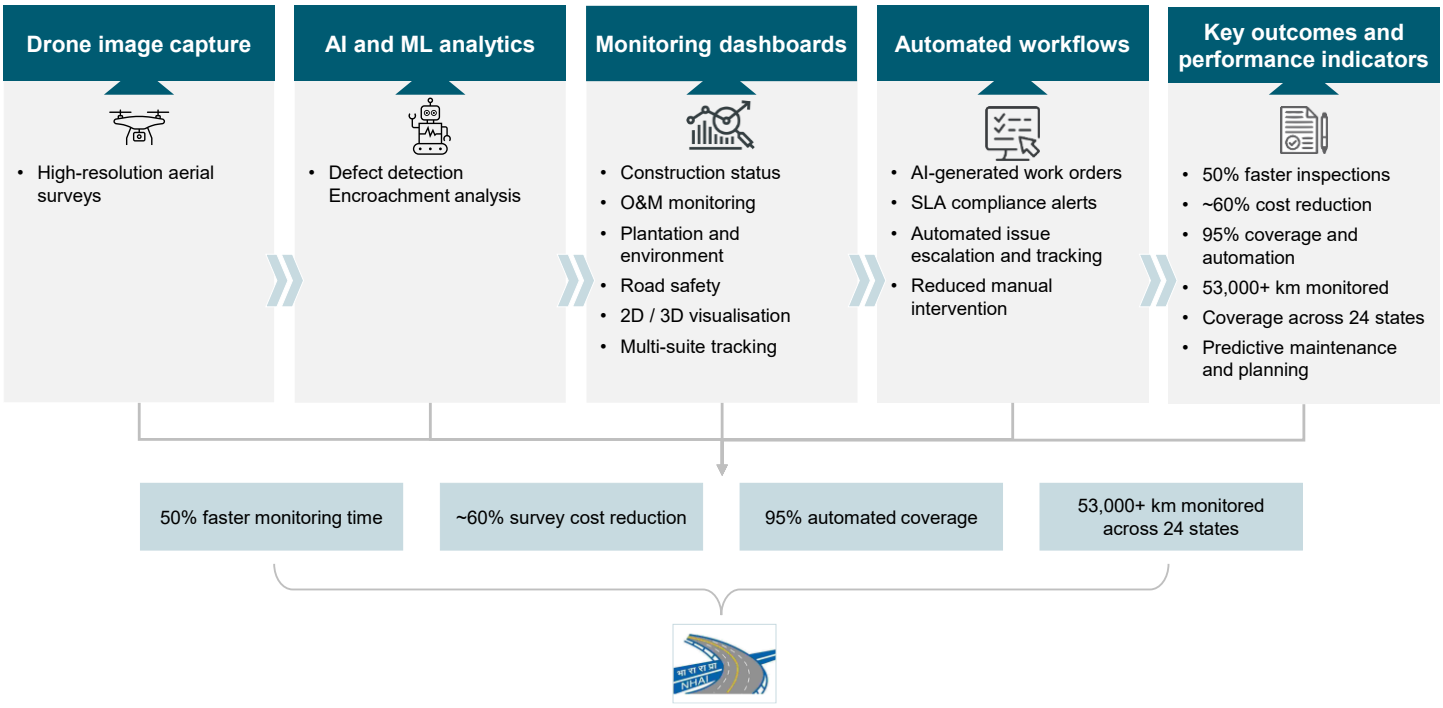
[22] Federal Highway Administration (FHWA), Life-Cycle Cost Analysis Primer and pavement preservation guidance; World Bank Transport Global Practice, Road Asset Management: Overview and Case Studies; National Highways Authority of India (NHAI), Drone Analytics and Monitoring System (DAMS) disclosures; Transportation Research Board (TRB) pavement management and asset analytics studies.

consistent, data-driven decision-making from a single command-and-control perspective.

Digital twins allow road operators to model how pavements are likely to behave under changing axle loads, weather patterns and traffic demand, helping teams identify emerging risks early and choose the most effective treatment strategies before failures surface. This also enables ongoing auditability through automated checks and quality verification. Ultimately, governance improves in operations and maintenance while avoidable overruns and cost slippages are limited.

In India, the NHAI has operationalised the Drone Analytics Monitoring System (DAMS) since October 2024. The system enables predictive and condition-based maintenance on India's national highways by integrating high-resolution drone imagery with AI-enabled analytics and GIS-based dashboards. Periodic drone surveys capture geo-referenced visual data across highway corridors, which is processed using machine-learning models to automatically detect pavement distress, structural anomalies, safety deficiencies and right-of-way issues.

The highway authority's DAMS initiative



Source: Crisil Intelligence, NHAI DAMS

These insights are consolidated into central dashboards that prioritise defects based on severity and progression, enabling maintenance interventions to be triggered before deterioration escalates into rehabilitation-intensive repairs. By shifting inspection and decision-making from manual, periodic assessments to continuous, data-driven monitoring, DAMS can potentially allow highway operators and road InvIT asset managers to optimise intervention timing, reduce lifecycle cost volatility and extend the effective service life of road asset.

While DAMS represents a major advancement in highway management in India, its true benefits can only be realised if adoption improves across the network and AI/ML-driven insights are fully integrated into maintenance and budgeting for proactive steps. For DAMS to be truly effective, authorities and asset operators must ensure data directly informs timely interventions, supported by strong change management and collaboration. Without this, the potential for cost savings and extended asset life may not be fully achieved, highlighting the importance of

embedding DAMS insights into everyday[23] maintenance practices.

Operational benefits for InvIT platforms

While digital monitoring remains largely compliance-driven, InvITs have an opportunity to transform operations by proactively implementing IoT, AI/ML and digital twin-enabled condition-based predictive maintenance. This shift will deliver tangible operational benefits, enhance asset performance and enable data-driven decision-making at scale.

Digital monitoring and predictive maintenance strengthen the link between the condition of the asset and financial performance. By enabling timely interventions, these systems help:

- Extend pavement life
- Avoid large, lumpy rehabilitation costs
- Preserve residual asset value at the end of the concession

For InvIT investors, this improves long-term distributable cash flow stability and valuation resilience.

5.1.1 Advanced Traffic Management Systems (ATMS) and safety

Advanced Traffic Management Systems (ATMS) represent the next phase in the digital evolution of India's highway network. By integrating sensors, cameras, communication infrastructure and centralised control platforms, ATMS transforms roads from passive civil assets into actively managed mobility corridors.

The components and capabilities of ATMS

A typical ATMS framework deployed on national highways comprises the following core elements:

- **Traffic surveillance and automated incident detection systems,** using CCTV, radar, and AI-based video analytics to identify accidents, congestion, stalled vehicles and abnormal traffic behaviour in real time
- **Variable message signs (VMS) and dynamic speed advisories**, enabling immediate communication with road users to manage speeds, lane discipline and diversions during incidents or adverse conditions
- **Weather and visibility monitoring systems**, including fog sensors, rainfall detectors and wind monitors, which allow proactive traffic regulation in high-risk conditions
- **Centralised command and control centres**, integrating live data feeds and enabling coordinated responses involving concessionaires, traffic police, emergency services and maintenance teams

Together, these components shift highway operations from reactive response to proactive traffic and incident management.

Safety as a financial variable

ATMS-enabled improved road safety outcomes have direct financial relevance for road InvIT portfolios, rather than being purely social or regulatory considerations.

Key financial linkages include the following:

- **Reduced accident frequency and severity,** which lowers the incidence of emergency lane closures, prolonged traffic disruptions and unplanned maintenance interventions
- **Improved traffic reliability and predictability,** enhancing user confidence and supporting sustained traffic volumes, particularly on toll corridors where reliability influences route choice
- **Lower regulatory, legal and reputational risk**, since improved safety performance reduces scrutiny from regulators and enforcement agencies and mitigates exposure to penalties or concession disputes

Over time, ATMS-enabled corridors tend to exhibit more stable traffic patterns and reduced volatility. This is particularly valuable for toll-based assets where revenue is directly linked to throughput and operating continuity.

Relevance for road InvITs

For road InvITs, the integration of ATMS strengthens the investment proposition by:

[23]28th National Conference on e Governance (NCeG), Drone Analytics Monitoring System (DAMS), Presentation by NHAI, September 2025

- Enhancing operational resilience across the asset portfolio
- Supporting predictable cash flows through reduced disruption risk
- Improving the risk profile perceived by lenders and long-term investors, especially in portfolios with significant toll exposure

In this sense, ATMS functions as both a safety intervention and a financial risk management instrument, aligning operational excellence with investor outcomes.

Data-driven policy and planning

Beyond real-time operations and safety management, ATMS deployments generate high-frequency, corridor-level datasets that materially strengthen policy formulation and infrastructure planning. Continuous data on traffic flows, incident patterns, weather impacts and response times enables the authorities and asset owners to move from anecdotal assessments to evidence-based decision-making.

In particular, ATMS-generated data supports:

- **Capacity expansion and network optimisation decisions** by identifying persistent congestion points, peak-load stress, and evolving demand patterns
- **Targeted safety investments**, allowing resources to be directed toward high-risk locations, time windows, and incident types rather than uniform, corridor-wide interventions
- **Improved coordination with enforcement and emergency services** through shared situational awareness, faster incident detection and structured response protocols

For policymakers, this data layer enhances accountability and transparency, enabling performance benchmarking across corridors and concessionaires. For asset owners and InvIT platforms, it strengthens long-term planning, supporting capital allocation decisions that are aligned with actual usage and risk profiles rather than static assumptions.



6 Gearing up InvITs for climate resilience and sustainable value creation

The integration of sustainability and environmental, social and governance (ESG) considerations into infrastructure investment has undergone a structural shift over the past decade. What began as voluntary disclosure and reputational signalling has evolved into a hard prerequisite for capital access, particularly for long-duration infrastructure assets globally. According to BNP Paribas' ESG Survey 2025[24], which covered 420 asset owners, managers, and private capital firms across 29 countries- institutional investors remain committed to sustainable investing, emphasising holistic approaches and the interconnectedness between climate, biodiversity, and social impact.For road InvITs, whose cash flows, asset lives and social impact extend over multiple decades, ESG alignment is now inseparable from financial performance, risk management and valuation resilience.

At the same time, climate volatility and regulatory expectations are reshaping how infrastructure assets are designed, monitored, financed and reported. Road InvITs are at the intersection of these forces, making sustainability and resilience not only compliance requirements, but also core determinants of long-term investability.

To create sustainable value for stakeholders and investors, InvITs can undertake the following actions:

- **Align performance with ESG objectives:** Ensure that operational and financial strategies are closely integrated with ESG goals, fostering responsible growth
- **Enhance infrastructure resilience and climate adaptation:** Invest in strengthening infrastructure to withstand environmental challenges and adapt to evolving climate risks, ensuring long-term viability and reliability.

6.1 Aligning performance with ESG objectives

For road InvITs, ESG considerations have evolved from a disclosure-driven exercise into a core determinant of asset performance, risk management and capital access. Given their long-term holding horizon and reliance on predictable cash flows, road InvITs are uniquely exposed to environmental, social and governance risks that can materially influence lifecycle costs, operational stability and investor confidence.

Global institutional investors increasingly view ESG alignment as a prerequisite for capital allocation, while domestic regulators are embedding sustainability expectations into reporting and governance frameworks. In this context, ESG integration for road InvITs must be operational, data-driven and performance-linked, rather than narrative-led.

Road InvITs can adopt the following strategies to effectively integrate ESG objectives into their business operations:

- Defining measurable ESG objectives at the asset and portfolio level
- Integrating ESG into planning, investments and acquisitions
- Embedding ESG KPIs into O&M contracts and operating procedures
- ESG performance monitoring, analytics and reporting
- Integrating ESG into risk management frameworks

Defining measurable ESG objectives at the asset and portfolio level

Effective ESG alignment begins with the establishment of clear, quantifiable ESG objectives at the individual asset as well as the portfolio level.

[24] BNP Paribas, ESG Survey, 2025

Indicative ESG metrics tailored for Road InvITs in India may include:

Environmental metrics

- Energy consumption per lane-km (kWh/km/year)
- Share of renewable energy used in toll plazas and operations (%)
- Water consumption per toll transaction/per km
- Waste generation and recycling rate (%)
- Use of recycled or sustainable materials in maintenance works
- Drainage performance and flood-resilience indicators

Social metrics

- Road safety indicators (fatalities per 100 million vehicle-km)
- Accident frequency and severity rates
- Emergency response time (incident to clearance)
- Worker health and safety metrics (lost time injury frequency rate)
- Community grievance redressal timelines

Governance metrics

- Timeliness and quality of disclosures
- Independence of valuation and audit processes
- Related-party transaction oversight
- Compliance with concession and regulatory obligations
- Board-level ESG committee or dedicated ESG oversight
- Integration of ESG objectives into executive compensation

By standardising these metrics across assets, road InvITs can establish portfolio-wide benchmarks, enabling comparability, performance tracking and investor transparency.

Integrating ESG into planning, investments and acquisitions

To move beyond reporting, ESG considerations must be embedded into decision-making processes across the InvIT lifecycle.

This includes:

- Incorporating ESG screening into asset acquisition and due diligence, assessing exposure to climate risks, safety performance, land and community sensitivities, and governance quality
- Prioritising capital investments that deliver dual financial and ESG returns, such as safety upgrades, drainage improvements, or energy-efficient toll infrastructure
- Factoring ESG risks and resilience characteristics into long-term financial planning and lifecycle cost assessments

By integrating ESG into investment decisions, road InvITs can proactively manage downside risks while enhancing long-term asset value.

Embedding ESG KPIs into O&M contracts and operating procedures

Operational alignment is critical for translating ESG objectives into on-ground outcomes. Road InvITs can achieve this by embedding ESG key performance indicators (KPIs) directly into O&M contracts, service-level agreements and standard operating procedures.

Common practices include:

- Linking contractor incentives to safety outcomes and incident response times
- Including environmental compliance and waste management KPIs in maintenance contracts
- Mandating reporting of energy, water and emissions data by service providers
- Standardising operating procedures for accident management, environmental incidents and community engagement

This contractual integration ensures that ESG commitments are enforced through execution, rather than remaining aspirational.

ESG performance monitoring, analytics and reporting

Robust ESG alignment requires continuous monitoring and data-driven oversight. Road InvITs increasingly rely on digital platforms to aggregate ESG data across assets and track performance against defined targets.

Key enablers include:

- Centralised ESG dashboards integrating safety, environmental and operational data
- Periodic performance reviews at the asset and portfolio level
- Alignment with the Business Responsibility and Sustainability Reporting (BRSR) framework of the Securities and Exchange Board of India (SEBI), including the BRSR Core requirements

Advanced analytics can be used to identify underperforming assets, assess the impact of ESG interventions and support evidence-based corrective actions.

Integrating ESG into risk management frameworks

Finally, ESG risks must be explicitly incorporated into the InvIT's enterprise risk management framework. Climate risks (flooding, heat stress), safety liabilities, social disruptions and governance failures can all have direct financial consequences for road assets.

Integrating ESG risks into risk registers, stress testing and scenario analysis enables:

- Early identification of vulnerabilities
- Prioritisation of resilience investments
- Improved preparedness for regulatory, climatic and operational shocks

This integration reinforces ESG as a risk mitigation and value protection mechanism, rather than a compliance obligation.

6.2 Enhance climate resilience

Climate change is increasing the frequency and intensity of extreme weather events such as intense rainfall, flooding, heatwaves, and landslides. These events pose significant risks to road infrastructure and its long-term operational reliability. Climate-resilient infrastructure design therefore focuses on ensuring that transport assets are able to withstand climate stresses, recover quickly from disruptions, and maintain service continuity over the lifecycle of the asset. Multilateral development institutions such as the World Bank emphasise that incorporating resilience measures in road design and maintenance, particularly in drainage systems, pavement materials, slope protection, and asset monitoring can significantly reduce long-term infrastructure damage and service disruptions.

For road InvIT portfolios, enhancing climate resilience is particularly critical because these trusts hold long-duration operational assets that are vulnerable to the physical risks of climate change. Proactive climate resilience preparation is essential, as it directly influences asset performance, maintenance costs, and revenue stability over time, helping to safeguard long-term value and operational continuity.

To effectively safeguard long-term asset value and operational continuity, road InvITs can proactively enhance climate resilience across their portfolios. The following strategies represent key avenues through which InvITs can strengthen their road assets against the growing risks posed by climate change: Climate risk as a financial risk

- Hydrology and drainage design upgrades
- Pavement material selection for heat stress
- Slope and embankment stabilisation
- Nature-based solutions
- Culvert and bridge scour protection
- Emergency preparedness and traffic management

Hydrology and drainage design upgrades

Effective hydrological design and drainage management are fundamental to climate-resilient road infrastructure. Increased rainfall intensity and flooding can accelerate pavement deterioration, weaken subgrades, and damage road embankments.

Asset managers can therefore prioritise improved drainage capacity, wider side drains, and robust cross-drainage structures such as culverts and stormwater channels to

ensure that excess water is rapidly evacuated from the road structure.

Strengthening drainage systems is widely recognised as one of the most critical measures for protecting road infrastructure from climate-induced flooding and water ingress

Pavement material selection for heat stress

Rising temperatures and prolonged heat exposure can cause pavement distress such as rutting, softening of asphalt binders, and reduced structural performance.

To address these risks, asset managers can increasingly adopt heat-resistant pavement mixes and improved binder formulations designed to withstand higher temperature ranges and heavy traffic loads. Advanced asphalt technologies and improved pavement material selection help maintain structural performance under heat stress while extending pavement service life under changing climatic conditions.

Slope and embankment stabilisation

Road corridors located in mountainous or high-rainfall regions are particularly vulnerable to landslides, erosion, and embankment failures triggered by extreme precipitation events.

Climate-resilient road design therefore incorporates structural and geotechnical measures such as retaining walls, reinforced embankments, slope protection systems, and improved drainage along slopes.

These interventions reduce soil instability and prevent rainfall infiltration from triggering landslides that could disrupt road connectivity.

Nature-based solutions

In addition to conventional engineering measures, climate resilience strategies increasingly incorporate nature-based solutions, which utilise natural processes to improve infrastructure performance and environmental outcomes.

Examples include vegetated slopes, bio-engineering for erosion control, natural drainage channels, and restored wetlands that help absorb excess stormwater. These approaches can reduce runoff intensity, stabilise soil, and enhance long-term resilience of road corridors while delivering environmental co-benefits such as improved biodiversity and water management.

Nature-based solutions are particularly relevant in areas prone to flooding or landslides, where vegetation-based slope stabilisation and natural drainage systems can complement traditional engineering measures.

Culvert and bridge scour protection

Flood events can generate strong water flows that erode soil around bridge foundations and culvert structures, a process known as scour, which can compromise structural stability.

Climate-resilient infrastructure planning therefore includes enhanced scour protection measures, such as reinforced foundations, riprap protection, and improved hydraulic design for bridges and culverts. These measures help ensure structural integrity during extreme flood events and reduce the risk of catastrophic infrastructure failure.

Emergency preparedness and traffic management

Climate resilience also depends on operational preparedness and real-time traffic management systems.

Road asset managers can increasingly deploy advanced monitoring systems, emergency response protocols, and coordinated traffic management strategies to ensure rapid response during extreme weather events.

Measures such as early warning systems, dynamic traffic control, and incident management enable road operators to quickly manage disruptions and maintain safe mobility during emergencies.

7 Way forward: Evolving InvITs from asset holders to long-term value creators

7.1 From monetisation instruments to scalable infrastructure platforms

India's road sector has undergone a structural shift with the introduction of InvITs, enabling the monetisation and professional management of operational highway assets. Through InvITs, capital locked in mature infrastructure is able to be recycled, thereby reducing the balance sheet stress for sponsors as well as attracting long-term domestic and global capital into the road sector.

As of FY25, approximately 15,700 km of road assets have been monetised under InvITs, out of a total network of 325,000 km of national and state highways - reflecting a penetration level of just 4.8%. This highlights the considerable headroom for growth in InvITs, with substantial opportunities yet to be unlocked.

Under NMP 2.0, the government aims to monetise highway assets worth Rs 4.14 lakh crore over the FY26-30 period, of which Rs 3.35 lakh crore is planned through InvIT and TOT alone. This corresponds to a monetisation plan for 19,200 km of roads under InvIT and TOT[25]. This marks a substantial increase compared to Rs 1.3 lakh crore worth of assets monetised during the FY20-25 period.

According to Crisil Intelligence assessment, the likely ready pipeline-comprising mature, monetisation-ready stretches-is valued at Rs 2.2-2.6 lakh crore. Consequently, Crisil Intelligence projects that the AUM of road InvITs will expand from Rs 2.46 lakh crore in FY25 to Rs 5.45 lakh crore by FY30, representing a CAGR of approximately 17% in the base case scenario.

The recent moderation in project awards and execution suggests that the near-term monetisation pipeline will be primarily driven by existing and near-operational assets. To achieve further scale, it will be essential to increase the pace of road awards and ensure timely commissioning of projects. Additionally, establishing a central framework to integrate high-potential state corridors into the national pipeline could significantly boost the expansion of state road projects.

By fiscal 2035, a materially larger share of India's operational road network could be consolidated under InvITs, potentially adding several km of road assets to the existing portfolios.

Such an expansion would have far-reaching implications:

- Large-scale capital mobilisation over the next decade
- Multi-fold increase in AUM for the road InvIT sector
- Accelerated capital recycling to fund new highway development without increasing the fiscal burden

Hence, the evolution positions road InvITs not merely as monetisation vehicles, but as long-term infrastructure ownership and management platforms.

7.2 Deepening investor participation, broadening capital base

The potential scale up of road InvITs will depend crucially on the depth and diversity of investor participation.

To-date, road InvITs have primarily attracted:

- Anchor sponsors and strategic investors
- Early-stage participation from domestic and global institutional capital

However, institutional participation in the space remains significantly underpenetrated. Large pools of long-term capital such as pension funds, insurance-linked capital, sovereign investors and global infrastructure funds have only begun to invest in the asset class.

Equally important is the role of retail and non-institutional investors, whose participation remains limited despite the yield-oriented nature of InvITs. To improve participation, inclusion of InvITs in passive indices, active market

[25] National Monetization Pipeline 2.0

making, conversion of private InvITs into public structures, active research coverage by brokerage houses and enhanced investor awareness are critical.

Expanding the unitholder base across investor categories is essential to:

- Improve secondary market liquidity
- Reduce concentration risk
- Enhance resilience to market cycles

Deepening investor participation is, therefore, a precondition for scaling the road InvIT ecosystem.

7.3 Enhancing investor confidence: The core growth enabler

At the crux of the growth trajectory lies investor confidence. Sustained capital inflows into road InvITs will depend on their ability to consistently demonstrate:

- Predictable and stable distributions
- High standards of transparency and disclosure
- Operational excellence across asset lifecycles

As road InvIT portfolios expand in size and complexity, investor expectations will increasingly shift from headline yields to quality of cash flows, risk management discipline and resilience under stress scenarios. Proven track record in asset performance, proactive management of traffic, regulatory and operational risks, and credible integration of ESG considerations will become decisive differentiators.

In this context, road InvITs must evolve from being perceived as passive yield vehicles to actively managed, data-driven infrastructure platforms that are capable of delivering durable value across economic cycles.

7.4 The P.A.V.E. framework for scaling road InvITs

To successfully transition from asset aggregation to scalable value creation the road InvIT sector must adopt a structured framework- P.A.V.E. The framework focuses on aligning governance, operations, sustainability and growth strategy.

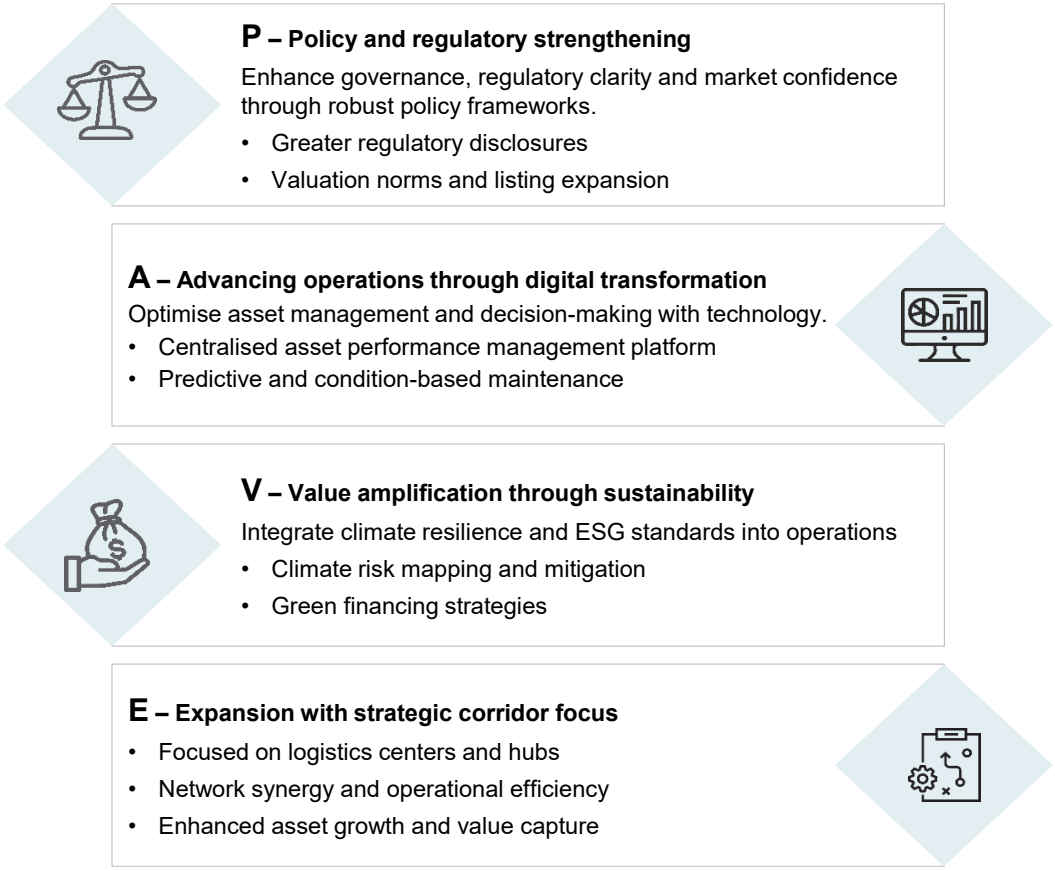
The framework focuses on four interlinked pillars:

Pillar		Focus area	Impact
P	**Policy and regulatory strengthening**	Strong governance, regulatory compliance and proactive engagement with policymakers	Stability and investor trust
A	**Advancing operations through digital transformation**	Digitalisation and technology-enabled asset and performance management	Operational efficiency and performance transparency
V	**Value amplification through sustainability**	Climate resilience measures and ESG integration across asset lifecycle	Asset longevity and enhanced investor appeal
E	**Expansion with strategic corridor focus**	Targeted asset acquisition along high-growth economic corridors	Network value creation and operational synergies

Source: Crisil Intelligence

Together, these pillars address the critical drivers of asset performance, risk management and investor confidence.

The P.A.V.E. framework for scaling road InvITs



7.5 Pillar A: Policy and regulatory strengthening

A stable and predictable regulatory environment is foundational to the scalability of road InvITs. SEBI has implemented comprehensive corporate governance standards, specifically tailored for InvITs, significantly strengthening transparency and accountability mechanisms.

The following regulatory interventions can further strengthen InvITs:

- **Standardised financial reporting and valuation:** Implement uniform accounting standards, including depreciation, amortisation and revenue recognition, and harmonise valuation methodologies and disclosure formats across sectors to improve comparability and analytical confidence
- **Bring regulatory clarity:** Formalise and communicate clear monetisation schedules, concession/asset-transfer frameworks and tax norms, ensuring time-bound approvals and transparent standards
- **Strengthen disclosures and investor communication:** Ensure frequent and granular disclosures on valuation movements, asset-level operating performance, cash flow drivers, leverage and covenant headroom, refinancing plans, and key risks, i.e. going beyond the minimum compliance requirement to enhance transparency
- **Improve liquidity and price discovery:** Enable broader listing and participation, including measures to deepen the investor base and increase the free float where feasible, to strengthen secondary market liquidity, improve price discovery and build investor confidence

Measures such as regular valuation updates, transparent distribution policies and robust governance structures will be critical in reinforcing trust and reducing any regulatory risk.

7.6 Pillar B: Advancing operations through digital transformation

Digital transformation is central to the transitioning of road InvITs from asset aggregators to value creators. This involves:

- Designing and implementing a portfolio-level digital transformation roadmap
- Establishing centralised asset performance management platforms integrating traffic, condition, financial and ESG data
- Standardising data architecture across assets to enable comparability and benchmarking
- Creating dedicated analytics and decision-support capabilities at the InvIT level
- Aligning O&M contracts with predictive maintenance and performance-linked metrics

Technology-enabled asset management enhances efficiency, improves yield visibility and strengthens risk control across diversified portfolios.

7.7 Pillar C: Value amplification through sustainability and climate resilience

Sustainability and climate resilience are no longer optional considerations; these are central to asset longevity and capital access.

Road InvITs should embed sustainability across the asset lifecycle by:

- Conducting portfolio-level climate risk assessments
- Integrating resilience considerations into maintenance and renewal planning
- Aligning O&M contracts with sustainability and safety KPIs
- Developing green financing and sustainability-linked funding strategies to lower the cost of capital

Targeted interventions, such as enhanced drainage, heat-resistant pavements, slope stabilisation, renewable-powered toll infrastructure and sustainable material usage, can materially improve asset durability and investor appeal.

7.8 Pillar D: Expansion with strategic corridor focus

Future road expansions should prioritise strategic economic corridors rather than opportunistic asset aggregation.

Focusing on contiguous or economically linked corridors enable:

- Operational synergies and scale efficiencies
- Improved risk management through corridor familiarity
- Cost efficiencies in O&M and contract management
- More predictable traffic and revenue profiles

Targeted expansion aligned with logistics hubs, industrial clusters and high-growth regions enhances both value creation and cash flow stability, reinforcing road InvITs as long-term infrastructure platforms rather than static asset pools.

By adopting the P.A.V.E. framework, road InvITs can evolve from mere monetisation instruments into integrated, data-driven and resilient infrastructure investment platforms. This evolution is critical to sustaining investor confidence, unlocking new capital pools and supporting India’s long-term infrastructure ambitions without imposing undue fiscal strain.

8 Annexures

1. Unlocking Latent Value: The Asset Monetisation Imperative

https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1748297&reg=3&lang=2

https://www.niti.gov.in/sites/default/files/2021-08/Vol_2_NATIONAL_MONETISATION_PIPELINE_23_Aug_2021.pdf

https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2026675&reg=3&lang=2

https://swarajyamag.com/news-brief/nmp-20-to-unlock-rs-10-lakh-crore-over-fy2630-fy26-asset-monetisation-target-pegged-at-rs-192-lakh-crore-report

2. InvITs as Strategic Capital Recycling Vehicles

https://hdfc-tru.com/wp-content/uploads/2025/07/Indias-Road-Asset-Monetization-Strategy.pdf

https://economictimes.indiatimes.com/news/economy/finance/indian-govt-raises-rs-1-42-lakh-cr-via-asset-monetisation-till-fy25/articleshow/123430736.cms

https://content.knightfrank.com/research/3031/documents/en/infrastructure-investment-trusts-invits-in-india-2025-12372.pdf

https://www.ibef.org/blogs/policy-regulatory-renaissance-how-strategic-reforms-are-redefining-india-s-investment-landscape

3. Roads in the Fast Lane: The Rise of Road InvITs

https://content.knightfrank.com/research/3031/documents/en/infrastructure-investment-trusts-invits-in-india-2025-12372.pdf

https://www.thehindubusinessline.com/economy/logistics/nhais-public-invit-wins-five-highway-concessions/article70611996.ece

https://www.careratings.com/upload/CompanyFiles/PR/202512141202_Raajmarg_Infra_Investment_Trust.pdf

https://www.businessworld.in/article/nhai-gets-sebi-nod-for-raajmarg-infra-investment-trust-as-public-invit-58487

https://www.indiaratings.co.in/pressrelease/80812

https://indbiz.gov.in/singapores-gic-invests-over-us615-mn-in-indian-roads-assets/

https://www.cppinvestments.com/newsroom/cpp-investments-commits-c297-million-in-follow-on-investment-to-indias-national-highways-infra-trust/

https://www.irbinfratrust.co.in/home/

https://interiseworld.com/trust

4. Lifecycle -Based Planning: Optimising Maintenance Spend and Extending Asset Longevity

https://www.fhwa.dot.gov/pavement/lcca/

https://lao.ca.gov/analysis_2004/transportation/trans_04_2660_anl04.htm

https://www.fhwa.dot.gov/publications/focus/99apr/needs.cfm

https://www.trb.org/Publications/PubsNCHRPPublications.aspx

https://ppp.worldbank.org/sites/default/files/2022-03/Final-LOW_WB_G20_Report_v4_1JUN_2021.pdf

5. Digital-First Infrastructure: IoT, AI-Led Asset Monitoring, and Predictive Maintenance

https://www.fhwa.dot.gov/pavement/lcca/

https://nceg.gov.in/public/assets/pdf/Shri_Deepak_Saxena_CGM_(IT)_NHAI.pdf

6. Adopting Progressive Risk Identification and Mitigation Frameworks to Deliver Superior Risk-Adjusted Returns

https://www.sebi.gov.in/legal/regulations/feb-2023/securities-and-exchange-board-of-india-infrastructure-investment-trusts-regulations-2014-last-amended-on-february-14-2023-_68062.html

https://www.sebi.gov.in/legal/master-circulars/jul-2025/master-circular-for-infrastructure-investment-trusts-invits-_95233.html

https://www.businessworld.in/article/balancing-scales-how-traffic-risk-revenue-guarantees-shape-infra-landscape-552637

https://www.careratings.com/upload/pdf/get-rated/Criteria_Rating_Methodology_Infrastructure_Investment_Trusts_(InvITs)_March_2025.pdf

7. Gearing Up InvITs for Climate Resilience and Sustainable Value Creation

https://openknowledge.worldbank.org/entities/publication/a475a009-b161-46a8-a365-4b0215d83352

https://securities.cib.bnpparibas/esg-survey-2025/

https://documents1.worldbank.org/curated/en/981831493278252684/pdf/114641-WP-ClimateAdaptationandAMSSFinal-PUBLIC.pdf https://blogs.worldbank.org/en/endpovertyinsouthasia/indias-road-resiliency-why-climate-proofing-indias-road-network-vital-secure

https://www.teriin.org/sites/default/files/2021-04/Report_Component-II.pdf
https://www.adb.org/sites/default/files/institutional-document/32772/files/guidelines-climate-proofing-roads.pdf

8. Charting the Next Decade: Evolving InvITs from Asset Holders to Value Creators

https://niifindia.in

https://indianexpress.com/article/business/fm-sitharaman-launches-nmp-2-0-monetisation-2030-10548110

Analytical Contacts

Crisil Intelligence (Crisil Limited)

Jagannarayan Padmanabhan
Senior Director,
Consulting,
Crisil Intelligence (Crisil Limited)
Phone: +91-22-6137 3000
Email: jagannarayan.padmanabhan@crisil.com

Anshuman Chauhan
Director
Transport, Logistics and Mobility,
Crisil Intelligence (Crisil Limited)
Phone: +91-9811701261
Email: anshuman.chauhan1@crisil.com

Jayesh Patil
Associate Director
Transport, Logistics and Mobility,
Crisil Intelligence (Crisil Limited)
Phone: +91-9699902087
Email: jayesh.patil2@crisil.com

Aranya Nandi
Senior Consultant
Transport, Logistics and Mobility,
Crisil Intelligence (Crisil Limited)
Phone: +91-7980641281
Email: aranya.nandi1@crisil.com

FICCI

Neerja Singh
Assistant Secretary General
FICCI
Phone: +91-11-2348 7326
Email: neerja.singh@ficci.com

Komal Sharma
Additional Director
Transport Infrastructure & Logistics
FICCI
Phone: +91-11-2348 7457
Email: komal.sharma@ficci.com

Tushar Sharma
Deputy Director
Infrastructure (Transport)
FICCI
Phone: +91-8950187828
Email: tushar.sharma@ficci.com

Shampa Kumari
Assistant Director
Infrastructure (Transport)
FICCI
Phone: +91-9717943165
Email: shampa.kumari@ficci.com

About FICCI

Established in 1927, FICCI is the largest and the oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialisation, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policymakers and civil society, FICCI articulates the views and concerns of industry. The organisation serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to more than 2,50,000 companies. FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policymakers, and the international business community.

About Crisil Intelligence (formerly Market Intelligence & Analytics)

Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

For more information, visit Intelligence.Crisil.com

About Crisil

Crisil is a global, insights-driven analytics company. Our extraordinary domain expertise and analytical rigour help clients make mission-critical decisions with confidence.

Large and highly respected firms partner with us for the most reliable opinions on risk in India, and for uncovering powerful insights and turning risks into opportunities globally. We are integral to multiplying their opportunities and success.

Headquartered in India, Crisil is majority owned by S&P Global.

Founded in 1987 as India's first credit rating agency, our expertise today extends across businesses: Crisil Ratings, Crisil Intelligence, Crisil Coalition Greenwich and Crisil Integral IQ.

Crisil's global workforce operates in the Americas, Asia-Pacific, Europe, Australia and the Middle East, setting the standards by which industries are measured.

For more information, visit www.Crisil.com

Connect with us: LinkedIn | Twitter

Crisil Privacy

Crisil respects your privacy. We may use your personal information, such as your name, location, contact number and email id to fulfil your request, service your account and to provide you with additional information from Crisil. For further information on Crisil's privacy policy please visit https://www.crisil.com/content/crisilcom/en/home/crisil-privacy-notice.html.