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Kearney, Zurich

Harnessing the opportunities in India's transportation infrastructure

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KEARNEY

Although the country has enhanced its transportation landscape over the past two decades, much remains to be done to meet demands now and in the years ahead.

India's transportation infrastructure has grown by leaps and bounds in the new millennium. Seminal infrastructure projects—the Golden Quadrilateral national highway network, the Delhi Metro rapid transit system, and several public–private partnership airport projects across India's major metropolitan regions in New Delhi, Mumbai, Bengaluru, and Hyderabad, just to name a few—have not only revolutionized the capacity and quality of the country's transportation infrastructure, but also spurred growth of other major infrastructure projects, such as the Bharatmala Pariyojana national highway project, high-speed and semi-high-speed rail projects, dedicated rail freight corridors, rapid-transit metro railways across major cities, and modernization of airports.

Although India has significantly augmented its transportation infrastructure over the past two decades, the country has much more to achieve to ensure that its infrastructure can meet the country's demands now and in the future. In this paper, we size the investment opportunities and explore most prominent issues that are crippling India's transportation infrastructure. Then, we take a closer look at the challenges that three groups of stakeholders—government agencies, concessionaires and contractors, and financiers—will face in capturing those opportunities. Finally, we share strategies that these stakeholders can adopt to overcome the challenges.

Four major obstacles

The amount of money that India invests into transportation infrastructure lags other developing countries. For example India has historically invested about 1 percent of GDP in transportation infrastructure while China increased its investments from 4.7 percent of GDP in 2014 to 6.5 percent in 2017.[1] Even developed nations that have more mature infrastructure such as France and Japan spend about 1 percent of their GDP on transportation infrastructure every year. Fueled by this lack of investments, four prominent issues are crippling India's transportation infrastructure:

Inadequate roads. Highways are the backbone of every growing economy. And yet, India only invested $38 billion—about 0.35 percent of its GDP—in highway development between 2014 and 2018, whereas China has consistently been investing about 1.5 percent of its GDP in highways.[2] The supply of investments in infrastructure, which is not in line with demand, has put a strain on the country's roads. In addition, roads are India's most important mode of transportation, catering to 65 percent of all freight movement, and constrained capacity creates highway congestion and slower operating speeds. Because congested roads lead to 8 to 10 percent of lost travel time, network enhancements such as new expressways to augment the capacity of congested corridors along with new economic corridors, and urban decongestion are the need of the hour.

[1] Organisation for Economic Co-operation and Development, World Development Indicators, The World Bank Group
[2] CEIC Database, Department of Public Works and Highways 2018 budget

Social welfare obligations. Governments are often under social welfare obligations to subsidize public services at the expense of businesses—case in point being railways, where freight operations subsidize the cost of passenger journeys. Raising the cost to transport freight via rail reduces the attractiveness of that mode of transport, which leads to modal shift away from railways, limits the government's ability to generate revenue, and restricts investments that could augment capacity, leading to poor service on major routes.

Insufficient airport capacity. India's aviation infrastructure will face a significant gap in supply and demand in the coming years. Although schemes such as the UDAN regional airport development are addressing regional connectivity issues, airport capacity enhancement remains a problem, especially in the metropolitan cities of Delhi and Mumbai, which account for nearly 55 percent of India's total air traffic. Going forward, large cities are expected to need at least two to three airports to address congestion issues while at the same time providing passengers with world-class facilities. Developing new greenfield airports at Navi Mumbai and Jewar is a testament to this approach and positive steps in the right direction.

Lack of public–private partnerships. Because India is a developing economy with limited financial resources, rapid development of transport infrastructure will require private participation. However, difficulty and uncertainty in enforcing a "user-pays principle" along with the risks associated with enforcing contracts creates uncertainty in revenues.[3] In addition, the country's evolving concessionaire ecosystem, with a mixed history of success in public–private partnerships (PPP), has limited private players' participation in infrastructure projects—private investment is only about 15 percent of the total investment in infrastructure.[4] Social acceptance and enforcement of user fees, in addition to stricter enforcement of contracts and sustained improvements to the concessionaire ecosystem, will be needed to sustain investments in India's infrastructure landscape.

These four issues are among the main reasons for India's poor performance in logistics. India's rank on the World Bank's Logistics Performance Index has worsened over the years, plummeting from 35 in 2016 to 44 in 2018—highlighting the necessity of addressing the infrastructure gap. For example, India's freight cost, which is one component of the Logistics Performance Index, is 13 to 14 percent of GDP; for other developed countries, it is 9 to 10 percent of GDP—revealing the need for and potential economic impact of improving the country's transportation infrastructure.[5]

Three groups of stakeholders—government agencies, concessionaires, and financiers—can address these challenges with a concerted and coordinated effort that addresses the following elements: sizing and evaluating the investment opportunity across sectors to identify the most attractive areas, understanding the challenges associated with capturing this opportunity, and strategizing to overcome the challenges to harness the opportunity to the fullest. In this paper, we explore each of these three elements in detail.

[3] User pays for the access to and usage of infrastructure such as toll roads
[4] National Infrastructure Pipeline Task Force Report
[5] Ministry of Commerce and Industry study

Investing in India's transport infrastructure

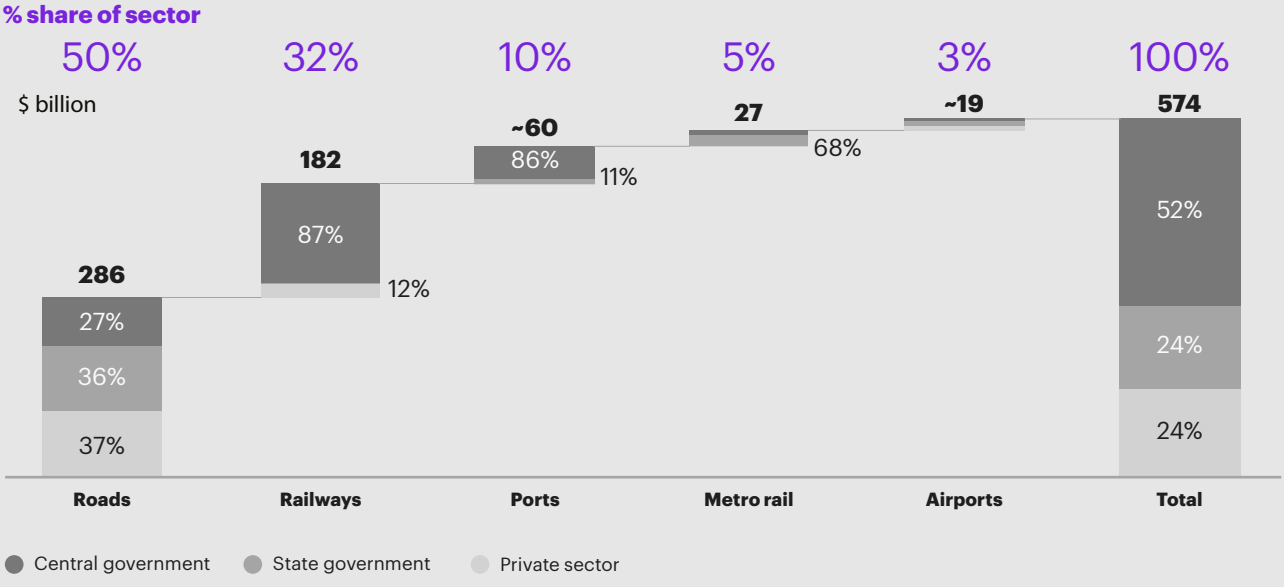
Significant opportunities exist in various transportation infrastructure modes. Prioritizing the most attractive opportunity is paramount. The National Infrastructure Pipeline, the government's development road map, has planned an investment of $1,350 billion over the next five years (fiscal year 2019–2020 to fiscal year 2024–2025).[6] Of this, about $575 billion is earmarked for transportation infrastructure. The rest is spread across other infrastructure sectors such as energy, irrigation, agriculture, and urban and rural infrastructure (see figure 1). This paper focuses on investments in transportation infrastructure.

Private-sector participation in developing transportation infrastructure is expected to increase in the coming years. In fact, the National Infrastructure Pipeline targets $115 billion of private-sector investments over the next five years across transportation segments, bearing testament to the opportunities and the need for greater contribution from the private sector. For example, private-sector participation in road projects is expected to increase from about 15 percent of total investments today to about 40 percent in the next five years.

[6] At an exchange rate of INR 75 per $1

Figure 1
India has earmarked funds to improve the country's transportation infrastructure

Estimated transportation infrastructure investment requirements (2020–2025)



Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

Roads

Bharatmala Pariyojana—India's largest infrastructure investment program with more than $100 billion—presents the most attractive investment opportunity in roads.

An average annual investment of about $45 billion is expected in the roads sector over the next five years, translating to about four times the average annual investment made between 2014 and 2016.[7] Investments are expected in a variety of ongoing programs—the most attractive opportunity being the flagship Bharatmala Pariyojana project, the government-sponsored national highways development program (see figure 2).[8]

Bharatmala Pariyojana presents an attractive opportunity for concessionaires and financial investors thanks to the program's scale and criticality:

— Once completed, the Bharatmala Pariyojana road network will be the backbone of the country's national highway network—catering to about 70 percent of the freight volume and connecting around 550 districts.

— Relatively shorter greenfield alignments between major economic centers are also being developed as part of Bharatmala Pariyojana. These high-traffic routes offer significant potential for tolls and will spur economic growth for previously poorly connected rural areas.

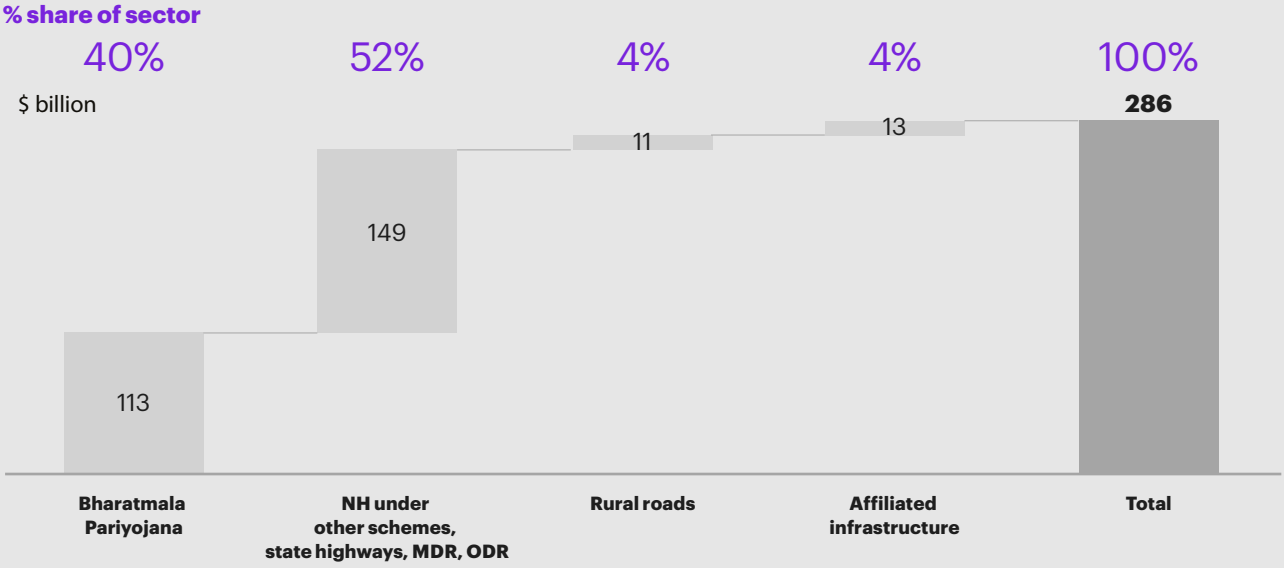
— With the country's history of tolling on national highways, there will be fewer challenges with enforcing tolls on the corridors being developed under Bharatmala Pariyojana.

— Bharatmala Pariyojana's investment potential is both significant and immediate; the first phase alone entails an award target of 34,800 km with an outlay of $110 billion. The National Highways Authority of India (NHAI) has focused on rapid rollout of projects under this scheme, which is manifested in the robust pipeline of detailed project reports prepared by NHAI.

[7] Organisation for Economic Co-operation and Development, World Development Indicators, World Bank
[8] Affiliated infrastructure in roads includes projects that support road network connectivity, such as wayside amenities, logistics parks, and intermodal hubs.

Figure 2
India plans to invest in a variety of road improvements

Estimated investment requirements for India's roads (2020–2025)



Notes: MDR is major district roads. ODR is other district roads.
Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

— While some of the ambitious target may not be fully met, the intent to fast-track the execution is clear. With the NHAI's growing experience in engineering, procurement, construction (EPC), and PPP projects, the award process has become more transparent and efficient, thereby improving the investment environment and reliability of such infrastructure projects. More than 32,500 kilometers of road work has been awarded since 2014.[9]

Given that Bharatmala Pariyojana has been the single largest outlay for any government road construction program in India's history, its projects are expected to garner priority support from stakeholders for quick approvals. This is a key driver for timely road construction and significantly reduces the risks involved in the project investment. Moreover, with dedicated resources working within government entities such as the NHAI to enhance and proactively manage project execution tracking and with major improvements being made in land acquisition processes, Bharatmala Pariyojana projects can be an attractive area for investors.

Railways

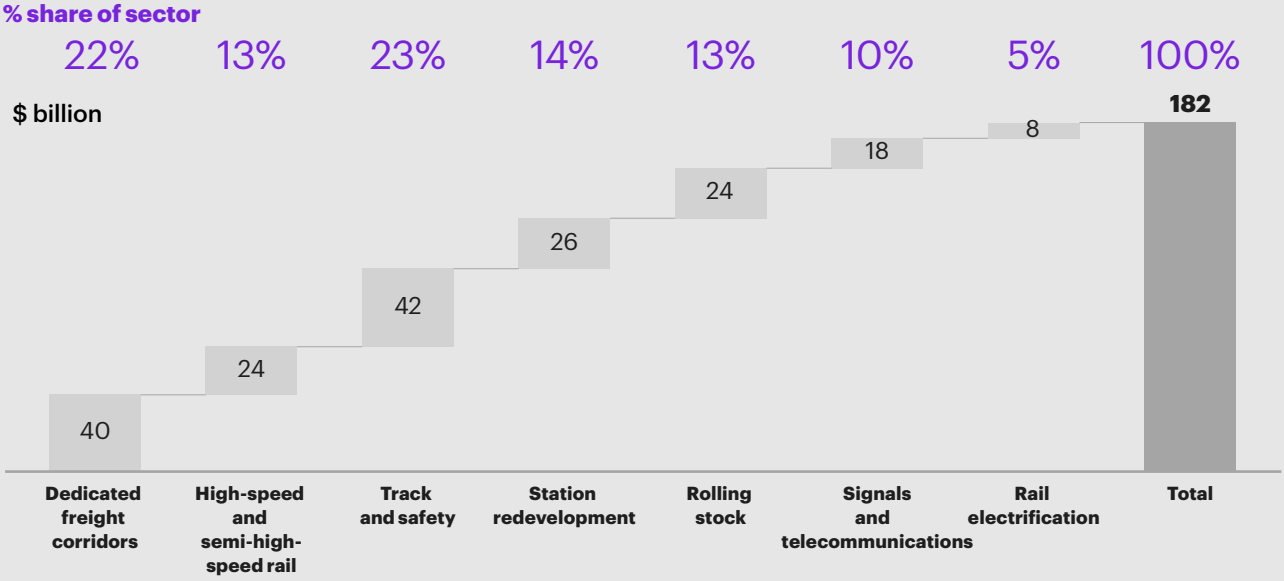
Railway station redevelopment and private train operations are among the most attractive investment opportunity in railways.

Railways will see an average 3.5 times increase in the annual investment over the next five years compared with the annual investment made between 2014 and 2017.[10] Investment opportunities in railway infrastructure are spread across seven areas (see figure 3). Of these, dedicated freight corridors (DFC) and high-speed and semi-high-speed rail will continue to drive investments to enhance logistics and passenger-handling capacity for Indian Railways. Station redevelopment is also seeing interesting PPP models of execution.

[9] Ministry of Road Transport, the Government of India, Investment Information and Credit Rating Agency
[10] Organisation for Economic Co-operation and Development

Figure 3
Railway infrastructure will be developed in seven areas

Estimated transportation infrastructure investment requirements (2020–2025)



Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

To boost private investments and improve the speed of execution for these projects, Indian Railways has set an ambitious target of increasing private-sector participation in major projects by 2025 across passenger and cargo trains, rolling stock, and stations. The high volume of traffic, the demand for better services, and an extensive network make railways an attractive proposition for investors.

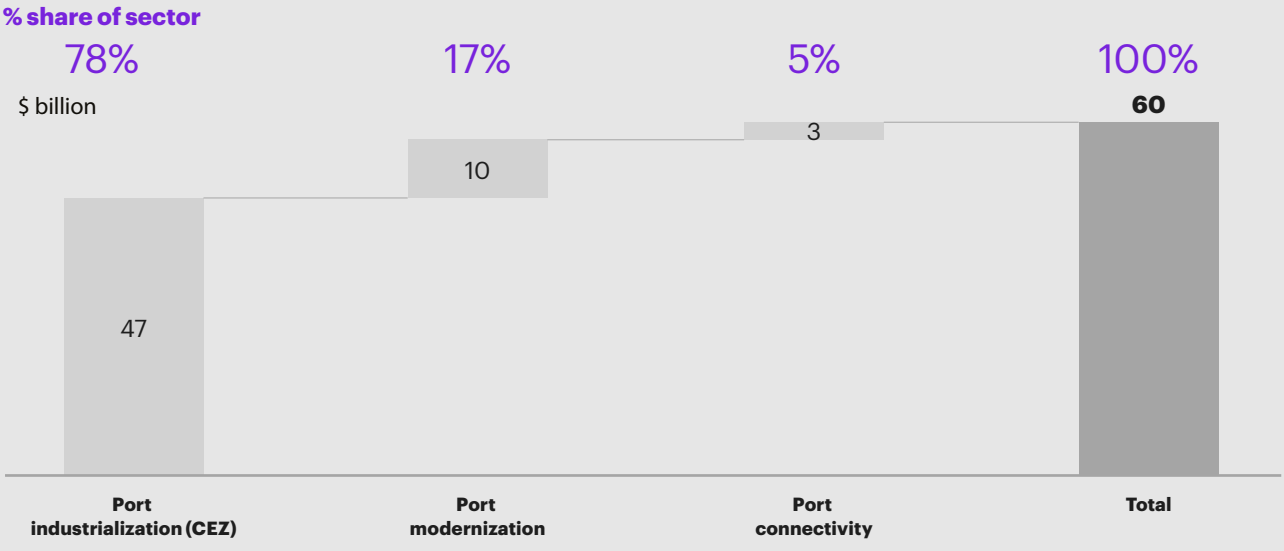
Station redevelopment has been a key focus for Indian Railways, driven by an urgent need to upgrade passenger amenities and infrastructure at stations. Further, capacity enhancement is also required because of the increasing footfalls at railway stations—more than 100 stations targeted under the redevelopment program have about 16 million footfalls every day with an average CAGR of 7 percent. Railways plans to leverage private-sector expertise for station redevelopment programs, especially in construction, commercialization, and operations and maintenance. With more than 600 stations proposed to be redeveloped in the long term via EPC and PPP projects, this subsegment has a high potential for investors.

Indian Railways has taken concrete steps to become more attractive to the private sector by introducing concessionaire agreements with much longer leases, giving investors an opportunity to earn a better internal rate of return (IRR). For example, the Surat multi-modal hub for rail and bus transport has a lease period of 99 years, while the Habibganj railway station in Bhopal is expected to be completed shortly with a lease period of 45 years. Railways have also made the concession model even more attractive by offering land parcels adjacent to city railway stations for commercial development—given the stations' large number of footfalls and prime locations—providing ample opportunities for a high IRR.

Indian Railways also has an ambitious plan to launch 150 privately run passenger trains on 100 key routes at an estimated investment of $3 billion in rolling stock and associated infrastructure. Private operators will be allowed to run train services using the common railway infrastructure—from tracks and signaling systems to depots and washing lines. Railways aims to provide world-class facilities to customers and overhaul the passenger train operations through privatization. The move is expected to improve the passenger experience, for example with reduced transit time and more modern coaches.

Figure 4
Port improvements will create a wealth of opportunities

Estimated investment requirements for India's ports (2020–2025)



Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

Ports

The Indian government's flagship Sagarmala program for port-led industrialization, with increased focus on inbound and outbound connectivity, presents significant opportunities.

Under this program, the government has envisioned developing port-proximate industrial capacities near the coast by setting up 14 coastal economic zones across all of India's maritime states and union territories (see figure 4). In addition, 35 potential port-linked industrial clusters have been identified in the energy, materials, discrete manufacturing, and maritime sectors.

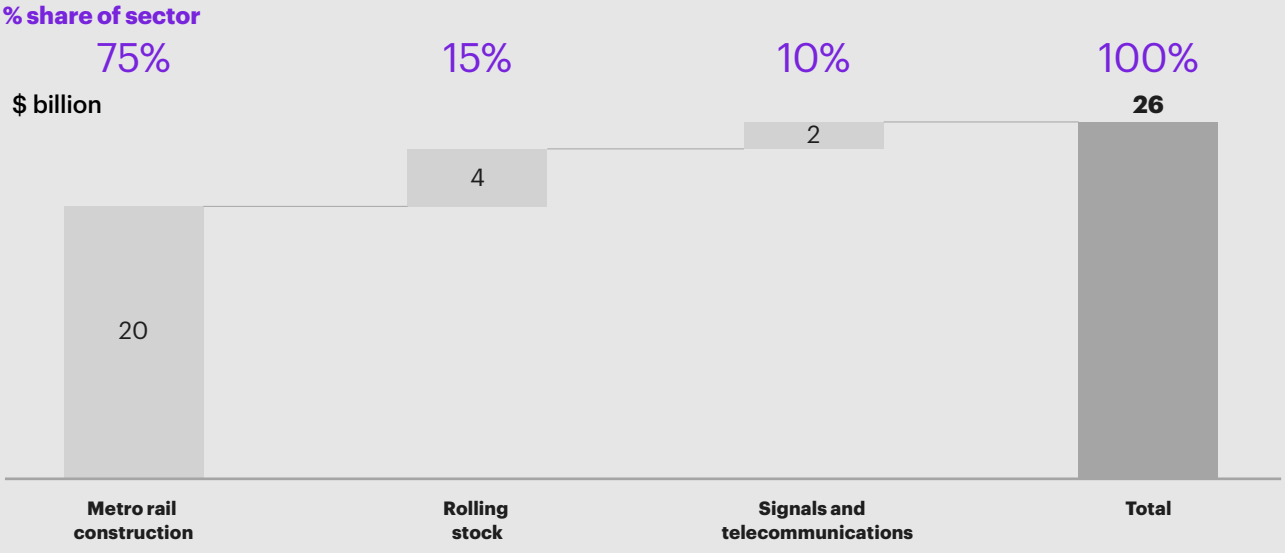
With a shift toward the globally preferred standard of port management under the landlord model in 2016, major ports gained an opportunity to introduce private-sector investments and improve operational efficiency, paving the way for private players to enter the market and help modernize ports.

In addition, development of inland waterways has seen good traction with the proposed development of several passenger and freight terminals along national waterways. These proposed waterways cover 24 states and two union territories and are proposed to be linked to the dedicated freight corridors and the Sagarmala project. These linkages would speed up the transportation of goods through a dense multimodal transport network, enabling seamless movement between waterways, dedicated freight corridors, and road transport. The ambitious inland waterway development program, which includes the country's 138 river systems, creeks, estuaries, and related canal systems, can be used to move passengers and cargo within the country and to the neighboring countries.[11]

[11] National Waterways Act, 2016

Figure 5
Enhancing mass transit will be essential amid India's rapid urbanization

Estimated investment requirements for India's metro rails (2020–2025)



Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

Metros

With a metro network expanding across the country, rail construction and operations present an exciting opportunity with an investment pipeline of $25 billion in the next five years.

Investments in urban transportation will continue to focus on developing mass transit infrastructure along with enhancing shared mobility and last-mile connectivity (see figure 5). With India's rapid urbanization, metros are a crucial part of each city's development.

Investments worth $25 billion are expected to come under bidding by 2025 for projects across multiple cities. About 50 to 60 percent of the total project costs would entail civil and electric works that require a high degree of domain specialization. Metro rail construction has already seen high interest and participation from private players, including in the form of PPP models, construction agreements, rolling stock supply, and maintenance agreements.

Airports

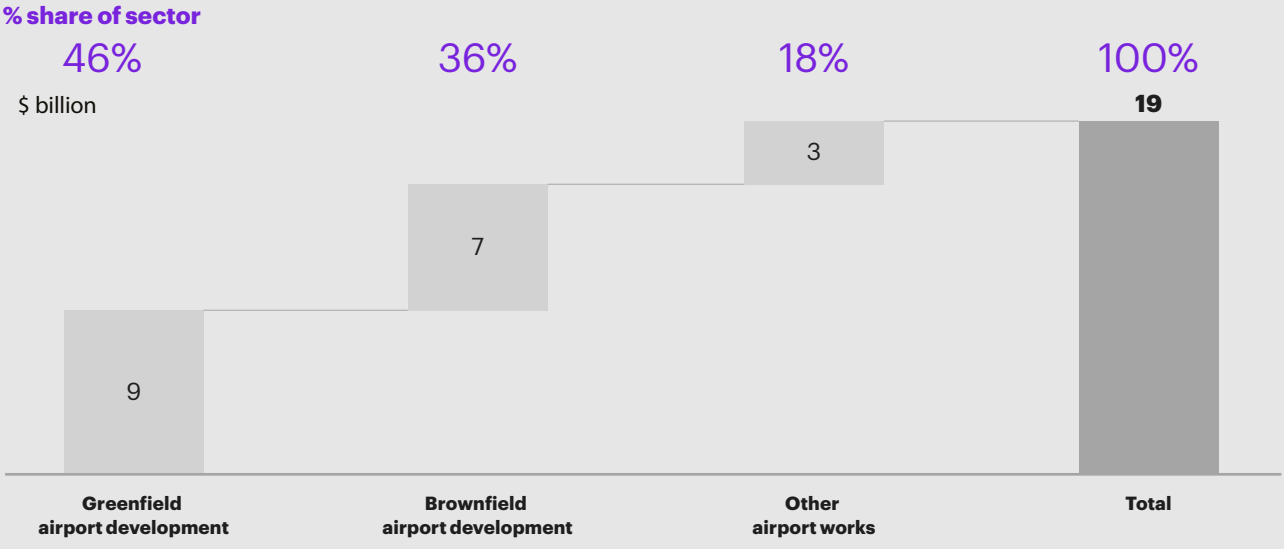
Plans to operationalize 100 new greenfield and brownfield airports in the next five years offer enough space for multiple players to comfortably coexist despite competition from incumbents.

India's aviation sector has enjoyed unprecedented growth over the past 15 years, driven by the growing demand for air travel, a rise in low-cost airlines, and the government's push for better regional connectivity, including schemes such as UDAN. Investments in this sector will fall into three areas (see figure 6 on page 9).

Over the next five years, 100 new airports—a combination of greenfield and brownfield projects—are expected to be operationalized. The push to improve regional connectivity has fueled a strong pipeline of airport projects across the country with a wealth of opportunities in greenfield airport development.

Figure 6
Airport investments will fall into three categories

Estimated investment requirements for India's airports (2020–2025)



Note: Other airport works includes airport terminal construction and runway works.
Sources: National Infrastructure Pipeline Task Force Report; Kearney analysis

Rapid execution, thanks to the anticipated high demand for airport infrastructure, and technical superiority will be the focus for players in this market. The recent tendering of the management contract for six AAI airports and the subsequent award to the Adani Group—with an aggressive per-passenger fee as a bid parameter—demonstrates both the interest from and opportunity for private investors. Similarly, the Jewar airport saw aggressive bidding from four companies: Adani Group, DIAL, Zurich Airport International AG, and Anchorage Infrastructure Investments Holding Limited, with Zurich Airport winning the contract.

The immense opportunities in this sector offer enough space for multiple players to comfortably coexist despite competition from incumbents. However, while large urban centers will need multiple airports, a more comprehensive development strategy will be needed for the next tier of airports, which may not be viable on traditional stand-alone PPP models.

Challenges in capturing the infrastructure opportunities

Although there are abundant opportunities in India's transport infrastructure sector, they come with a unique set of challenges for each group of stakeholders: government authorities, private concessionaires, and financial institutions.

Government authorities

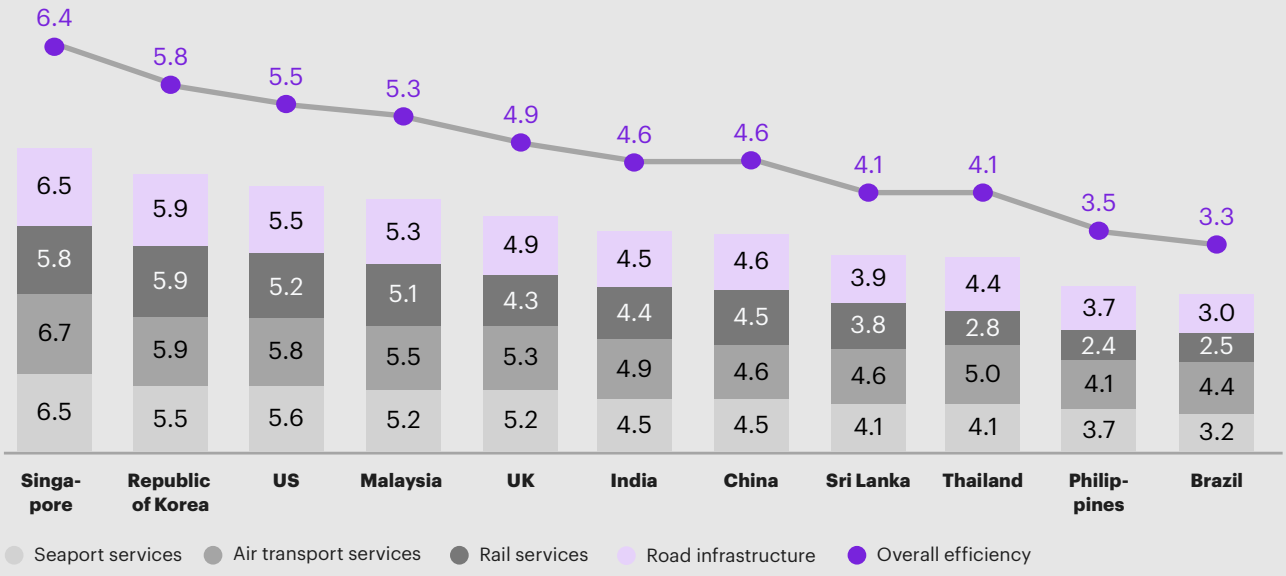
Challenges around project funding, clearance delays, land acquisition delays, and concessionaire and contractor non-performance result in deficient infrastructure coverage and quality.

India is lacking on both the extensiveness and the efficiency of its transportation infrastructure in road, rail, air, and port infrastructure, highlighting an urgent need to improve the quality and extensiveness of the infrastructure (see figure 7). Challenges pertaining to project funding, timely land acquisition and clearances, and contractor non-performance have accentuated the same.

The main challenge for government agencies is to secure project funding because of the high upfront capital investment that is required. Typically, the expenditures on infrastructure development are incurred in the first two to three years while revenue from the project in terms of collecting user fees is spread across 20 to 30 years after the project is launched. Because of this, a large-scale infrastructure push will require a combination of upfront public- and private-sector funding. With the rapid evolution of technological interventions in infrastructure development, there is a need to evaluate and prioritize investments based on the total life-cycle cost and returns from the project as opposed to the required upfront investment.

Figure 7
India's infrastructure is not as advanced as other countries

Infrastructure efficiency indicators



Note: The infrastructure quality is 1 = poorly developed and inefficient and 7 = among the best in the world.
Overall efficiency is calculated as the average of road, rail, air, and seaport services efficiency scores.
Sources: World Economic Forum's Global Competitiveness Report 2019; Kearney analysis

Finding the right partners for efficient, timely, and cost-effective project execution and ensuring high-quality asset maintenance and operations are also crucial and challenging tasks. Multiple large transport infrastructure programs have been delayed in the past as a result of poor performance by contractors and concessionaires. In addition, substandard pre-project preparation resulting in a change in scope during execution can lead to disputes between government authorities and concessionaires and disrupts project execution.

Monitoring the execution of ongoing projects also poses a significant challenge for government agencies given the country's massive size and the wide span of infrastructure projects. Further, there is a limited focus on tracking the quality of execution with objective metrics. Additionally, the lack of strong project management skills (aside from a few high-profile projects such as the Delhi Metro's initial phases) leads to poor planning and delays. Defining the right metrics to review and monitor progress and deploying the latest technology are essential to monitoring on-the-ground execution. Delays in project execution also result in escalations in the costs required to complete a project. For instance, delays in executing 205 Ministry of Railways projects has resulted in a cost escalation of $30 billion, which represents a 130 percent escalation over the initial estimate, according to a report by the Ministry of Statistics and Program Implementation.

Requirements for statutory approvals from multiple agencies are also a major bottleneck for any infrastructure project in India. For instance, the Supreme Court suspended the environmental clearance for the Mopa Airport in Goa, and construction was suspended in March 2019. The court eventually lifted the ban in January, but the suspension put the project off schedule by close to a year. Similarly, road, rail, and metro projects require coordination across multiple government agencies to shift utilities and build railway overbridges, underpasses, and tunnels. In the absence of a well-thought-through master plan with a cross-functional steering team or a single window approval, projects are bound to be delayed.

Another challenge that government agencies often face is approvals from tribunals and litigations. For instance, many urban infrastructure projects such as metro rail systems face challenges in engaging local residents to alleviate their concerns about safety, pollution, and privacy issues.

A delay in land acquisition and clearances also results in cost overruns in projects and leads to claims and arbitration by the concessionaires. Several projects for metro rail development in Indian cities have seen costs escalate as a result of inordinate delays in land acquisition and construction. A case in point is the first phase of the Bangalore metro; completion was delayed by more than six years, resulting in a cost overrun of about $1.1 billion.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act of 2013 resulted in an increase in the average land acquisition cost for greenfield projects. As a result, those costs rose from 10 percent of the total capital costs for road projects to 25 percent.[12] This has had a significant impact on the capital requirements for the government. Track doubling and tripling and laying of new railway tracks are examples of escalating land costs impacting project commercials, thereby rendering them unviable. Multiple railway projects have become unviable due to escalating land costs, which now accounts for about half of the total capital cost for laying a new line.

[12] NHAI annual Reports

Concessionaires and contractors

Challenges around project funding, timely clearances, disruptions in operations, and user-fee collection impact viability for concessionaires and contractors.

For concessionaires, the main issue is efficient capital management. It is imperative to have a comprehensive portfolio view that minimizes risk while enhancing profitability. Further, availability of credit from the financial institutions to undertake large projects is a major hurdle in generating interest in infrastructure projects. Of late, the credit crunch in the market is hurting concessionaires, especially small to mid-size concessionaires, when it comes to raising capital—leading to project delays.

Concerns about timely approvals continue to exist with the ever-present need for a strong structural mechanism to minimize risks that are beyond concessionaires' control. The need for approvals and clearances from a range of government agencies in each project along with unforeseen arbitration issues result in delays at various stages of a project. Given the scale of projects, excessive delays have often resulted in concessionaires' bankruptcy.

The infrastructure construction industry employs more than 33 million people, second only to the agriculture sector. However, most of this manpower is unskilled. With this mix of manpower and India's growing infrastructure projects, there is an acute shortage of skilled manpower to undertake complex work such as tunneling, boring, project planning, and design, especially in urban areas. These complicated activities require deep knowledge and expertise to achieve the desired level of quality in a cost-efficient manner.

Another key challenge is enforcing fee collections and increasing fares in a timely manner. Increases in user fees are a sensitive topic that can impact concessionaires' recovery. For example, metro rail fare hikes have come under massive public and media scrutiny and at times have led to lengthy arbitration and dispute resolution. Tolling disruptions in highway projects also pose a risk. For instance, suspension in tolling during the recent COVID-19 pandemic impacts project revenues and viability for concessionaires. In addition, issues with enforcing and collecting tolls have been a major challenge for many projects. However, this is expected to be partially resolved with automated toll collections on highways through FASTag, an electronic toll-collecting system of NHAI.

Unforeseeable events also disrupt the planning, logistics, and feasibility of projects. Natural disasters such as floods can set projects back for years. In the recent past, airport operations have been suspended because of floods, creating a significant revenue loss for concessionaires. Likewise, as a result of geopolitical issues and trade wars, port viability can drastically change in a short span of time because of a drop in the volume of commodities being shipped through the port. A very recent example is the COVID-19 pandemic, during which all construction activities have been halted, and as a result, most infrastructure projects will be delayed, leading to increased cost of project completion and lower returns.

Financial institutions

Lack of a strong legal and regulatory framework for early and efficient dispute resolution and challenges in infrastructure valuation have limited the participation of financial institutions.

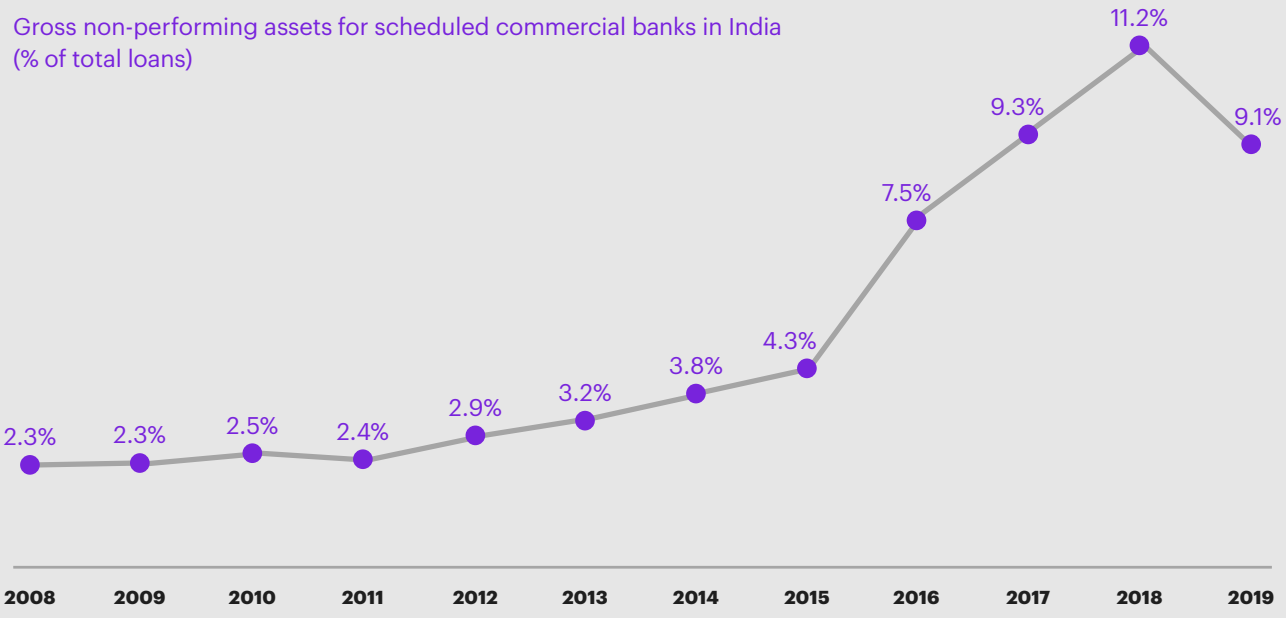
For financiers, investing in assets with risks to revenue realization is a constant worry. Identifying potential risks associated with infrastructure projects and valuing the risk factor in the project appraisal is a complex task. Missing an important risk or overvaluing the project can lead to non-performing assets. The issue of stalled projects and non-performing assets is already well-documented and continues to haunt infrastructure-focused financial institutions (see figure 8). In novel scenarios such as greenfield airports in tier 2 cities and greenfield corridors of national highways with no history of tolls, revenue projections under various scenarios need to be carefully evaluated.

Although large marquee projects that require significant investments have been conceptualized, the government still funds most of the projects despite a constraint on the overall spending power.

A stable regulatory model and strong governance mechanism to build investor confidence has been lacking, which has resulted in limited interest from financial institutions in proactively designing new products for infrastructure financing for both the government and private concessionaires.

One of the main reasons for the mismatch between the demand and the supply of infrastructure finance is financiers' lack of visibility into the long-term pipeline of projects. Infrastructure financing is a complex legal and financial process, requiring significant expertise. Developing this level of expertise is costly, and financial institutions will invest in this only if there is a well-defined pipeline of opportunities. Otherwise, the cost of developing the capabilities will outweigh the benefits that financiers will be aiming to reap by investing in infrastructure over other less complex asset classes. The government will need to define a long-term strategy with strong legal backing that enables a variety of financial institutions to enter the infrastructure market with diverse portfolios without the fear of arbitrary exercise of political power. Developing a national infrastructure pipeline is a step in the right direction and should be supported by stronger financial and legal safeguards for financial investors.

Figure 8
Banks are apprehensive about investing in assets that could put revenue at risk



Sources: Reserve Bank of India; Kearney analysis

Overcoming the obstacles and maximizing the opportunities

The investment opportunity in India's transport infrastructure sector is huge and spread across subsegments. Although there are obstacles to realizing the vast potential, these challenges can be overcome with a concerted and coherent strategy across all three groups of stakeholders: government authorities, concessionaires and contractors, and financial institutions.

Government authorities

As authorities design their transport infrastructure development strategies, they will need to focus on identifying the right funding model, ensuring robust cash flow management, and enabling a vibrant ecosystem of concessionaires and contractors.

Robust viability assessment and innovations to enhance project viability

Assessing project cashflows, returns, and viability is one of the most important factors in determining the right funding model for a project. Poorly made detailed project reports, sketchy business case models with generic revenue projections and cost estimates, and limitations in financial risk assessment are some of the major hurdles in developing a robust business case for investment. This can be addressed by creating a strong viability assessment framework for each focus subsector, highlighting clear guiding principles for prioritizing projects within each asset class. The project execution model and the financial model can then be decided based on the project viability.

Apart from the viability assessment, another important tool that can improve project viability and enhance a project's attractiveness for private participation is innovations in financial and project structuring. Financial innovations and project structuring can make projects more viable, particularly for those on the borderline of IRR thresholds. Innovative project structuring, such as the toll–operate–transfer model (TOT), can be much more attractive for projects with proven returns as opposed to greenfield development, with much more stable cash flows on the revenue and cost sides for private investors.

Another innovation, the hybrid annuity model, aims to lower the capex burden on the concessionaire, as in the case of a pure PPP project, but it also ensures that payouts are linked to performance during the concessions period, thereby addressing the authority's risk of concessionaire non-performance. This leads to a reduced cash outlay for the government and ensures a steady coupon payment with the concessionaire having skin in the game during the operations and maintenance period. In addition, this model enables authorities to leverage private-sector expertise and efficiencies in construction and operations while at the same time retaining the risks associated with revenue realization with itself.

Another innovation that is finding resounding success across infrastructure projects is asset commercialization, which can significantly impact a project's business case and make it far more viable than a stand-alone infrastructure project. For example, Indian Railways Stations Development Corporation has begun to tender out station redevelopment projects with a significant share of real estate development on the land parcel by relaxing the norms for floor space. Similarly, the NHAI is planning to monetize its land parcels along highways to offset the high cost of investment required and to improve project viability.

In addition, flexible policies on user fees can improve project viability. For instance, Malaysia recently introduced reforms in its port sector to improve efficiency and viability and prevent anti-competition behaviors while adopting tariff mechanisms to ensure competitiveness and operational capability. Each port has an independent government agency as the port authority, which develops tailored policies while acting as a landlord, regulator, and trade facilitator. The port authority also sets tariff limits in consultation with stakeholders. This helped improve the viability of port operations.

Managing the funding requirement

Infrastructure projects are largely executed by the government through the EPC mode. Raising the upfront capital required to execute infrastructure projects without upsetting government finances is a delicate balance. This coupled with the fact that revenues from transportation infrastructure projects are spread over 20 to 30 years after the project is completed poses a significant cash-flow management challenge. Relying solely on the budgetary resources will constrain the government's ability to plan and execute large infrastructure programs. Alternate and innovative sources of raising capital are the need of the hour. For example, the Airport Authority of India is looking at an investment of $25 billion over the next 10 years to meet targets laid out by the National Civil Aviation Policy of 2016, but it had internal resources and a government scheme allocation of only about $0.6 billion in 2019.[13] The gap is simply too wide to bridge using only budgetary allocation. However, with a debt–equity ratio of less than 0.1 in 2019, the Airport Authority of India's balance sheet is underleveraged for an infrastructure development authority building airports—one of the more viable asset classes within transport infrastructure. Government authorities are exploring options to bridge the gap between the required capital and the available resources, such as borrowing through bonds and loans, rotating assets, and land value capture financing to capitalize on the increased value of land as a result of infrastructure development.

There is a significant opportunity to raise additional capital through bonds by leveraging government agencies' balance sheets. For instance, Indian Railways recently raised $20 billion through bonds issued by Indian Railway Finance Corporation from the Life Insurance Corporation of India (LIC). Similarly, the NHAI raised $3.5 billion from LIC through bonds in the past year. In addition to raising finances for EPC projects, the government should also put in place the right mechanisms for selecting and phasing projects. This will enable enough revenue generation and phased capital deployment to meet the obligations of debt repayment. Although there is significant leeway to increase the debt on the balance sheet of infrastructure development agencies, structuring the terms of the debt (interest rate, moratorium, and tenure) to closely match the project's cash flow is crucial to limit any short-term cash shortfall and ensure robust debt serviceability throughout the life cycle of the asset.

Asset rotation, where the revenue from completed projects is capitalized by transferring the rights to levy user fees to private investors, is being explored to finance new projects. The TOT model eliminates the construction risk for the financial investor while providing a significant return on the investment through expected traffic growth. Such an asset class is well-suited for infrastructure-focused private equity and sovereign wealth funds as the construction risk is eliminated and the base traffic is already established, minimizing the revenue risk. A case in point is the first round of TOT auctions completed by the Ministry of Road Transport and Highways, which fetched about $1.3 billion—1.5 times the expected value. However, the second round did not get the desired response from the market as projects were not bundled appropriately. Based on the lessons learned from the second phase and from engaging with stakeholders, the third phase was successful.

The key imperative for successful asset rotation is prioritizing assets to be put on block and phasing them to ensure regular cash flows. In addition, ensuring the availability of good quality data to the interested bidders is essential to enable successful bidding and discovery of a fair price for the assets. Governments will need to proactively open communication channels with potential bidders to solve their deal-related queries to evince interest from domestic and global investors. The TOT model was refined to allow varying concession periods based on project features to attract a variety of investors.

The government is also bringing in new models to manage the financing requirement and create investment avenues for private investors. The infrastructure investment trust model is being used to monetize operational assets in the power and roads sectors. The NHAI is also exploring a project-based funding model to set up special purpose vehicles that would invest in developing a particular road stretch and operating it for a specified amount of time to get a return on the equity component and repay the debt obligations.

This would help the authority tap into additional resources for developing highways. More government agencies are opting for land monetization. Delhi Metro Rail Corporation has been involved in leasing land parcels and developing and leasing an IT park in Delhi. Similarly, the Airport Authority of India is leasing out land for hotel chains, car parks, and city-side developments. The Rail Land Development Authority is working on commercializing excess land available with Indian Railways. Funds from such proceeds can be poured back into ongoing projects to ease the funding requirements.

[13] Airport Authority of India Annual Report 2018–19

Authorities are also exploring ways to capture the value of increased real estate activity with the development of major urban infrastructure projects. For instance, the stamp duty in the influence area of 500 meters along Nagpur Metro has increased by 1 percentage point, and the surcharge is being shared equally between Nagpur Metro Rail Corporation Limited and Nagpur Municipal Corporation. Successful implementation of value capture financing through a higher stamp duty or other related mechanisms requires coordinated action with all concerned stakeholders: the infrastructure development authority, state governments, and urban local bodies.

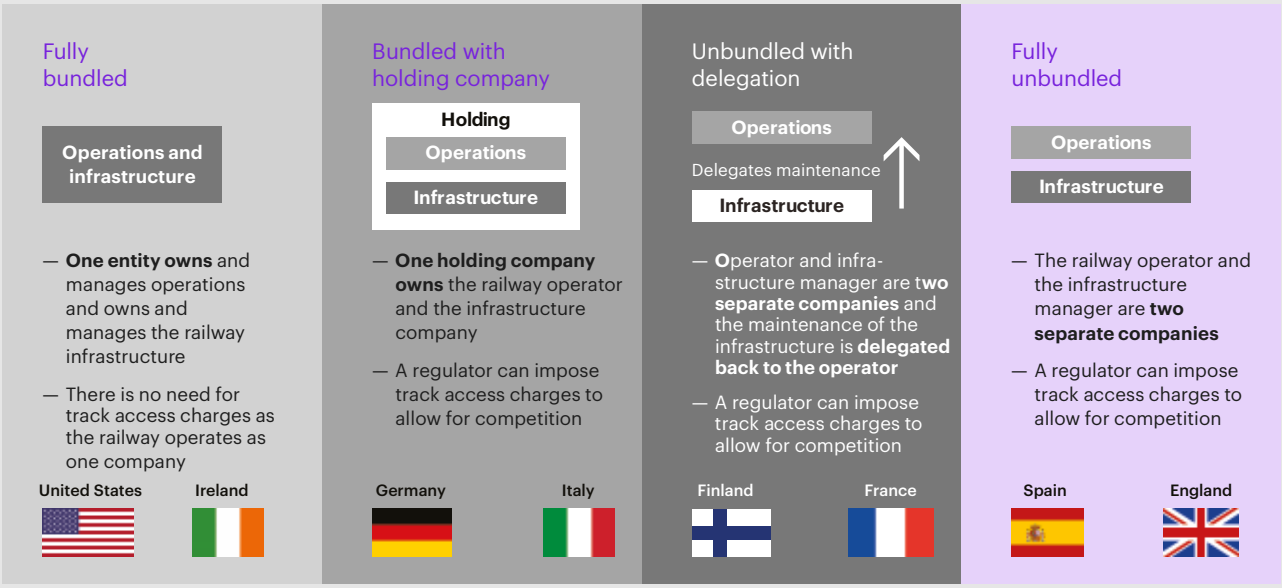
The financial models will have to be supported by the right operating model framework—clearly defining the roles and responsibilities of all stakeholders: government authorities, private concessionaires, and financial institutions. Specifically, in the context of railways, there are four operating models globally (see figure 9).

Enabling a vibrant ecosystem to absorb the infrastructure gap

Government agencies have a crucial role to play in developing the concessionaire ecosystem. Smaller regional players are often more agile when it comes to executing brownfield projects such as lane expansions or relatively smaller projects such as building local rural roads. On the other hand, projects such as greenfield airports are almost solely in the purview of a few large infrastructure players. In both cases, the government has a key role to play in shaping the ecosystem—creating a level playing field for both small regional players and large national infrastructure players. For example, the Ministry of Road Transport and Highways has modified the qualifying criteria for several road projects with smaller project packages that enhance smaller players' participation without compromising on quality thanks to stringent service-level agreements and metric-based performance tracking in concession agreements.

Figure 9
Operating models for railways

Operating models – overview and examples



Sources: Kearney analysis

South Africa's Skukuza Airport is a good example of how a PPP can be used for small infrastructure projects. The airport's operations were leased out to a consortium of companies, including regional airlines, a resort, and the South African National Parks Company for 10 years.

Private-sector involvement can improve both the execution and the financing of a project; the crucial role of the public sector is to provide the right conditions to reap those benefits. Apart from a proper contractual structure, a solid legal framework is crucial. Infrastructure projects are long term, and political risks loom large for investors. Investors will be prepared to commit large sums of financing at long horizons only if they can trust the legal and political procedures. Improved safeguards for preventing non-performing assets and mechanisms to turn non-performing assets around can also boost the concessionaire ecosystem and provide more confidence for investment. The Airport Authority of India's recent management contracts for brownfield airports have enabled many new bidders to enter the fray despite the sector being a monopoly of a few large infrastructure players over the past decade and a half. By addressing the concerns of all parties and developing a robust framework for tendering and performance-based tracking, agencies can play a vital role in developing a robust ecosystem of concessionaires.

A great example of a vibrant ecosystem can be found in the allied non-transport infrastructure space: urban sanitation and wastewater treatment. Infrastructure projects have historically been executed at a local level with a variety of contractors in charge of interception and diversion work, laying sewage lines, and finally, operating sewage treatment plants. This led to several issues, such as lack of monitoring and responsibility tracking, which resulted in several projects not being functional as planned. Larger contractors were not interested in executing small piecemeal projects. A shift in thinking resulted in a novel "one city, one operator" concept, enabling larger contractors to take responsibility for a city's entire sanitation network. Further, mandating the use of technology to track operational performance and a clear metric-based compensation system has triggered a transformation in the ecosystem. This has also significantly enhanced the ecosystem's capacity to absorb more projects by bringing newer players into the fold.

Concessionaires and contractors

With the growing infrastructure investments and greater participation from the private sector, concessionaires need to explore strategic partnerships, identify the right markers for decision-making, and ensure the quality and timeline of project delivery.

Exploring strategic bidding and partnerships to improve efficiency and the quality of work

With more private-player participation, there is bound to be immense competition. Recent projects across subsegments ranging from roads to airports have seen aggressive bids, including from domestic and international players. With the growing scale and complexity of projects, concessionaries are facing intense competition in multiple unfamiliar environments and are managing the projects across a more complex and frequently decentralized organization. This necessitates active engagement with multiple domestic and international agencies to bid as a consortium. While consortiums enable cross-pollination of expertise and best practices across various entities of the consortium, it is also crucial to manage the performance of all the partners backed by a robust risk–reward structure.

While projects are typically awarded in smaller packages, strategic bidding with a portfolio view will help maximize economies of scale. For example, aggressive bidding for all project packages in a region, thereby optimizing deployment of machinery, material resources, and skilled manpower, will lead to a profitable portfolio for the contractor. Maximizing profitability thus requires a focused strategy at key decision points along the life cycle of individual projects and the portfolio.

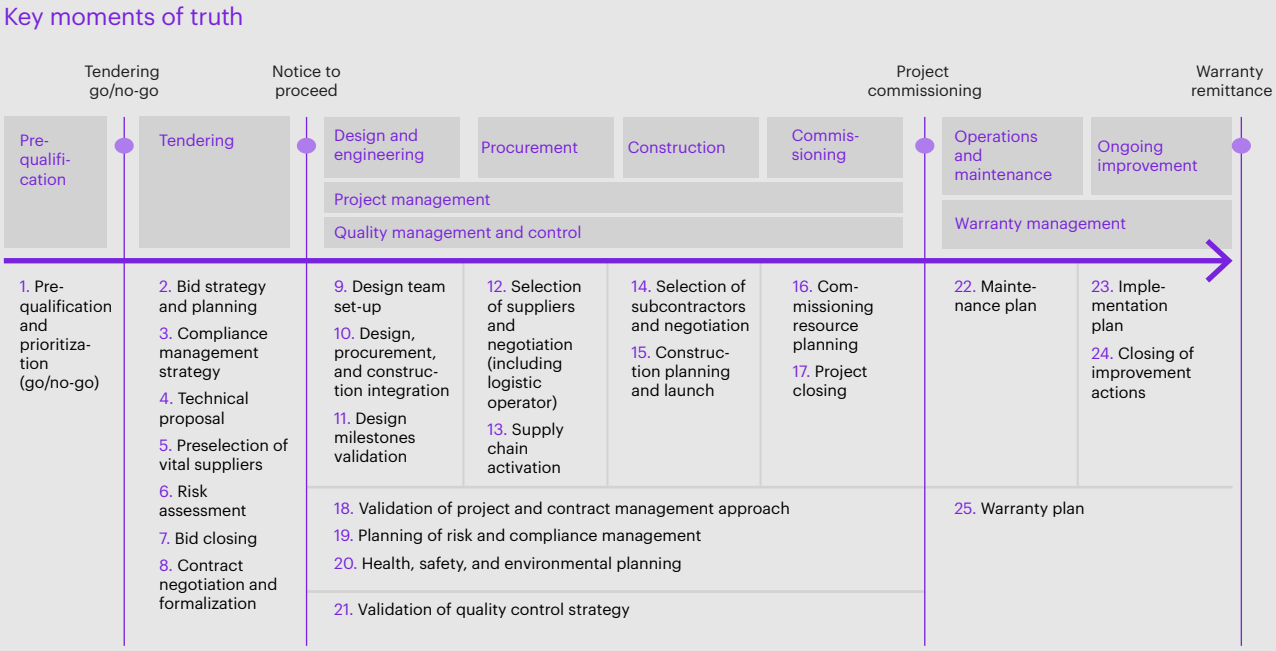
Identifying the right markers for decision-making

While most organizations believe they have a robust operating model, the fact remains that across hundreds of processes, the moments of truth are often lost, resulting in loss-making projects that impact profitability. In this environment, concessionaires must identify the crucial markers or key decision points at the right time to ensure competitiveness, minimize risks, and improve profitability. Kearney's proprietary digital platform-enabled approach, the Shielded Operating Model (SOM), provides a funnel for all key decisions, helping to monitor processes and improve discipline and control (see figure 10). In addition, it improves and facilitates the work environment and coordination in an organization with dispersed projects and diverse people working simultaneously in real time, ensuring that know-how is kept within the firm. For example, in civil construction projects, 25 to 30 key decision points, backed by the right control elements, can help minimize risks and improve profitability (see figure 11 on page 19).

Ensuring the quality and the timeliness of project delivery

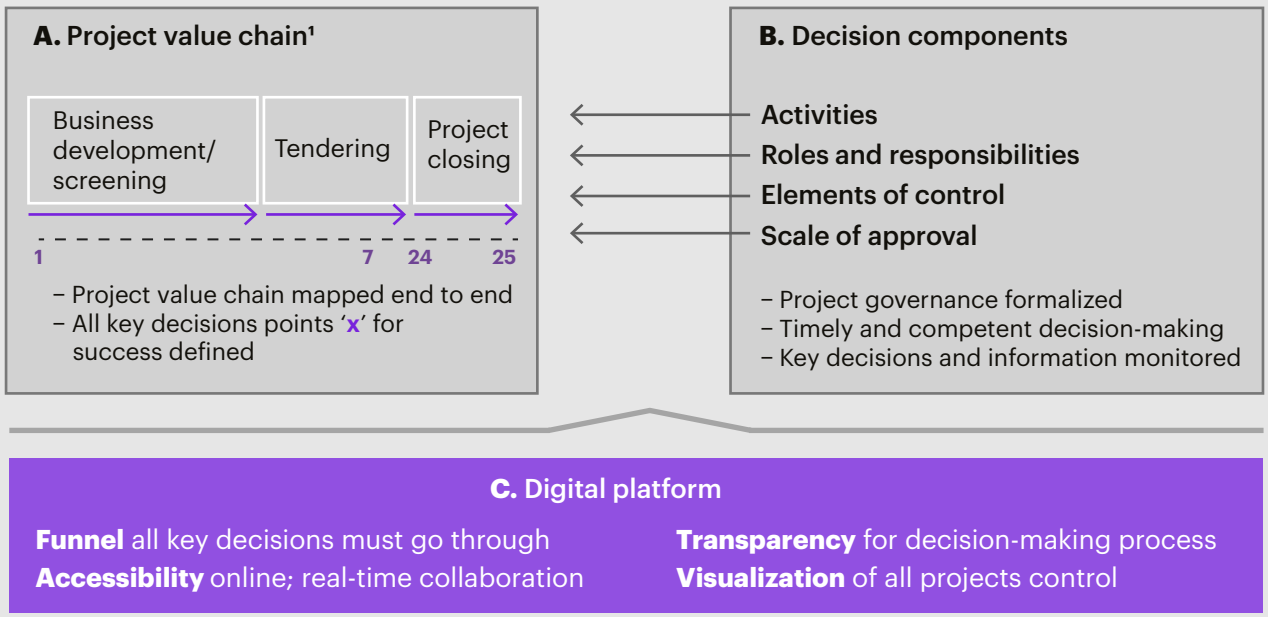
Concessionaires and contractors must focus on developing strong capex deployment and project management capabilities to ensure timely completion of projects, which in turn enables faster realization of returns. This would entail a thorough risk assessment to proactively identify risks associated with construction and development of mitigation strategies. For example, undertaking a thorough on-the-ground investigation by adopting advanced techniques such as LiDAR and ground penetration radar before beginning work will enable more accurate planning and minimize uncertainties during the execution of highway projects. Proactive engagement with the government authority during project execution is also essential to resolve risks and minimize delays and cost overruns.

Figure 10
A digital platform can help funnel decisions to reduce risk



Sources: Kearney analysis

Figure 11
Identifying the essential decisions can minimize risk and improve profitability



Source: Kearney analysis

Financiers

In addition to reevaluating the risk–reward spread in the infrastructure sector, financial institutions should collaborate with government authorities and concessionaires to develop innovative products for financing.

Foreign direct investment in India's infrastructure sector has been growing at a rate of about 35 percent CAGR over the past five years, and the trend is expected to continue, driven by the increased infrastructure spending expected in the government's flagship projects. This staggering growth in foreign investment is a testimony to the fact that India's infrastructure growth story is fast emerging as an attractive investment opportunity for global financiers, despite challenges (as outlined above). With the evolution of new financing and operating models for infrastructure projects, financiers will have to thoroughly evaluate the risk return profile of each asset class. Specifically, the risks and sensitivities associated with collecting user fees, which is the basic source of returns, will need to be evaluated in a fair and transparent manner to ensure secured returns and business case viability.

Financial institutions also need to reevaluate their portfolio of investments given the wide variety of new government projects—from high-risk projects such as greenfield development to those with more secure cashflows such as brownfield projects. Financial institutions will also need to be mindful of the cash-flow cycles of their investment portfolios to balance the risks associated with refinancing, which is typically needed in capital-heavy projects.

Given the evolving ecosystem with a variety of players from small local firms to large infrastructure companies, financial institutions will need to create products that cater to a wide range of needs. They will have to constantly bring innovative products to the market that satisfy the risk appetite of concessionaires and government agencies. Furthermore, financial institutions must work closely with the government to fine-tune the contracting terms and project packaging and to design alternate financing options for asset rotation.

Bridging the gap

India has an attractive transport infrastructure opportunity, but there is a lot to be done across the spectrum of stakeholders to close the infrastructure gap. Successful projects need to be analyzed and upheld as models, with the key lessons learned disseminated across government agencies, concessionaires and contractors, and financiers. The supply–demand gap is too large to be solved without effective collaboration, speedy execution, and robust monitoring and tracking. With a concerted effort, today's challenges can be transformed into an opportunity that will not only boost organic growth, drive job creation, and aid a whole gamut of industries but also help fulfill one of the most basic tenets of economic and social activity: mobility to serve the common good.

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