Infrastructure Practice

Building India

Accelerating Infrastructure Projects

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Executive Summary

India has set an ambitious target of investing USD 500 billion in infrastructure during the Eleventh Plan period. However, the country has consistently fallen short of meeting such targets over the last few years and early signs of implementation challenges are already visible. During the first two years of the Eleventh Plan, fewer infrastructure projects have been awarded than planned. We estimate that the average rate of awarding projects has been around 70 per cent of the planned rate. Further, government data[1] suggest that a majority of projects—close to 60 per cent—are plagued by time and cost over-runs.

Inefficiencies In Infrastructure Impede Growth

If current trends continue over the Eleventh and Twelfth Plan periods (2008 to 2017), McKinsey estimates suggest that India could suffer a GDP loss of USD 200 billion[2] (around 10 per cent of its GDP[3]) in fiscal year 2017. In terms of GDP growth rate, this would imply a loss of 1.1 percentage points.

In addition, India's economy could lose up to USD 160 billion in 2017, by forgoing the industrial productivity impact of infrastructure. However, there is no conclusive approach for estimating the value of such productivity impact, and hence it is not included in our estimate of the GDP loss, which is pegged at USD 200 billion.

Inefficiencies in implementing infrastructure projects in India occur at all stages. This includes awarding projects as per plan targets, securing financial closure, and executing projects within cost and time. Our estimates suggest that the shortfall in awarding projects as per plan could result in a USD 100 billion loss to the GDP; time and cost over-runs in project execution could lead to another USD 80 billion loss; and capital constraints would account for the remaining loss of USD 20 billion.

Shortfall in awarding projects as per plan

The shortfall in awarding projects during fiscal years 2008 and 2009 has been on two levels. One, nodal agencies such as the National Highways Authority of India (NHAI), have not tendered projects as per the Eleventh Plan; two, many tendered public-private partnership (PPP) projects have not found bidders due to viability concerns and bidding eligibility criteria (e.g., players who had been shortlisted for eight or more projects were restricted from bidding in the National Highways Development Project or NHDP, Phase 3). Overall, our analysis suggests that this has resulted in a shortfall of around 30 per cent in awarding projects in power generation, national highways and major ports.

Inefficient project execution

India does not compare favourably with other countries in executing projects. Data from government and industry suggest that on average, each project suffers from 20 to 25 per cent time and cost over-runs, while in some sectors this is as high as over 50 per cent. Further, discussions with leading industry players suggest

1 Project implementation status report of central sector projects costing INR 20 crore and above (April to June, 2008), Ministry of Statistics and Programme Implementation.
2 Based on an exchange rate of INR 41 per USD.
3 Based on an average GDP growth rate between 2008 and 2017 of 7.5 per cent.

that Indian providers (engineering, procurement and construction or EP&C companies) often fail to tap significant opportunities to reduce time and cost.

Impending shortfall in funding

Structural impediments in the financial system coupled with the global credit crisis will constrain capital flows to the sector. The core[4] infrastructure sectors are on course to a deficit of USD 150 billion to USD 190 billion in financing during the Eleventh Plan period. This deficit is equal to around 35 per cent of the investment planned in core sectors over this period[5]. However, the shortage of funds has not been acutely felt during fiscal years 2008 and 2009 because the slow pace of tendering and uptake of projects has suppressed the sector's demand for capital.

Major Bottlenecks Hamper Infrastructure Implementation in India

Our analysis and discussions with stakeholders including policy makers, nodal agencies, construction companies, developers, financiers and bureaucrats, highlighted major bottlenecks in different phases of implementing infrastructure projects in India.

Challenges in the tendering phase affect viability of projects, delaying implementation

Several bottlenecks in the tendering phase of projects impact their viability and uptake, and create delays during pre-tendering or construction stages. Our discussions with a range of stakeholders reveal several common challenges in the tendering phase of infrastructure projects:

- **Quality of planning and engineering design is poor:** Project plans are of poor quality and lack attention to detail, which creates problems such as scope changes and variations during project execution, thereby creating disputes and delays. Also, nodal agencies often do not adopt a value engineering mindset to project design, thereby increasing the project costs.
- **Tendering unviable PPP projects is common:** Many examples of unviable projects exist in the national highways sub-sector. Three issues that hamper the viability of projects are: projects that are planned beyond their scope, dated cost estimates that lead to insufficient viability gap funding (VGF), and increased risk to the provider due to several contractual terms such as the possibility of termination of concession, if traffic crosses a threshold level.
- **Contracts in use are inappropriate:** Item rate contracts are common as opposed to lump-sum EP&C contracts. These contracts allow the designs to be variable and increase the frictional cost of interaction between the nodal agency and the construction contractor.
- **Pre-tendering approval process is centralised and slow:** The multitude of approvals required across many infrastructure sectors (e.g., from the External Finance Committee, Public Investment Board or by the Cabinet Committee for Economic Affairs) can add almost up to one year to the pre-tendering process. Several processes, such as ministerial approvals, do not have defined timelines. Furthermore, the individuals involved are not always held accountable for delays in approvals.

Construction phase beset with over-runs and disputes

In the construction phase, delays in land acquisition, ineffective resolution of disputes, shortages in the availability of skilled manpower and weak performance management in nodal agencies result in time and cost over-runs.

- **Land acquisition delays are common:** Global best practices suggest that land acquisition should be complete before a project is tendered. In India, projects are often awarded with only part of the land physically acquired, sometimes as low as 30 per cent. Delays in subsequent land acquisition are possibly the single largest factor causing project

4 Power, roads, railways, ports, airports, irrigation, water storage, gas.

5 Please refer to McKinsey's *Building India: Financing and Investing in Infrastructure*, 2009, for more details.

delays. These delays are driven by three factors: 1) under-valuation of land price; 2) dependence on state governments for land acquisition; and 3) the ambiguous definition of the term "unencumbered land"[6].

- **Dispute resolution processes are ineffective:** Arbitration is the method of choice to resolve disputes globally. However, in India, arbitration has been largely ineffective. The Arbitration and Conciliation Act, 1996, is ambiguous about the challenging of awards, and lacks enforceability. During industry interviews, customers and providers agreed that arbitration awards are almost invariably appealed against, resulting in long drawn-out disputes that often last 3 to 10 years.
- **Performance management is weak:** Nodal agencies are hampered by weak performance management including: 1) low transparency in performance, which would help create public pressure; 2) lack of meaningful incentives (financial or otherwise); and 3) absence of clearly defined consequences in the event of under-performance.
- **Availability of skilled and semi-skilled manpower is insufficient:** The growth of skilled and semi-skilled manpower in India has not kept pace with the growth in infrastructure projects. While a survey by the National Sample Survey Organisation[7] estimates that 13 million workers enter the market every year, only 3 million receive training. India's vocational training curriculum is largely outdated and not based on clear standards. Further, the current certification process is based largely on theoretical testing, and does not ensure employability.

Provider skills are weak across the value chain

While there are examples of companies that have matured from small, unorganised contractors to large, well-organised construction companies, notable skill gaps remain. These include:

- **Weak risk management skills:** The skills and tools Indian providers have to assess and manage risks are weak compared with their counterparts in developed countries. McKinsey's assessment of leading construction companies in India reveals a low prevalence of global norms of risk assessment. This increases project costs and results in project failures when providers take up projects beyond their capabilities.
- **Below-par design and engineering skills:** Providers under-utilise the value engineering opportunity in EP&C and PPP projects due to the lack of a value engineering mindset as well as poor capabilities. Most providers do not have an adequate organisational set-up to capitalise on this opportunity.
- **Lack of best-in-class procurement practices:** While most Indian providers attempt to optimise procurement, their practices are not best-in-class. Global majors commonly follow practices such as demand consolidation, new vendor development, preferred relationships through frame contracts, and joint cost reduction. Prevalence of these procurement practices in India remains relatively limited. As a result, our estimates suggest that potential savings opportunities of 5 to 20 per cent of the addressable costs are forgone.
- **Low prevalence of lean construction principles:** Lean construction is a nascent phenomenon globally. Discussions with leading industry players suggest that most Indian providers have not adopted lean principles. As a result, opportunities to reduce time and costs by 20 to 30 per cent are forgone.

Way Forward for Government, Policy Makers and Nodal Agencies

A few key initiatives could help address the bottlenecks and allow policy makers and nodal agencies to emerge as best-practice customers. Given the critical role of

6 The National Highways Act, 1956, defines land as "free from all encumbrances" after issuing a 3D notification. This does not necessarily imply the absence of physical encumbrances such as dwellings.

7 Paper titled "Challenges before Construction Industry in India", 2004, by Arghadeep Laskar and C.V.R. Murthy, Indian Institute of Technology (IIT), Kanpur.

infrastructure in ensuring a sustained growth trajectory for India, it is imperative that these initiatives are acted upon at the earliest. While several of them can have immediate impact, others would need sustained efforts over the long term.

Five initiatives can have immediate impact

These five initiatives, after due deliberation with key stakeholders, can be implemented immediately.

1. **Change land availability norms and tighten contractual penalties for delays:** Acquiring 90 to 95 per cent land could be a pre-condition for tendering PPP and EP&C projects; for other projects this limit could be 80 per cent. The definition of "unencumbered land" could also be modified so that it is based on the absence of any physical encumbrance such as dwellings. Further, after a project has been awarded, the nodal agency's commitment to acquire the balance land should be secured by including an unambiguous penalty provision in the contract.

2. **Establish a high-power group to monitor and de-bottleneck infrastructure projects:** This group could be a part of the Committee on Infrastructure and its scope could include all projects above USD 25 million to USD 50 million. It should monitor project portfolio and nodal agency performance, and ensure transparency in performance. The group should have powers to escalate inter-ministerial bottlenecks to relevant decision makers and expedite their resolution.

3. **Amend policies and regulation to hasten dispute resolution process:** A few initiatives could help improve the dispute resolution process. These should include, for instance, strengthening India's arbitration laws to make arbitration awards more effective and enforceable (even if they are appealed against), ensuring equal representation of both parties on the arbitration panel, deterring frivolous litigation by issuing policy guidelines, and setting up a dedicated tribunal for infrastructure cases, with powers equivalent to those of High Courts.

4. **Judiciously adopt delivery mode to increase success rate of tendering PPP projects:** To make tendering more efficient, the delivery mode of each project should be decided upfront on the basis of size, viability and feedback from potential providers. The government could create a think tank that has technical and analytical capabilities to test and modify the scope of individual projects. This think tank should also make appropriate and much more binding recommendations than are made currently on delivery mode to the PPP Appraisal Committee (PPPAC).

5. **Select design and engineering consultants on the basis of quality-cum-cost assessment:** Technical consultants should be selected using a quality-cum-cost based approach (QCBA), instead of the traditional L-1 basis. This approach would be similar to what other countries follow. Including the past performance of consultants in their quality assessment could help increase its relevance and accuracy.

Four initiatives will need continued efforts for impact

The four initiatives described below should be kick-started immediately, with a long-term commitment towards developing the right capabilities, systems and processes.

1. **Reform contracts:** Nodal agencies need to consider reworking their contracts to capture private sector efficiencies and accelerate project execution. In line with global norms, they should consider moving from item rate contracts to lump-sum EP&C contracts. The suitability of this approach would depend on project size, complexity and provider sophistication. Further, they should use standard contracts, possibly based on those used in multi-lateral agency-funded projects, as it would make

interpretations of clauses consistent and lead to lesser disputes.

2. **Carve out programmes of national importance as special purpose vehicles (SPVs) with world-class governance:** The government should identify a few large programmes and put them under new independent entities; each should span a few high-impact projects of national importance and have excellent capabilities.

3. **Institute strong performance management systems at nodal agencies:** While external governance will continue to be important, its success depends critically on the agencies' ability to create stronger performance orientation internally. Broadly, this will entail developing comprehensive quantitative performance metrics, establishing tracking mechanisms for these metrics, and setting up consequence management systems.

4. **Kick-start a construction-focused vocational training programme:** The government could initiate a programme to generate an additional 2 to 3 million skilled/semi-skilled workers per year for the construction industry alone. This programme should develop viable PPP models to attract private entrepreneurs with the government potentially providing partial equity and real-estate for these institutions. This programme should use industry expertise in setting standards, faculty training, apprenticeship and certification.

A Call to Action for Providers

Operationally, the capabilities and practices of Indian providers need to mirror the standards of their global counterparts. Bridging this gap would reduce both the time taken and costs incurred in infrastructure projects. In addition, providers need to make some conscious choices about their business models and the corresponding skills required to win sustainably in chosen spaces. They should also collectively take a set of actions to become more professional and competitive.

Improve risk assessment and management: As efforts to meet India's infrastructure needs gain momentum, increasingly, government and nodal agencies will offer larger projects transferring a majority of risk to providers through PPP and EP&C modes of project delivery. Accordingly, providers will need to improve their risk assessment and management capabilities. This would include setting up an independent team to assess risk; institutionalising processes to manage risk at multiple stages; and developing sophisticated tools and systems.

- **Upgrade design and engineering capabilities:** As PPP and EP&C projects become more prevalent, the engineering role will be increasingly transferred to providers. Providers should aim to capture the full potential of value engineering by building strong in-house value engineering teams, putting in place the right performance tracking and incentive mechanisms, and enforcing value engineering in all steps of the design process. They should aggressively eliminate the redundancies and over-engineering in project design, and explore the use of standardised design modules across projects.

- **Make procurement and sub-contracting world-class:** Providers should adopt a total cost of ownership (TCO) approach to optimising procurement. They should manage their supplier and sub-contractor base with the mindset of developing long-term, preferred relationships. This would entail tracking their performance to identify high performers, and investing in their development. Low-cost countries such as China, Russia and those in Eastern Europe should be explored as sourcing options by setting up local offices. Internally, the demand for large spend categories should be consolidated for centralised sourcing.

- **Adopt lean principles in construction:** At the very least, providers need to improve their basic construction management, by putting in place practices such as planning to the L-5/L-6 level before starting construction, translating plans into daily productivity schedules, ensuring on-time availability

of material and equipment, and using automated equipment and tools. To reduce waste and increase their productivity substantially, they should use lean principles such as construction flow balancing (CFB). To accomplish these improvements, they will need to substantially strengthen their planning and construction management organisation.

Beyond operational improvements, India's large spend on infrastructure and the changing nature of opportunities (e.g., more PPP projects, increase in usage of lump-sum EP&C contracts) will force providers to make strategic choices along several dimensions. In particular, providers should consciously decide their footprint across the value chain (e.g., becoming developers) and the segments to participate in (e.g., restrict to one versus diversify into multiple segments). These decisions will determine the business model of the providers and help them prioritise the right capabilities.

Finally, providers should collectively take a set of actions to become more professional and competitive, safeguard the interests of their employees, and enhance the industry's reputation. These actions should be taken through a well-organised industry association with committed participation from major players. They could include the adoption of latest health, safety and welfare standards for employees; working with industry participation and government for enhancing the availability of skilled and semi-skilled workers; and increasing awareness among industry participants about important issues such as demand patterns, risks and technology evolution.

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Setting an ambitious target for infrastructure investment is only the first step towards improving infrastructure in India. Significant inefficiencies plague the sector, posing a threat to the successful achievement of this target. In the past few months, the government has taken several measures to address these inefficiencies, such as providing close to USD 20 billion of low-cost funds for infrastructure projects, through the India Infrastructure Finance Company Limited (IIFCL). The new government has also expressed strong commitment towards infrastructure, for example, the target of adding 20 km of roads every day and investing USD 60 billion in roads during the next five years. However, eliminating these inefficiencies will require more of such concrete steps, based on a common understanding of the key bottlenecks that hamper infrastructure implementation.