Digital technologies and skilled professionals together define the modern project environment.

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How do you look at the current scenario of project execution in India?

India is going through a significant phase of infrastructure development. Over the past decade, the size and ambition of national programmes have grown significantly. Areas such as urban infrastructure, water supply, renewable energy, transport corridors, manufacturing, and digital public systems are expanding faster than ever before. This makes project execution a key part of India's growth story.

One positive change is finally a realisation and appreciation of how sponsor, project, and operations teams must plan and execute across the CAPEX and OPEX phases, and a mindset that respects the core aspects while also enabling collaboration. CAPEX mindset brings to the table, for example, structured upfront planning with scenario crafting, proper project site and Geotech due diligence, utility planning, engineering discipline know-how, procurement planning, and risk management. In contrast, the operational mindset or OPEX thinking adds practical knowledge of reliability, maintenance, and operational performance. When these two perspectives are aligned early, projects progress with much more clarity. If there are gaps in understanding and appreciating the differences between CAPEX and OPEX thinking, mindset, planning, and collaboration, projects and operational plans will undoubtedly be adversely affected and face a severe risk of failure or delay.

At the same time, projects have become more complex. There are multiple agencies involved, more statutory requirements, and higher expectations for quality, safety, sustainability, and transparency. Success now depends on strong planning, sound front-end engineering, and capable leadership throughout the project life cycle.

The good news is that both government and industry now see professional project management, planning, procurement strategies and predictable cash flow as essential, not optional. It is a core capability that ensures investments deliver timely and lasting value. With better governance, digital tools, risk-based planning, and skilled project managers, India is well-positioned to achieve global standards in predictability and quality.

What is lacking in effective project management at Indian construction projects?

India has strong design, engineering and execution capabilities, but some structural gaps still affect project outcomes, the most critical being upfront project planning and scenario analysis. The first and most common issue is a lack of proper, in-depth, milestone-driven project preparation, including fundamental aspects such as a detailed project report (DPR), site, soil, and geotechnical analyses, and proper approvals. Many projects fall into the trap of believing they know operations and the market and using these as the drivers for the capital project phase, without having complete clarity on objectives, scope, site readiness, or statutory approvals.

Project stakeholders also fall into the trap of replicating past projects in a new region or sector. When front-end engineering and early studies are given insufficient attention, it often results in design changes, additional claims, cost overruns, and schedule delays.

The second challenge is fragmented communication. Large projects involve multiple agencies, disciplines, and contractors, each using different formats and processes. Without a unified digital platform, decisions take longer, site issues are reported late, and

chances to correct deviations are missed.

A third concern is the limited use of data and analytics. Many decisions are still based on assumptions rather than evidence. Advanced digital systems and AI tools, which are common in global projects, are still underused in India.

Finally, clarity of responsibility is often weak. When ownership of tasks, approvals, and deliverables is not clearly defined at the start, accountability becomes diluted. Structured models such as RACI can help, but adoption has been slow.

From a design perspective, while early involvement of operational teams helps ensure operational reliability, excessive interference during the capital project design phase can delay projects and disrupt structured planning. The key is to strike the right balance. OPEX inputs should be captured at defined stages without compromising design progress.

India's project ecosystem will benefit greatly from stronger preparation, balanced coordination between CAPEX and OPEX mindsets and talents that have capital project vs operational experiences and competencies, wider use of digital tools, data-driven decisions, and clear responsibility structures.

What are the key steps needed in project planning and execution that will bring more efficiency?

Efficiency is created long before a project reaches the site. The most critical steps are thoughtful planning, disciplined engineering, and structured coordination. Project efficiency is established long before work begins on site. The foundation lies in disciplined planning, strong engineering, and structured coordination. For a company like TCE, which focuses on design and engineering, these steps are critical to ensure smooth execution and predictable outcomes.

The first step is an adequate and proper early project preparation stage. This includes feasibility studies, site investigations, stakeholder consultations, statutory mapping, risk assessment, and front-end engineering design. This stage must clearly define what the project will deliver and what resources, decisions, approvals, and dependencies are required to make it feasible. When preparation is thorough, design changes and delays during execution are minimised.

The second step is alignment between CAPEX and OPEX at the right stage. OPEX inputs are valuable for shaping layout, equipment selection, safety systems, and maintainability. However, these inputs should be captured during the preparation phase and early design reviews, not during detailed engineering. Excessive interference later can disrupt structured planning and delay progress. Once alignment is achieved, CAPEX can focus on engineering quality, constructability, and planning discipline, while OPEX concentrates on operational reliability and long-term upkeep.

The third step is a robust project master plan. This plan should integrate timelines, risk registers, procurement strategies, design dependencies, interface responsibilities, and milestones. It must be realistic and aligned with statutory processes, supply chain realities, and site conditions. A well-prepared master plan acts as the single reference point for all stakeholders.

The fourth step is to define roles and approvals with a responsibility matrix, such as RACI. When every activity has an identified owner, a responsible executor, a set of stakeholders to be consulted, and those who need to be informed, communication becomes smoother, and decisions move faster. This clarity prevents duplication and ensures accountability.

The fifth step is the use of digital technologies. Tools such as BIM, digital twins, 4D and 5D planning, cloud-based collaboration platforms, and mobile applications like SmartSITE enable planners and field teams to work from a single source of information. This improves coordination, reduces rework, and enhances transparency.

The sixth step is leveraging AI for better decision-making. AI-enabled forecasting can highlight early signs of schedule pressure. AI-supported design reviews can detect clashes and errors that may not be visible in manual checks. AI-based analytics can help planners test multiple scenarios before finalising execution strategies. These capabilities allow teams to anticipate risks and act proactively.

When these elements are in place, project delivery becomes more predictable, risks are managed effectively, and the asset is ready to perform well over its whole life cycle. For TCE, the focus must remain on disciplined

engineering and structured planning, supported by timely OPEX inputs and advanced digital tools.

How are you bringing in more efficiency and productivity in your project management activities and services?

At Tata Consulting Engineers, we see project management as an integrated discipline that combines engineering expertise, digital intelligence, and strong governance. Our aim is to create predictability, reduce rework, and ensure alignment between design and execution throughout the life cycle of a project.

Clarity of responsibility: Every major engagement begins with a RACI structure that defines ownership, execution, consultation, and information flows for each deliverable. This ensures that teams know who is accountable for every task, who will provide inputs, and who needs to be informed. This clarity prevents duplication, reduces delays in approvals, and builds trust among stakeholders.

Digital enablement: Our TCE SmartSITE platform plays an important role in improving transparency and responsiveness. SmartSITE captures real-time data on daily progress, safety observations, photographs, manpower details, equipment usage, and material status. This information is instantly available to project managers and owners through dashboards. As a result, decisions are quicker, risks are identified earlier, and the reporting burden on site teams is reduced.

Advanced digital tools and AI: We use Building Information Modelling, 4D and 5D planning, digital twins, and automated document management systems to improve constructability and coordination. AI-based tools help us forecast schedules, validate quantities, simulate risks, and assess progress with accuracy. These technologies allow teams to anticipate challenges and act proactively.

Capability building and multidisciplinary support: Our project managers are supported by multidisciplinary teams that include planners, discipline engineers, safety professionals, and digital specialists. Continuous learning programmes ensure that they remain updated in contract management, statutory frameworks, stakeholder engagement, digital project controls, risk management, and emerging construction technologies.

This integrated approach helps us deliver projects with higher certainty, lower rework, and better life cycle performance. By combining engineering discipline with digital intelligence and strong governance, Tata Consulting Engineers ensures that projects meet global standards of efficiency and quality while creating lasting value for clients.

What is the role of digital technologies and skilled professionals in your project management practices?

Digital technologies and skilled professionals together define the modern project environment. Each brings unique strengths that complement the other and create a foundation for efficient and predictable project delivery.

Role of digital technologies: Digital tools improve accuracy, speed, and visibility across the entire project life cycle. Building Information Modelling and digital twins allow us to visualise and validate the project long before construction begins. Cloud-based collaboration systems ensure that design teams, planners, and contractors work from the same source of information, reducing errors and improving coordination. Mobile applications such as TCE SmartSITE provide real-time updates on progress, safety observations, manpower, and material status, creating a single source of truth for all stakeholders.

Artificial Intelligence adds significant value by strengthening decision-making. AI can analyse thousands of schedule scenarios in minutes, detect patterns of delay, predict material shortages, and highlight possible clashes in design. It can also assist in quality reviews and support health and safety monitoring. AI does not replace human judgment; it enhances the quality and speed of decisions by providing evidence-based insights.

Role of skilled professionals: Technology alone cannot solve project challenges. Skilled professionals remain essential for success. Experienced engineers and project managers bring judgment, leadership, and practical understanding of site conditions, contractor capabilities, and stakeholder expectations. They ensure that digital insights translate into responsible decisions and that projects adapt effectively to real-world complexities.

The TCE approach: At Tata Consulting Engineers, we combine both elements intentionally. Our project teams include domain specialists with deep engineering knowledge and digital professionals who bring advanced tools and analytics. This balance allows us to design and deliver assets that are efficient to build, reliable to operate, and aligned with client objectives. By integrating technology with human expertise, we create a project environment that is transparent, collaborative, and capable of meeting global standards.

What are your thoughts on adopting effective project management practices for bringing in more efficiency in project execution in the country?

India is at a defining stage in its development journey. The country is building airports, metros, renewable energy parks, industrial corridors, city water systems, and next-generation digital infrastructure at an unprecedented scale. The efficiency of project management will determine how quickly these investments translate into social and economic value.

There are four areas that deserve national focus:

First, stronger project preparation - A project that begins without a clear scope, realistic timelines, and well-defined risks will struggle throughout its life cycle. Preparation must become a mandatory discipline, not a compressible step. This includes feasibility studies, risk mapping, statutory clearances, and front-end engineering. When preparation is robust, execution becomes predictable.

Second, wider adoption of digital tools and AI - Digital platforms improve transparency, reduce disputes, and allow owners to make decisions based on evidence. AI brings predictive strength that can highlight risks months before they appear at the site. Technologies such as BIM, digital twins, and cloud-based collaboration systems should become standard practice across large projects.

Third, clarity of responsibility - Models such as RACI create accountability and reduce ambiguity. When each stakeholder understands their role and decision rights, coordination becomes smoother and execution faster. Responsibility clarity must be embedded in contracts and project governance frameworks.

Fourth, investment in skilled project managers - India needs a larger pool of trained professionals who understand engineering, contracting, regulation, stakeholder management, and digital tools. Skilled project managers are the link between planning and execution, and their leadership is essential for timely and quality delivery.

By prioritising these practices, India can deliver projects with greater predictability and create assets that perform well throughout their life cycle. This will ensure that the country's ambitious development agenda translates into lasting social and economic value. ■