ORGANIZATION STRATEGY

Fixing Large Capital Projects Isn’t About More Planning. It’s About a New Approach to Delivery.

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It’s the uncomfortable truth of large capital projects: almost all take more time and money than expected to complete—and project owners know it before the first steel is cut. That’s true whether the project is an oil rig, bridge, or power plant.

In fact, less than 1% of capital projects meet deadlines and deliver promised value. The problem lies in traditional project management, which prioritizes detailed, rigid planning, stability, and control. When things go wrong, the standard response is to double down on planning. But in an era of dynamic change and technological innovation, flexibility and speed win the day.

To fix what’s ailing large capital project performance, project owners can follow the lead of the technology industry, which tackled its once-chronic underperformance by switching to adaptive project delivery. In it, the end state is clearly defined but how to get there remains fluid enough to accommodate delays and unforeseen circumstances. Asset owners can achieve better outcomes faster by replacing rigid controls with outcome-based accountability, modular design, dynamic governance, collaboration, cross-functional teams, and AI-augmented workflows.

Traditional Project Delivery Is Broken

Large capital projects fail consistently across industries and geographies, pointing to deep structural problems. The existing model is slow to adapt, cumbersome to learn, and too brittle for today’s construction environment, where capital can be volatile and new technology is a constant.

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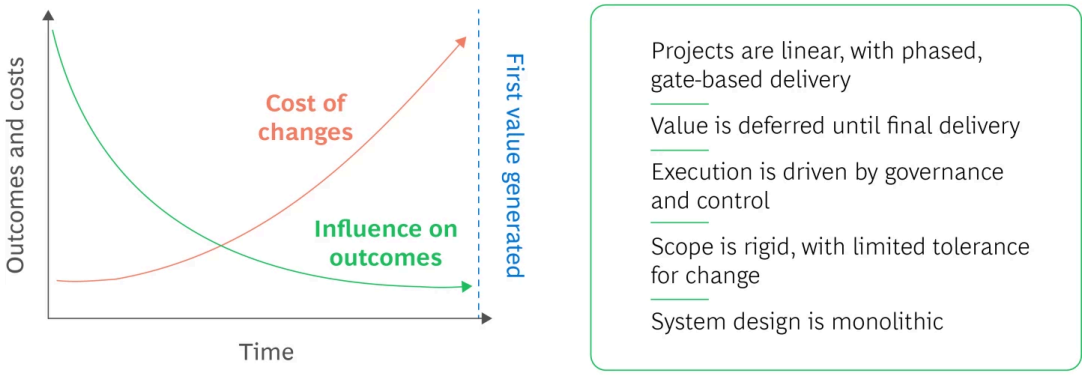
In a typical project, copious time goes into creating detailed design plans that, once locked into place, cannot be changed. Work is mapped out in rigid stages for workflow and safety reasons, then budgets and oversight guardrails are set, vendors chosen, and incentives created for their work. When projects get hit with supply chain interruptions, labor issues, or other problems—

which happens all the time—costs increase, along with delays, which defer when the project starts generating value. (See Exhibit 1.)

EXHIBIT 1

Traditional Capital Project Delivery Structure Can Delay Generating Value



Source: BCG analysis.

A deeper look at how delivery traditionally is managed shows the problems inherent in the system.

Governance prioritizes rigid planning. A linear governance model, with a specific order in which phases of work must be finished before the next phase can start, leads to bottlenecks when problems arise. The need to stick with what's in the plan often prevents project teams from having frank conversations about what's happening. Contractors may be especially reluctant to bring up issues for fear of reprisals, or because incentives favor staying the course over taking action.

The process, not the insight, dictates the course. Success is defined by adhering to the plan, not responding to new data or changing realities. Performance is measured by deliverables and deadlines. Project teams become custodians of compliance rather than stewards of value.

Delays are baked in. Delays are framed as execution issues and overruns as exceptions. The root cause is often structural, a delivery model designed for control, not learning. What feels like risk reduction in the moment can become risk amplification over time.

As a result of the flaws, a shift in policy, design, or supplier midway through a project can unravel months or years of design work, whether it's a new emissions target or a reporting mandate. Entire systems may have to be reengineered, recertified, or replaced. Changes can cascade across interfaces, procurement schedules, and construction sequencing, affecting timelines, budgets and

project credibility. Delays add to the time that projects will take to be completed, create uncertainty and strained communications, and provide more time for the world to change in the interim.

How Adaptive Capital Project Delivery Works

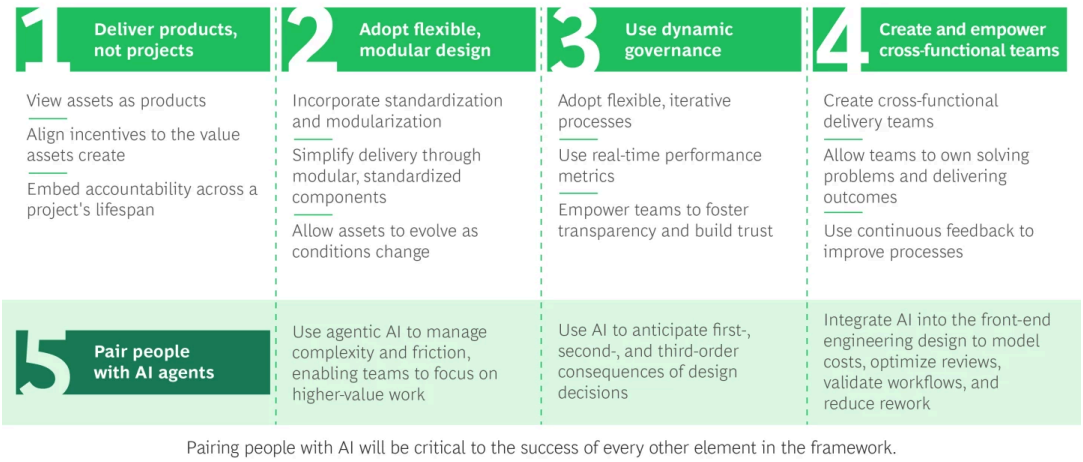
As large capital projects get more complex and technology-driven, leaders must modernize how they manage and deliver the work to unlock productivity, resilience, and ROI.

Our experience and client work have demonstrated the benefits of adopting adaptive capital project delivery. In such an approach, a project's end goal is still clearly defined. But the pathways for getting from start to finish have enough flexibility built in so project managers can navigate issues and make adjustments without losing momentum. Adaptive project delivery has some features in common with the agile principles––including modern ways of working, cross-functional teams, and delivering continuous value––that originated in the tech sector and over time have seeped into industries of all kinds.

The approach depends on five key changes to how work is done. (See Exhibit 2.)

EXHIBIT 2

Adaptive Capital Project Delivery Is Based on Five Key Changes



Source: BCG analysis.
Note: The examples shown are illustrative, not exhaustive.

1. **Deliver products, not projects.** Instead of thinking of a bridge, cargo ship, or digital transformation as a project, asset owners need to think of these as products with a mix of

physical, digital, and automated elements that can be adjusted, improved, and scaled over time. That means moving away from managing based on milestones with discrete tasks and specific pathways. Instead, project leaders must spread accountability across a project's entire lifespan and align incentives to the value that the project creates for the business. By making those shifts, project teams can realize value and benefits earlier and faster without compromising long-term performance.

2. **Adopt flexible, modular design.** Flexible designs that incorporate standardization and modularization—including interchangeable components—allow project teams to make modifications on the fly and avoid delays. Building modularity into a project's design and delivery also makes assembling or reconfiguring systems faster, reduces complexity, and makes it easier to continuously evolve.

3. **Use dynamic governance.** It's possible to address safety concerns while moving from rigid stage gates to flexible processes and dynamic oversight. The key is using real-time performance metrics to quickly identify issues at every level of delivery and then make rapid, informed decisions about how to clear them. Empowering teams in this way fosters transparency, builds trust, and enables continuous improvement.

4. **Create and empower cross-functional teams.** Having separate departments, functions, or organizations operating in isolation can lead to duplicate efforts, which slows down work. Instead, asset owners and project leaders can create cross-functional delivery teams with representatives from engineering, procurement, operations, subcontractors, or other groups. Leaders can then encourage teams to solve problems, deliver outcomes, and seek continuous feedback to improve processes along the way.

5. **Pair people with AI agents.** Companies can use agentic AI to augment the work that teams do throughout the delivery process. AI agents can manage complexity and friction, freeing up people for more critical work. For example, AI agents are good at pinpointing and solving problems with dependencies between workstreams that can be too complex for people to discern on their own. AI-based predictive scenario models could track first-, second-, and third-order consequences of design decisions, and optimize decision making by providing a clear picture of a project's status.

Integrating AI agents into a project's front-end engineering design (FEED) phase—the planning stage where technical specifications, costs, and procurement needs are spelled out in detail—can help asset owners optimize safety and compliance reviews, model costs, and schedule scenarios. It also can validate engineering workflows and reduce rework. All of these early interventions reduce downstream risk and keep projects data-driven.

> Early interventions reduce downstream risk and keep projects data-driven.

How Two Companies Implemented Adaptive Capital Project Delivery

The experiences of two companies in different industries illustrate how adopting a modern, adaptive approach improves capital project delivery.

An Energy Company Switches Gears. When an energy company with multiple projects in early phases of construction encounteredsetbacks, the problems pointed to traditional delivery methods. For example, senior asset owners weren't as engaged as they should have been early on, and a compressed project design phase and siloed engineering function led to design problems, which created delays. In addition, low-cost labor and lack of coordination between trades led to poor execution and the need for rework.

To address these issues, the company adopted an adaptive delivery model approach that included the following steps:

- Asset owners became more engaged in the process, and success metrics were changed to prioritize system readiness and first-time quality. Project teams treated assumptions about timelines, circumstances, and technology as hypotheses to be tested, not hard truths to be followed.
- Project leaders set up cross-functional, product-focused teams that adopted modular design, widely available components, just-in-time procurement, and integrated digital platforms to keep design, procurement, and construction in sync. Teams were empowered with end-to-end accountability and used velocity-focused metrics to enforce it.
- AI was integrated into the FEED phase of the projects, which made the phase more dynamic, and allowed for continuously validating assumptions to iterate and evolve the scope. Teams used digital twins to identify integration risks early and replaced rigid, siloed workflows with

an agile delivery model. In addition, they updated the project architecture to include schedule flexibility and supply chain adaptability.

- Teams also adopted AI models for simulations and scenario planning, and used agentic AI to anticipate integration risks, forecast material constraints, track readiness, prioritize workflows dynamically, and enable just-in-time decisions.

A Materials Company Adopts Adaptive Capital Delivery. Early into planning a lithium extraction plant, leaders at the plant's parent company realized that having siloed functions working autonomously would result in inefficiency and slow down delivery.

The company adopted multiple aspects of an adaptive delivery approach to remedy the issues, including the following:

- The company set up cross-functional teams and restructured work on various aspects of the extraction plant into individual "products."
- Instead of designing the entire project prior to construction, teams are making pressing design decisions and delaying others until they have more data. They are also prioritizing making decisions about items with long lead times, as well as tackling key uncertainties early—–all of which makes work go faster without increasing risk. Prioritizing decisions also helps advance key regulatory processes.
- Individual teams are given clear ownership of upgrade pathways for specific product modules, which give them experience with adaptability and supported scaling and improves accountability.
- Teams work toward predetermined goals in quarterly cycles, and they are trusted to figure out how work should get done as long as it is within prescribed guidelines.
- At the end of each cycle, teams hold reviews with internal stakeholders to assess their progress and get feedback that they integrate into future work.

The results of shifting from function-based to product-based work has been profound. The newfound clarity of scope and ownership means fewer people need to sign off on deliverables, which accelerates the work. Giving teams responsibility for product modules makes communications faster, decisions more autonomous, and accountability clearer. The new structure has improved delivery performance. It has also created a culture where people know what they are building, why it matters, and how their work fits into the whole, which helps establish purpose and incentives. The shift also improved inter-team communications, which matters for a project with complexities that demand significant dependencies.

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Putting the Approach into Action

For asset owners facing pressure to improve capital project delivery performance, overhauling the current system isn't enough. Success requires a fundamentally different mindset and approach to deliver value faster, make adjustments in real time, and integrate emerging technologies without friction.

To assess where they are and what changes they may need to make, asset owners can ask themselves the following questions:

- What failures keep happening despite better planning? How do we choose the right delivery concept if we won't know how it will work until after we've committed to it?
- If speed and adaptability are important, how is the current team structure holding us back? Are contractor strategies in sync with fast, flexible asset delivery?
- How do we stay on schedule if late-stage changes are almost inevitable?
- What changes could we make to transform our supply chain from a limiting factor into a strategic advantage?
- How can we make construction timely and efficient while minimizing fabrication-yard costs?
- How can we design assets to adapt to change in the future?

Large capital project delivery doesn't fail because of isolated execution errors. It fails because existing systems were designed for an era that no longer exists. Re-architecting delivery systems

with empowered teams, modularity, and assistance from AI agents is essential. It's not about perfecting yesterday's process—it is about designing tomorrow's.

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