

Establishing a capital project procedural framework increases the odds that a company's portfolio of projects delivers intended outcomes.

Managing capital projects through controls, processes, and procedures

Toward increased project transparency and accountability







Introduction

Companies that have significant capital project portfolios may have hundreds of projects, ranging in cost from thousands to billions of dollars. Managing a mix of projects—either several large or “mega” capital projects with multiyear timelines, ever-shifting requirements, and complex procurement challenges, or a huge number of small capital projects—comes with inherent uncertainties that can affect costs, schedules, and quality.

To effectively manage such complex capital projects, companies can benefit by adopting an integrated capital project procedural framework and manage their projects through:

- Transparency of controls
- Clear accountability of responsibilities
- A meaningful audit trail
- A rigorous risk management process



Research shows that a large percentage of capital projects goes over budget

PwC analysis shows that capital projects that come in under budget are the exception, not the rule. Moreover, an evaluation of 975 light and heavy industrial projects by the Construction Industry Institute found that only 5.4 percent met “best in class” predictability in terms of schedule as well as cost.

Projects under budget are the exception



Source: PwC analysis, based on industry research

“A transformation is under way: Not only are large-scale capital projects and infrastructure programs increasingly complex, but owners, investors, shareholders, taxpayers, and regulators are all looking for more efficient, faster, and higher-value project delivery.”

—Peter Raymond, PwC Capital Projects & Infrastructure Global Leader

“Some organizations’ capital velocity is increasing tremendously, meaning that the percentage of their total capital going toward new projects has increased from an average of 20 percent a year to an average of 60 or 70 percent. So they’re facing different challenges, and these challenges are those of scale. With these issues, capital investment strategies as well as corporate capability and readiness are their major concerns.”

— Anthony Caletka, PwC US Capital Projects & Infrastructure Principal

Increase the odds that your capital project delivers the intended outcomes

For organizations of all types, capital projects are topping the list as keys to executing their competitive strategies, achieving their growth goals, and fulfilling their missions. Yet even as more organizations step up their capital project efforts, a confluence of forces is making management of such projects increasingly challenging. For example, increased globalization is making supply chains longer and more complex than ever. Globalization is also driving companies to enter new and unfamiliar markets, where project owners have scant knowledge of local commercial, legal, sociopolitical, and regulatory realities, and where they have to face new competitors. Tough economic conditions are also motivating contractors to shift project risks back to owners.

At the same time, climate change is increasing the incidence of natural disasters around the globe, bringing the need for capital asset security into sharper relief. And rapid urbanization and population growth are making natural resources scarcer than ever while heightening the need for capital infrastructure, including railroads, ports and airports, medical facilities, power-generation facilities, and water-treatment and waste-disposal plants.

Those projects that involve new technologies, depend on regulatory decisions, and take place in politically unstable regions face the greatest challenges. Also, large projects have inherent uncertainties since they encompass many moving parts, resources, and contractors that may keep changing over many years. And in new markets, project owners and developers face special challenges, including language barriers in contract negotiations, variances in legal standards, a greater likelihood of political interference, and the need to import skilled labor, equipment, and materials.

All of these realities have made it even more challenging to plan and manage capital projects so that they fulfill stakeholders’ expectations.

To increase the odds that the capital projects in a company’s portfolio deliver the intended outcomes, organizations need to first understand the risks and then establish controls, processes, and procedures for mitigating those risks. To help with this effort, PwC has developed a procedural framework to support execution of capital projects.





The capital project procedural framework

PwC's capital project procedural framework consists of controls, processes, and procedures for anticipating and mitigating the uncertainties inherent in capital projects. The key

elements of the control environment are transparency of controls, clear accountability of responsibilities, a meaningful audit trail, and a rigorous risk-management process.

“Many projects are kicked off with temporary systems for scheduling, cost control, payment of invoices, and risk management. Then the company realizes it needs a more structured system and more efficient processes. It tries to implement these ‘in flight,’ and that can create challenges.”

—Anthony Caletka, PwC US Capital Projects & Infrastructure Principal

“When you maintain accountability, you establish tighter control over a capital project’s scope, cost, and quality.”

— Daryl Walcroft, US Capital Projects & Infrastructure Leader

Transparency of controls

The processes required to deliver a capital project typically cut across different business functions, organizations, business units, and sometimes geographies. To coordinate such processes in ways that reduce project risk, companies need to design the right controls and put them in place early in the project lifecycle (see Figure 1).

Clear accountability of responsibilities

Some companies use an engineer procure construct (EPC) method on one project and manage the contractors or perform the work themselves on another project; or they might hire a construction manager to oversee a third project. Each method of delivery requires a different level of governance

and different types of systems and tools, as well as clear accountability of responsibilities. For instance, companies need to ask themselves, “Who’s going to bring the software—is it going to be the EPC? The construction manager? Should we install it and tell the EPC that this is the system we will use?”

Figure 1: Capital project procedural framework: establishing controls for each phase of the project lifecycle

Major capital project teams should review all aspects of the control environment. Using PwC’s capital project procedural framework, the project is separated into a number of elements.

		Project lifecycle					
		Planning	Design	Execution	Testing	Turn-over	Ops/Maint
Project elements	1. Organization framework	Project resource plan, organization, roles and responsibilities		Mobilize and manage labor	Demobilization	Operations staff planning	Ongoing req.'s/skills review
	2. Procurement and contract management	Contract strategy	Contractor qualification and evaluation	Contractor selection and negotiation	Contract compliance review	Trouble-shoot and punch list	Vendor qualification and selection
	3. Scope and change management	Project objectives and scope definition	Detailed project design and scope freeze	Change control		Owner acceptance	Asset change management
	4. Cost/financial management	Project estimate	Project cost baseline	Cost control		Final payment/retention release	Ops & Maint. budgeting
	5. Schedule management	Project schedule requirements	Project schedule baseline	Schedule management		Completion checklist	Ongoing Maint. schedule
	6. Systems and tools	Project systems strategy	Implement project systems	System support and maintenance		Transition to enterprise asset management	
	7. Risk and issue management	Risk and issue mgmt. planning	Risk and issue tracking and resolution			Confirm issue resolution	Ongoing issue management
	8. Communication and reporting	Assess stakeholder requirements	Project status and regulatory filings	Project performance	Asset performance	Project close-out	Operations and fin. reporting
	9. Quality management	Quality plan	Specs. compliance criteria	Quality assurance and control		Transition as-built specifications to operations	
	10. Safety management	Safety plan	Safety training program	Safety trend tracking and incident investigations		Commissioning interface plan	Operation safety program

Source: PwC



Establishing discipline: A hierarchy of documents

Establishing a good control environment for capital project delivery depends greatly on the people involved. After all, such an environment requires healthy tension between the oversight team, the execution team, and an independent assurance team. Such tension creates the right checks and balances, especially if everyone involved has adopted a mindset focused on discipline. But getting people to think in terms of transparency and accountability takes work. To accomplish this, companies must develop a hierarchy of documents:

- **Policies** mandating how capital projects will be governed
- **Minimum standards** to which everyone will be held, regarding matters such as scope definition, quality and level of estimates, quality and level of schedules, and risk assessment approaches
- **Implementation guidelines** including best practices for capital project delivery
- **Templates** including project execution plans, risk registers, reporting dashboards, and monthly reports
- **Training** to help people understand and correctly use these policies, standards, guides and templates

Many organizations are growing fast to meet their capital investment priorities. Some may be seeking to hire many hundreds of new people over each of the next few years. By establishing this hierarchy of documents, they can “plug in” newly recruited staff and drive a culture of discipline.

There are numerous processes that are critical to successful project delivery, and these need to be clearly defined in decision trees, process diagrams, and project execution plans. The processes must also be backed up with clear definition of responsibilities and reporting hierarchy, so that there is accountability at each level in the organization.

In short, project owners can benefit from clearly defining who is responsible for implementing the established controls (see Figure 2). Clarity on this front helps an organization manage capital projects more efficiently by avoiding situations where control functions overlap or where there are gaps in such functions.

Figure 2: Capital project organization framework



PwC's capital project organization framework defines the key project stakeholders across the enterprise and defines their roles and responsibilities in relation to various project considerations over the project lifecycle.

“A contract is your single most effective point for controlling your capital project risk.”

—Daryl Walcroft, PwC US Capital Projects & Infrastructure Leader

Meaningful audit trail

A meaningful audit trail comprises information needed to ensure that people are performing their required roles. The focal points for a review might include organization, procurement and contract management, scope management and change control, cost management, schedule management, business systems and technology, risk and issue management, communication and reporting quality management, and safety management.

The internal audit role would determine the elements to be reviewed and how to review them, document the specific scope of work and associated audit steps for each element, and communicate to the project management team the rationale for timing based on the existing project schedule.

Benefits of an audit trail for capital programs may include:

- Identification and remediation of ineffective or missing policies, procedures, or controls
- Identification of deviations from best practices and remediation of inefficient techniques used by the project management team
- Identification of higher risk activities requiring immediate management focus
- Identification and recommendation of cost reduction, avoidance, or recovery opportunities
- Lessons learned and actionable recommendations for continuous improvement on existing or future capital projects

A meaningful audit trail comprises information needed to ensure that people are performing their required roles.



Client mini-case

Providing a clear and concise audit trail

Client issue

When a large utility was set to transform a power station from natural gas to clean coal, it already faced stiff challenges including tight emission-reduction regulations. But when plummeting gas prices brought the multibillion dollar “repowering” project to a halt, the utility faced a much larger problem: How to terminate the project midstream?

Action

Using the PwC Capital Project Procedural Framework, which touches on cost and time tracking, communication, risk evaluation, and reporting, the PwC team advised management on how to prioritize its decision making. PwC also provided the client with a detailed framework to document the contract suspension and termination period, providing a clear and concise audit trail that could be used in regulatory proceedings.

Impact

With a clear, organized approach, the utility was able to take a strategic view of decisions throughout the suspension and termination project. Also, the PwC team helped the client mitigate termination costs and develop an incentive program to reduce the cost exposure of phasing out subcontractors. It also conducted a detailed analysis and presentation of the incentive program to help both sides come to a mutually beneficial solution.



Client mini-case

Augmenting an internal audit team's skills

Client issue

An engineering procurement construction firm was an industry leader in the design and construction of liquefied natural gas (LNG) facilities. These \$1 billion-plus facilities are typically built in remote areas where LNG is stored in huge tanks, re-gasified, and distributed to large geographical areas.

The firm's internal audit and risk group visited project sites and reviewed compliance with policies and procedures, associated costs, challenges, process flows, and potential risks for each project phase. But the internal audit and risk team lacked specialists with the capital project management skills needed for these large-scale infrastructure projects.

Action

The firm asked PwC to contribute needed skills to its audit team's review. PwC assessed the project control tools, procedure implementation, and change controls that the firm had established, and identified risks and improvement areas, reviewing projects in a wide range of geographies. Analysis revealed scheduling as a particularly important issue, given the intricacy and scale involved in building an LNG terminal, and PwC provided coaching and specialized training in schedule management.

Impact

The firm's internal audit and risk group can now better anticipate key risks and make more informed recommendations for managing them. The group is thus playing a more central role in delivering value to the capital project management process and enabling the company to manage its projects more effectively going forward.

“Whether a company is a regulated utility, an upstream or midstream energy company, a transportation and infrastructure company, or an operations and maintenance organization that already operates its assets very well—establishing an integrated approach to risk management can help them become an exceptional capital delivery organization.”

—Anthony Caletka, PwC US Capital Projects & Infrastructure Principal

Rigorous risk management process

An effective risk management process enables project managers to monitor risks and identify when they need to put a mitigation plan in place to actively manage them. Key to this process is the ability to recognize and respond to early warning signs, such as

- Requests to expand the project budget or stretch the schedule
- Change in project scope
- Materials delays
- Suspicion of fraud
- Quality concerns
- Safety incidents, such as a serious injury or a string of minor injuries among workers
- Numerous revisions to architectural drawings
- Multiple requests for information (RFI) from contractors, which indicate incomplete design documents
- Multiple change orders from the project owner
- Delays in contractors' response to questions

Such red flags signal that it's time to investigate—to determine whether the project in question is truly in trouble and, if so, how to fix the problems. To move from a position of fear and uncertainty to one of confidence and control, project leaders can take the following steps:

1. Regroup

Gather key people together to discuss causes behind the problems plaguing the project, such as cost or schedule overruns, and to brainstorm corrective options. Solutions may be as simple as providing more granular and accurate cost forecasts to help senior managers make more informed decisions.

2. Seek outside help

When problems rear their heads during execution of a capital project, the people involved may have difficulty assessing them objectively because reputations and profits are on the line. So, consider bringing in a third-party consultant or mediator to provide project leaders with an objective analysis of the cause of the problems. External advisors can also help develop a road map for addressing the issues at hand.

3. Balance cost, quality, and time

Resist any urge to respond to problems in a knee-jerk fashion, such as slashing costs that are out of control in order to meet a project's budget or speeding up activity on the project to meet interim deadlines. Such moves could jeopardize the third element in the triad of project performance: quality. For instance, if a project team in charge of building a facility switches to cheaper materials to rein in costs, future maintenance on the completed facility could end up costing more than anyone expected. To keep cost, quality, and time in balance, teams can modify a project's original plans. Examples include changing the order in which project activities are done, or abandoning parts of the project that have grown costly but no longer provide the benefits anticipated in the original business case.



Insights from experience



Anthony Caletka
PwC US Capital Projects &
Infrastructure Principal

Observations on establishing the right controls, processes, and procedures.

Q: *Which competencies do companies need to excel at most to establish the right controls, processes, and procedures for successful capital delivery?*

A: There are a lot of competencies, including estimating, scope and change management, risk and contingency management, cost control and forecasting, and communication and reporting. Which competencies a company should focus on depends on its strategy and time horizon. For instance, a company that's on a 20-year capital program might want to focus on excelling at estimating more than scope and change management, and it might decide to outsource schedule management.

Q: *If you could offer just one critical piece of advice to companies on the subject of controls, processes, and procedures, what would it be?*

A: Governance structure and project delivery capability is not one size fits all. Each organization has different priorities and needs to take time to get clarity on those priorities and make the changes needed to meet them. We see a lot of lessons learned out of trying to do too much too soon. However, some

of the biggest root causes of project delivery problems include unclear scope definition and insufficiently detailed estimates early on in a project as well as lack of adequate contingency strategies. Contingency strategies can take the form of backup funding to cover any additional costs that weren't reflected in early estimates, or extra time that will be worked into the schedule if needed.

Major trends are intensifying the uncertainties inherent in capital projects. And that's making it more challenging than ever for companies to ensure that their projects meet cost and budget imperatives while also delivering the quality of results anticipated in their original business case. To boost the chances of success on all three fronts—cost, schedule, quality—companies must adopt a rigorous, integrated approach to managing capital project risks. That approach starts with establishing the right controls, processes, and procedures for anticipating, identifying, and mitigating risks. Companies that deploy this approach will lay a foundation for getting maximum strategic value from their capital investments.

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