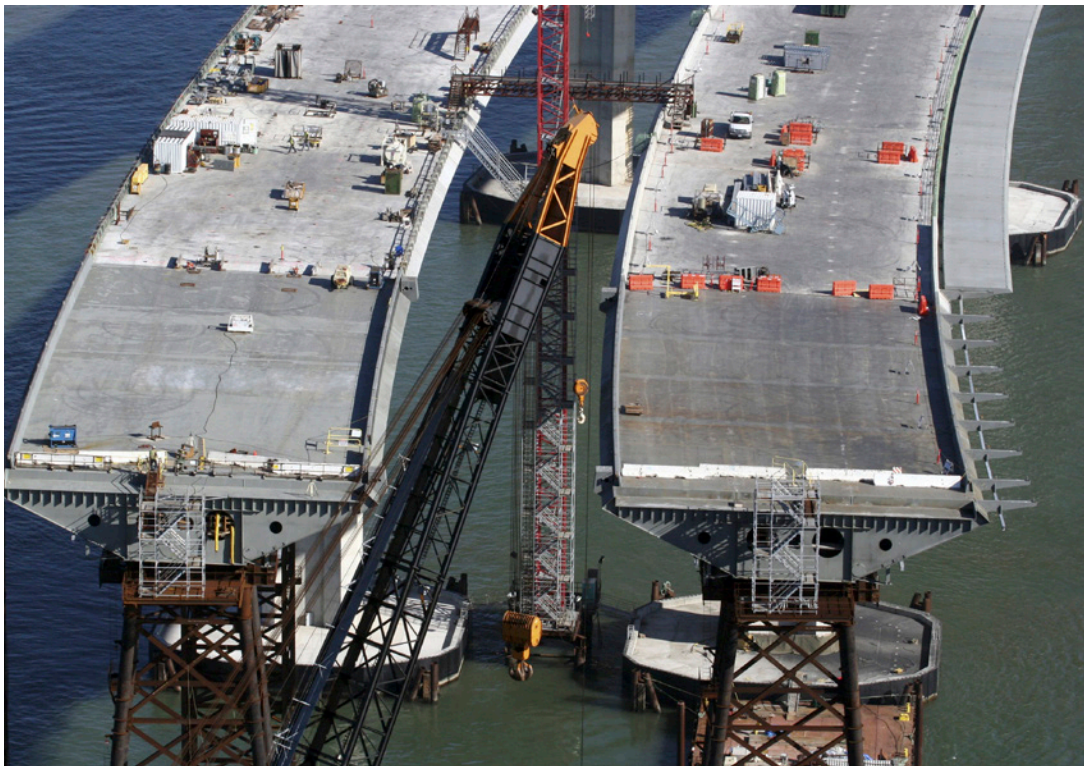
Mastering the five keys to execution excellence to improve capital project delivery and maximize the value of the capital projects portfolio.

Capital project excellence

An enterprise-wide, transformational approach to successful project delivery



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Introduction

To successfully deliver projects, companies must understand the execution challenges and apply an enterprise-wide approach to managing their project portfolio.

Using this approach requires mastering five keys to execution excellence:

- Efficient capital deployment and management and improved predictability
- Organization efficiency and accountability
- Project categorization and application of standard project management fundamentals
- Reliable and consistent project and portfolio status information
- Integrated technology

Companies that have significant capital project portfolios may have hundreds of projects, ranging in cost from thousands to billions of dollars. Regardless of the portfolio mix—whether it includes several large or "mega" capital projects with their multiyear timelines, ever-shifting requirements, and complex procurement challenges; a huge number of small capital projects; or a combination of the two—managing these capital project portfolios comes with serious, inherent risks and uncertainties. Companies that fail to effectively deal with these risks may end up facing problems ranging from delays and cost overruns to poor-quality work and even complete shutdown of a project. These woes can badly hurt a company's share price.

"With megaprojects, there's so much at stake. These projects are simply massive and complex and without a robust project delivery framework, the slightest issue—over existing site conditions, engineering design or working methods for example—can quickly turn into a multimillion dollar issue."

—Daryl Walcroft, PwC Capital Projects & Infrastructure US Leader

In fact, a PwC analysis of 52 capital projects revealed that after a public announcement of a delay or shutdown, a majority of companies experience a steady decline in share price. After only three months, this decline averaged 15 percent in the projects we studied. In the most severe case we analyzed, one organization saw its share price plummet almost 90 percent. The drop resulted directly from project delays and cost overruns that came as a surprise to the board and shareholders alike.

The danger to a company's financial health can intensify if the capital project portfolio has at least one "mega" effort, such as a nuclear power plant or national high-speed rail system. Similarly, a capital portfolio with many small- and medium-sized projects that are unique, that cross multiple regions, and that require diverse expertise can imperil a company's financial health, especially when combined with a large capital project that receives more attention. With such a complex portfolio, an organization's success or failure hinges tightly on the effectiveness of the project delivery strategy and system that the company adopts.

Clearly, when it comes to managing capital projects, the stakes are high, and the risks and uncertainties daunting. To boost the odds that the capital projects in a company's portfolio deliver the intended outcomes, organizations must first understand common execution challenges and then master an enterprise-wide approach to project delivery.

What's at stake

Companies worldwide are expected to invest millions, if not billions, of dollars in capital projects each year for the foreseeable future. In fact, according to a recent PwC report, *Capital project and infrastructure spending: Outlook to 2025*, global capital project and infrastructure spending is expected to grow to more than $9 trillion annually by 2025, up from $4 trillion in 2012. The goal for each of these companies' investments is to achieve strategic objectives and to meet public and market demands. A company that has a significant capital project portfolio might spend as much as $1 billion to $8 billion a year on more than 100 projects and repeat this year after year for five-plus years.

Examples include:

- Utilities expanding electricity transmission, distribution, and generation infrastructure
- High-tech companies constructing new campuses and data centers
- Telecommunication businesses building new networks and decommissioning old ones
- Energy companies adopting new technologies to reduce carbon emissions, manage usage through smart metering, and improve energy efficiency
- Federal and state government agencies constructing or updating transportation infrastructure (new roadways, airports, high-speed rail systems, and seaports)
- Healthcare groups expanding their facilities or building new hospitals
- Oil and gas and petrochemical companies expanding, upgrading, or responding to regulatory requirements
- Biopharmaceutical and life science companies constructing new manufacturing plants to meet demand
- Real estate development groups undertaking new global construction projects

Project delivery challenges

Capital project delivery challenges take many forms, but perhaps the most serious among them are limited governance and oversight, increased scale of project portfolios, lack of realistic budgets from the outset, and the proliferation of business-unit silos.

Limited governance and oversight

Regardless of whether a company's capital portfolio includes one or more "mega" projects or many smaller projects, formal governance and diligent oversight from management and the board are essential if the company hopes to execute its projects successfully. Yet despite the well-documented perils of unmanaged project risks and ineffective project management, all too many companies fail to provide such governance and oversight.

Companies under pressure to expand to meet changing market demands, modernize facilities, and integrate the latest in technology often spend too little time focusing on managing the risks inherent in project execution. This lack of focus frequently stems from competing board priorities and the view that project execution can be handled exclusively at lower levels.

However, as companies seek to capture more market share and take on major growth initiatives through mergers and acquisitions or organic growth initiatives, more and more individual projects now have enterprise-level impacts. This constitutes a paradigm shift for companies and their boards. As large project failures begin to show up on board meeting agendas, companies struggle to fully grasp the causes behind such failures.

Often, such causes take the shape of incomplete or inaccurate information. Even under the best circumstances, providing the appropriate level and quality of risk-based portfolio information for boards to effectively engage senior management is difficult. Yet many companies do not focus on identifying and managing risks at the project level. Therefore, they have little chance of successfully managing risk at the portfolio level and communicating the necessary information to their boards.

Increased scale of capital portfolios

Companies that have undertaken relatively little major construction may lack the in-house organizational structures, expertise, procedures, processes, and tools required to execute a complex capital portfolio. For these and other such enterprises, key operational and functional teams, along with the teams' project management systems and tools, simply aren't suitable for the scale and volume of the capital projects now being contemplated.

Lack of realistic budgets from the outset

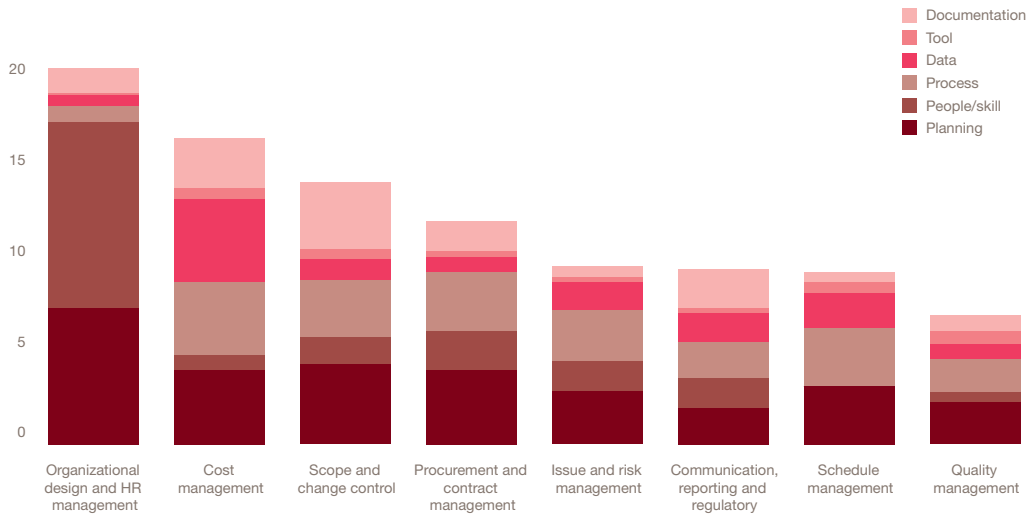
Project teams sometimes rush to develop an estimate and get project funding without sufficient planning and scope definition. Furthermore, they may not include adequate contingency plans in their budget to address risks and uncertainties. Consequently, project budgets may not be realistic for the scope. That can lead to unanticipated costs during a project and, in turn, put unnecessary pressure on a company's financial performance. Further, when project budgets are unrealistic from the outset, the company won't likely get an adequate return on investment in the project.

Proliferation of business-unit silos

In many companies, management of large capital projects is standardized within a business unit or function, but not across the corporation. Each business unit thus executes its own set of projects in its own way, drawing on the skills embodied in their workforces and past experiences with managing such projects. Project management processes may be inherited from mergers and acquisitions and from legacy relationships with contractors.

Variances in project management processes across business units can create inconsistency in both delivery and reporting to management. Owing to such inconsistencies, executives can't know for sure that all projects are being managed with the same rigor. Whether due to increased shareholder involvement, tougher regulatory requirements, or scrutiny from customers, executives are being held more accountable than ever for their companies' project governance. Thus, they want more predictability and certainty in the processes used for delivery and execution of capital projects. Yet a PwC review of recent capital project readiness assessments found that process accounts for a large percentage of the total number of issues that crop up on several key project elements. We saw this especially with the elements of scope and change control, cost management, issue and risk management, and schedule management (see Figure 1).

Figure 1: Impact of process on project delivery issues



Source: PwC analysis

Insights from experience

Jon Howe
PwC US Capital Projects & Infrastructure Director

Observations on the consequences of business silos for successful project delivery

Q: How does proliferation of business-unit silos present challenges for capital project delivery?

A: With business silos, companies end up with mini portfolios being managed across the organization in an inconsistent manner, each with teams deployed, each with their own tools and approaches. It's hard to know whether any of those projects are contributing to the strategic imperatives of the business, whether the company is tracking toward that plan throughout the year, and whether projects are generating the intended benefits. Also, it becomes questionable as to whether the right investment are being made in the right business unit if projects are not being considered on a like-for-like basis; for example, when considering both financial and non-financial metrics.

***Q**: What developments are you seeing that are making it more important than ever for client companies to establish an enterprise-wide approach to manage the challenges of business-unit silos?*

A: Many utilities have been in the bottom quartile in terms of return on investment for shareholders for the last ten years. So they're becoming less and less attractive to investors. They have a base of expenditure that they've got to deal with every year to win new customers and to provide existing services and power to current customers. All of this needs investment. But they have to make sure that whatever they're spending within their business is done so efficiently and effectively. By establishing an enterprise-wide approach, they can provide the proof points of how efficiently and effectively they're deploying their capital.

Investors want to see performance results for specific investments, and that a company isn't going over budget on capital projects or developing only some of the projects they've planned.

Mastering capital project portfolio management: Five keys to excellence

Given the challenges of executing capital project portfolios and the consequences of failure, many executives are wondering how to achieve excellence in capital project portfolio management. Every company travels a unique path to excellence, but there are common, interrelated components that all companies should master (see Figure 2). Moreover, the activities that a company initiate related to each excellence component will vary depending on priorities and maturity; however, the transformation steps from assessment to operate should be consistent (see Figure 3). In the sections that follow, we examine each component more closely.

> Every company travels a unique path to excellence, but there are common, interrelated components that all companies should master.

Capital project portfolio management: execution challenges and consequences

Execution challenge	Consequence
Deploying sufficient capital to maximize efficiency	If project estimates are inaccurate and/or timelines change, budgets will be exceeded, negatively impacting return on investment.
Hiring multiple outside contractors with varied competencies	Project outcomes affect company's reputation, not that of external contractors.
Managing internal resources	Lack of organizational efficiency or insufficient resources and skills can lead to heavy reliance on external contractors or staff being stretched thin.
Attracting and retaining qualified project management and controls staff	Staff may not be qualified, or the company may not have the human resource capacity it needs to manage the portfolio.
Scrutiny from the public, investors, and/or regulators	Lack of robust controls and leading management practices can reduce stakeholder confidence.
Competing pressures from stakeholders (executives, internal end users, external customers, investors)	Planning may be rushed and cost and time estimates may be inaccurate, leading to cost and schedule overruns.

Figure 2: Portfolio management excellence

Excellence	Components
Efficient capital deployment and management and improved predictability	Project prioritization and portfolio optimization Use of funds and contingency within a portfolio Proper upfront planning (e.g., Stage gate process) and robust risk management
Organizational efficiency and accountability	Project management organization structure Governance, oversight, execution & support roles and responsibilities Professional development and training plan
Project categorization and application of standard PM fundamentals	Cost and complexity driven categories Alignment with organizational and procedural needs Defined procedural framework Standardize fundamental project Management functions
Reliable and consistent project and portfolio status information	Standardize project & portfolio reporting Efficient use of reporting information
Integrated technology	Common enterprise tools (e.g., financial systems) Project management technology Use of technology in engineering and construction

Source: PwC

Efficient capital deployment and improved predictability

Capital project planning and budgeting for multiyear periods can be difficult. Market, customer, and business needs change, and the ability to adapt, prioritize, and efficiently deploy capital is essential to the success of a capital-intensive company and its project portfolio. Capital investments must contribute to the achievement of corporate strategy and goals. Therefore, these goals should be made clear from the start to all business units involved in capital projects.

Meanwhile, a company may make capital investments to create new assets or to expand, maintain, or upgrade existing assets, or both. Yet, early in the decision process, questions and uncertainties about total investment and return on investment are bound to come up. A company must decide on the right project mix and prioritization of capital project investment that best align with its strategy and goals. Companies can gain more insight into and reduce uncertainties associated with its projects early on, but to do so, executives need to assess likely outcomes and returns on a capital investment before fully committing capital. They can achieve this through structured front-end planning.

Front-end planning involves early engineering and design work to gain more insight into the right project solution for the business. Such planning enables executives to weigh the alternatives and estimate how much

Figure 3: Steps to project excellence

Excellence components	Assess	Design and construct	Implement	Operate and review
Efficient capital deployment and improved predictability	• Review contingency use across portfolio • Evaluate project data • Evaluate past project performance	• Define contingency management • Design methodology to prioritize projects • Design stage gate process	• Alignment between Executives and project teams • Buy in from top down • Fill key positions with talented resources • Communicate new approach repeatedly • Workshops to teach approach • Create temporary support function to address question and issues • Allow iterative process • Request reporting in designed format	• Robust governance and oversight plan • Internal audit plan • Periodic review and refinement of processes • Independent assessments
Organizational efficiency and accountability	• Evaluate governance, oversight, execution and support (GOES) roles	• Centralize PM roles • Define GOES responsibilities		
Project categorization and application of standard PM fundamentals	• Review project types and sizes • Review governing processes • Validate compliance to processes	• Define project categories • Standard requirements • Practice guides		
Reliable and consistent project and portfolio status information	• Understand current reporting and stakeholders • Evaluate KPIs	• Consolidate and streamline reporting requirements • Standardize KPIs		
Integrated technology	• Map existing use of PM software • Evaluate inefficiencies	• Enterprise PM solution • Integration with business functions		

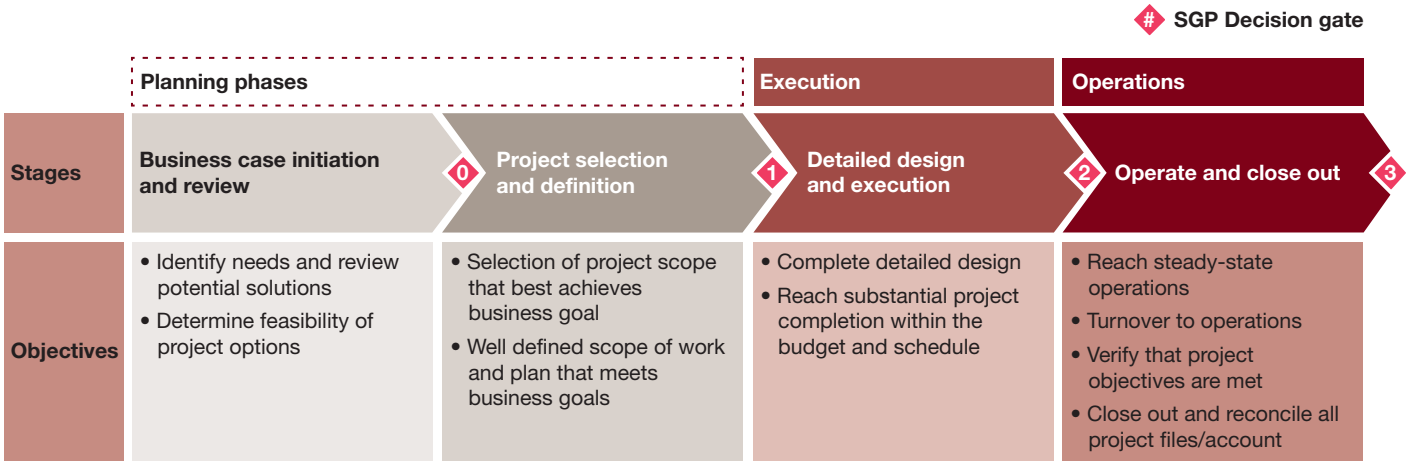
Source: PwC

Front-end planning helps avoid project cost overruns and investment write-offs.

the asset may cost and how long it will take to build. With the insights gained from these activities, a company might decide to invest in additional design work before approving full funding. By doing so, it can get even more definition about the scope of work, associated costs, and schedule implications. This approach further whittles down the uncertainty associated with an investment. It thus helps a company decide whether to continue, pause, or shut down the capital project in question, as well as how to allocate investment over the project's life. While front-end planning does have an associated cost, such cost can become part of a project's capital spend if a project continues or count as a small operational investment for a project that turns out not to be viable. The main point is that front-end planning helps avoid project cost overruns and investment write-offs that can negatively impact a company's finances and reputation.

To support front-end planning, a company needs a consistent and comprehensive framework for project planning and execution that is specific to its needs and goals. One way to provide consistency is to establish a rigorous stage-gate process (SGP) wherein ongoing project funding is provided only after key deliverables are satisfactorily completed and issues raised by senior management are resolved (see Figure 4). The SGP provides a roadmap of key deliverables and decisions

Figure 4: Example of a stage gate process



Source: PwC

that must be sequentially completed to promote consistent and robust planning and decision making throughout every project's lifecycle. Using an SGP, companies can systematically evaluate the underlying business case for a project and completion of key deliverables, and can identify and mitigate critical risks as a project progresses. All this helps ensure that projects support business objectives as well as provide clarity surrounding cost and schedule requirements—particularly in the early stages of a project before full funding is committed.

An SGP comprises several stages and approval gates throughout a project's front-end planning, engineering and design, execution, and operational phases. Examples include stages for determining the feasibility of project options and definition of the project scope. Each company should define its own set of gates, and the gates will vary across industries. Companies use these stages and gates to confirm whether a given business case for a project is still viable at each stage and to reconsider marginal investments as needed. The SGP also gives stakeholders an opportunity to confirm that design and execution plans are aligned with business needs.

Each stage in the process has defined objectives, functions, and deliverables. Once a project has traveled through a stage, it's ready to be submitted for approval to move through the gate and into the next stage. At the decision gate, approvers decide whether the project is ready to move, whether it requires more work before it's ready, or whether external factors have fundamentally changed the business case—in which case a project may be temporarily delayed or stopped completely. Key factors used to make these decisions should include analysis and resolution of risks and issues previously communicated, cost and schedule projections, and quality of the deliverables submitted for approval. Other factors may include resource availability, for example.

In addition to directing project activities toward defined decision points, an SGP provides a sound framework for program and project governance and oversight. Specifically, leadership gains an objective view into a project's readiness, viability, and status at key points throughout the project lifecycle. This framework can help counteract the blind optimism, sunk-cost, and other inherent biases that commonly afflict project teams.

Finally, an SGP can position companies to capture lessons learned throughout the project lifecycle and apply them to subsequent projects. For instance, in analyzing all the data once a project is finished, managers may better understand the estimating accuracy they can expect from a certain level of scope definition. Armed with this insight, they can improve the planning process.

For all these reasons, it's especially critical that companies establish and adhere to a front-end planning process, including an SGP, to improve certainty in the delivery of the capital project or portfolio at hand. An effective project management organization structure, as well as deployment of the right project management controls and contractual approaches, are also key to getting the most value from an SGP.

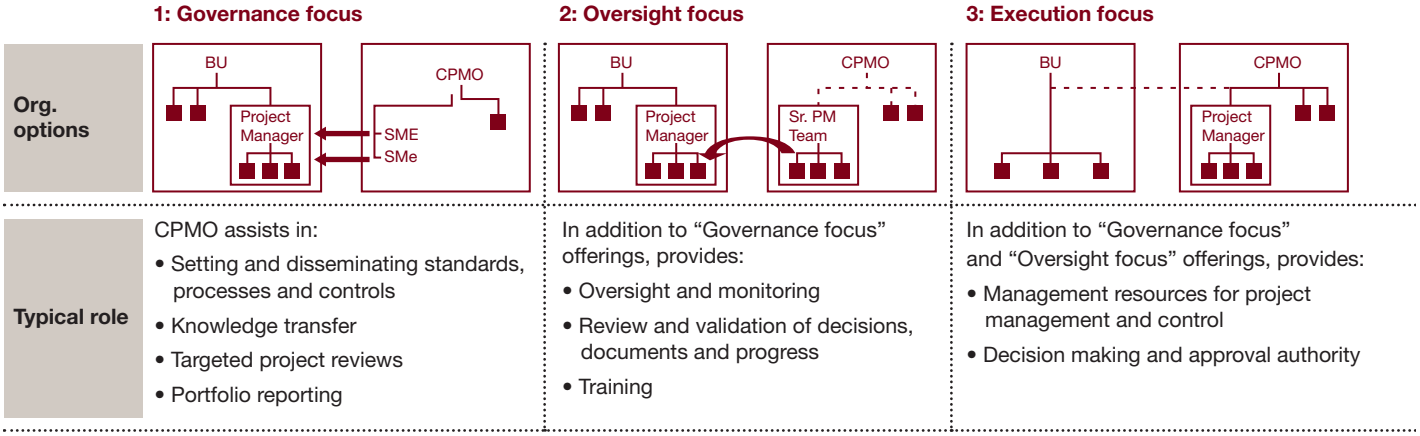
Forward-thinking companies create a centralized project management organization

Organizational efficiency and accountability

An effective project management organization structure is fundamental to establishing and implementing a standardized, enterprise-wide project governance environment. Forward-thinking companies create a centralized project management organization (CPMO). The organization's core responsibilities include:

- Developing standardized processes, procedures, tools, and methodologies for managing and monitoring projects
- Defining project management oversight and support needs
- Recommending and assisting with implementation of specific project management processes, procedures, and tools for individual projects
- Providing project management and contract administrative support through advice or through dedicated or shared staff

Figure 5: Sample CPMO configurations



Source: PwC

Insights from experience

Ralph Roam
PwC US Capital Projects & Infrastructure Principal

Observations on capital project accountability

Q: What problems are you seeing in the area of accountability?

A: Often we see lack of definition around accountability—about who owns a capital project—at the leadership level. Take a project that's being managed for a particular business unit, but it's an IT project. Who is ultimately accountable? Is it the business unit or senior leadership within IT? Companies can set the stage for success if they clarify those fundamental accountabilities upfront. There can often be cultural hurdles to also get over if an organization has not historically identified individuals to be accountable.

***Q**: What about accountability across teams?*

A: Accountable parties must be clear at every step of the lifecycle if a project is to be successful. For example, team members who originate a project need to ensure that it is transitioned to individuals and teams who will handle other aspects of it, including any needed further investigation, engineering, or planning—both prior to and after full funding. Companies we've worked with can benefit from confirming accountable parties and from making stronger connections between groups in charge of initiating, planning, and executing.

A CPMO's role, responsibilities, and structure may vary depending on an organization's needs and the nature of its capital project portfolio. For instance, a CPMO might take the form of an assurance provider, it may provide a portfolio management function, or it might be directly involved and responsible for project execution (see Figure 5).

In the assurance provider scenario, the CPMO would be responsible for developing standardized project management approaches, deploying them, providing training for project practitioners, and providing an assurance/oversight role. A portfolio management CPMO builds on the assurance provider responsibilities. It may monitor projects as they flow through a front-end planning process, assessing whether each project has met predetermined gate requirements and providing approval or support at key decision points along the project's lifecycle. This CPMO may also evaluate whether the portfolio is optimized and provide aggregated project status reports for executives. A CPMO involved in project execution would be directly responsible for managing and executing projects, assisted by a dedicated staff of project management specialists, including project managers, project controls specialists, and project engineers.

To ensure executive support and consistent application, the CPMO should report to an executive committee or a steering committee. It must also ensure that project governance, oversight, execution, and support responsibilities are clearly established for all projects from the outset.

Companies may also create a CPMO that's a hybrid of two or even all three of these configurations. To decide how to structure its CPMO, a company needs to consider the nature of its project mix as well as the level of maturity of its existing project management processes, and technology. Consider an organization that has a project portfolio mix of $8 billion, where 10 percent of the projects in that portfolio accounts for 80 percent of the $8 billion. In this case, the CPMO may play a project execution role for the biggest projects in the portfolio. The remaining smaller projects could be managed and executed within the relevant business units, possibly with assistance and training on standardized procedures from the CPMO. For companies with mature project management capabilities, the assurance provider format may be the right choice.

While a CPMO should be structured to meet the company's specific needs, it should also take a four—or five—year view of the organization's capital projects budget. Regardless of its role, responsibilities, and structure, a CPMO should comprise professionals with deep expertise in project management, project controls, and engineering and construction management. These individuals must have skills and knowledge in all areas of project management, including cost, scheduling, scope change management, risk, engineering, procurement, and construction. The size of the CPMO team depends on

Client mini-case

Streamlining capital project delivery for a major public utility

Client issue

A major utility prepared to invest more than $10 billion over five years for large capital infrastructure projects, including construction of new power plants, upgrades of existing facilities, and new environmental projects. These projects were ambitious for the client and the industry as few utilities had funded such projects to this extent in the preceding decade. New environmental regulations added to the complexity of managing this complex, huge portfolio.

The utility turned to PwC to help manage the portfolio, including identifying key risks and strengthening rigor around capital project policies, procedures, organizational structures, and methodologies. The utility planned to then apply the resulting lessons to its overall capital portfolio strategy.

Action

The PwC team worked with the company to break down project management functions into core components across the project lifecycle. For each component, standards and procedures were developed, linked and implemented. In addition, PwC assisted with the design, construction and implementation of a new centralized organization structure, stage-gate process, governance model and procedural framework including training.

Benefits

As a result of these changes, the company gained a set of standards and controls that it could apply to its overall capital portfolio, not just the capital projects at hand. Moreover, the organization underwent a shift in thinking about capital projects. It began setting expectations at all levels so everyone involved in each project was "on the same page" at each stage of the project lifecycle. Members of the executive team became aware of their individual governance and oversight responsibilities and began thinking more comprehensively about governance, oversight and control policies and procedures, and risks at each point in a project's lifecycle. The executive team was thus better equipped to challenge project teams, ask the right questions, and evaluate status information more thoroughly, which led to better results.

the number of projects to be managed across business units and functional groups. It also hinges on whether the organization will be providing project management and contract administrative support in an advisory capacity or through dedicated or shared staff. Other considerations may include the use of contract employees when needed, geographical locations of projects, and the diversity of capital project types within a portfolio.

An optimized CPMO generates important advantages. For example, through the CPMO's work, best practices are developed. Moreover, the company achieves new efficiencies from the use of standardized management processes, procedures, systems, and tools. In addition, executives gain a detailed, accurate understanding of status for all projects within the portfolio. The CPMO also provides insight into the portfolio risk profile. Equally important, a good CPMO encourages a culture of knowledge sharing and continuous improvement, and serves as a platform for training across business units and functional groups.

Project categorization and application of standard PM fundamentals

As noted earlier, a capital project portfolio may comprise hundreds of projects ranging from $10,000 to multiple billions of dollars. The underlying organization, risk control environment, and project management fundamentals necessary for successful execution are not the same for projects at either end of this broad spectrum. Companies need to define project categories based on cost and complexity and then clarify what is required for each category from an organizational and controls perspective.

Executives may select an initial category for a project based on a cost range and then refine the category selection based on the project's complexity. Complexity increases with projects that are first of their kind versus ones that are routine or have a high level of public scrutiny or numerous external stakeholders. The final category chosen for a project should then dictate decisions about the level of governance and oversight as well as the project management controls needed.

To effectively manage large-scale projects and portfolios, companies must establish a framework of project management standards that map specific deliverable and control requirements to a project through its lifecycle. Examples of such requirements include project execution plans, business cases, project schedules, and project estimates. Components of such standards include:

- Project organization set-up
- Procurement and contract management
- Work breakdown structure (WBS), scope, and change management
- Cost estimation and financial management
- Schedule management
- Risk and issue management
- Communication and document management
- Performance monitoring
- Quality management
- Safety management

Using a framework of project management standards, executives can gain confidence that the right controls in all areas of project management will be implemented at the right time. For example, issues that often arise during execution of a project include changes in the project scope and the discovery of inadequately supported cost estimates. By using an SGP together with project management standards, companies can inject more rigor into scope definition and project cost estimates early in the project lifecycle. As a result, executives can feel more assured about the reliability of the estimates before they decide to award full funding to the project. This, in turn, can reduce the likelihood of scope changes arising during execution of the project.

Reliable and consistent project and portfolio status information

Accurate and reliable project status information is critical for effective and active management of projects and project portfolios. Companies must gather and analyze the large volumes of data that are generated as projects move through their lifecycle, including cost estimates, actual spending, progress toward milestones, and real-time updates regarding risks and issues to be addressed. Every project inevitably deviates from the baseline plan; the problem is often exacerbated

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by a complex risk landscape as well. Without effective status reporting, executives cannot identify potential areas of risk or deviations early enough to take mitigating action.

However, typically, many stakeholders are involved in projects and portfolios—all with different expectations regarding status reporting. Over time, conflicting expectations can lead to duplicate and/or contradictory information requested and provided about a project. This, in turn, introduces costly inefficiencies and ineffectiveness into the project management process. In many cases, project status reporting is done to "check a box," but is not meaningful and is therefore not used to proactively manage a project. Similarly, many companies spend more time and effort on reporting data than interpreting, analyzing, and acting on the information. Considerable time—often hundreds of hours—is required each month to develop the multiple reports needed for each project and across the project portfolio. Consequently, reporting efforts generate limited value for decision makers.

To effectively report on the status of projects and portfolios, organizations need common sources of information and a standard set of key performance indicators that align with project and corporate goals. Companies also can benefit from reducing the turnaround time for generation of project status reports. Once reports are developed, members of the project team and leadership team need to discuss them and agree on next steps. In addition, project status reports across the company should report the same type of information in the same format and from the same database.

Many companies use manual processes for project reporting. These can be effective, but often they are time consuming and prone to human error, compared to processes backed by the right technology. Use of such technology can help ensure that project status data is consistently structured, derived from standardized project management processes, and readily available to decision makers.

To effectively execute their capital projects, companies need enterprise-wide visibility into and control of project delivery.

Integrated technology

Historically, there weren't many proven project management tools and technologies available on the market to efficiently support the gathering and analysis of project management data. As a result, many companies developed their own tools for handling functions critical for the day-to-day running of capital projects. These functions range from portfolio optimization, procurement, and resource management to estimating, budgeting, scheduling, risk and issue management, capturing of lessons learned, collaborating, and reporting.

While this response was understandable, it has created variances in the tools and technologies typically used across company business units. These variances can prevent executives from gaining access to real-time and consistent data (such as accurate project status and current issues) needed for disciplined project control and informed decision making at the enterprise level. Moreover, without consistent data, teams have to search for information on projects being managed in different parts of the organization as well as enter data manually in some cases. All of this wastes valuable time and leads to errors and misinformation.

Over the past decade, technology vendors have invested heavily in developing much more effective tools for handling project management functions. However, with the greater range of choices comes the challenge of evaluating the benefits of one tool versus another. Companies struggle to decide which tools to adopt and whether to replace disparate legacy systems and tools wholesale with an out-of-the-box solution versus integrating customized function-specific applications with their existing system environment. Under pressure to deliver capital projects in increasingly compressed delivery windows, many companies put the strategic question of which tools to use at the bottom of their priorities list.

Yet to effectively execute their capital projects, companies need enterprise-wide visibility into and control of project delivery. The right set of tools and technologies, thoughtfully integrated with other corporate tools, can help provide these advantages and reinforce the gains made through an effective CPMO, a rigorous stage-gate process, project management standards, and disciplined project controls. Integrated tools can bring disparate data together and ensure consistency and accuracy across data types. They can also eliminate redundancy of effort and the potential for errors.

Nevertheless, such tools can be expensive, and they take time and investment to implement. In addition, they're not necessarily a sure thing. In some cases, after years of technology deployment effort, a solution may not function as intended. Possible reasons include poor upfront specification, excessive customization to meet existing business processes, and resistance to use of the tools because people haven't received adequate training.

To manage these challenges, organizations must educate themselves on the latest project management tools available in the market. Some have been developed for specific industries; others require considerable initial set-up and, configuration but can be used with great success across diverse business units and industries. To select the right combination of tools, managers need to consider their organization's level of maturity as well as its unique needs.

To define a path forward regarding technology, executives should take a structured approach to understanding their current system environment. From there, they need to define a desired future state that supports their organization's project-related goals. They can then rigorously assess the availability and suitability of technologies and work with shortlisted technology vendors to gain an in-depth understanding of the potential solution. A company may provide its own data to potential technology vendors to develop a company-specific demonstration within the software. In addition to a demonstration, managers can consider cost, goals, future needs, and maintenance before selecting the best-fit software solution. Once they've made their choice, they need to plan implementation of the new solution just as they would plan implementation of a project or a major change program.

Insights from experience

Stephen Lechner
PwC US Capital Projects & Infrastructure Principal

Observations on how the five keys to excellence are interrelated

Q: Can companies focus on one or two of the five keys to excellence, or do they need to master all of them equally well?

A: Absolutely from a prioritization perspective; however, all of them are very much interrelated, which makes things complicated. If you take reporting, for example, there are clear benefits to getting that right rapidly. But to actually get the data in the report along with the right level of metrics and the right level of information in a standardized manner across projects, you need to have the right underlying processes in place.

You know that the data and information is reliable if you have a standard approach for project delivery where every project is developed, defined, estimated, scheduled, etc. following the same approach and that the right governance and oversight has been provided throughout. So companies really need to be thinking about strengthening their abilities on each of these. They need to take an integrated approach.

There's certainly a lot of benefits from being good at any one of the keys to excellence, but when you improve them in an integrated way, you have a better chance of reaching high quality and predictable performance on capital project delivery.

A case in point

A major utility company transforms its capital project management approach

The business challenge

A major utility was experiencing cost overruns and delays in delivery of its capital projects. Part of the problem was that the company did not invest enough time, effort, and funding in the early stages of the project to evaluate options for achieving a particular business objective, analyze the risks, or get leadership buy-in on decisions about which option was the right one.

Moreover, projects were being managed in different ways in different business units. For instance, an approximate $500 million project would be funded even though a business unit had provided little definition of what the project would entail and had done no engineering design work. Then, when project teams began the planning and engineering, they often discovered that actual costs would be considerably more than they initially expected. The teams might still be optimistic initially about getting costs back down to the original approved funding, but ultimately were not able to do so. The updated financials then found their way to the board and were reported to the market.

If the board had had the opportunity, it may have recommended spending a bit more on engineering and estimating to gain a more accurate sense of a project's costs prior to full funding. In fact, it would have been better to spend even $100,000 on such planning efforts early on than to commit to a project that ultimately goes several million dollars over budget. And the board would have had better opportunities to decide where it made the most sense to allocate capital. Such as building a new plant versus upgrading several substations.

Benchmarking data on the company's industry peers showed that transformation efforts aimed at improving capital project management had run into obstacles. For example, opinions among leaders were split on whether the organization really needed such a program. And without solid, committed support from the C-suite, improvement initiatives were not making much of an impact.

For this reason, PwC advised the major utility that, if it wanted to launch such a transformation program, it would need to clarify its vision for the program, fully communicate it, and get commitment from leadership. This would involve a profound change in mindset, but it would be critical to overcoming resistance to change from business unit leaders concerned about whether managing projects in a new way would affect them in negative ways, such as leading to the shutdown of a project or even a plant in their unit.

How PwC helped

We proposed a project excellence transformation program aimed at arming the organization with the systems, structures, and processes needed to deploy capital efficiently and effectively, so that shareholders and the market would ultimately benefit. The program included creation of a new, centralized project management organization that is now responsible for the largest project investments. There is also a new policy in place that authorizes use of the new project management system, which comprises a number of key elements. One element is a stage-gate process that identifies the various stages of a project lifecycle, including what the requirements are for a project at each stage in terms of governance, oversight, execution, and support for activities such as estimating or risk assessment and mitigation.

In addition, guidelines were established to help project teams understand leading practices and ways to meet standards and requirements of the stage-gate process. Moreover, about 300 people were trained on the new project management system. Project teams now need to follow this project management system and will be held accountable for it. Business units do not get funding for capital projects unless they demonstrate that they have achieved the requirements of the stage gate process.

The impact

Now, when business units present a project proposal, they have invested sufficient money and time on planning, engineering, and assessing alternative capital expenditures and risks. They therefore have a project cost estimate that they present to senior executives, who are also now fully familiar with the concepts behind the new project delivery system and understand the quality of estimates and how risk and uncertainty has been accounted for.

The COO has the information he needs to challenge a project team on its estimates and proposals, and to ask specific, technical questions about the rigor that has gone into development of the business case for a major project. Most of the senior executives are better positioned to do this as well. They have clear governance roles for capital projects, as well as the knowledge of how the new project delivery system works so that they can fulfill those roles.

As a result, this company has blazed a trail past its peers. A key to the successful implementation of the transformation is that the CEO and the entire executive level leadership fully supported the initiative, which enabled a speedy, enterprise-wide rollout. In contrast, some of the organization's industry peers had embarked on similar "transformation" efforts, but only with partial leadership support and a slow rollout process at the business-unit level, which left those companies unable to overcome the enterprise-wide challenges they faced.

Insights from experience

Anthony Caletka
PwC US Capital Projects & Infrastructure Principal

Observations about how companies can avoid troubled projects

***Q**: Since capital projects can still experience challenges even if a company has solid structures, systems, processes, and people in place, how can companies reinforce these elements to boost the chances of successful project delivery?*

A: The companies we see that are in the top quartile on metrics like operating margin, return on capital employed, capital productivity, and capital velocity are very selective about the projects they decide to take on. They select projects that align with their corporate strategy, their corporate capability, and what's needed to drive their growth, whether it's margin or velocity or revenue or imperatives coming from the board level. They also manage them not as individual projects but as a portfolio, knowing that projects affect each other in terms of resources, costs, and other factors.

They also commit to driving capital efficiency, for example, through process efficiency, integrated planning, portfolio management, and bringing the best engineering and technology to the project.

Finally, they achieve operational excellence. For instance, they commit to saying a new facility will be operational on a fixed date, and then from that point forward, it's treated as an operation.

***Q**: Can you tell us a bit more about integrated planning?*

A: With integrated planning, a company integrates regulatory approvals, design, procurement, and project execution with testing, operations, and handover. It develops a schedule that integrates all of those phases of the project and every task that is going to occur on the project. There might be five or six different contractors working on one project. Without an integrated plan. It's very easy for surprises to slip into the schedule if project managers aren't watching out for them. So integrated planning is one of the core disciplines that helps drive the predictability of projects.

An invitation to change

PwC experience has shown that applying any or all of the components of project and portfolio management excellence outlined above can yield significant and tangible benefits. Whether it's the creation of a CPMO and/or the rollout of standardized project management processes, tools, and systems, a project-excellence initiative should be managed as a change project, with proper consideration given to change sponsors, stakeholders, scope, schedule, and cost. Executives will need to develop and carefully follow a change project plan, keep stakeholders front and center as the effort unfolds, regularly communicate changes, offer training, and assess the results of the change project.

All this takes a considerable investment of time and effort. But given the significant impact that large capital projects can have on a company's bottom line, executives cannot afford to shy away from this investment. By putting in place the components of excellence essential for successful capital project management across the enterprise, companies can mitigate the risks and uncertainties inherent in large capital projects. That, in turn, can position them to meet their strategic objectives, better serve their customers, and protect and enhance shareholder value.

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