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# Large-Project Management

*A Blueprint for Success*



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# Large-Project Management

*A Blueprint for Success*

**Mark Freedman and Raphaël Desi**

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## AT A GLANCE

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Large-project management has never been more challenging. A confluence of forces, including larger projects, higher technological hurdles, increased regulation, greater volatility along the supply chain, and the emergence of formidable new competitors, is responsible.

### **COMPANIES' RESPONSES ARE FALLING SHORT**

Companies have responded by tightening standards and controls, launching internal audits, pursuing more favorable contract terms, and taking other similar measures. But these efforts have generally disappointed; companies' results often show little improvement.

### **THE ANSWER: A THREE-TIERED APPROACH**

To succeed, companies must utilize a three-tiered approach that looks critically not only at the logistics of project management but also at the company's broader strategic planning and at how each project fits in as part of a portfolio.

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**M**ANAGING LARGE PROJECTS—THE CONSTRUCTION of a refinery, a power plant, or a ship, for example—has always been complex. It has become significantly more challenging in recent years, however, owing to a confluence of forces. These include larger projects, higher technological hurdles, increased regulation, greater volatility along the supply chain, and the emergence of formidable new competitors, particularly from low-cost countries. The upshot of all this is that hitting the mark with large projects—delivering them on time, on budget, and with the hoped-for competitive advantages established—requires more skill and planning than ever before.

Many companies have reacted to this environment by tightening standards and controls, launching internal audits, pursuing more favorable contract terms, and taking other such measures. Although these are logical steps that should certainly be explored, they tend to fall short, in most cases, because they focus primarily on the *process* rather than on the root causes—the strategic, operational, and people issues—of most large-project slippages.

We believe that established players in this space can, in fact, do much to maximize their likelihood of success in the current environment—but they need to tackle the challenge in a different manner. Specifically, they need to utilize a three-tiered approach, one that looks critically not only at the logistics of project management but also at the company's broader strategic planning and at how each project fits in as part of a portfolio. Failure to think through and optimize all three of these elements will translate into project delays, cost overruns, and other problems.

In this report, we discuss this approach—the factors that necessitate it, its orientation, and the specifics of the thinking behind it.

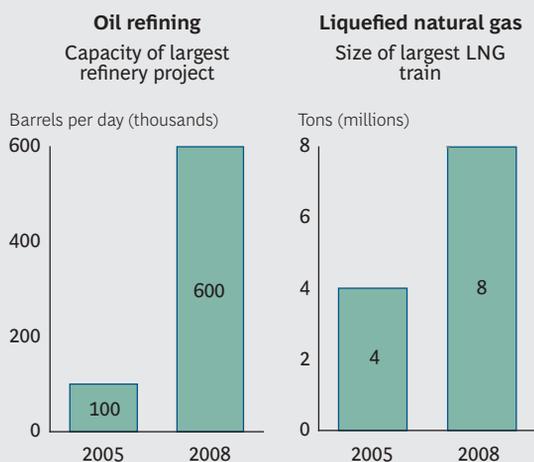
## A More Challenging Environment

As noted, the backdrop for large-project management is becoming increasingly complex. For one thing, projects are becoming larger and more expensive. (See Exhibit 1.) The largest oil-refinery project in 2005, for example, generated an output of roughly 100,000 barrels a day; by 2008, that number had climbed to 600,000. Greater size translates into a variety of challenges, including those associated with managing ever-larger numbers of workers (Qatar's liquefied-natural-gas projects, for example, employed up to 70,000 full-time workers) and, often, operating multiple sites simultaneously.

## EXHIBIT 1 | Projects Are Getting Larger and More Expensive

### Project size is increasing...

Illustration from the oil and gas sector



### ...as is project cost<sup>1</sup>

Illustration from the power sector

#### IHS CERA Power Capital Costs Index<sup>2</sup>



Sources: J.S. Herold; Barclays Capital's Original E&P Spending Survey, December 16, 2009; IHS CERA.

<sup>1</sup>Expenditure calculated on the basis of data from J.S. Herold and Barclays Capital.

<sup>2</sup>Indexed to 2000.

Additionally, the technological hurdles (for example, those associated with deep-sea oil rigs or nuclear power plants) facing companies in this space grow increasingly difficult to negotiate, as do the constraints imposed by regulatory bodies and public opinion. Furthermore, heightened supply-chain volatility (many commodities saw price spikes of 30 to 100 percent from 2005 through 2008, followed by sharp decreases and subsequent rebounds following the economic crisis) makes planning much more difficult, increasing dramatically the level of risk companies assume when bidding on fixed-cost projects.

On the competitive front, established Western players are facing a rising challenge from emerging competitors. In oil and gas, for example, South Korean companies already have an established presence in very large projects, especially refining. And both incumbents and challengers will face intensifying competition from players based in rapidly developing economies. Chinese and Indian players are gaining experience in their domestic markets and will pose a significant threat over the medium term. In the conventional power-plant business, Chinese companies are increasingly competitive, especially when bidding for large coal plants in Southeast Asia.

As a result of these different factors, many project business companies are increasingly concerned about the potential for major cost and schedule slippages,

since these can have a significant impact on the company's overall financial condition.

## Companies' Responses Are Falling Short

Many companies have raised the bar on their procedures and controls in response to this more challenging environment. They have formalized or upgraded project manuals, quality-control policies, and risk-management processes, and they have launched internal audits on difficult projects. They have established new control processes, expanded the number of KPIs, and mandated more frequent reporting from project teams. They have also sought to formally limit risk through more stringent contract terms, transferring risk to suppliers or subcontractors where possible.

Although useful, these measures have typically disappointed. Efforts to tighten controls are often viewed by project teams as bureaucratically driven, and many of the announced changes are not systematically applied or enforced, resulting in little impact on behavior. Internal audits tend to focus on financial performance and processes but leave unexamined critical organizational and people problems such as a lack of skills, transparency, collaboration, and appropriate incentives. Greater emphasis on reporting yields more, but not necessarily better, information, because the KPIs are not always the right ones and governance issues are not sufficiently addressed. And transferring risk to third parties by means of contracts is not always possible or efficient.

The outcome is that companies' results often show little improvement. What is missing is a focus on the strategic issues and operational levers that ultimately determine project performance.

From a strategic perspective, a company needs to understand whether it is focusing on the right projects (in terms of clients, geographic regions, technology, and other relevant factors) and whether the financial goals it has for its projects are aligned with its organizational capabilities and competitive position.

From an operational perspective, the company needs to identify and implement levers that can improve actual performance. Specifically, it should determine how to improve a project's organization and planning, which internal skills to hone, and what best practices to employ for each phase of the project, from preparation and bidding to construction. Finally, the company needs to know how to ensure that behaviors are changing—for example, by fostering collaboration and transparency.

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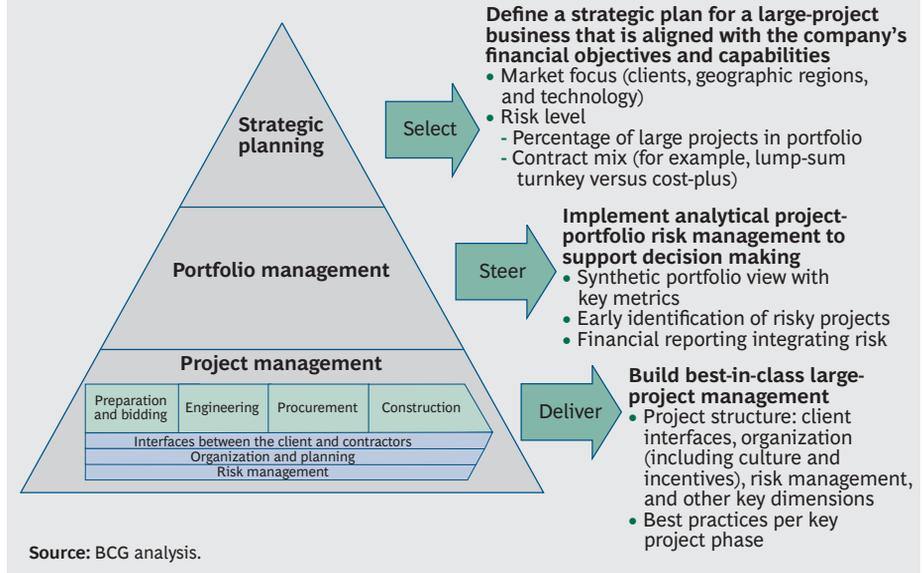
## The Answer: A Three-Tiered Approach

To ensure they focus on the right elements, large-project players need to take a three-tiered approach that looks at each project through the lenses of strategic planning, portfolio management, and project management. (See Exhibit 2.)

### STRATEGIC PLANNING

Some companies take an opportunistic, project-by-project approach to project selection. The risks of this type of approach are rising, however, given the growth

## EXHIBIT 2 | A Three-Tiered Approach Will Ensure a Focus on the Right Elements



and caliber of competition in many sectors. Instead, the current environment demands a strategic perspective on project selection and the business overall.

A strategic perspective and a clear focus will give companies a greater opportunity to build sustainable competitive advantage by, for example, developing specific know-how and assets (including technologies), building a stronger local presence in key markets, and forging deeper client relationships. A strategic perspective can also help companies align their financial goals with their organizational capabilities and their competitive position.

A strategic perspective can help companies align their financial goals with their organizational capabilities and competitive position.

The key questions a company should consider when formulating its project strategy include the following:

- What balance do we want to strike between large and small projects?
- What level of risk (typically by contract type) are we comfortable with?
- Which segment(s) of the market do we want to target?
- What types of clients do we want to pursue?
- Which geographic regions do we want to concentrate on?
- Which technologies should we deploy?

Once the company has made these decisions, it should codify them in a policy and apply the policy across the project portfolio. The policy should, for example, specify

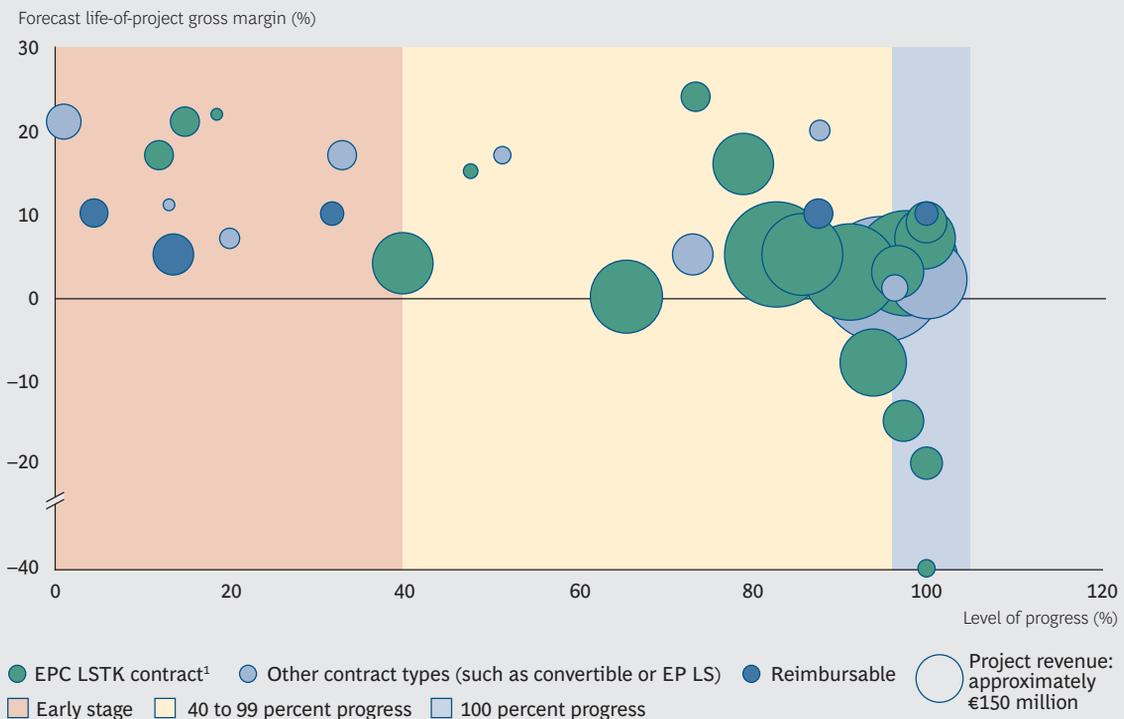
the number of large projects the company will take on in a given year, the upper limit on project size, a target portfolio-risk level, and limits on country, client, and regional exposure. Although not a mechanistic substitute for business judgment, this framework can be a useful and pragmatic guide to help dissuade management from overextending itself in pursuit of growth during boom times—and discourage it from taking on risky low-price projects during downturns.

### PORTFOLIO MANAGEMENT

Large-project players should also adopt a more comprehensive portfolio-driven view and develop the tools to facilitate that approach. Top management often lacks a full understanding of the status of all projects under way and the ability to identify projects that are the likeliest candidates for slippages. This typically stems from several factors; foremost among them is a lack of transparency from project teams and insufficient or improper metrics and evaluation tools.

Companies need to upgrade their capabilities on this front. They should define and track (a few) key metrics that allow a complete, accurate portfolio-wide perspective, particularly those metrics indicating progress, financial performance, and risk level per project, typically by contract type. (See Exhibit 3.) By doing so, companies could gain a comprehensive and evolutionary view of their large-project portfolio and its specific components on all key fronts.

**EXHIBIT 3 | A Complete, Portfolio-Wide View Is Essential**



Source: BCG analysis.

<sup>1</sup>EPC LSTK = engineer-procure-construct lump-sum turnkey.

Companies also need to develop models that identify risky projects and quantify the degree of risk, using both scoring models to evaluate the a priori risk (BCG’s DICE framework, illustrated in Exhibit 4, is an example of such a model) and statistical trend analysis to evaluate a project’s risk profile during execution. Ultimately, companies should aim to leverage these scoring models to integrate risk parameters into their financial reporting. Doing so can provide management with risk-adjusted forecasts on portfolio margins, which can permit more robust planning.

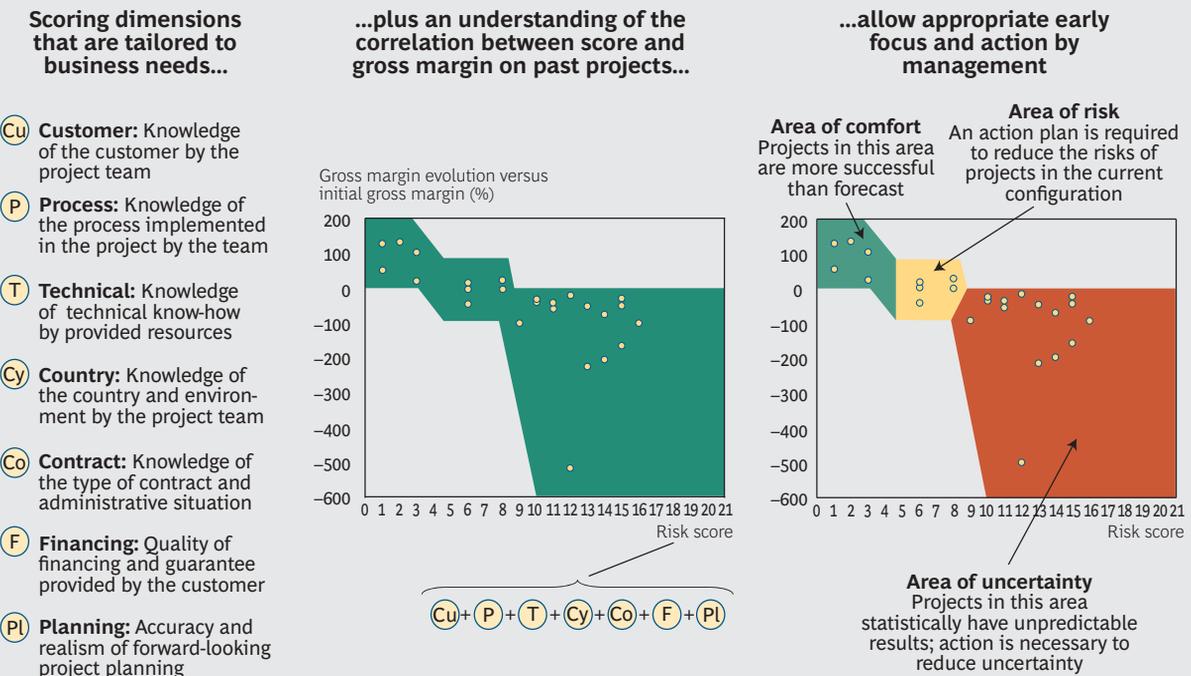
### PROJECT MANAGEMENT

The third tier of the approach is the hands-on, day-to-day planning and management of the project. Delivering projects on time and on budget hinges on getting it right on many dimensions simultaneously. Exhibit 5, which shows exploration, production, and construction projects in the oil and gas sector, illustrates the many ways in which projects can falter over time. Avoiding these types of setbacks entails achieving best practice in all elements of the project—and maintaining that standard throughout the project’s duration.

Companies should structure their planning and optimization efforts along seven key dimensions: preparation and bidding, engineering, procurement, construction, interfaces between the client and contractors, organization and planning, and risk

#### EXHIBIT 4 | Early Project Scoring Can Identify “Bad” Projects

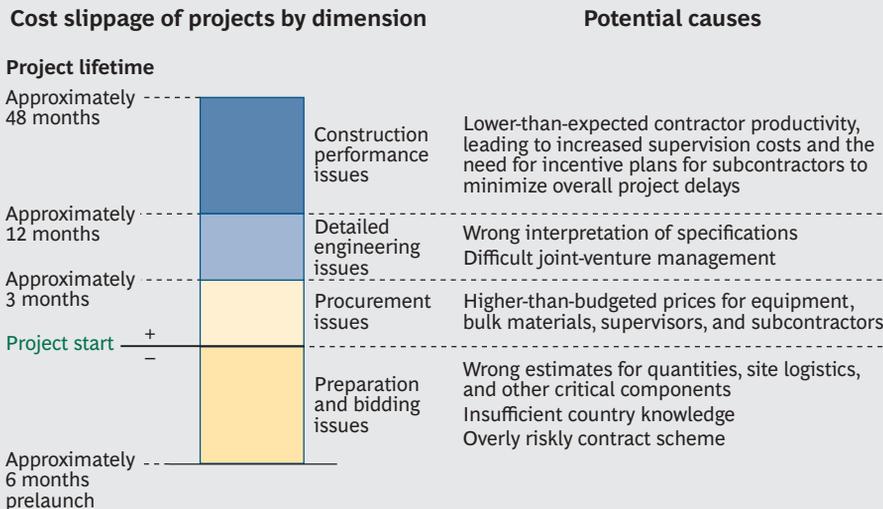
Illustration for an electrical contracting company based on BCG’s DICE methodology



Source: BCG analysis.

Note: BCG’s DICE framework is a tool for assessing the risks and probability of success of projects and change management efforts. It focuses on what we consider the four key determinants of success: the *duration* of the project, the performance *integrity* of the team, the organizational *commitment* to change, and the additional *effort* required of staff members.

## EXHIBIT 5 | Large-Project Slippages Can Have Multiple Causes



**There is no silver bullet—companies must get it right on all key dimensions**

Source: BCG analysis.

Make sure that key risks and opportunities are identified, quantified, and prioritized before you make pricing decisions.

management. There are many levers that improve outcomes in each dimension; we highlight some particularly critical ones.

**Preparation and Bidding.** The first dimension involves an early focus on suppliers and contract optimization.

- *Define the execution plan early—and stick to it.* Identify and freeze partners and key subcontractors, for example, and define the breakdown of roles.
- *Attempt to limit the volatility of the supply chain.* Get precommitments from key suppliers, and set up partnerships with critical subcontractors early on.
- *Make all key decisions from a risk-opportunity perspective.* Make sure that critical risks and opportunities are identified, quantified, and prioritized before you make pricing decisions. Have management review the top five to ten risks (looking at both potential impact and potential mitigation plans) of all key decisions.
- *In negotiations, secure the right to propose optimization of the contract and requirements after the contract has been awarded.* Review the contract with a cold eye; identify and leverage any last-minute opportunities (on the basis of modifications made and additional information learned during negotiations).

**Engineering.** The right skills and tools are critical to the engineering process.

- *Secure the right mix of skills to optimize tradeoffs among quality, time, and cost.* Make sure that skilled engineering resources are available for complex tasks,

such as challenging design, and that lower-cost resources are available for easier, more repetitive ones, such as detailed design.

- *Roll out collaborative tools.* These will enable synchronization across disciplines and among stakeholders, such as joint-venture partners and key suppliers and subcontractors, by using shared tools.
- *Standardize the design.* Implement a standard design for all processes, tools, and parts.

**Procurement.** It is important to assess suppliers' roles and monitor their performance.

- *Adopt an integrated view of suppliers across projects.* When negotiating with suppliers, gather information on other projects and proposals that they are involved in with the organization.
- *Ensure that execution constraints are embedded in procurement processes.* The delivery schedule, in particular, should be aligned with the construction schedule. (Equipment should arrive precisely on time.)
- *Proactively manage critical suppliers during project execution.* Regularly monitor suppliers to ensure on-time delivery and raise the alarm if there is the threat of a late delivery.

**Construction.** Both external and internal resources should be optimally leveraged.

- *Collaborate closely with key subcontractors.* Involve subcontractors early, ideally during the preparation phase.
- *Consider integrating in-house construction skills.* In-house construction engineers can help define how-to-build specifications with subcontractors early in the process, ensuring that construction constraints are embedded in the design and project planning. Maintaining a platform of in-house site-management capabilities (for example, having 30 percent of needed supervisors in critical trades in-house) will also help maintain better control and responsiveness during the execution phase.
- *Build a project organization and culture that integrates construction.* Ensure a balance with other disciplines, particularly engineering.

**Interfaces Between the Client and Contractors.** Key to a project's success is establishing expectations early and reviewing performance regularly.

- *Precisely define the scope of the contract and use incentive clauses to align expectations.* Clients' obligations and contractors' deliverables should be clear to all parties, and incentives should be put in place to align clients' and contractors' goals.
- *Develop an efficient claims-management process.* Put a dedicated team in place that identifies and manages the claims process with both the client and the subcontractors.

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Clients' obligations and contractors' deliverables should be clear to all parties, and incentives should be put in place to align clients' and contractors' goals.

- *Hold regular review meetings with the client and have a set agenda.* Meetings should be held monthly, at a minimum, to review progress against performance indicators and assess key risks and risk-mitigation measures.

**Organization and Planning.** Transparency and clear communication are critical.

- *Develop a plan for driving execution.* Typically, the engineering schedule should be based on the construction schedule, not the opposite. This requires being able to define how-to-build specifications (including work packages and logistics) early in the process.
- *Define roles and responsibilities clearly.* All positions and functions should be documented, especially in joint ventures.
- *Ensure transparency and align incentives.* Foster a culture of transparency in which teams and project managers feel comfortable raising their concerns early. Create shared, simple incentives for each team.
- *Set up rigorous project governance.* The project control function should report on a solid line to corporate control. Steering committees should meet at least monthly.
- *Develop focused, analytical project reports.* Concentrate on a limited number of KPIs, including trend analysis. Follow up on key risks.
- *Facilitate the sharing of practical experiences.* Conduct regular “step-back” sessions (for example, a project review with experienced senior project managers) and build a lessons-learned system that disseminates information.

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**Risk Management.** Risk should be identified early and assessed on a regular basis.

- *Put a strong focus on risk evaluation and mitigation in the preparation phase.* Leverage internal knowledge by conducting workshops with highly skilled and experienced people.
- *Define clear roles and responsibilities regarding risk.* Assign a risk manager to the project to orchestrate the process. Appoint “risk owners” to each identified major risk.
- *Develop appropriate tools to manage risks.* Risk management tools include scoring models, quantitative-assessment tools, risk checklists, and a risk management system that integrates knowledge management (and can thus help identify similar risks across projects).
- *Review risk regularly with contractors during project execution.* Discuss the evolution of risk identified at the bidding stage, new risks that have been identified, and the development and implementation of mitigation actions.

The degree of importance of each of these seven dimensions in project performance will depend on a company’s specific situation. For most players, all dimen-

sions will be of at least moderate importance. For many, all will be quite important—and each will need to be optimized to ensure project success.

**P**ROPER PLANNING OF large projects is critical to delivering them on time, on budget, and to specifications, particularly in today's increasingly challenging environment. The above approach, encompassing strategic planning, portfolio management, and project management, provides a road map for making it happen.

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## For Further Contact

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