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Excellence in Capital Projects: A Goal Yet to Be Achieved

There is much room for improvement in capex performance, with a clear gap between leading practitioners and the rest. Embedding best practices and disciplined execution are the keys to success.

A Short-Lived Recovery

In the wake of the 2008–2009 global financial crisis, capital spending bounced back as companies began to heavily invest, stimulated by the rising price of oil and gas and other raw materials. The recovery, however, was short-lived once commodity prices plummeted after the 2014 peak, leading energy companies to radically rethink their capital spending in an effort to manage cash flow, and sending shock waves through the global supply base. Across energy and process industries, about 60 percent of capital projects were negatively affected by either scaling back projects, postponing investments, or canceling projects all together.

Leading companies have adopted measures **to address underperformance.**

Despite the dramatic price squeeze, lower-than-expected return on investment, consequent pressure on costs, and expanding glut in the project and construction services market, capital project performance remains well below par. In fact, six out of 10 projects are either over budget or behind schedule, according to A.T. Kearney's third Excellence in Capital Projects study (ExCap III), which includes data from about 100 major global companies in the oil and gas, chemicals, metals and mining, and utilities industries (see sidebar: About the Study on page 2).

Leading companies have defined and adopted a set of measures to address underperformance. What remains to be seen is how committed the organizations are to embedding best practices and how disciplined the implementation and execution will be. In this paper, we examine the study's findings on performance and practices, discuss the capital project challenges that managers face, and highlight leading practices across the capital expenditure life cycle.

Capital Projects: The State of Play

Project approvals show increased risk aversion; sustenance has been the focus over growth

Capital budgets in all sectors are affected by fluctuating commodity prices and a weak global economy. Nearly half of the study's participants reported that their organization's capital budgets were reduced by more than 30 percent in the past couple years. During times of capital rationing, project selection is crucial.

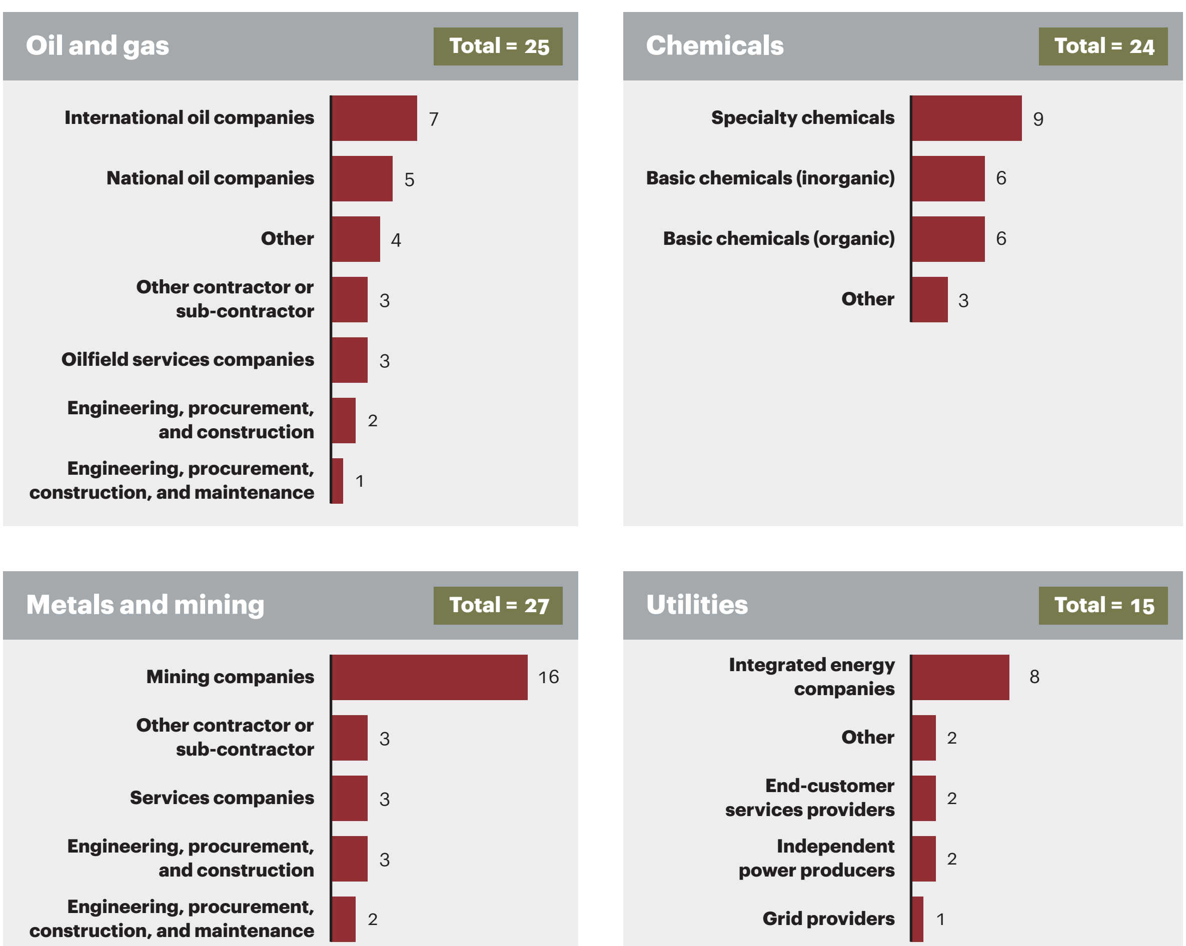
Our study reveals two themes: **For project selection, cost position** (in the fully loaded cost curve) and proximity to customers dominate the criteria, followed by agility and flexibility, such as brownfield expansion options and technology change options. Most investments are made to sustain production levels and grow selectively. **For project approvals, risk aversion** is on the rise: a third of our study's participants require the project's net present value to work within +/-30 percent of key volume and price assumptions, and more than 60 percent require it to work within +/-20 percent of key volume and price assumptions. This translates to approval of fewer growth projects and focuses investments on sustenance projects or brownfield expansions.

The companies in our study say there is significant overcapacity in engineering, procurement, construction, construction management, and construction services because of capital project budget reductions across the board, especially in mining and in oil and gas. As a result, many are concerned about the viability of small and medium-size firms in project and construction services and expect industry consolidation to continue.

About the Study

A.T. Kearney's Excellence in Capital Projects (ExCap) is a global, cross-industry study that identifies leading trends and best practices in managing capital projects across their entire life cycles. This third in a series, or ExCap III, was conducted in 2016, with proprietary early results discussed with industry participants through the second half of the year. Participants include about 100 executives in the oil and gas, chemicals, metals and mining, and utilities industries (see figure).

Figure
Overview of ExCap III study participants



Sources: ExCap III study; A.T. Kearney analysis

Project portfolios are shifting toward a higher share of small projects

As a result of increased risk aversion and requirements for more resilient capital returns, the composition of project portfolios is changing. More than 60 percent of study participants have an annual capex budget that exceeds $1 billion, and more than 25 percent have an annual capex budget greater than $5 billion. Nearly two-thirds of their portfolios are composed of projects worth less than $10 million, and nearly 80 percent are composed of projects worth less than $100 million. This is congruent with our general market observation that mega projects have been harder to come by, and sustenance has been the priority over growth.

Changing the project portfolio requires adjusting the operating model since many large organizations—especially complex, multi-product organizations—are not set up to succeed with portfolios that have a large share of projects valued at less than $100 million. They need to rethink their operating models, core processes, and governance mechanisms to facilitate performance on a portfolio with a greater share of smaller projects.

Capital project performance continues to be challenged

Sixty percent of capital projects have more than a 10 percent overrun on costs and schedules, and nearly a third have more than 25 percent overrun on costs. This is similar to the findings in our ExCap II study from 2011. So, broadly, there has been no performance improvement over the past five years.

Several challenges, similar across industry verticals, cause project performance to deliver below expectations:

- **Construction management.** The ability to complete project construction and hand over the project to commissioning on time and on budget is a major constraint.
- **Design and engineering.** The ability to develop an optimized and construction-ready solution that sets up construction stages for success on schedule and budget is a major challenge.
- **Project management.** These capabilities are a constraint despite the reduction in project volume and glut in project and construction services.
- **Procurement and contracting.** Establishing an optimized contracting model for key projects continues to be a challenge, and supply chain issues such as items with long lead times, materials management, and preservation continue to cause delays.
- **Contractor non-performance.** This is a significant problem, especially when the right project management capability and optimized contracting models are absent.

Common project-specific challenges include lack of adequate stakeholder management, execution in remote geographic areas, and regulatory environment.

Top organizations lead the way with excellent practices

Practices drive performance. ExCap III proves this aphorism to be true. To understand the leading organizations' practices, we took a closer look at our study's top performers—about 30 percent of participants. When we compared their practices with the rest of the participants, we saw significant differences.

Strong internal practices are essential to success

The leaders (about 30 percent of ExCap III participants) improved their project performance over the past five years, and they believe this trajectory will continue. They attribute their success to strong internal practices, which they are committed to investing in. More than half of all participants have seen no improvements in project delivery, and they don't expect to see any going forward. These participants have not developed strong internal practices.

Leaders focus strongly on construction and the front end of the project

Top performers focus on concept selection, front-end engineering, and construction. This is directly linked to strong internal value improvement practices, which drive capital efficiency. The focus on construction is linked to struggles to preserve project value during construction. This attention on the front end also aids in running a better procurement and contracting process.

Value improvement practices are embedded in capital project processes

Leading companies have adopted a number of value improvement practices that deliver two objectives:

- **Generate project value.** The leaders consider concept and design optimization and an enhanced contracting strategy as major value-generation drivers. To optimize their projects' concept and design, they focus on cross-functional collaboration, standard designs, and modularization (predominantly using low-cost countries). To optimize contracting strategies, they focus on improving their procurement and contracting practices.
- **Preserve project value.** Recognizing the challenges in construction, leading companies focus on lean construction techniques and improved construction performance management. Design standardization and modularization also help with this objective. The leaders also link project performance with contractor and personnel incentives to align around a common set of objectives.

The leaders also take a more functional approach to their capital project organization design by focusing on the right functional expertise from the early planning stages of a capital project throughout its execution.

Strong skill development and talent retention policies

In most organizations, the focus on developing skills and retaining talent in project departments still lags behind their ongoing operations. However, 25 percent of top performers believe their organization does focus on skills and talent and that this has helped improve their performance. However, none of the other participants believe skill development and talent retention have been focus areas for them. Project resources are still seen as contracted resources, obtained from the market when required. This is an area of significant opportunity for project departments. We have seen several organizations develop leading practices in this area with proven tools such as competency models, workforce planning, individual development plans, and job rotations. These organizations delivered much better capital project performance.

The path to capital project excellence

Overall, our study reveals several emerging priorities for project departments that want to improve their project performance and capture more capital returns from their project portfolios:

- **Focus on strengthening portfolio management and investment decision making.** Because portfolios are getting more complex and fragmented, and with risk aversion on the rise, stronger portfolio management and investment decision making will underpin better capital returns. Developing stronger practices in these areas based on deep and differential market insights will be essential.
- **Redefine the project operating model, and improve the project management framework.** With changing portfolios and higher expectations for performance, the project management framework needs to be revised. For example, many companies do not use a tailored project segmentation framework that allows them to choose right governance pathways for individual projects. Such gaps can cause significant efficiency losses (for example, burdensome bureaucratic processes) and encourage project managers to run their projects in silos. At the same time, because of the changing nature of the portfolio, traditional project hubs for large organizations do not have the same level of project volume causing significant inefficiencies. Revisiting the project operating model can ensure efficiency losses are understood and remedied. In addition, it is vital to ensure that the new operating model focuses on skill development and talent retention. Maintaining strong internal practices depends on the ability to retain key people.
- **Embed value improvement practices.** Following the example of leading organizations, one pillar of success is to define and embed value improvement practices in the way projects are executed. This will be a combination of developing the practices, mandating their application in projects, and continuously improving the practices with lessons learned from projects. To encourage value creation and delivery, project teams and contractors should be rewarded for adhering to the practices and for delivering results.

If executed well, these priorities will deliver sustainable results throughout a project's life cycle (see sidebar: Delivering Capital Project Excellence).

Delivering Capital Project Excellence

A.T. Kearney has a range of offerings for capital project excellence from portfolio management to the execution of a capital project. Robust portfolio management ensures that capital is allocated in the best manner: to maximize returns and meet strategic objectives. A fit-for-purpose project operating model (structure, systems, processes, and governance) ensures that projects are delivered in an efficient and productive manner. A.T. Kearney has a wealth of experience assessing, refining, and delivering improved capital project operating models. Key offerings in this area include designing project operating, governance, and stage gate models as well as creating project segmentation frameworks and project and investment readiness assessments.

One primary objective is to improve the project's value throughout its life cycle. A.T. Kearney has helped a wide array of companies improve the net present value of their projects from concept and design optimization to standardization and modularization. Backed by our strength in procurement and supply chain, A.T. Kearney helps companies improve their contracting strategies and enhance procurement in their capital projects. We also have a wealth of experience transforming projects during the construction and commissioning phase. Large asset shutdowns and turnarounds should also be treated as major capital projects. A.T. Kearney has proprietary tools to optimize the value of large turnarounds through value improvement tools.

In the following sections, we offer some sector-specific insights.

Oil and Gas

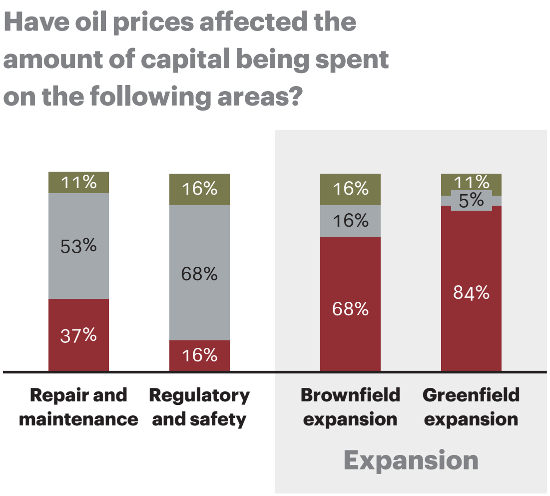
Most oil and gas projects are occurring downstream in processing, pipelines, and refineries. Upstream, there is activity in offshore shallow water and onshore conventional.

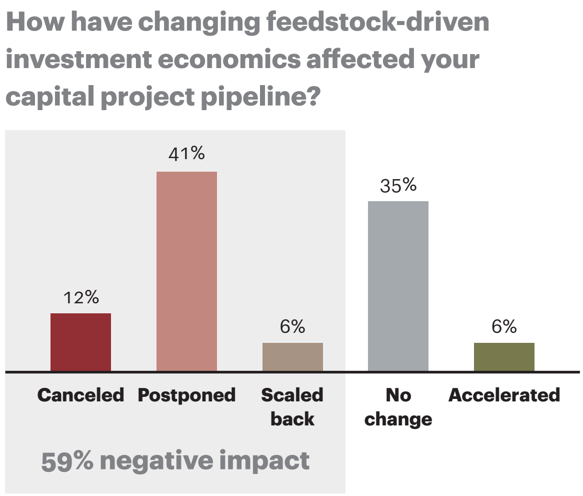
Falling oil prices along with spending on repairs and maintenance have had a **severe impact on annual spending for expansion projects.**

Not surprisingly, falling oil prices along with spending on repairs and maintenance have had a severe impact on annual spending for expansion projects: 59 percent have been either canceled, postponed, or scaled back (see figure 1). Forty-seven percent of participants have seen 30 percent or more of their capital budget affected by the current situation, and 21 percent said more than half of their annual capital spending has been negatively impacted.

When asked about the supply and availability of contractor services, 40 percent say engineering procurement and construction services are oversupplied in Europe, followed by general operations and maintenance as well as inspection and testing. Least oversupplied are logistics services.

Figure 1
Few oil and gas firms are spending money on expansions





Increase   Stagnate   Decrease

Note: Numbers may not resolve due to rounding.
Sources: ExCap III study; A.T. Kearney analysis

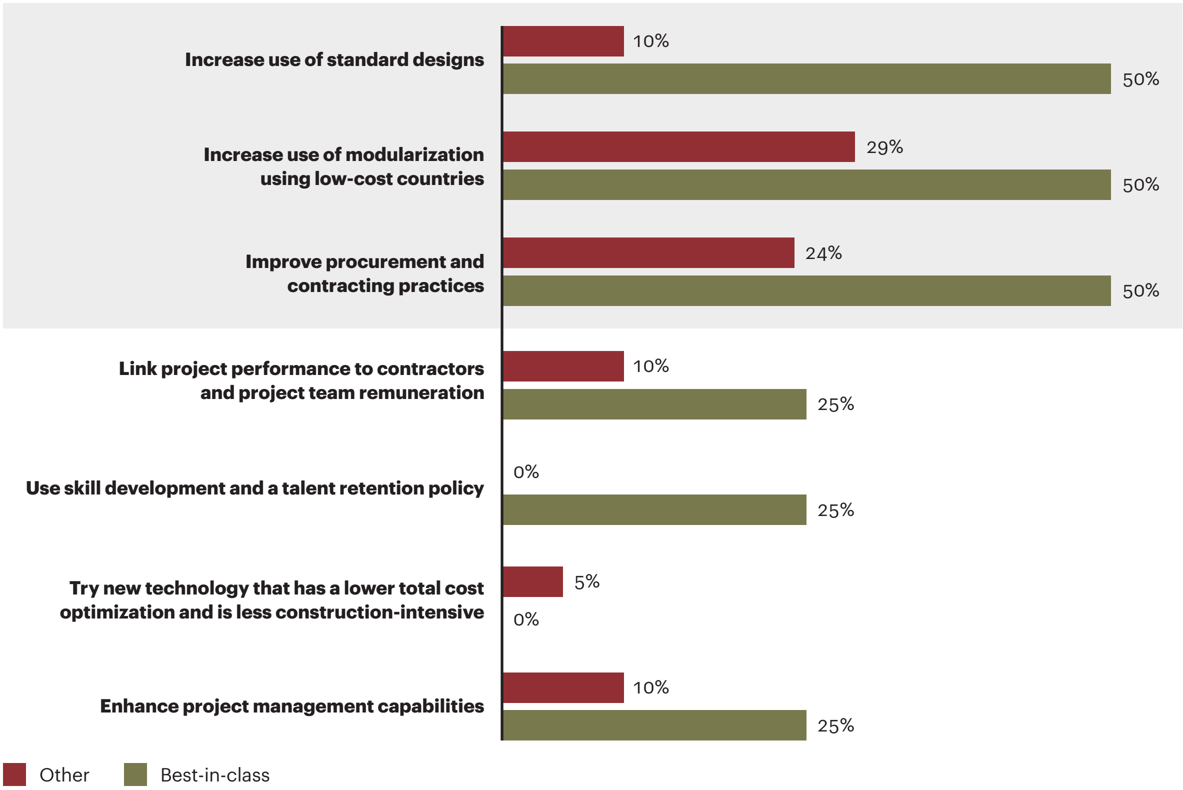
Going forward, oil and gas companies see a **more functional-focused capex organization.**

Oil and gas companies have not been idle in improving this situation and have been using concrete measures to minimize the impact of project challenges on budgets and schedules, especially through standard designs, increased modularization, and improvements in procurement and contracting (see figure 2). Going forward, oil and gas companies see a more functional-focused capex organization. For example, pooling crucial resources for new and more complex projects as well as improving internal practices are seen as essential to success.

Figure 2
Several methods can keep capital projects on time and on budget

Project performance versus schedule
(% of "yes" responses)

Which of the following does your organization do to minimize the impact of project challenges to the budget and schedule?



Sources: ExCap III study; A.T. Kearney analysis

Chemicals

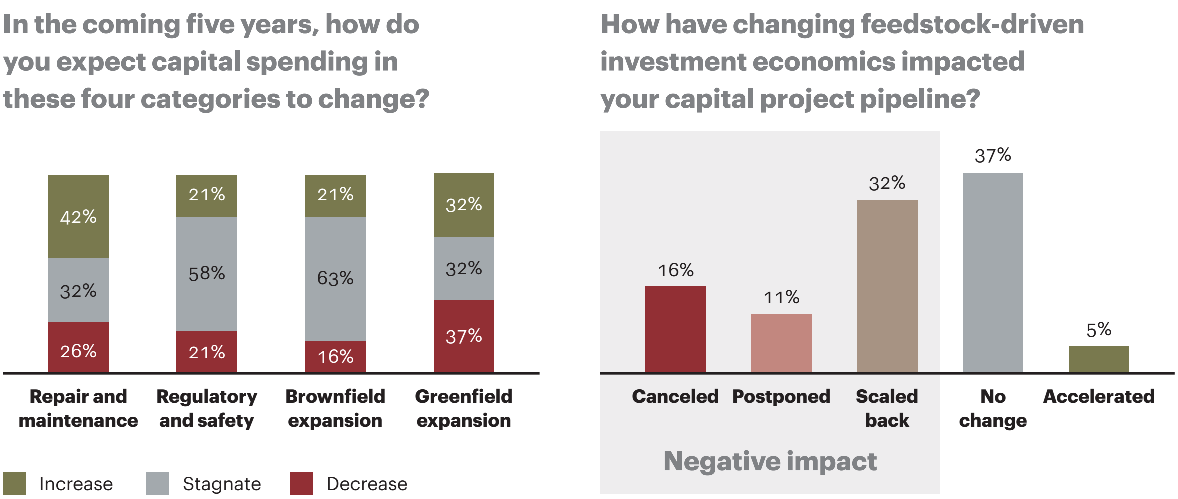
Investments in chemicals can be grouped into two clusters: A few big firms are pursuing multi-billion-dollar projects, primarily in feedstock-driven opportunities in the Middle East and North America. But most are managing much smaller investments with about 50 percent spending less than $100 million a year, and about 75 percent spending less than $500 million.

Project performance in the chemicals sector remains a significant challenge.

Ongoing feedstock uncertainty, a potential shake-up in planned and existing free-trade agreements, and the overall economic outlook are dampening the outlook for capital spending.

In fact, nearly 60 percent of projects were canceled, postponed, or scaled back (see figure 3).

Figure 3
Fluctuating feedstock prices affecting chemicals projects



Note: Numbers may not resolve due to rounding.
Sources: ExCap III study; A.T. Kearney analysis

In line with the overall study findings, project performance in this sector remains a significant challenge. In fact, one out of two projects is behind schedule, and two out of three are over budget. Companies that have seen improvements in performance suggest that focusing on procurement and contracting optimization as well as adopting more efficient technologies were the key enablers.

On the bright side, almost all are optimistic that they will improve their capex performance within the next 10 years with better internal practices and a more functionally focused capex organization.

Utilities

The utilities in our study are all focusing on new markets, including Africa and North America. The project portfolio covers all main business areas and types of projects from new construction to facility, maintenance, and minor upgrades. Because of cash restrictions, the vast majority of investments are being allocated to smaller projects of less than $500 million.

Most utilities expect expansion in capex projects, especially greenfield and brownfield, to stagnate or decrease in the coming years. Execution remains weak in terms of both schedule and budget: 33 percent of projects are behind schedule, and 66 percent are over budget. However, utilities are addressing challenges with methods such as design standardization and modularization in project planning (see figure 4).

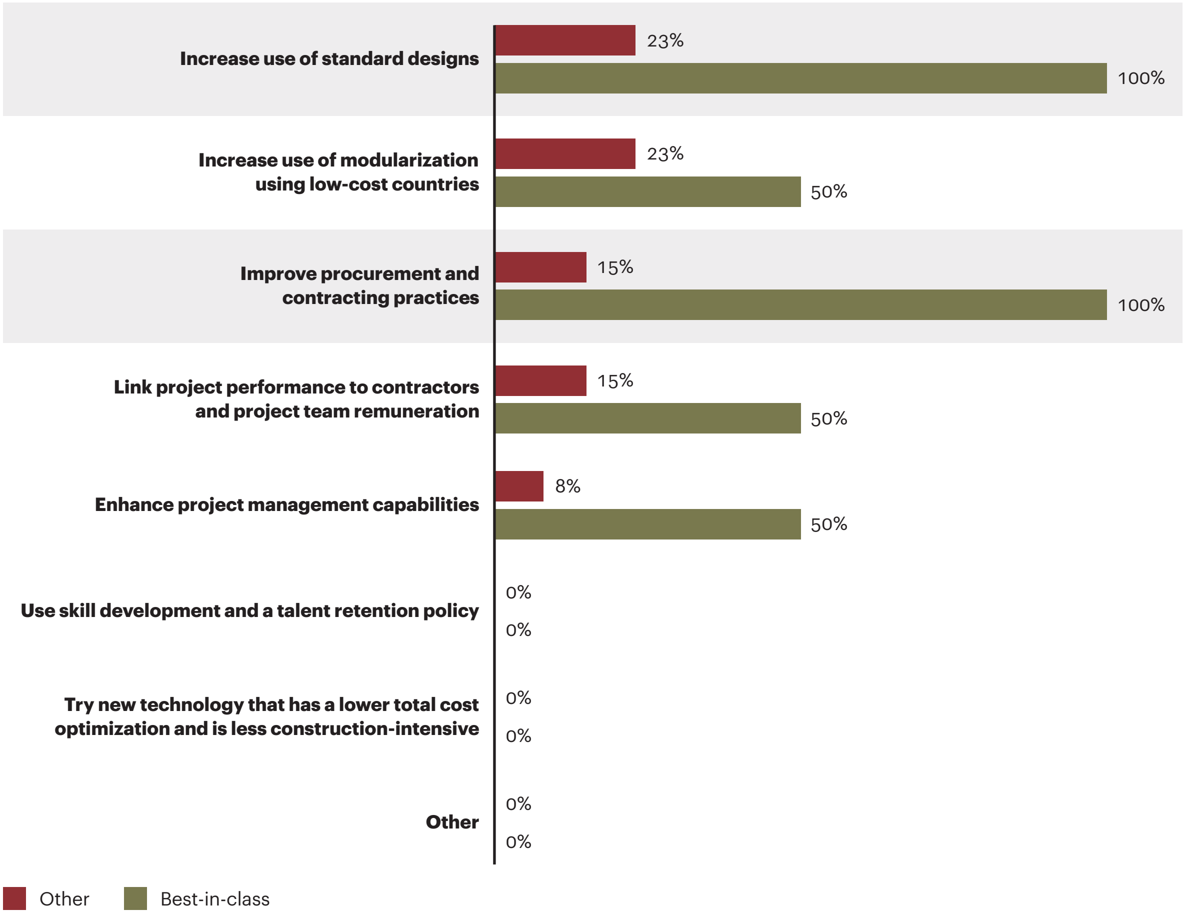
Figure 4

Utilities focusing on standard designs, procurement, and contracting

Project performance versus schedule

(% of "yes" responses)

Which of the following measures has your organization implemented to minimize the impact of project challenges to budget and schedule? (Check all that apply)



Note: Best-in-class companies are those that deliver a project within or under budget and on time or ahead of schedule. Other includes those that deliver projects over budget or behind schedule.

Sources: ExCap III study; A.T. Kearney analysis

Metals and Mining

With commodities prices remaining low, capital project spending in metals and mining is declining. Only 19 percent of projects are greenfield (as a share of capex), more than 30 percent are a mix of greenfield and brownfield, and more than 40 percent are pure brownfield projects. As in other sectors, reduced capital budgets are common.

In terms of both schedules and budgets, similar to other sectors, 68 percent are behind schedule, and 62 percent are over budget. Leading companies have adopted a range of measures to improve project performance. Modularization using low-cost countries, improvements to procurement and contracting practices, linking project performance to contractors and project team remuneration, and skill development and talent retention policies are key measures that metals and mining companies have adopted (see figure 5).

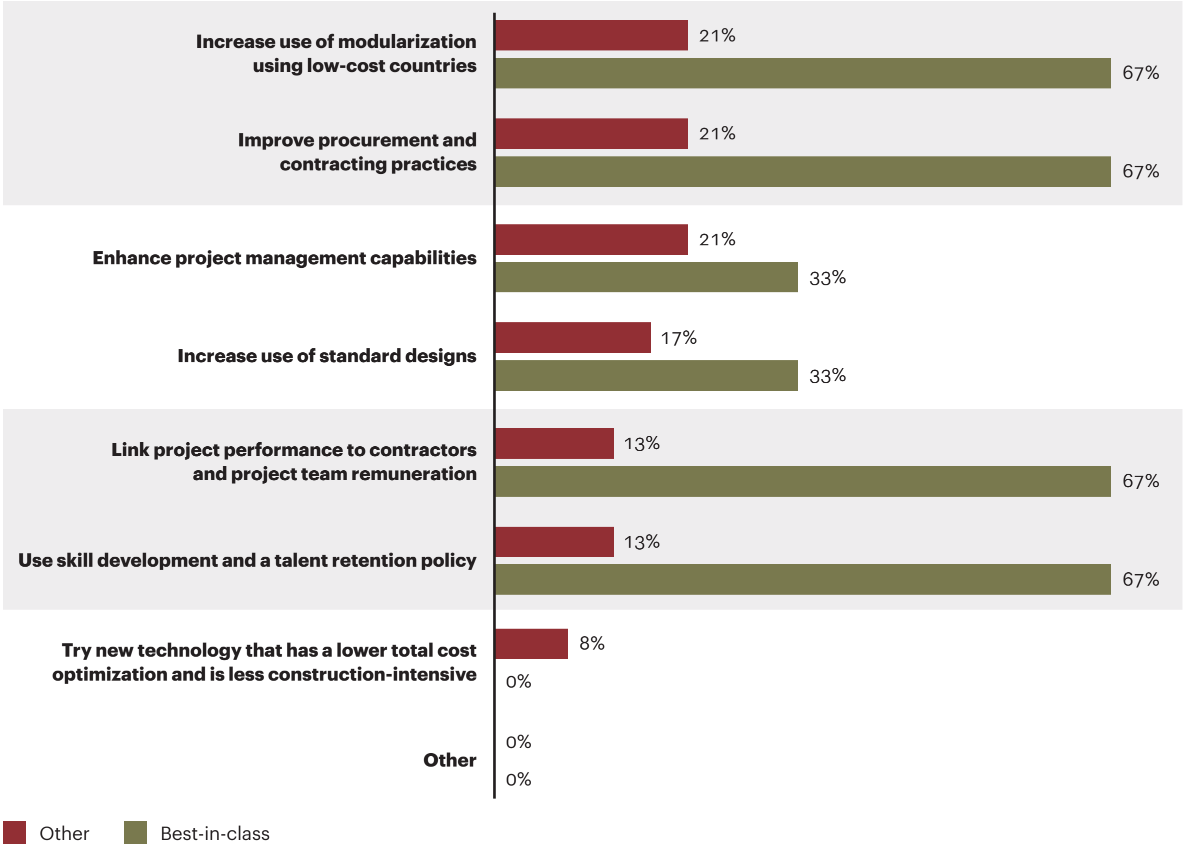
Figure 5

Metals and mining firms focusing on various tools to improve value

Project performance versus schedule

(% of "yes" responses)

Which of the following measures has your organization implemented to minimize the impact of project challenges to budget and schedule?



Note: Best-in-class companies are those that deliver a project within or under budget and on time or ahead of schedule. Other includes those that deliver projects over budget or behind schedule.

Sources: ExCap III study; A.T. Kearney

A Path Forward

The overall picture is clear: whether in oil and gas, utilities, chemicals, or metals and mining, companies are facing similar performance challenges. The leaders are using similar practices to improve the value of their capital project performance in terms of budget and schedule: increasing the use of standard designs, adopting greater modularization using low-cost country fabrication yards (where possible), improving procurement contracting practices, and implementing lean construction techniques. Linking project performance to contractors and project team remuneration paired with a deliberate strategy to retain key talent are considered pivotal practices for aligning incentives and project targets.

Forward-thinking organizations that want to improve their capital project performance should focus on strengthening their portfolio management, reviewing and improving their project operating model, developing and embedding value-improvement practices in their project processes, and focusing on skill development and talent retention.

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The signature of our namesake and founder, Andrew Thomas Kearney, on the cover of this document represents our pledge to live the values he instilled in our firm and uphold his commitment to ensuring "essential rightness" in all that we do.