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Managing a moonshot: Keeping large industrial projects on track

Smarter capital expenditure management can save large industrial companies up to 25 percent on every project.

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An American manufacturing company had begun to build multiple state-of-the-art factories. Initially, analysts estimated that capital expenditures (capex) would reach $3 billion, and the project would take three years to complete, but even before ground had been broken, headquarters began to receive worrying reports.

Serious delays driven by repeated supply chain disruptions, customs disputes, and troubles with engineering, procurement, and construction (EPC) management contracts pointed toward massive cost overruns. Executives could see that these budget-busting expenditures and the opportunity cost of delayed completion could greatly weaken the company's strategic position. Their technology was good and demand was strong, but without competitive manufacturing facilities, they could still lose.

As managers considered these mounting challenges, they realized they faced a problem surprisingly common among global companies in large industries: weak capex management. Advanced procurement systems now ensure that companies don't overpay for their material purchases, almost down to the paper clip. The same thing can't be said of most capex portfolios. The unique and lumpy nature of capex means that even major, sophisticated industrial companies still treat its management much more as an art than a science, an approach that results in rampant cost overruns for both large and small projects.

Fortunately, these executives learned in time that it doesn't have to be this way. By putting a more structured capex management process in place, they were able to stop the seemingly uncontrollable cash drain and set the project back on a trajectory that would end with the facilities built on time and on budget.

The four pitfalls of industrial capex management

As they discovered, four factors make capex management difficult for large industrial companies:

1. *It is difficult to estimate what a unique capital project* should *cost.* In the case of this manufacturer, for example, each new plant would be customized to produce different products. Unlike most expenditures, where it's simple to gauge this year's cost against last year's or an average price paid in the industry against your own, the right comparison is often not obvious, particularly for a pioneer: How do you benchmark a moonshot?

2. *Complex project requirements tend to inflate costs.* Large industrial manufacturers must produce products with rapidly changing specifications due to changing technologies, regulations, and customer preferences. These rapid changes mean products are often tweaked late in the design phase, and manufacturers must strain to accommodate those adjustments.

   Frequently, the drive for product changes or product flexibility also lends itself to gold plating (specifications or design that exceeds the minimum needed to meet the project objectives). When new specifications are implemented, they may be layered on top of legacy requirements. Managers lack a clear path or incentives to remove specification or scope redundancies, and there is no clear accountability if such redundancies are not removed.

3. *Large industrial companies handle many distinct product categories across multiple business units, making trade-off decisions difficult.* Large industrial companies can produce consumer electronics and automotive products and sell them across multiple business units. Each of these categories may have very different requirements and ramp-up times, making it hard to conduct "apples to apples" value comparisons. This forces companies to reference historic spending patterns or local knowledge to make these crucial decisions, rather than taking a comprehensive portfolio view of opportunities and trade-offs. As a result, managers are unable to use annual capex budgeting processes to manage risk exposure in the aggregate, driving inconsistent choices about capex priorities.

4. *Pressure to speed the time to market leads to reactive decision-making.* When the race is on

to enter a market, managers often accept cost overruns as the price of acceleration. This can lead project leaders to make snap decisions that focus on removing immediate bottlenecks instead of taking a holistic view of levers available to improve the overall project schedule and cost performance.

Staying on track, on time, and on budget

To steer clear of these traps, the best large industrial players introduce more discipline into the project and portfolio development process early, at the point where it matters most.

Achieving world-class capex management can drive a 15 to 25 percent reduction in overall capital spend coupled with an improvement of 2 to 4 percent in ROIC. Some firms have even achieved a staggering 50 percent reduction in year-on-year capex portfolio spending.

Four best practices in particular can reduce cost uncertainty for many high-tech and industrial companies, making on-time and on-budget delivery more likely at both the project and portfolio levels:

1. Budget: Set the right target

Performance isn't measurable in a vacuum. Without a reliable benchmark, managers cannot hope to determine the cost efficacy of their capex. Benchmarking a moonshot can be hard, but fortunately, even leaders at the cutting edge will find elements of a project that can be compared to an established set of costs.

Capex teams can reliably evaluate projects within their portfolios based on the cost details and known cost drivers of past projects. Prior investments can be broken down to the level of an individual tool, robot, or equipment line item. These data points are then aggregated for each project using key performance indicators (KPIs) for major cost drivers. The two KPIs most helpful for comparing investments are work content (for example, internal weld spot equivalents) and capacity (for example, jobs per hour processed). Owners can add other potential KPIs (level of automation, say) to identify other potential savings opportunities.

This approach can also be applied across companies. McKinsey studied "body-in-white" capex across more than 35,000 data points from several automotive OEMs and 65 KPIs to identify capex-saving opportunities in the construction of automotive body shops. They helped one auto manufacturer zero-in on two parts of its assembly line where its costs were out of sync with industry norms. The culprits turned out to be robots: Robot use was 80 percent higher than industry average in the body side framing section, and 90 percent higher in the closures section. This helped the design team focus its efforts on stress-testing the business case for the number of robots in these lines.

2. Scope: Remove gold plating from the project and specifications

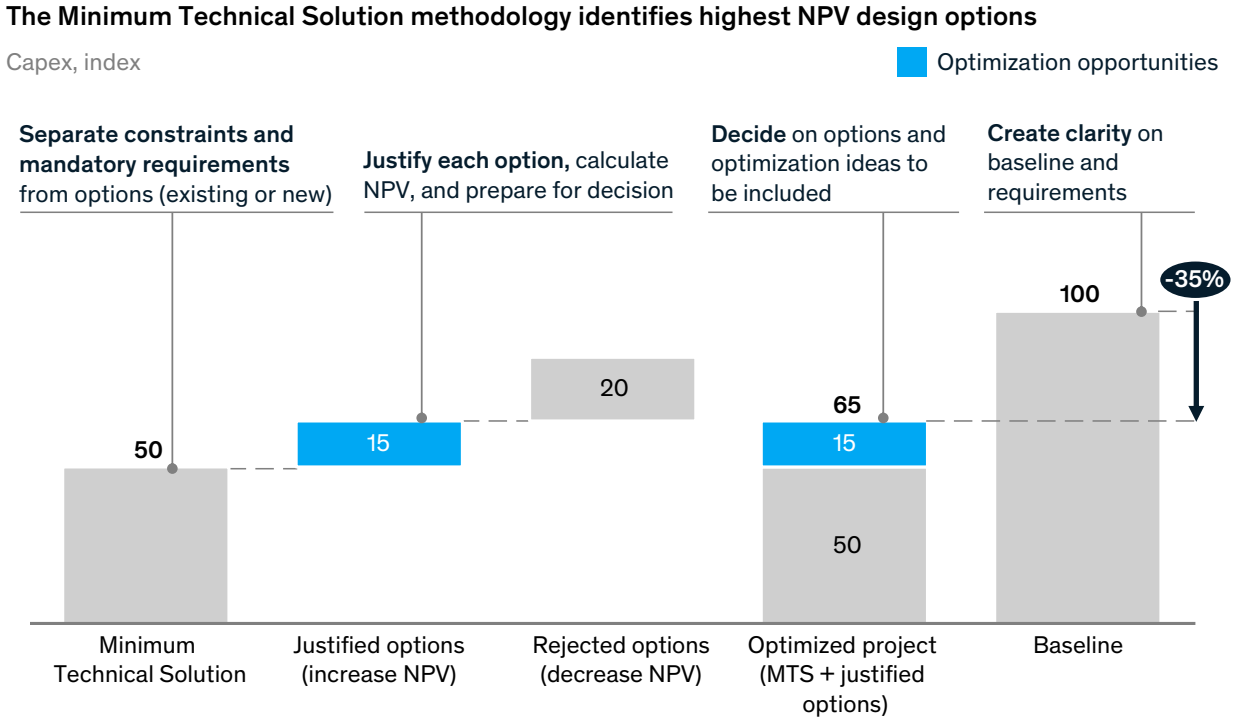
Companies can reduce gold plating by assembling multi-disciplinary teams that empower key stakeholders to make specification decisions. These teams should identify the absolute lowest-cost design capable of meeting the project objectives. Only after aligning on the "minimum technical solution" should technical teams begin to add features, and only those elements that add value to the overall project, such as greater line flexibility (exhibit).

These investigative teams should ask questions such as, can we justify the trade-offs for each of the steps from the minimum solutions to the current specification or is it worth paying for an improved feeder line? Does the back-up pump need to be installed or would keeping a spare in the warehouse be enough? Only after the investigators have had a fact-based discussion with key stakeholders and assessed the value of each add-on component, should they finalize their design.

At the same time, the company should hold a series of workshops that include panels of cross-functional leaders and trusted suppliers to come up with new ideas to improve the project's overall value. One American panel maker that undertook this exercise identified a variety of opportunities (e.g., reassessing the space needed for a clean zone, streamlining a design approval process, and increasing the efficacy of rinse equipment) that shaved 25 percent off the cost of a nine-figure project.

Exhibit

Minimum technical solution workshops offer a structured fact-based approach to improving project NPV while reducing capex.



3. Bucket: Compare like-for-like projects

To avoid "apples to oranges" comparisons, companies should avoid grouping their projects by product or industry. Instead, they are better off sorting them by general aim. In our experience, most capex projects focus on one of four goals:

- Complying with regulatory/safety guidelines
- Maintaining business-as-usual
- Pursuing new growth
- Improving existing performance

This insight enables leaders to set specific evaluation metrics for each category, facilitating objective thresholds and sensible project-ranking. This process leads towards a portfolio based on metrics related to value, regulatory risk, size, and urgency. Once executives have evaluated each project by these criteria, they normally have a much easier time making optimal resource allocation decisions. For instance, they can set a limit on overall spend, allocate that spend toward projects with the most value, and defer remaining projects for the next planning cycle.

4. Execute: Accelerate the go-to-market timeline

Traditionally, project managers have treated projects as a sequence of execution milestones on the way to the finish line. They use resource-loaded schedules created by management teams based on technical estimates and historical performance. Schedules are updated weekly, not in real time, which creates an information lag and forces reactive problem solving. Each day a team faces a milestone delay—for instance, when the civil construction team must wait for a building permit—they waste resources and lose momentum.

Sidebar

Building transparency into capex

A top-tier automotive supplier faced pressure to rapidly reduce its budget and control cash-out in the coming year. Unfortunately, the firm did not have the analytical insights needed to scale back thoughtfully. Investments were not centrally consolidated by program, even for major multi-year initiatives; some projects also lacked a clear business case.

To better understand its investments, the company set up a cross-functional team to develop a more structured approach to capex. The executive team established evaluation metrics for each type of project, enabling them to set objective funding thresholds and develop clear project rankings based on quantitative metrics. This ensured the management team would be equipped to have data-driven discussions of risk trade-offs to align the portfolio with business objectives.

Pressure-testing the portfolio and introducing more discipline had dramatic results: Within three months, the company shrank its capex portfolio by 50 percent. The firm saved on cancelled projects, postponed projects, and projects optimized for efficiency—and most importantly, the projects that remained all met management's internal definition of acceptable risk.

Best-in-class leaders circumvent this risk by adapting advanced manufacturing principles in a construction context. One of these principles is Project Production Management (PPM), a methodology that optimizes capacity, inventory, and variability of construction resources. It optimizes the execution of work by minimizing work in process (i.e., inventory), allocating capacity, and controlling variability. Under PPM, the entire project system is mapped to identify critical inputs, constraints, and outputs of each given process center. For example, the process center for civil construction has a variety of inputs, including designs, materials, skilled labor, and equipment, while critical dates such as permit issue, completion of site grading work, and target completion become constraints. PPM integrates all these data into a system that forecasts likely delays or bottlenecks, harmonizing production rates across all process centers.

Ironically, many large industrial companies already apply these principles in their plants but overlook them when they are building those same plants. By extending manufacturing principles to construction, some large industrial leaders have seen their building costs fall by 10 to 15 percent, even as their schedule accelerates more than 10 percent. Properly executed, the combined impact of these four solutions can be felt all over the company.

Capital expenditures are a huge cost concern for the strategists of large industrial companies—and they have proven remarkably difficult to manage. However, as analytic techniques, data availability, and managerial understanding of capex have advanced, what was once impossible is now merely difficult. And for companies that build everything from advanced jets to computers that can fit in your pocket, difficult need not mean impossible.

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