



Preparing to make big-ticket investment decisions

When the stakes couldn't be higher, the quality of the decision making can make all the difference. Process improvements can help.

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Few decisions in an executive's career are as complex or sensitive as a multibillion-dollar investment with a payback timetable that can stretch on for decades. The right call can positively transform a company's value. The wrong one can damage the company's share price, draw public criticism, and perhaps even cost responsible managers their jobs.

Insight into the process by which successful managers make such decisions is hard to come by.¹ By their nature, projects of this size are highly individual and fairly rare, so quantitative data typically are insufficient to reliably calculate the root causes of failed investments. And qualitative data are hard to generalize about, given

big differences among the practices of various companies and industries.

To get at what it takes to prepare for such high-stakes decisions, we interviewed executives from sectors where big-ticket investments regularly arise—natural resources, utilities, heavy industrials, and even pharmaceuticals—and pooled our collective experience. Despite variations among sectors and projects, we concluded that many good practices in interviewees' decision-making processes could be more widely applied, both within capital-intensive industries and indeed in any company that faces a material investment decision. These include examining the handful of characteristics that are most critical to a project

early in the process of evaluating an investment proposal, employing both quantitative and qualitative insight in risk discussions, and keeping decision biases in check.

Start with the swing factors

Due to their long-term nature, large, complex projects have many more uncertainties that affect revenue, cost, and investment than do smaller ones. Development and construction alone can span a decade or more, and a project's operating life can last several times longer than that. And over that time, there's often little correlation among factors such as global commodity prices, local labor costs, and geological characteristics.

One approach to managing this challenge is to focus analysis on those material factors where uncertainty is greatest before jumping fully into the detailed business plan that such investments require. These factors are what one practitioner we spoke with calls "the most critical swing factors." Looking back and rigorously evaluating why projects failed or succeeded, "You find very few factors that really made the difference," he says. "You analyze them as best you can, then set aside the projects that don't look great—even if other factors seem attractive."

When considering a mining project in a remote location, for example, it's easier to get good information on building a prerequisite railway line through difficult topology than it is to build the entire project's business case. Moreover, companies can use the actual cost of comparable railway projects to get a feel for the likely range of investment required. This analysis is really about understanding those factors that will affect costs, and then making useful comparisons, such as cost per kilometer of railway track.

Swing factors vary from industry to industry. Managers will be familiar with most of them when past experience and familiar technologies are involved but may be mistaken or blindsided by others that are only revealed through analysis. In the case of mining, as the example above suggests, a common swing factor is the cost of putting in place the infrastructure to deliver a bulk product to market. For other mining companies, additional swing factors might be highly unusual and project-specific, such as the cash and reputation costs of resettling a community living too close to a planned mine. An early look at political and regulatory risk can also be important, leading many resource companies to avoid certain geographies entirely, despite compelling geological opportunities.

Even after making an initial decision to invest, some managers shift their attention as a project evolves, looking for other swing factors that may have arisen along the way. Has the price outlook changed, for example? Is the project on time, with cost and capital expenditure under control? In bad cases, projects can take twice as long as planned and cost double the original projections, while producing less output than expected. Substantial write-offs will follow. In any industry, the realization that the company has overpaid for a large acquisition can result in public criticism.

Quantify and qualify

Just as companies need to disaggregate the sources of value in big projects, they must also differentiate among sources of risk. Often their approach is desultory, leaning heavily on oversimplified quantitative approaches. Even for large decisions, many executives limit their calculations to high, medium, and low cases for cash flow, based on fairly arbitrary sensitivities. It's also not uncommon for them to reflect the added risk of

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less secure regions or early-stage projects merely by adjusting the discount rate they use to calculate the cost of capital in their valuation models. Such adjustments are typically made without factual basis—for example, plus or minus 1 percent for no apparent reason. And the approach implicitly assumes that because any given project is but a part of a diversified portfolio of investments, there would be no severe consequences for the company, which is unrealistic given the size and nature of these investments. Such projects are more susceptible to a wider range of market, technology, and regulatory risks, which affect different aspects of a large project differently—with potentially severe consequences in some areas and more mild ones elsewhere. That impact can't be meaningfully captured in a simple percentage adjustment.

Instead, companies with the best decision methodologies we've observed disaggregate different sources of uncertainty and model them separately—often both quantitatively and qualitatively. The type of data itself usually dictates what kind of analysis will work best, but for many large projects, using both quantitative and qualitative data is necessary to offer managers a fuller picture of risk. Managers who restrict themselves to one or the other could miss some key points.

Consider the case of a resource company operating in Africa. Managers evaluating an investment there charted out several scenarios for the development of the country in which the prospective

investment would take place. They looked at the fiscal position of the government under each of the scenarios and then calculated what the royalty rate would need to be to allow the country to meet its spending obligations. That analysis provided a more sophisticated perspective on where royalties would go than the typical approach of making an arbitrary assumption that royalties could go up by an average of, say, 10 percent. The team then triangulated the development scenarios against what had actually happened in other resource-rich countries to try to get a sense of the likely shape of evolving regulation. Managers quickly concluded that the country they were interested in would likely face a real near-term cash shortage and that it would increase natural-resource royalties prohibitively in order to balance its budget.

Keep decision biases in check

Companies across capital-intensive industries are starting to recognize the prevalence of decision biases and their potential impact on investment decision making. This is particularly evident in natural-resource companies; we've observed that the duration and uncertainty of investments, as well as the importance of big projects for individual careers, can exacerbate the impact of biases in such companies. As one manager we met admitted, "If you've spent a few years in the desert looking for a resource, you can be biased toward going ahead with an investment so you can be the one running a large operation." Any functional manager trying to build up investment in the

multiple projects she oversees might have the same bias, albeit to a lesser degree than the manager in the desert overseeing a single large one.

This topic is far too broad to cover comprehensively here. However, time and again, the executives we've spoken with have agreed that when making decisions about investments of this size, it's essential to include measures in the process that identify and mitigate the effects of bias.² Most companies have a policy that lays out who approves investments and on what grounds, but those policies are often inadequate or wrong, and companies seldom track the quality and performance of the process. As a result, as one executive observed, his company's biggest failures occurred when senior managers overrode established processes and methodologies.

Some practical countermeasures can help. One global power company asks all functional heads individually for their perspectives on each proposal; the act of recording the various positions can encourage people to take greater accountability for their decisions. A few companies go further, explicitly identifying which biases they and their managers are vulnerable to—and then investing in techniques to mitigate the effects. For example, one global energy supplier established an independent team of evaluators, separate from the project team, to tackle an optimism bias and misaligned incentives within the project team itself. The evaluators audit the analytical models, stress test the assumptions behind the analysis, and ensure that every relevant stakeholder and functional department has provided comment

before proposals are considered by the investment committee. The process culminates with the team submitting an independent assessment of the project to the investment committee.

Elsewhere, a private-equity company insists on as many as 15 to 20 interactions between the investment committee and the team proposing an investment. Compare that with the two or three interactions more typical of a large mining company, where the initial case, a full project review, and a final decision may be the only formal senior interactions. The private-equity company's more thorough review gives the investment committee more than just the choice of accepting an investment despite concerns or forgoing a potential opportunity by allowing it to lapse. Moreover, during each interaction, the investment committee actively tests and shapes the assumptions made in assessing the project—challenging the effect on the project's value if the price were slightly higher or lower, for example, if extraction costs were twice as much, or if the quality of the product were higher or lower. Obviously, that kind of discussion isn't possible for every variable, but it's far more detailed than in most corporations—where the investment committee is typically regarded as much too senior to get so involved, and all assumptions are usually agreed upon long beforehand. ○

¹ See Martin Pergler and Anders Rasmussen, "Making better decisions about the risks of capital projects," *McKinsey on Finance*, May 2014, mckinsey.com.

² For more on the five key groups of biases that affect investment decision making, see Dan Lovallo and Olivier Sibony, "The case for behavioral strategy," *McKinsey Quarterly*, March 2010, mckinsey.com.