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Delivering large-scale IT projects on time, on budget, and on value

Large IT efforts often cost much more than planned; some can put the whole organization in jeopardy. The companies that defy these odds are the ones that master key dimensions that align IT and business value.

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[1]For another cut of the data—one focused on all IT projects in the database (not just the large ones)—see Alexander Budzier and Bent Flyvbjerg, "Why your IT project may be riskier than you think," *Harvard Business Review*, September 2011.

[2]IT projects are continuously added to the database. This round of research is based on the more than 5,400 projects that were in the database as of June 2012.

As IT systems become an important competitive element in many industries, technology projects are getting larger, touching more parts of the organization, and posing a risk to the company if something goes wrong. Unfortunately, things often do go wrong. Our research conducted in collaboration with the University of Oxford suggests that half of all large IT projects—defined as those with initial price tags exceeding $15 million—massively blow their budget. On average, large IT projects run 45 percent over budget and 7 percent over time while delivering 56 percent less value than predicted. Software projects run the highest risk of cost and schedule overruns[1] (Exhibit 1).

These findings—consistent across industries—emerged from research recently conducted on more than 5,400 IT projects[2] by McKinsey and the BT Centre for Major Programme Management at the University of Oxford. After comparing budgets, schedules, and predicted performance benefits with the actual costs and results, we found that these IT projects, in total, had a cost overrun of $66 billion, more than the GDP of Luxembourg. We also found that the longer a project is scheduled to last, the more likely it is that it will run over time and budget, with every additional year spent on the project increasing cost overruns by 15 percent.

Staggering as these findings are, most companies survive the pain of cost and schedule overruns. However, 17 percent of IT projects go so bad that they can threaten the very existence of the company. These unpredictable high-impact events—"black swans" in popular risk parlance—occur significantly more often than would be expected under a normal distribution. Large IT projects that turn into black swans are defined as those with budget overruns of more than 200 percent (and up to 400 percent at the extreme end of the spectrum). Such overruns

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Surveys of IT executives indicate that the key to success lies in mastering a value-assurance method-ology for large-scale IT projects. This approach gets companies to focus on managing strategy and stakeholders, master technology and project content, build effective teams, and excel at core project-management practices.

It's wise to analyze pros-pects before starting a large IT project. Companies may begin with a diagnostic to determine the health of a project from the standpoint of the value-assurance approach and its relative prospects when compared with the outcomes of similar projects.

match or surpass those experienced by black swans among complex construction projects such as tunnels and bridges.

One large retailer started a $1.4 billion effort to modernize its IT systems, but the project was eventually abandoned. As the company fell behind its competitors, it initiated another project—a new system for supply-chain manage-ment—to the tune of $600 million. When that effort failed, too, the retailer had to file for bankruptcy.

Four ways to improve project performance

So how do companies maximize the chances that their IT projects deliver the expected value on time and within budget? Our surveys of IT executives indicate that the key to success lies in mastering four broad dimensions, which combined make up a methodology for large-scale IT projects that we call "value assurance." The following elements make up this approach:

- focusing on managing strategy and stake-holders instead of exclusively concentrating on budget and scheduling
- mastering technology and project content by securing critical internal and external talent
- building effective teams by aligning their incentives with the overall goals of the project
- excelling at core project-management practices, such as short delivery cycles and rigorous quality checks

According to survey responses, the inability to master the first two dimensions typically causes about half of all cost overruns, while poor performance on the second two dimensions accounts for another 40 percent of overspending (Exhibit 2).

1. Managing strategy and stakeholders

IT initiatives too often pay little heed to strategy and stakeholders and manage projects purely according to budget and schedule targets. The perils are illustrated by one bank's transformation effort, in which its finance department became involved only a few months before the system was due to go live. This led to several complex changes in the accounting modules due to a recently introduced performance-management system. Coming so late in the day, the changes delayed the launch by more than three months, at a cost of more than $8 million.

Top-performing projects, on the other hand, establish a clear view of the initiative's strategic value—one that goes beyond the technical content. By building a robust business case and maintaining focus on business objectives along the whole project timeline, successful teams can avoid cost overruns. They can also, for example, ensure faster customer response times, obtain higher-quality data for the marketing organization, or reduce the number of required manual processes.

High-performing project teams also improve the ways in which the company manages its internal and external stakeholders, such as business and IT executives, vendors, partners, and regula-tors. They make sure the project aligns with the company's overarching business strategy and undertake detailed analyses of stakeholder posi-tions. Project leaders continually engage with all business unit and functional heads to ensure genuine alignment between business needs and the IT solutions being developed.

Good stakeholder management involves foresight when it comes to selecting vendors and negotiating contracts with them. Company negotiators should proactively identify potential risks and, for instance, expand their focus beyond unit price and seek to

Exhibit 1
The performance of different types of IT projects varies significantly.

%, projects >$15 million, in 2010 dollars

Project type	Average cost overrun	Average schedule overrun	Average benefits shortfall
Software	66	33	17
Nonsoftware	43	3.6	133
Total	45	7	56

Source: McKinsey-Oxford study on reference-class forecasting for IT projects

establish "win-win" agreements. Doing so can help ensure that the company has preferential access to the vendor's best talent for an extended period of time.

Some companies have learned this the hard way. A bank in the Middle East negotiated hard for price with a vendor and later suffered at the hands of an inexperienced vendor team. Another bank scored well on unit price with a software-package provider for the project phase of a trading-system implementation but encountered high costs for changes and support after the system was introduced and the bank was locked into the new technology.
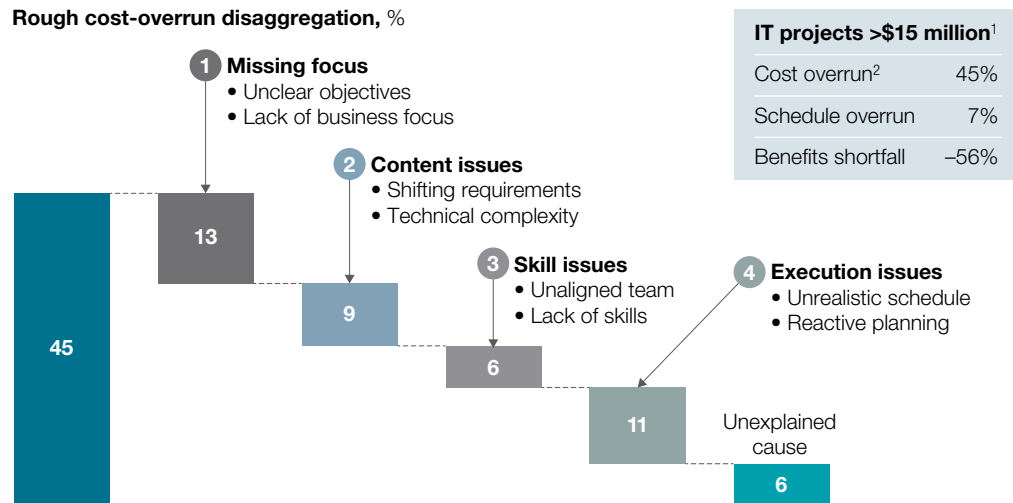
2. Mastering technology and content
Drawing on expert help as needed, high-performing teams orchestrate all technical aspects of the project, including IT architecture and infrastructure, functionality trade-offs, quality assurance, migration and rollout plans, and project scope. The right team will understand both business and technical concerns, which is why companies must assign a few high-performing and experienced experts for the length of the program. We estimate that the appropriate experts can raise performance by as much as 100 percent through their judgment and ability to interpret data patterns.

One common pitfall occurs when teams focus disproportionately on technology issues and targets. A bank wanted to create a central data warehouse to overcome inconsistencies that occurred among its business unit finance data, centralized finance data, and risk data. However, the project team focused purely on developing the IT architecture solution for the data warehouse instead of addressing the end goal, which was to handle information inconsistencies. As a result, the project budget ballooned as the team pursued architectural "perfection," which involved the inclusion of unneeded data from other systems. This added huge amounts of unnecessary complexity. With milestones and launch dates constantly being pushed back and investments totaling almost $10 million, the bank stopped the project after 18 months.

In contrast, one public-sector institution was able to rescope and simplify its IT project's technical requirements even though most stakeholders believed doing so was impossible. To eliminate waste and to focus on the items that represented the greatest business value, the team introduced lean[3] techniques. At the same time, it established rigorous testing and rollout plans to ensure quality and introduced clearly defined stage gates. Through these and other actions, the team was able to check 95 percent

[3]For more on lean techniques in IT, see Nicklas Ilebrand, Tor Mesøy, and Remco Vlemmix, "Using IT to enable a lean transformation," mckinseyquarterly.com, February 2010.

Exhibit 2
IT executives identify 4 groups of issues that cause most project failures.

Rough cost-overrun disaggregation, %

1 Missing focus
• Unclear objectives
• Lack of business focus

2 Content issues
• Shifting requirements
• Technical complexity

3 Skill issues
• Unaligned team
• Lack of skills

4 Execution issues
• Unrealistic schedule
• Reactive planning

IT projects >$15 million[1]	
Cost overrun[2]	45%
Schedule overrun	7%
Benefits shortfall	−56%

45

13

9

6

11

Unexplained cause

6

[1]With cost overrun, in 2010 dollars.
[2]Cost increase over regular cost.

Source: McKinsey-Oxford study on reference-class forecasting for IT projects

of all test cases, fix critical defects, and verify the fixes before continuing from the unit test phase to integration testing.

3. Building effective teams
Large projects can take on a life of their own in an organization. To be effective and efficient, project teams need a common vision, shared team processes, and a high-performance culture. To build a solid team, members should have a common incentive structure that is aligned with the overall project goal in contrast to individual work-stream goals. A business-to-technology team that is financially aligned with the value-delivery targets will also ensure that all the critical change-management steps are taken and that, for example, communications with the rest of the organization are clear, timely, and precise.

To ensure the smooth start-up of new front-end and core systems that more than 8,000 people would use, one company team launched a massive—and successful—change-management program.

The program included a regular newsletter, desktop calendars that highlighted key changes and milestones, and quarterly town-hall meetings with the CEO. The team made sure all top business unit leaders were involved during the user-acceptance phase. The company included at least one change agent on each team. These agents received training that instilled a clear understanding of the benefits of the IT change. The actions helped the company to verify that it had the required business capabilities in place to make full use of the technology being implemented and that it could deliver the business value expected in the overall project business case.

4. Excelling at core project-management practices
To achieve effective project management, there's no substitute for tested practices. These include having a strategic and disciplined project-management office and establishing rigorous processes for managing requirements engineering and change requests. The project office should establish a few

strong stage gates to ensure high-quality end products. At the same time, it needs to strive for a short delivery life cycle to avoid creating waste in the development process.

One public-sector organization established strong project control by defining the initiative's scope in an initial six-month phase and making sure all stakeholders signed off on the plan. Beyond this phase, the organization's board had to approve all change requests, and the project was given a predefined cost-overrun buffer of less than $2 million. Another organization, a high-tech company, established clear quality criteria for the project master plan, which mandated that teams break down all activities so that they required fewer than 20 person-days to complete and took no longer than four weeks.

In yet another case, instead of following a "waterfall"[4] or linear approach, a company created integrated business and IT teams that worked on an end-to-end basis in their respective work streams. In other words, the teams participated from the beginning of the project to its completion—from defining requirements to testing. This approach helps to avoid misunderstandings during stage transitions and ensures clear responsibility and ownership. It also promotes efficiency gains and fast delivery.

Assessing the black-swan risk

The high rate of failure makes it wise to analyze prospects before starting a large IT project.

Companies usually begin with a diagnostic to determine the status of their key projects and programs—both finalized and existing projects (to understand company-specific problems) and planned projects (to estimate their true cost and duration). This diagnostic determines two condi-

tions: the health of a project from the standpoint of the four dimensions of the value-assurance methodology (Exhibit 3) and its relative prospects when compared with the outcomes of a reference class[5] of similar projects. Teams can measure the latter by making a comparative assessment against the 5,400 IT projects in our proprietary database, developed jointly with the University of Oxford. This resource provides comparative data on the scope, cost, duration, and performance characteristics of many projects. Despite differences in project subject and geography, the database can be used to forecast project risk, adding much needed accuracy to up-front investment decision making. The overall assessment takes about three weeks and is supported by Web surveys and other tools. Depending on the findings, companies can attach greater reliability to investment decisions and deploy the optimal management structure for the project.

This comparative assessment may have helped a health care provider avoid disaster. The provider was about to spend about $1 billion over eight years to replace its health care management system—an amount twice as large and a duration twice as long as any comparable IT project in the database. Given that the black-swan risk is largely driven by how long the project takes before it goes live, top management stopped the initiative at the green-light stage and asked the team to revise the plan. Leaders also charged the team with planning for intermediate checkpoints. The latest estimate is now in line with comparable projects in the database, and it still delivers the desired scope.
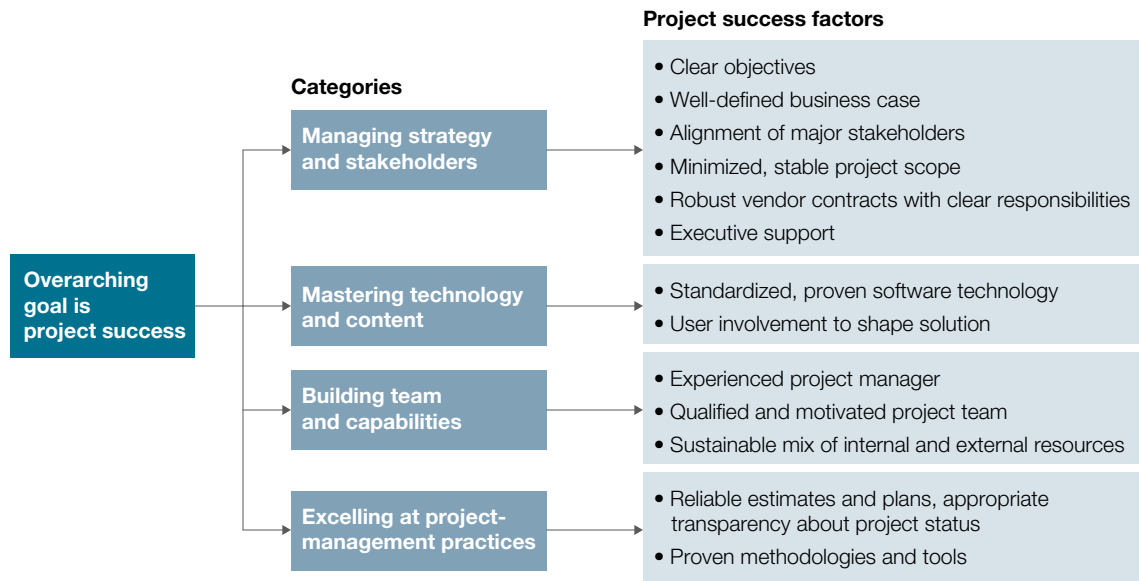
In another case, an organization used a broader and more interview-driven diagnostic approach to identify critical improvement areas. The organization had recently experienced failures that led it to make a commitment to reform IT and drive fundamental improvement in IT project delivery. The diagnostic helped it realize that the major hurdle to creating a

[4] The waterfall model is a sequential software-development process in which progress is seen as flowing steadily downward—like a waterfall—through the phases of conception, initiation, analysis, design, construction, testing, and maintenance.

[5] Reference-class forecasting predicts the outcome of a planned action based on actual outcomes in a reference class of actions similar to that being forecast. The theories behind reference-class forecasting were developed by Daniel Kahneman and Amos Tversky and helped Kahneman win the Nobel Prize in Economics. Today reference-class forecasting is practiced in both public- and private-sector policy and management.

Exhibit 3

A 'value assurance' assessment indicates how a project is doing against 4 groups of success factors.

Project success factors

Categories

Managing strategy and stakeholders	• Clear objectives • Well-defined business case • Alignment of major stakeholders • Minimized, stable project scope • Robust vendor contracts with clear responsibilities • Executive support
Mastering technology and content	• Standardized, proven software technology • User involvement to shape solution
Building team and capabilities	• Experienced project manager • Qualified and motivated project team • Sustainable mix of internal and external resources
Excelling at project-management practices	• Reliable estimates and plans, appropriate transparency about project status • Proven methodologies and tools

Overarching goal is project success

well-defined business case was the limited availability of funding during the prestudy phase. The study also revealed that the organization's inability to arrive at a stable and accurate project scope resulted from the infrequent communication between project managers and stakeholders about issues such as new requirements and change requests, which led to deviations from the original scope.

The value-assurance approach has a solid track record. One large public-sector organization, for example, replaced about 50 legacy IT systems with a standard system for enterprise resource planning over the course of three years—within budget and on schedule—even though analysis of projects of this size and duration had indicated an expected budget overrun in the range of $80 million to $100 million.

Similarly, a global insurance company used the approach to consolidate its IT infrastructure over 18 months, delivering the project on time and within budget and realizing savings of about $800 million a year.

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Large-scale IT projects are prone to take too long, are usually more expensive than expected, and, crucially, fail to deliver the expected benefits. This need not be the case. Companies can achieve successful outcomes through an approach that helps IT and business join forces in a commitment to deliver value. Despite the disasters, large organizations can engineer IT projects to defy the odds. ○

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