For the past 40 years, for example, we’ve tortured ourselves over our inability to finish a software project on time and on budget. But this never should have been the supreme goal. The more important goal is transformation, creating software that changes the world or that transforms a company or how it does business… Software development is and always will be somewhat experimental.

DeMarco, 1995

Introduction

Government leaders know that every large information technology (IT) project carries some level of risk. Many high-profile public-sector projects have cost too much, taken too long or failed to deliver the promised benefits. The consequences can include disruptions to daily operations, financial losses, negative publicity or all of the above. Because the failure of an IT change initiative often has wide-ranging repercussions, government leaders – not just chief information officers – are beginning to understand they must proactively manage the attendant risks.

In May 1996, the Benefits Agency of the UK Department of Social Security and the executives at Post Office Counters Ltd jointly made a decision. They awarded a £1 billion seven-year contract that would change how 20,000 post offices would work, and how 17 million benefits recipients would receive their money (760 million payments every year). However, the decision quickly turned sour – in July, the first issues were discovered two months before the system development was planned to start; by the end of the year, the project was re-baselined to allow increased time for system development, from seven to twelve months. The project was finally abandoned in May 1999; software development had not been completed and the most current forecast projected the project to deliver three years behind the scheduled go-live, as well as a 30 per cent budget overrun and a total spend of £1 billion (National Audit Office).

This was an eye-catching example of failure. Whenever a large IT system goes live, the press is rife with stories about it. Yet, the public sector is not alone. Our research shows that IT project failure can bring down entire private companies. But how risky are IT projects really? Several attempts have been made to turn the anecdotal evidence of cost and schedule overruns and benefits shortfalls in large-scale IT projects into surveys that measure risk more systematically.

When, in 1999, the Standish Group first published the now infamous Chaos Report, their findings seemed to epitomise the perceived IT project crisis. Academic research by US specialist Capers Jones, who aimed to develop measurements to quantify the scope of IT projects, reported a plummeting success rate of such projects with increasing size. Both studies saw virtually no success for projects larger than US$6 million. However, academia debunked these findings. Surveys and case studies of IT portfolios failed to find signs of an IT project crisis. Many of our colleagues have questioned the rigour and criticised the opaque data collection behind the alarmist studies. Recently, our colleagues showed that using the Standish Group’s definitions of ‘successful’, ‘challenged’ and ‘failed projects’ actually harms an organisation.

Moreover, none of the prior studies has recognised the special context of the public sector (for a survey of studies, see our 2011 working paper Double Whammy). The research project first tries to answer the question: How risky are public-sector IT projects really?

A global stocktake

To help public-sector leaders better understand and manage risk in IT projects, we have conducted the largest-ever global study of public-sector IT change initiatives. Our research, covering a sample of 1,355 IT projects, was supported by management consultancy firm McKinsey & Company. Our data came from three sources: Freedom of Information Act requests to 26 US federal departments, reports from the US Government Accountability Office and international equivalents, and project documents from public-sector organisations. The IT projects in our sample had an average initial budget of $130 million and an average duration of 35 months.

Overspend? Late? Failure? What the data says about IT project risk in the public sector

Alexander Budzier and Bent Flyvbjerg
Results and analysis

Our research is still ongoing, but our preliminary analysis has already yielded two surprising findings. The first is that public-sector IT projects, on average, do not go over budget at all. This counterintuitive finding makes sense in light of our second surprising finding: that the risk distribution of IT projects is full of outliers in very fat tails and far from a normal distribution. Most risk-management models assume a normal distribution with thin tails – in this case, a ‘normal’ project’s actual costs would be within -30 per cent and +25 per cent of the budget, and 99.3 per cent of projects would fall within this range – i.e. less than 0.7 per cent of all projects are outliers. Public-sector IT, however, is a different story: the data shows that a staggering 18 per cent of all projects are ‘expensive’ outliers (that is, projects with cost overruns above 25 per cent).

We call these expensive outliers ‘Black Swans’, after Nassim Nicholas Taleb in his 2007 book *The Black Swan*. Taleb defines Black Swans as rare, high-impact events that seem improbable and unforeseeable but, in hindsight, are explainable. In our sample, we found a 4,957 per cent over-incidence of Black Swans.

From this perspective, starting an IT project is similar to playing Russian Roulette. From six project proposals that ask for funding on your desk, one is going to run out of control so badly that it might not only bring government services to a halt, but can cause major economic damage, and end your career.

This disproportionate number of Black Swans represents very high risks for public-sector organisations. The typical IT project in our sample had 0 per cent cost overruns and took an unremarkable 24 per cent longer to implement than initially expected. When you green-light a project today, the likelihood of this happening is 31 per cent. These are not the jaw-dropping, triple-digit overruns often associated with large government IT projects. There is, however, a 28 per cent chance that a project overruns the budget, and so a reasonable expectation is that the project needs 47 per cent more budget and 38 per cent more time than initially expected.

But what really matters are the Black Swans. The data shows that with a probability of 18 per cent, the project is going to spin out of control and a typical Black Swan overruns its cost by 130 per cent in real terms and falls 41 per cent behind schedule.

Our research also uncovered another class of Black Swans, albeit a very different species. We found that in the last four years, half of all public-sector IT projects have suffered an average budget cut of 75 per cent. These ‘starved projects’ are also a public management challenge. Public-sector leaders must prepare robust answers to the question: What will we do if half our ongoing IT projects get their budgets cut by as much as 75 per cent?

When it comes to assessing risk in public-sector IT projects, therefore, simple averages don’t matter much. What matters are the Black Swans – the one in six projects that could go terribly wrong. In light of the enormous risks, managing Black Swans can only be the responsibility of top management, not just IT leadership. A crucial question for top management becomes: What will our organisation do in the event that every sixth large IT project we undertake goes over budget by 130 per cent and takes 40 per cent longer than scheduled?

Apart from bracing for impact, what can a public-sector organisation do? We believe it is the following four factors that count:
1. Benchmark your organisation to know where you are.
2. De-bias your IT project decision-making.
3. Reduce the complexities of your IT projects.
4. Develop ‘Master Builders’ – learn from the best in the field.

First, we find that for most organisations the starting point and the most valuable knowledge comes from simply understanding where they stand. Very often, we find organisations lack a reliable view of how the organisation’s projects perform. A very first step is to establish a system of reporting that enables impactful decision-making: spot things early, surface issues quickly, act on them decisively. Moreover, a powerful benchmark compares not only your project risks (including the risk of projects turning into Black Swans) internally but also with other public- and private-sector organisations.

Figure 2 reveals a starting point for how decision-makers can break down and better understand the risk faced by their organisation. Our data show, for example, that standard software projects, despite their perceived ease of implementation, face the highest risk of turning into Black Swans. The data also shows that Big Data and office automation projects are particularly risky. How does your organisation’s risk compare?

Secondly, once you have understood and measured the risks in your organisation, you can turn this knowledge into better decisions. The Nobel Laureate Daniel Kahneman and his colleague Amos Tversky discovered that decisions can be de-biased by taking the outside view. Simply by asking the question: How did the last ten IT projects do that tried to do the same as the one planned? What does this say about the likelihood of success or failure for the planned project? Also ask whether there were tell-tale signs that either a project was running smoothly or got into trouble. Our data shows, for instance, that projects that are described as ‘unique’ by people involved in them have a three-times higher propensity of turning into Black Swans. If project uniqueness is a common claim in your organisation, be aware!

Thirdly, to mitigate the risks that Black Swans pose, public-sector organisations must reduce the complexity of their IT projects. Our data indicates quite clearly that the longer the project, the higher the risk (Figure 3). Every additional year of project duration increases the average cost risk by 4.2 percentage points. Long projects are also more likely to turn into a Black Swan. Reducing the project complexity – for instance, by introducing modularity – will help improve IT project risks.

Lastly, learn from the best in the field. Learn from what we call ‘Master Builders’. Our observations show that in every organisation and in every industry, there are project managers who are able to deliver on time and on budget time and time again. Finding your Master Builders, uncovering their practices of how to avoid Black Swans might seem the most difficult task, but it will be the best defence of your organisation and your career against a disastrous Black Swan.

Endnotes

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