

What You Should Know about Megaprojects and Why: An Overview

Bent Flyvbjerg, Oxford University, UK

ABSTRACT

KEY WORDS

*Megaproject Management
Program Management
Uncertainty and Risk
Management
Requirements Management
Stakeholder Management
Cost Management
Benefits Management*

This controversial, yet profound, paper challenges the prevailing wisdom relevant to megaproject management. Flyvbjerg presents strong evidence showing how megaprojects usually unfold. He identifies four causes or “sublimes” that explain the increase in size and frequency of this extremely large kind of project. Namely, political, technological, economical and aesthetic drivers seduce decision makers to underestimate hidden risks, and to overestimate benefits. He also denounces a “break-fix” model which explains the “iron law of megaprojects”: Over budget, over time, over and over again. Furthermore, he presents evidence against current theories, responsible for an inverted Darwinism, where the “unfittest” project is selected and funded over better fitted ones. Consequently, many megaprojects can be characterized as “disasters waiting to happen.”

THE PROBLEM

Megaprojects, sometimes called major programs, are large-scale, complex ventures that typically cost more than 1 billion US Dollars, take many years to build, involve multiple public and private stakeholders,... and impact millions of people.

Megaprojects, sometimes called “major programs”, are large-scale, complex ventures that typically cost more than 1 billion US Dollars, take many years to build, involve multiple public and private stakeholders, are transformational, and impact millions of people. They are a completely different breed of project in terms of their objectives, lead times, complexity, and stakeholder involvement. Consequently, they require a special and different type of manager. Just like you would not want someone with just a driver’s license flying a jumbo jet, you would not want a conventional program manager managing a megaproject.

Examples of megaprojects are high-speed rail lines, airports, seaports, the Olympics, high-energy particle accelerators, logistics for large supply chains, etc. Not only are megaprojects large, they also are constantly growing ever larger in a long historical trend. Project costs have escalated to the billions. To be accurate, megaprojects are evolving into gigaprojects and even teraprojects. Projects of this size compare with GDPs of the world’s top 20 nations, and the scale seems to be accelerating.

Nine out of ten megaprojects have cost overruns.

Evidence shows that megaprojects are highly risky endeavors. Cost overruns, time delays, and benefit shortfalls have remained high and constant for the 70-year period for which comparable data exist. Nine out of ten megaprojects have cost overruns. Overruns up to 50% in real terms are common, and over 50% overruns are not uncommon.

■ THE FINDINGS

Megaprojects are not only large; they are growing larger at an accelerating pace.

The four sublimes: Technology, Politics, Economy, and Aesthetics.

Megaprojects are growing larger at an accelerating pace and are multiplying all around the world. For instance, between 2005 and 2008, China built as many kilometers of high-speed rail as Europe did in two decades. The same phenomenon occurs in other industries such as oil and gas, mining, aerospace, ICT, supply chains, defense. A conservative estimate for the global megaproject market is between US\$6 and US\$9 trillion per year.

Megaprojects have proved to be remarkably recession tolerant. Even during the downturn from 2008, the megaprojects business grew further. Never has it been more important to choose the most fitting projects and get their economic, social, and environmental impacts right. Never has systematic and valid knowledge about megaprojects been more critical.

This research found four drivers (“sublimes”) that explain megaprojects growth and development.

- The “technological sublime” describes the excitement engineers and technologists get in pushing the envelope for what is possible in “longest-tallest-fastest” types of projects.
- The “political sublime” describes the tendency politicians have for constructing monumental infrastructure to benefit themselves and their causes.
- The “economic sublime” describes the delight business people and trade unions get from making lots of money and jobs from megaprojects.
- Finally, the “aesthetic sublime” is the pleasure designers and people who appreciate good design derive from building and using iconic and beautiful megaprojects.

Policy makers are particularly attracted to megaprojects because, if done right, such projects:

- Create and sustain employment;
- Contain a large element of domestic inputs relative to imports;
- Improve productivity and competitiveness;
- Benefit consumers by higher-quality services;
- Improve the environment.

However, conventional megaproject delivery is highly problematic. Poor performance records in terms of actual costs and benefits are common because the following characteristics are overlooked when the four sublimes are at play:

- Megaprojects are inherently risky due to long lead times and complexity.
- Often managers and planners in charge do not have deep domain experience.
- The decision process typically involves multiple actors and stakeholders with conflicting interests.
- Technology and design are usually non-standard, leading to “uniqueness bias” with managers.
- Frequently, there is lock-in of commitment to a certain project concept at early stages, leaving analysis of alternatives weak or absent.
- Megaprojects involve large budgets, encouraging rent-seeking behavior.
- The scope and ambition level typically change significantly over time.
- Delivery is a high-risk activity with overexposure to massive negative outcomes.

■ THE FINDINGS *(continued)*

The 'iron law' of mega-projects: Over budget, over time, over and over.

- Statistical evidence shows that complexity and unplanned events are often unaccounted for in the budget.
- Misinformation about costs, schedules, benefits and risks cause cost overruns, delays, and benefit shortages; and undermine project viability.

Despite a few honorable exceptions (e.g. Guggenheim Museum Bilbao), performance data about megaprojects evidence large cost overruns, delays, and benefit shortfalls. It seems that megaprojects follow the so-called “iron law”: Over budget, over time, over and over. The reason for such a poor performance is due to weak front-end planning and poor downstream management.

The Megaproject Paradox: Even with risky scenarios, megaprojects have never been more in demand, and the size and frequency have never been larger.

However, even with these risky scenarios and poor performance records, megaprojects have never been more in demand, and the size and frequency have never been larger. This constitutes the “*megaproject paradox*”. Today, megaproject planners and managers are stuck in this paradox and use a delivery method called the “*break-fix*” model.

Managers and planners do not know how to deliver successful megaprojects, or do not have the incentives to do so. Consequently, projects tend to break sooner or later. After a major “*break*,” projects are usually paused and reorganized in an attempt to “*fix*” problems and deliver some version of the initially planned project with a semblance of success. The break-fix model is wasteful and leads to misallocation of resources.

The conjunction of the megaproject paradox with the break-fix model creates an environment of inverted Darwinism, where the better projects on paper become the worst or unfittest in implemented reality.

■ RESEARCH IMPLICATIONS

Megaprojects that are managed following the 'break-fix' model are disasters waiting to happen.

Underestimating costs and overestimating benefits lead to a falsely high benefit-cost ratio. As a consequence, a project may start despite the fact it is not financially or economically viable; or may start instead of another one with a better return. The consequence is misallocation of resources, and in the case of public projects, waste of taxpayer’s money. There are ethical and legal issues too. Megaprojects that are managed following the “break-fix” model are disasters waiting to happen.

Is there light at the end of the tunnel? Fortunately, yes. The megaprojects community has started to talk about the problems above. That’s a start. The academy is also moving in the right direction. Research that demonstrated optimism bias and introduced significantly better explanations of megaprojects outcomes than previously accepted ones, has led to development of better management methods that are now widely used in practice, and are even mandatory for some project types.

A more materialistic driver to improve management practices comes from the consequences of failure. The fact is, that some projects are now so big and consequential to individual businesses and agencies, that cost overruns, benefit shortfalls, or risks may bring down executives and whole corporations. Even the wealth of cities and nations may be affected by a single megaproject failure.

■ FULL CITATION

Flyvbjerg B. (2014) What you should Know about Megaprojects and Why: An Overview. *Project Management Journal*, Vol 45 (April/May), Number 2.

FOR MORE INFORMATION

- PMJ articles and Sponsored Research monographs are available to members for free download.
- Monographs can also be purchased at the PMI Store on PMI.org.



From Academia: Summaries of New Research for the Reflective Practitioner | October 2014

PROJECT MANAGEMENT INSTITUTE
14 Campus Boulevard | Newtown Square, Pennsylvania | 19073-3299 USA
Tel: +1 610 356 4600 | Fax: +1 610 356 4647
research.program@pmi.org | PMI.org/research

© 2014 Project Management Institute, Inc.
All rights reserved. "PMI" and the PMI logo are marks of Project Management Institute, Inc.
For a comprehensive list of PMI marks, contact the PMI Legal Department.