

THINK ACT

BEYOND MAINSTREAM



November 2015

Keep your megaproject on track

Implement decision-making support for successful
megaproject management





THE BIG

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90%

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original budgets.

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EUR 30-75 TRILLION

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Page 3

EUR 3-7.5 TRILLION

could be saved if megaprojects
are managed just 10% better.

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Megaprojects are on the rise as a delivery model for large investment projects.

Without exception, every industry will encounter complex, technically challenging, multi-year, multibillion and multi-stakeholder projects: the megaproject.

They range from the construction of airports, pipelines, refineries, roads and rail infrastructure to high-speed trains, aircrafts and IT systems. The challenges these projects face come from many sides at once: the environment, the scope, the conditions at hand. It is also often the case that the megaproject lacks precedent, having never been tried before. In short: megaprojects are everywhere and megaproject management is hard.

In an attempt to overcome the challenges of megaproject management, several theoretical frameworks, methodologies and specialized companies have arisen, but the true success factor behind megaproject management has remained largely out of reach. At least **90%**¹⁾ of megaprojects exceed their budgets and timelines. Project organizations and contractors are not up to the job, front-end loading cannot cope with the frequent changes necessary, and project

management offices often simply monitor and report on the project rather than steer it.

From supporting megaproject management teams in a variety of industries and challenges, Roland Berger has learned that successful megaproject management means solving a multidimensional puzzle in a constantly changing context. What successful megaproject management needs, therefore, is a RADAR: Rapid and Appropriate Decisions with Accurate Response that is enabled by an executive intelligence office. Of the **EUR 30-75 trillion**²⁾³⁾⁴⁾ expected to be invested in megaprojects in the coming 15 years, RADARs could save anywhere from EUR 3 to 7.5 trillion.

BIG DEAL: MEGAPROJECTS ARE CRUCIAL IN MANY INDUSTRIES

Energy, transport, information. Whatever your industry, odds are that developing new infrastructure, products and services entails a megaproject. Megaprojects are already everywhere: many well-known megaprojects have just started or are about to. Examples include

1) Flyvbjerg, B. 2014, What you should know about megaprojects and why: An overview, Project Management Journal, Vol. 45, No. 2, 6-19

2) World Economic Forum, 2013, The Green Investment Report, The ways and means to unlock private finance for green growth. Geneva, World Economic Forum

3) Goldman Sachs 2008, Building the world: Mapping infrastructure demand. New York, Goldman Sachs Group

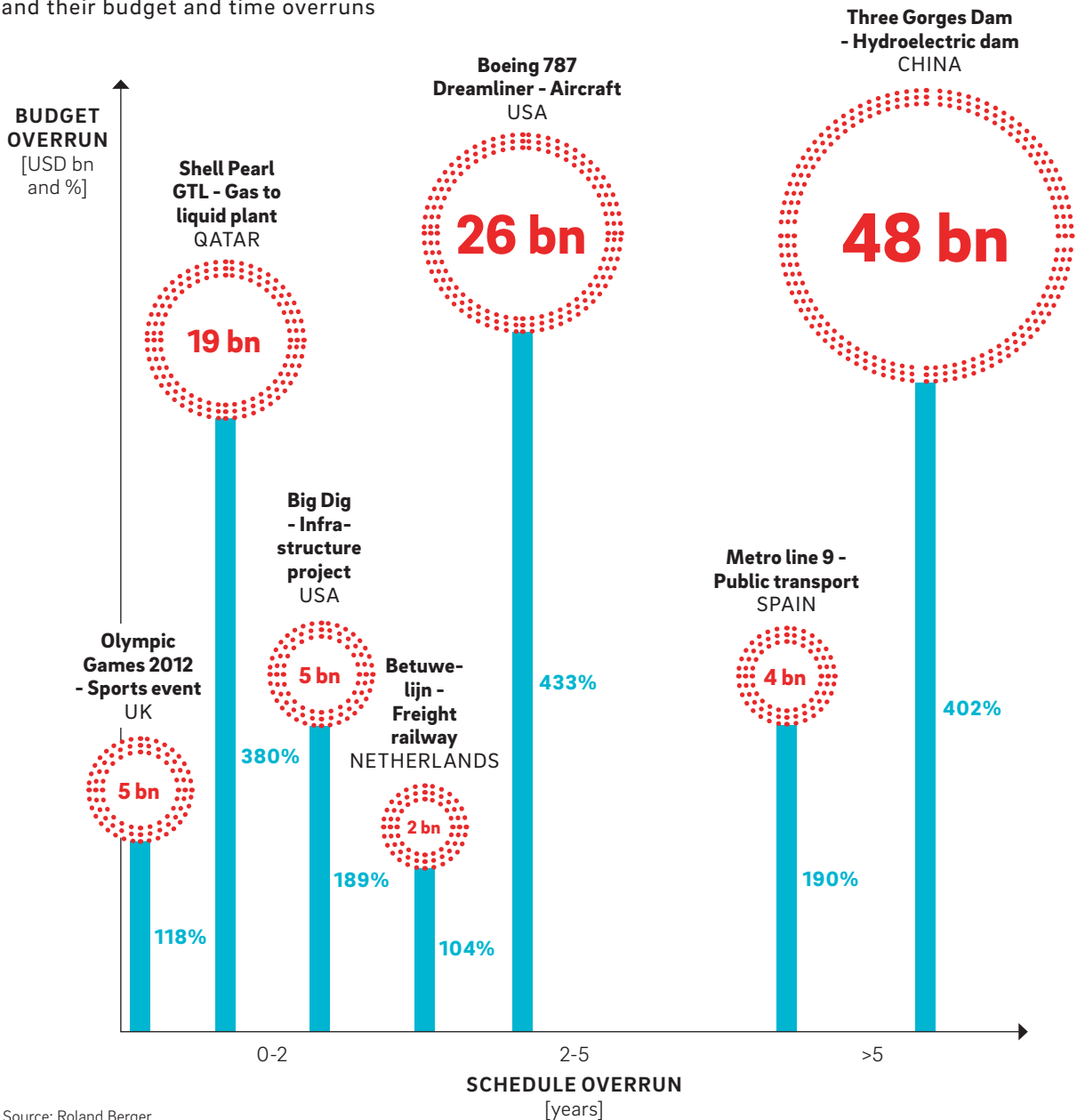
4) OECD 2006, Infrastructure to 2030, Telecom, Land transport, Water and Electricity. Paris, The Organisation for Economic Co-operation and Development

A

MURPHY'S LAW

What can go wrong, will go wrong –
if not properly managed.

Prominent examples of megaprojects
and their budget and time overruns



the Trans-Adriatic gas pipeline, the expansion of the Suez and Panama Canals, the implementation of a new rail safety system in Europe, and Beijing's, Istanbul's and Rio de Janeiro's new international airports. Megaprojects are not only in infrastructure: consider the development of the Joint Strike Fighter or the Olympic Games in Rio de Janeiro.

Broadly defined as multiyear projects with investments of over one billion dollars, few megaprojects deliver on time and within budget. In fact, at least 90%¹⁾ do not. In a sample of almost 1,000 megaprojects, cost overruns average more than 55% of the original budgets – and for many, the actual costs exceed the original business case by a factor of two, three or more¹⁾⁵⁾. → **A**

Overruns occur not because the people managing these megaprojects are inept, but because megaproject management is notoriously difficult. Durations are long, technical challenges complex, the environment uncertain, and stakeholders numerous and varied. The politics of project approval in both the public and private domains may also lead to cost and schedule overruns, and such dynamics can destine megaprojects for failure before they even begin.

This matters because the number and frequency of megaprojects are growing. In the next 15 years, between EUR 30 to 75 trillion will be spent on infrastructure projects alone. The OECD, the World Economic Forum, and others estimate annual infrastructure investments between EUR 2 and 5 trillion²⁾³⁾⁴⁾. This means dozens of new megaprojects each year. In emerging economies, megaprojects are booming³⁾⁶⁾, as they are becoming a delivery model for the high demand for e.g. infrastructure, telecommunications and energy.

The study of megaproject failure, its reasons and remedies, goes back to the 1950s. But despite academia's, industry's and specialist project managers' best efforts, the recipe for megaproject success has yet to be found. However, our experience with supporting megaproject management has taught us that some things are crucial to improve the chances of success.

WHY MORE THAN 90% OF MEGAPROJECTS STILL STRUGGLE TO SUCCEED

Companies apply normal project management approaches but these are not sufficient. Few embark on megaprojects without thorough preparation. Theories and models for successful project management abound: stage gates, front-end loading, the Program Evaluation Review Technique (PERT), Work Breakdown Structure (WBS), the Project Management Body of Knowledge Guide, PProjects IN Controlled Environments (PRINCE 1 and 2), etc. All have merit, all have their use – but none so far have proven sufficient. These approaches focus almost exclusively on static decision-making and progress tracking. They define criteria for progressing to successive stages, formalize project structure and evaluation, standardize information and practices, and monitor either input (activity, tasks) or output parameters (milestones, products, quality). But they do not address the root causes of megaproject failure; therefore they also do not define the underlying reasons behind megaproject success.

ROOT CAUSES OF MEGAPROJECT FAILURE

From project management literature¹⁾⁷⁾⁸⁾, both academic and from industry, and from project experience, research has identified four root causes of megaproject failure:

1. INHERENT COMPLEXITY

Megaprojects are fundamentally complicated. The longer timetables and greater number of interfaces make them difficult to manage.

2. NEW GROUND

The technologies applied in megaprojects tend to be non-standard and new rather than off-the-shelf, proven and predictable – either because developing such technology is the very purpose of the project, or because no suitable alternatives are deemed to exist, or for reasons of prestige. Whatever the motivation, megaprojects often break new ground and must there-

5) Brookes, N. 2015, Delivering European Megaprojects, A guide for policy makers and practitioners. University of Leeds

6) The World Bank Group, 2014, H1 2014 Global Private Participation in Infrastructure Update. USA, World Bank Group

7) Sovacool, B.K. and Cooper, C.J. 2013, The governance of energy megaprojects, Politics, Hubris and Energy Security. Cheltenham: Edward Elgar Publishing Limited

8) Mellow, E.W. 2011. Industrial megaprojects, Concepts, Strategies, and Practices for Success. Hoboken: John Wiley & Sons

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Megaproject management

fore deal with new challenges that only become apparent as the project progresses.

3. UNPREDICTABLE EVENTS

Given the complexity, duration and uncertainty, unforeseen circumstances and complications are bound to arise and are almost impossible to account for. But such events must be dealt with. Scenario modeling can aid some risk preparation, but such scenarios are the ones that are already foreseeable; because megaprojects often break new ground, the negative events they may encounter are also often "new".

4. STAKEHOLDER DYNAMICS

Megaprojects involve many diverse stakeholders whose priorities and circumstances may change over time. The reality of megaproject management is that the goal posts will be moved, the scope and conditions will be changed, and conflicts of interests will arise. While megaproject management cannot influence reality, it must still somehow manage it.

From experience in megaproject management support, Roland Berger has often encountered these root causes of failure. The complexity, new ground, unpredictable events and stakeholder dynamics result in many issues that need to be solved quickly. Department or work stream managers react by taking decisions to bring their departments or work streams back-on track as fast as possible. Unfortunately these lower-level decisions are often not communicated well due to time pressure, and moreover the consequences of these decisions to the overall project are often not taken into account and are hard to oversee. This misalignment in project "puzzle pieces" then results in additional work and thus in schedule and/or budget overrun.

Looking at these root causes of megaproject failure more closely, one can see why traditional project management tools fall short. Front-end loading, for example, in which multiple issues are decided upon as early as possible in the project, is useful to keep momentum and avoid surprises later – but only those one can foresee. Front-end loading will work for projects which last months, not years. Similarly, the project organization will be too light by definition: it is all but impossible to mobilize all of the expertise needed over the entire project timeline. For many of an organization's most

motivated and brightest staff, a multiyear project is an unwelcome (and harmful) interruption of their careers. Measuring progress by the original front-end loaded plan alone means either exceeding budget and schedule as circumstances change or creating a result that no longer fits the new reality.

ENSURE RAPID AND APPROPRIATE DECISIONS WITH ACCURATE RESPONSE – RADAR

Roland Berger has helped run megaprojects, getting them back on track or preventing them from derailing in the first place. In our experience, project directors, management and stakeholders are well aware of most or all of the points of failure described above – and they take action accordingly. But we have found that the failure of their responsiveness is because a key ingredient is missing from most project management studies and approaches: rapid and thus dynamic support to keep making appropriate decisions throughout the project duration.

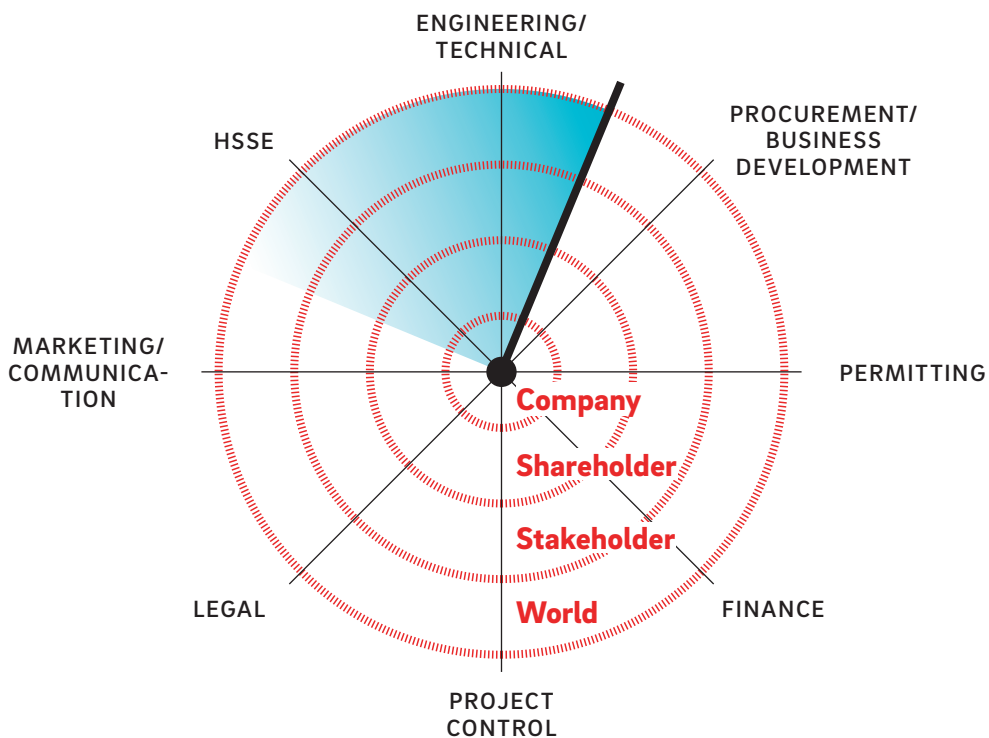
Every megaproject entails thousands of decisions that need to be taken accurately and be responsive to circumstances: from small day-to-day decisions to the final investment decision and contracting strategy. Ideally, management makes each decision based on perfect information. But over time and in (constantly) changing circumstances, such information is not readily available – nor is it always obvious what information is needed in the first place. Moreover, this information must come from a wide array of experts, as far removed from the project director, management and shareholders as they are from each other. Although English is the lingua franca of megaproject management, experts in the fields of engineering, permitting, procurement, legal and finance do not speak and think the same way. Managers need to know what decisions are needed when, and must be able to make these decisions based on the appropriate synthesis of information from different (expert) sources.

Megaproject management means solving a multidimensional puzzle in a constantly changing context. In the megaproject context, time to prepare is limited. If you wait until you have all the information you need for a perfect decision, you will either be too late to influence project outcomes or the circumstances will have changed again – or both. Decisions must be appropriate and they must be fast. This does not negate the necessity of gathering, analyzing and synthesizing all rele-

B

SET UP YOUR RADAR

Implement an executive intelligence office to ensure Rapid and Appropriate Decisions with Accurate Response.



Source: Roland Berger

vant information. Rather, it stresses the importance of doing so constantly and with keen eyes for new developments and moments of truth, always being ready to take the appropriate decision to escalate project parameters to stakeholders on time and to keep projects on course, on schedule and within budget. → **B**

THE EXECUTIVE INTELLIGENCE OFFICE, YOUR RADAR: A PROVEN APPROACH TO MEGAPROJECT SUCCESS

The key to megaproject decision-making is decision support from a dedicated executive intelligence office:

a relatively small group of smart and experienced people who report directly to the megaproject's decision makers. The executive intelligence office is tasked with fact-finding, cross-checking impact on other parts of the project, asking what-if questions, challenging assumptions and the status-quo, looking to other industries for inspiration and learnings, spotting early warning signs – generally making sure that issues are raised in time and that rapid, appropriate decisions are possible. In doing so, the executive intelligence office provides crucial additional support for megaproject management. → **C**

C

EXECUTIVE INTELLIGENCE OFFICE **IS THE CENTER TO SUCCESS**

The executive intelligence office comprises all capabilities of strategy consultancy.



D

PROVEN APPROACH TO SUCCESS

Roland Berger has successfully supported the management of various megaprojects, including:

HELICOPTER PRODUCTION

WHAT

Program recovery for a leading helicopter OEM

COMPLEXITY

Tight timeline and pressure on margins from beginning of project, complex workshare over multiple projects and high number of customized for clients from around the world.

The development of a flagship program for a globally operating and leading helicopter OEM encountered significant delays, threatening customer confidence in delivery capabilities and quality. Roland Berger addressed key issues linked to program management to satisfy the need to enhance quality, while meeting the challenging delivery schedule by developing an integrated turnaround program. A rigorous and holistic root cause analysis identified work packages and design-specific approaches for the work packages and the interfaces to be managed. These were the basis for a result-oriented and quality-gate master project plan, supporting the work packages and ensuring the implementation of actions. Furthermore a multi-level communication concept was designed and implemented to communicate with and involve all relevant stakeholders.

NORD STREAM

WHAT

Offshore natural gas pipeline project from Russia to Europe

COMPLEXITY

Route through 8 Baltic countries, more than 15 subcontractors working on permitting, tight regulation, lack of internal resources

Roland Berger supported the planning and delivery of this project. Through a critical path analysis it was discovered that the project permitting was on the critical path, endangering the timely delivery of the project overall. The permitting operation was recovered through management of the overall process through comprehensive planning and program management, with task forces covering all relevant functions. Permitting became leading in all decisions for the project planning and execution. This resulted in a successful and timely preparation of the permitting documents for nine Baltic states.

In sum: the executive intelligence office, your project RADAR, keeps your megaproject on track.

The executive intelligence office bridges the gaps among experts and between experts, project directors, management and stakeholders, and communicates experts' insights and synthesizes these in a clear and actionable way. The executive intelligence office is therefore your project's RADAR: enabling Rapid and Appropriate Decisions with Accurate Response.

It should be obvious, we hope, that such an executive intelligence office is not the same as a traditional project management office. The latter generally monitors and reports progress compared to the original plans. It is static and backward-looking ("are we doing what we set out to do?"). The executive intelligence office, on the other hand, is dynamic. It focuses on helping steer the project by identifying and enabling decisions within the context of the ever-changing reality. It looks forward: "are we getting where we want to go?". The RADAR is tailored to the specific needs and situation of the megaproject at hand.

Given the importance of megaprojects and the investments involved, the benefits of preventing megaproject failure can be measured in years and in tens to hundreds of millions – not to mention in the otherwise missed objectives, unfulfilled expectations,

defeated business cases and disappointed stakeholders. Just imagine what the benefits will be if the upcoming EUR 30-75 trillion in megaproject investments are managed just 10% better. The monetary benefit is **EUR 3-7.5 trillion**. It pays to think – and act. ♦

ABOUT US

Roland Berger, founded in 1967, is the only leading global consultancy of German heritage and European origin. With 2,400 employees working from 36 countries, we have successful operations in all major international markets. Our 50 offices are located in the key global business hubs. The consultancy is an independent partnership owned exclusively by 220 Partners.

FURTHER READING



Making it happen – Central European North-South Infrastructure Corridor

At a time when energy security is at the top of the political agenda and infrastructure investments are widely acknowledged as a powerful driver of growth and competitiveness as well as a fundamental pillar of European integration, various grand political plans are discussed in Europe's policymaking circles. However, many of these ambitious plans have little chance of ever becoming reality. The North-South Corridor must not become another such project, for it is too important to Central and Eastern Europe and the EU.



FINANCING INFRASTRUCTURE IN DEVELOPING COUNTRIES

Through a combination of internal dynamics and external trends, today's low and middle-income countries are growing on their own terms and not by mimicking the trajectories of mature markets. Still, many investors have yet to notice. They apply out-dated judgments about how to assess risk, ignoring the realities of fast-changing economies across Africa, Asia and Latin America and missing out on promising opportunities for themselves.

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