

Why mega-projects fail

By [Paul Fitzsimons](#)

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While fingers have been pointed at examples of mega-projects with cost and schedule challenges such as Medupi and the multi-product pipeline, it is not a new or uniquely South African phenomenon. Internationally many flagship projects such as Concorde, the Channel Tunnel, space shuttle, A380 and B747-8 experienced multiple challenges, some ultimately leading to project failure.



When detailed planning and optioneering are overlooked at the front-end of a complex mega-project, someone will pay for it at the back-end. Without a systematic process based approach, projects that proceed too quickly or with too little definition in a highly complex and variables-laden environment will lead to unexpected costs and delays or missed deadlines.

Big doesn't necessarily mean complex

Notably, not every mega-project is complex. Today, any project above R1bn is categorised as such, but this does not necessarily mean it is highly complex. The simpler the project is, the better the engineering is understood and the more references or scalable projects that exist, the easier it is to measure the time and costs involved.

In addition to cost, other factors to consider when determining the complexity of a project include duration (generally in excess of three years), uniqueness (one-of-a-kind projects characterised by highly complex processes, systems and technical challenges), national significance, critical completion dates, funding constraints, coordination of multiple contractors, design agents and stakeholders with competing agendas, and overlapping or dependent project phases.

Due to the intricacy of mega-projects, the scope can and does change over time. These projects are also susceptible to misinformation about costs, benefits and risks during project development and decision-making, including in the business case. These factors often lead to cost overruns and benefit shortfalls during implementation.

Integrated management systems

This is why intensive planning needs to form part of an integrated pre-feasibility study ahead of the project. Following this, the appropriate programme and project management processes need to be applied, all within the framework of effective integrated management systems.

Empirical research by the Australian Institute of Project Managers into a multitude of large projects globally identified several critical practices that set mega-projects up to succeed or fail:

- Setting clear fully articulated business objectives for the team
- Ensuring all key owner functions are involved in development
- Having stability in leadership of the project
- Having full integration of all teams
- Ensuring complete definition of work (front-end loading) prior to sanction

Front-end loading appears to be the best predictor of how projects will turn out with respect to cost, schedule and functionality. If this step is not performed properly, projects are set up for failure from the beginning rather than during execution.

One of the most important failure points is the “need for speed“, which results in projects running ahead of basic data development, stakeholder alignment, permitting requirements, front-end loading development – and perhaps the business case itself.

How to build a nuclear plant

Given the current interest in the potential development of a nuclear energy industry in South Africa, insight could be gleaned from a recent study by the Royal Academy of Engineering, which identified the success factors and lessons learned from a number of major nuclear project developments across the globe. These can be applied to mega-projects in general and some of the key considerations include:

- An understanding that it is not possible to produce a fully developed and fully licensed design prior to construction for the first of a kind in any country
- It is essential to establish a regulator-approved programme and process for resolution of licensing issues throughout the build programme and that such issues are resolved before they approach the construction programme critical path
- Project management arrangements must reflect the allocation of risk between client and constructors
- Front-end loading processes take a long time, but the resulting maturity of the design, quality of the safety-related documentation and detailed costing and scheduling pay dividends in enabling the subsequent programme to be met

- 3D “walk through” computer models produced early in the design and construction planning process can be an invaluable tool for design, planning, operability and safety validation and in explaining the project at all levels in organisations
- Modular construction can reduce construction times and improve quality
- The client, main contractor and key subcontractors must develop shared goals and work collaboratively
- The licensee is responsible for the safety of its plant when it starts to operate and must therefore have strong overall control of the project

In the South African context, none of the above should be showstoppers, but they require structured planning, the establishment of clear programme frameworks and key pegs in the ground sooner rather than later.

ABOUT THE AUTHOR

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