



# NAC Executive Insights

## Foundations for Success

### Key Points

- Large complex projects require strong foundations.
- Weaknesses in strategic business objectives (SBOs) are the number one reason megaprojects fail.
- Inadequate scope definition and management has been identified as a major source of degraded project performance.
- Major projects often succeed or fail based on the readiness of the owner's organization.
- We assume the uncertainties that we face reside in a Gaussian world despite repeated non-Gaussian project failures.
- There are a "zoo" of new risks that challenge megaprojects.
- Assumptions must be made explicit and tracked.
- Vulnerabilities enter large programs and project organizations as they grow more complex.
- A key factor in understanding the risks associated with complexity involves understanding and assessing the various types of couplings to which a project is susceptible.
- Many megaprojects face growing organizational complexity with clouded accountabilities.
- It is important to recognize and be prepared for the agile execution that large complex projects demand by developing "contingent execution" strategies, plans, and capabilities.
- Program initiation schedules are not sufficiently granular.
- Effective designs must reflect construction and maintenance as fundamental project requirements.

### Introduction

Large complex projects require strong foundations if they are to be successful. Arguably, these are the same foundations any project would require, but experience suggests otherwise. When we look at recurrent weaknesses in foundations for success of large complex projects, we see several recurring themes. These include:

- Weaknesses in strategic business objectives (SBOs)
- Incomplete overall project scope
- Inadequate owner readiness

- Optimism bias in estimates
- Poorly founded risk assessment and modeling
- Unconsidered risk classes – Black Swans; “White Space” risk; Black Elephants
- Assumption migration
- Inadequate understanding of complexity
- Constraint coupling
- Inadequate decision frameworks
- Inadequate valuation of time
- Lack of startup granularity
- Incomplete basis of design

### **Weaknesses in Strategic Business Objectives (SBOs)**

Governance in large programs (NAC Executive Insight, “Governance Under Program Management”) is separate and distinct from management thinking. In reviewing failing programs, governance shortcomings were the number one reason large programs failed. Typically this breakdown in governance manifested as a failure to clearly articulate the owner’s strategic business objectives (SBOs) (Executive Insight, “Importance of Strategic Business Objectives”); obtain agreement on them; and continuously communicate them.

Uncertainty often begins at the earliest stages of addressing business needs within the owner's organization. The owner's inability to clearly articulate the SBOs—namely the outcomes the owner wants to achieve—creates uncertainty in the very foundations of a project. Even if defined, these SBOs must be agreed to by key stakeholders (internal and external) and continuously communicated since project team members change over time.

Well-founded projects (clearly defined and agreed to, with continuously well-communicated SBOs) are still prone to underperformance due to a number of other foundational factors that are rationalized away or overlooked. Some of these foundational factors impact the project from the outset while others emerge over time. These other foundational factors are discussed below.

### **Incomplete Overall Project Scope**

Inadequate scope definition and management has been identified as a major source of degraded project performance. (Executive Insight, “Know What You Are Trying to Accomplish: The Primacy of the Scope Baseline”). The International Association for Contract & Commercial Management (IACCM) has identified 10 common pitfalls for contract management. Number one among these is a “lack of clarity on scope and goals.” Others have identified that when scope is not clearly and accurately defined, overruns become systemic; scope creep is a consequence and the second highest rework indicator.

In addition to cost overruns arising from poor scope definition, delayed completion and disputes often occur as well.

If scope is prescriptive, then identify all elements and services, document all elements required for a “complete” project that are not within the prescriptive scope, and confirm that they are to be provided by the owner or through another contract. Document critical interfaces and include them in the contract or in an early contract deliverable that requires the owner’s acceptance.

### **Inadequate Owner Readiness**

Major projects often succeed or fail based on the readiness of the owner’s organization. It is clear certain elements of readiness must be in place in order to promote project success. Owner’s readiness (Executive Insight, “Owner Readiness”) must look specifically at issues within the owner’s organization, its processes, and the level of shared understanding.

Execution frameworks greatly impact program success. As part of readiness activities, the owner’s organization must have a secure handle on several execution processes that include but are not limited to:

1. Business model, scenarios, and relationship to program.
2. Prerequisites for owner’s executive approvals and linkage to a formal stage gate process, including clarity and comprehensiveness of stage gate requirements and processes; stage gate approvals, authorities granted, resource commitments and constraints; and an approvals matrix:
  - Prerequisites for external approvals.
  - External approval requirements, timing, and likelihood.
  - External prerequisites linked to stage gates including regulatory approvals required, process clarity, and timing, including safety case requirements; and process for property acquisition.

### **Optimism Bias in Estimates**

Optimism bias is driven by our susceptibility to being baited by "framing questions." Daniel Kahneman, in winning the Nobel Prize, speaks directly to these susceptibilities. We fail to use reference class forecasting to provide a check on this bias and, even more disturbing, really fail to mobilize data that we have to undertake those reference class forecasts (Executive Insights, “Managing Risk in Large Complex Programs,” “Improving Large Project Delivery,” and “Black Holes”).

## **Poorly Founded Risk Assessment and Modeling**

Poorly founded risk assessment and modeling is a key foundational challenge (Executive Insight, “Managing Risks in Large Complex Programs”). Even with excellent average values as a starting point, we assume the uncertainties around these means reside in a Gaussian world (Executive Insight, “Fat Tails”). Results suggest this is not the case. Non-Gaussian behaviors and models are increasingly used in modeling of natural (catastrophe) and financial systems. Project management performance is a function of two factors: the validity and resilience of the baseline we are managing to and the effectiveness of our management to it. The industry does much to put baselines in place and improve project execution against those baselines, but what if these baselines are fundamentally flawed? Consider, for example, a mistake in a line of code in a program that only becomes obvious in extremes but misleads, ever so slightly, in all its calculations (Executive Insight, “Systemic Risks in Large Complex Projects”).

## **Unconsidered Risk Classes—Black Swans, White Space, and Black Elephants (Executive Insights, “Addressing Emergent Risks”)**

So what are Black Swans (Executive Insight, “Black Swan Risks”)?

First, Black Swans are outliers, beyond the set of expectations we have about allowable “value.” They are outliers since we *believe* we have no past experience to suggest the possibility. We emphasize the word “believe” since there is a reasonable expectation that large complex projects are “neighborhoods” that Black Swans visit.

Second, Black Swans have a significant impact not only on the project, but on the psychology and behavior of those implementing it. They often cause a new paradigm to develop that may not fundamentally reduce risks.

Third, we rationalize after the fact that it was, in effect, predictable. While in some instances this may be true, often it defies rationality. Thus, a focus on resisting, responding, and recovering from these unknown unknowns through resiliency is a more appropriate focus.

“White space risks” (Executive Insight, “White Space Risks”) are those that are not well considered (or we would see elements of constraint coupling). They also grow with complexity. It is in this white space that Black Swans nest and breed.

A Black Elephant (Executive Insight, “Black Elephants”) is a cross between a Black Swan and the proverbial elephant in the room. You can’t miss the Black Elephant; everyone sees it, but nobody wants to deal with it.

Said another way, Black Elephants are high-impact events that lie beyond the realm of regular expectations, but are ignored despite evidence of their existence, at least until they trample you.

### **Assumption Migration**

Assumption migration (Executive Insight, “Assumption, Risk Driver, and Constraint Tracking”) draws on the confidence we gained in the past with respect to the "fixed" nature of certain assumptions when project durations were 12-18 months in duration. Should our confidence on these assumptions remaining fixed over seven, ten, or even twenty years be just as high? Probably not. At very fundamental levels, we make literally thousands of assumptions that we don't write down (they are implicit) and as such don't track.

Assumptions must be made explicit and tracked.

### **Inadequate Understanding of Complexity**

Complexity and scale create an attractive environment for Black Swans. They create a hidden, interlocking fragility while at the same time giving a perception of stability in this complex system.

Failing to fully understand the level of complexity (Executive Insight, “Systemic Risks in Large Complex Projects”) in our project execution strategies and, even worse, having no effective tools to measure the relative complexity of approach "A" vs. approach "B." In prior work, we were able to take two years out of a ten-year schedule by simplifying the project execution approach. In effect we minimized inter-dependencies between main projects to de-risk the program and actually started some elements later than originally envisioned, accruing other benefits in the process. Individual construction activity durations were unchanged.

Vulnerabilities enter large programs, project organizations, and other human-designed systems as they grow more complex. Increasingly these systems and their myriad of relationships, including hidden relationships, are so complex that they defy a thorough understanding

As complexity grows, insufficient attention is often paid to the introduction and proliferation of new links with new risks. As a result, many programs continually implement workarounds and “fixes,” which ultimately add to the total life cycle cost and often sow the seeds of new risks and new failures.

### **Constraint Coupling**

Think of inadequate identification of constraint coupling (Executive Insight, “Coupling in Large Complex Projects”) as second or third order coupling that is present, not easily visible in "complexity," and that can result in non-critical path activities without direct critical path dependencies, thus impacting critical path performance.

A key factor in understanding the risks associated with complexity involves understanding and assessing the various types of coupling to which a project is susceptible. Tight coupling, for example, creates new risks in large scale projects. This action is not yet adequately understood or managed. More traditionally sized projects, by contrast, are less susceptible. Coupling in large complex projects can be classified and strategies implemented to better manage them.

### **Inadequate Decision Frameworks**

Many large complex projects face growing organizational complexity with clouded accountabilities. Leaders are less able to delegate decisions cleanly. In addition, the number of decision makers has grown. The reduced cost of communications brought on by the digital age has compounded matters by bringing more people into the flow via email, slack®, and internal knowledge-sharing platforms without clarifying decision-making authority. The result is too many meetings and email threads with too little high-quality dialogue as executives ricochet between boredom and disengagement, paralysis, and anxiety. All this is a recipe for poor decisions.

### **Inadequate Valuation of Time**

Understand the value of time (literally) on the project.

Time is not your friend. A large complex project manager must understand the value of time. How does a day of time impact project cost and schedule? What about even an hour or a minute?

Know the value of a day's worth of time and drive actions and decisions with this in mind. Recognize and be prepared for the agile execution that large complex projects demand by developing contingent execution strategies (Executive Insight, "Contingent Execution"), plans, and capabilities. Lost productivity is seldom recovered.

### **Lack of Startup Granularity**

Program initiation schedules are not sufficiently granular.

Deploy a project startup team on day one with a 90 day-by-day schedule. Focus on getting the project processes, procedures, and infrastructure set up while the project team focuses on delivery.

Start well. Ensure designer-led permitting and right-of-way activity schedules are very granular and tied out to individual construction work packages. Failure to do this is a recurring problem. Ensure sequencing of related design activities support the construction sequence.

## **Incomplete Basis of Design (Executive Insight, “Business Basis of Design”)**

Much more is required to develop effective designs that reflect construction and maintenance as fundamental project requirements. In this sense, construction and maintenance considerations are not items to be reviewed, but rather fundamental requirements to be satisfied together with other project requirements established by the owner. The change suggested here is about a shift in mindset and perspective as well as in our design work processes.

## **Summary**

This Executive Insight provides a broad scan of the foundational issues that often undermine large complex projects even before they are well underway. Throughout this Insight, we have referenced other Executive Insights which develop each of the foundational issues in more depth.

Start right, finish strong!

## **References**

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## **About the Author**

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