



NAC Executive Insights

Improving Large Project Delivery

The current theory of project management was developed at a time when projects were more readily decomposed and well bounded. Today's large, complex projects do not exhibit these characteristics and current project management approaches result in unacceptable project failure rates and high levels of uncertainty with respect to cost and schedule.

A new theory of management of large, complex projects is required addressing the need for:

- Strengthened project foundations and frameworks.
- Increased focus on flows, not just the progressively decomposed tasks.
- Recognition of the implications of the unbounded nature of these projects.

Strengthened Project Foundations and Frameworks

The current theory of project management does not adequately address the unique characteristics of large, complex projects. Project foundations are not well founded and some framework processes are either absent, break down at scale, or are not adequately addressed. Strengthened project foundations must encompass:

- A heightened and structured focus on owner readiness, not just project readiness. Three aspects must be addressed:
 1. Strategic Business Outcomes/Objectives (SBOs) must be clearly articulated, agreed to, and *continuously* communicated.
 2. Owner's framework processes for decision making and approvals must be strengthened and streamlined.
 3. Project SBOs must be committed to by all owner elements, including legal, procurement, contracts, and accounts payable.
- Project readiness must be further strengthened along the lines of traditional readiness elements, but also be expanded to ensure SBO alignment and the utilization of big analytics starting at the planning stage.
- Project baselines must include an expanded Basis Of Design (BOD) that encompasses not only the traditional BOD associated with meeting the owner's project requirements, but also:

- A Construction Basis of Design (CBOD) that reflects desired means and methods (prior to the start of design; i.e., more than just a constructability review) such that a project is designed to build. Safety is taken to a new level through hazard elimination rather than mitigation during construction. Incorporation of a CBOD changes design packages, requiring more granularity in design package definition.
- An Operations & Maintenance Basis of Design (O&MBOD) that brings life cycle consideration to the very front end of the project, influencing design choices from the outset rather than seeking to improve the O&M characteristics of a developed design at a later stage.
- Foundations must further strengthen project baselines, especially for large, complex projects (where two out of three fail), by recognizing the inadequacy of current risk models that ignore the observed “fat tails” and optimism bias in project performance.
 - Risk models must avoid screening out risks prematurely and provide for Monte Carlo risk modeling with “fat tail” distributions such as a Cauchy distribution.
 - Optimism bias must be addressed through the increased use of reference class forecasting for cost and schedule.
 - Assumption capture and tracking is needed to address assumption migration in long duration projects.
- Risk focus must be expanded to address:
 - White space risks (areas of disconnect) that exist in complexity.
 - Stakeholder risks that act on today’s more unbounded projects.
 - Changed risk profiles associated with data and tool sharing, such as seen in shared BIM models.

Formal owner readiness assessments are a first step in an improved project initiation process. Optimism bias must be addressed through required use of reference class forecasting for cost and schedules on large, complex projects. Refinement of traditional industry risk models and modeling to account for risks in complexity and scale as observed in the “fat tail” performance outcomes also is required.

An expanded project control focus must be developed, recognizing the inherent risks from stakeholder action/inaction that today’s projects face. The role of big analytics is significant, but requires looking at the right data.

Increased Focus on Flows, Not Just the Progressively Decomposed Tasks

Project delivery heavily focuses on decomposing a project into a series of interrelated tasks and then managing the activities within each task. These tasks are reflected on schedules and

network diagrams with small arrows showing directional flows. These arrows are not dimensionless, and inadequate attention to flows is a significant source of project disruption and degraded performance. Project management must strengthen its focus on flow management with:

- Increased attention to interface identification and management, including identification of underlying constraints that may “couple” otherwise disparate tasks on a project.
- Recognition that previously established interface requirements may change as underlying assumptions and conditions migrate over time.
- Greater use of “last planner” techniques and improved workforce planning from a knowledge-enabled workforce.
- Utilization of “knowledge assemblies” that bring all the informational resources required by a particular task together with the associated computational and analytical tools and methods.
- Recognition of the growing importance of flow management as supply chains are more tightly integrated. This is in addition to the flow complexity associated with distributed execution and challenging project logistics both in remote and urban areas.

Recognition of the Implications of the Unbounded Nature of These Projects

Today’s largely unbounded projects are subject to the debilitating impacts of stakeholder-derived influencing flows that sweep across a project’s semi-permeable boundary, impacting not only the project’s tasks, but perhaps more importantly its various transformational flows. Addressing this challenge requires:

- Development of a new paradigm for project control that includes equal attention to potentially impacting flows arising from changes outside the project proper.
- Shifting stakeholder perspective from one of management to one of engagement.

About the Author

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