



Dar Al Riyadh Insight #3

Precepts and Assumptions Differ for Megaprojects

Dar Al Riyadh Insights reflect the knowledge and experience of our Board, executives and staff in leading and providing PMC, design and construction management services. Dar Al Riyadh believes in the importance of broadly sharing knowledge with our clients and staff to improve project outcomes for the benefit of the Kingdom of Saudi Arabia.

One could easily think the essential difference between megaprojects and more traditional projects is one of scale. A better analogy, and something that we see more clearly in giga-projects, is that this scaling up in size has the concomitant effect of unfolding, unseen dimensions that were likely always there but whose effects were not readily noticeable or whose resolutions were incidental at smaller scales. These unseen dimensions:

- Create new regions of white space that if not aggressively managed serve as nesting and breeding grounds for new, more systemic risks, including black swan risks. These white spaces may also act as homes for new, yet to be discovered opportunities, if we only thoroughly examine and understand the potentials that exist.
- Expose a subtle “coupling” across the giga-project that at smaller scales was not as significant. This “coupling” is not only direct coupling but importantly indirect coupling realized through “coupled constraints” or “white space” couplings that previously were not significant
- Create a level of complexity where the scaling of activities is dramatically outweighed by the scaling of the possible network combinations and effects that are created.
- Expose the fragility of many of our assumptions, as longer project development and execution periods that are inherent characteristics of commitment of growing levels of capital, demonstrate that they are far from static and instead experience “assumption migration.” This “assumption migration” can be thought of simply as the reasonable error band which we may have recognized as existing at project initiation but which broadens as time passes. In reality, the types of “assumption migration” we are concerned most about are those that demonstrate 2σ or greater behaviors or are particularly sensitive to uncertainty growth when confronted with extended time periods.
- Shift the management focus to the various “flows” that comprise the project, not just the tasks. We discover that the myriad of arrows between tasks are not dimensionless .
- Highlight management dimensions that are less significant on smaller scale projects such as those associated with:
 - Increased strategic importance (achievement of SBOs with their outcomes focus) vs. the output focus of delivering more traditional projects and the emergence of a changed governance regime.
 - Owner readiness, not just project readiness, given the increased level of owner organizational involvement and oversight that giga-programs attract.
 - Increased importance of multi-party contractual relationships both in the various execution teams and potentially even in the project ownership structure.



- Expose the need to think about “capital efficiency” in a fuller way than is traditionally experienced on smaller projects where CAPEX or construction schedule usually suffice as project optimization points.

Table 1: Precepts and Assumptions Differ for Large Complex Projects	
Theory of Traditional Projects	Theory of Large Complex Projects
PRECEPTS	PRECEPTS
1. Project is a temporary endeavor.	1. Range from semi-permanent endeavors to life-cycle provision of services.
2. Total transformation can be decomposed into manageable tasks.	2. Influencing flows shape transformative flows and may arise from flows crossing semi-permeable boundaries and interaction between two or more transformative flows present within the project context.
3. Executing each task in optimal manner and sequence optimizes overall project execution.	3. Influencing flows may change the nature of tasks to be undertaken and how various process flows define, interact with, and drive forward the transformation process.
ASSUMPTIONS	ASSUMPTIONS
4. Tasks are independent, except for sequential relationships.	4. Tasks increasingly interdependent, coupled by constraints and white space risks. Influencing vectors arise from process, influencing, and new flows created from interaction of two or more influencing vectors.
5. Tasks are discrete and bounded.	5. Tasks may become coupled and entangled and task limits may change and at times become open ended.
6. Uncertainty of requirements low.	6. Requirements may emerge in project execution; susceptibility to the planning fallacy.
7. Uncertainty of tasks to be performed is low.	7. Tasks may arise as the result of emergent requirements, influencing vectors, and flow-to-flow interactions.
8. Totality of works to be performed can be described by top down decomposition of total transformation effort.	8. Totality of work influenced by semi-permeable project boundaries, emergent requirements, and influencing vectors. Initial decomposition of initial transformation effort may not define ultimate totality of transformation.
9. Requirements exist at outset of project.	9. Strategic business objectives become more important than requirements, and in some instances, projects may be faced with emergent SBOs.
10. Requirements can be decomposed together with the work to be executed.	10. Requirements must address emergent factors and uncertainty over time as large complex projects often have extended project delivery times and significant considerations of life-cycle factors and needs.