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Performance Risk Has Overpowered Capital Cost Practices

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PERFORMANCE RISK HAS OVERPOWERED CAPITAL COST PRACTICES

The low success rate highlighted to the right indicates a persistent lack of predictability in capital projects. Clearly, the industry has not performed well. Westney experience suggests this can be attributed in part to unrealistic expectations at project sanction, due to three performance risk factors that are seldom recognized:

1. Engineering and construction productivity keeps declining, while project estimates continue to use historical productivity norms.

2. Risk exposure actually increases after project sanction, despite significant investments in front-end loading (FEL) and project definition.

3. Over-management of lump-sum turnkey (LSTK) contracts has the unintended consequence of shifting risk back to the owner.

Each of these factors is described below.

Engineering and Construction Productivity Keeps Declining

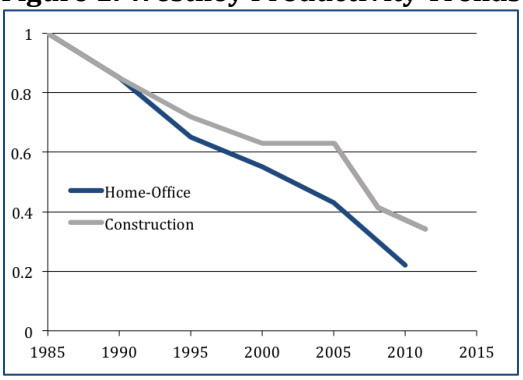
Westney has tracked home-office (engineering and project management) and construction productivity for the last 25 years. During this time, both have continually declined, an alarming trend that is generally unaccounted for by estimators that are accustomed to utilizing historical project norms. After anticipating some improvement after the high activity period of 2005 to 2008, we find that home-office performance has actually declined even more sharply in the last 5 years.

Only **2.5%** of Capital Projects are Successful[1].

Plants of common technology and size, that are easily benchmarked by home-office work-hours per piece of major equipment, now require roughly double the work-hours when compared to 1995. Offshore topsides show similar trends when measured by work-hours per ton, as does construction when measured by work-hours per unit (e.g., ton of steel, feet of pipe).

Some of the productivity trend can be accounted for by low-cost engineering centers and domestic content requirements during execution, but our data does not support this as a very significant contributor to the decline. While we are uncertain if these trends will turn around anytime soon, management needs to be aware of the effect they will have on current projects.

Figure 1: Westney Productivity Trends*



* From the Westney Productivity Database

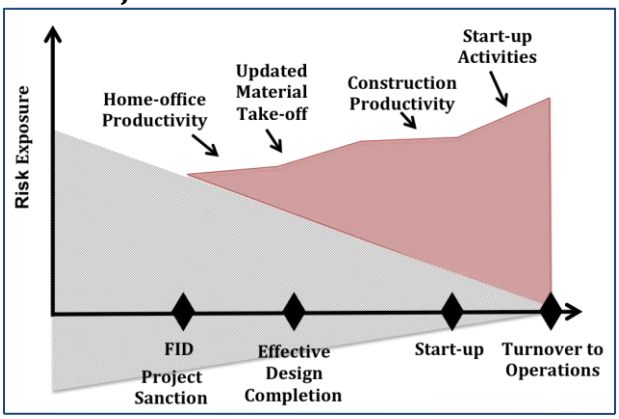
[1] *Need to know: Delivering capital project value in the down-turn, PricewaterhouseCoopers 2009*

Risk Exposure Actually Increases After Project Sanction

Front-end loading (FEL) is based on the idea that the risk of cost overrun is directly correlated to the degree of project definition, with the expectation that the risks at the final investment decision (FID) will be reasonable. This is the traditional project definition "tunnel" shown in the background of the risk exposure plot to the right.

However, performance during engineering, procurement, and construction has become the highest area of risk exposure, as shown by the red risk exposure line. Risk exposure after FID takes the form of higher execution costs due to the lower-than-expected home-office and construction productivity described above, as well as increased material quantities and pricing. In addition, turnover of incomplete construction and design rework results in increased risk exposure during start-up.

Figure 2: Increase in Real Risk Exposure after Project Sanction



There is no single solution to reducing this risk exposure, but some of the key issues identified in our investigations are listed in Exhibit I below.

Exhibit I: Key Risk Exposure Issues

- Incomplete FEED deliverables that delay detailed design and construction
- Unrealistic schedules that lead to acceleration of engineering and procurement, which forces errors as work flows from engineering to procurement to construction
- Owner decision-making that is not consistent with project implementation requirements
- Significant data and performance metrics requirements that add work-hours without improving performance
- Limited original equipment manufacturer (OEM) and supplier engineering resources that reduce the ability to provide timely product information
- Complexity of the design model that increases the amount of data required, as well as the level of coordination between design disciplines
- Shortage of skilled owner's staff (engineering and project management) that leads to lower home-office productivity and reduces contractor effectiveness
- Shortage of skilled contractor's staff (engineering, project management, and construction) that leads to lower contractor productivity
- Lack of qualified front-line construction supervisors that leads to lower construction productivity
- Optimistic project schedule that does not consider resource availability
- Sheer size and logistics of projects that increases management and construction complexity and exposure to external risks

Over-management of LSTK Contracts Shifts Risks Back to the Owner

The term "LSTK contract" has long been viewed as a panacea for the transfer of execution risks from owner to contractor, with little recognition given to the reality of the risks actually transferred. While current LSTK, fixed-price, or incentive contracts can be constructed to impose many levels of liability and guarantees on the contractor, they also typically contain escape clauses. Examples include a Force Majeure clause that considers "market" conditions, or clauses that specify requirements for very detailed and defined owner deliverables; these can be invoked with relative ease, transferring the real risk back to the owner.

Many owners with a history of executing reimbursable contracts, who are therefore accustomed to controlling detailed engineering, procurement, and construction tasks, are finding they have serious difficulty with LSTK or fixed-price contracting strategies. Over-management and contract infringement by owners is becoming much more common. Contractors may also contribute to the problem by agreeing to tasks they are not capable of performing, and by using contract language as an aggressive defense. Owners too often respond by stepping in to correct what they perceive as poor contractor performance, and, as a result, again shift risk back to themselves. Too many projects today start out as fixed price, but due to owner interference or assumption of control, end up having to convert to a reimbursable contract.

Summary

Addressing the three performance risk factors described here will help remove some of the obstacles to achieving capital project success, but will also require significant management attention. Executive decision-makers must develop risk-driven planning that considers organizational history, competencies, and productivity trends, and recognizes the owner's risk exposure during execution. An increased emphasis on due diligence is often a good approach, which results in a better understanding of the performance trends and available competencies of the contractors to whom control of the project is ultimately transferred.