Flexible procurement and the control of megaproject development costs and schedules

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It is becoming best practice to invest time and money upfront in megaprojects to create procurement flexibility in the project development phase. For example, modular development plans, contingent labour supply plans, and detailed long-term contracts for crucial specialized equipment are being used in an effort to tame capital cost and schedule overruns in the oil sands industry.

We show how to determine, for different projects in different economic environments, the appropriate level of resources (time and money) to be committed upfront to produce procurement flexibility throughout the development phase of project.

To do so, we take a "top down" approach to produce a planning tool that looks at overall patterns of development costs, so that some quick overall initial planning decisions might be supported.

Different levels of procurement flexibility are represented by different probability distributions of the cost time series required to complete the project, including different dependencies of these cost patterns on overall activity in the industry, modelled as a function of the long-term oil price forecast. The value of the completed project is determined as a function of a small number of state variables for the economy and for the project itself, using a relatively simple model of the cash-flows in its production and reclamation phases.

We use a decision tree approach to determine the appropriate level of resources to be committed. We do two types of analysis, one using standard discounted cash-flow (DCF) methods to value payoffs on the decision tree and the other using market-based (MBV) valuation methods.

Given DCF/MBV comparisons undertaken in other settings, our prediction is that, in any given situation, the DCF approach will suggest less investment be undertaken than the MBV approach suggests.

We show how that comparison plays out in this type of situation.