Megaprojects managements in Ecuador: Challenges and Opportunities

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ABSTRACT

Megaprojects are described as large, complex and expensive construction projects. Recent studies have shown that megaprojects often result in cost overruns, time extensions and undesired outcomes. Regardless, megaprojects are common, particularly in developing countries, as they are a trigger for social and economic development (Li et al., 2010). Since 2007, the Government of Ecuador has begun an unprecedent investment in infrastructure. Through the National Water Secretary, the government has 16 projects in agenda accounting for over $ 3 billion, with 6 projects currently under construction. These projects are considered flagship infrastructure in the endeavour to enhance the country´s productivity.

The Bulubulu-Naranjal-Cañar project, a $406 million multi-purpose hydraulic project for irrigation and flood control, consists of over 1,000 activities and was proposed to be completed by 2015. This novel project for Ecuador, presented as a case study, represents a challenge for project management and financing. The purpose of this preliminary study is to provide an insight to megaproject management in Ecuador, and propose improvements to megaproject management through optimization of stochastic project schedules.

Keywords: Megaprojects, Project management, Scheduling.

1. INTRODUCTION

Megaprojects ara a particular kind of infrastructure project characterized by their large size, high complexity, expensive budgets, and extendend schedules compared to traditional construction projects (Van Marrewijk et al. , 2008). Most of megaprojects exceed their estimated budget, fall behind schedule, and fail to meet the original project's objectives (Flyvbjerg et al., 2003). The causes for these problems have been well documented (CII, 1987) and can be summerized as follows:

- Lack of realism in initial cost estimates.
- Uderestimation of length and cost of delays.
- Underevaluated quantities and price changes.
- Contingencies are set too low.
- Underestimated geological risks.
- Undervaluation of expropiations costs and time.
- Undervaluation of safety and environmental demands.
- High risk as a result of technological innovation.
- Changes in project specificactions and design are not sufficiently taken into account.

Causes of poor performance can be analyzed during the planning and execution phase, Haidar and Ellis (2010) identified these causes in each phase being the most relevant:

Planning phase causes:

- Incomplete designs.
- Non-realistic planning in terms of cost and time.
- Underestimation of project's complexity.
- Underestimated materials quanities.
- Underevaluated risks.
- In-efficient governmental procedures and regulations.

Execution phase causes:

- Variations and mistakes due to inadequate planning, incomplete execution requirements, and ambiguous design documents.
- Poor project culture leading to productivity loss.

- Inadequate project organization that is insufficient for the size and complexity of the project.
- Poor communication and team work.
- Poor coordination and integration of work crews; inexperienced personnel in critical positions

The causes reflect that convetional management practices are not well suited for to manage megaprojects. Megaprojects clearly bring together, under various project delivery methdos, differing and competing partners, interests, values and work cultures. The following section is a brief summary of megaprojects characteristics in Ecuador that represent challenges, ultimately leading to time and cost increases.

2. MEGAPROJECTS AND INFRASTRUCTURE MANAGEMENT IN ECUADOR

Megaprojects are considered flagship projects in Ecuador, as they provide the infrastructure required to enhance the country's productivity. Under this scenario, projects durations are set within political time frames, during which deep and quick changes to the economy are introduced. In the best case, construction times are determined using deterministic approaches, in which activities durations are calculated as function of productivity and quantities. Traditional project delivery methods, usually design-bid-build, are preferred for project execution. Megaprojects in Ecuador are owned by governmental agencies and performed by private contractors. Funding comes from external sources; recently, most of it financed through mutual trade agreements with the government of China.

3. PROPOSED AND ONGOING RESEARCH

To further understand the causes of poor project performance in Ecuador, we propose to hold structured interviews with managers of megaprojects to identify problems, contrasting them with most frequent problems found in literature. To have realistic schedules, we propose to evaluate the original projects schedules, and develop a probabilistic schedule using probability density functions for activities durations, trying to incorporate uncertainty and risk.

Finally a framework for megaproject management in Ecuador is proposed to serve as a decision tool to find quick solutions for future and currently under construction projects. Data available from the *Bululu* multipurpose project will be used as a case study and for a validation model.

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