

# Chapter 71

## Project Portfolio Risk Management: Managing Risk in Case of Investment Portfolio

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### ABSTRACT

*The overall performance of a project portfolios doesn't rely on the successful implementation of the largest or complex projects, but on how the entire group of projects is managed. In most cases organizations don't have sufficient funds to implement multiple projects in a certain time interval and turn to sponsors in order to implement them. Depending on each sponsors' conditions for funding the project the organization has to create a prioritization scheme for accelerating, delaying or abandoning certain projects. The chapter focuses on managing projects and project portfolios risk in regard to sponsor conditions for funding projects, how these conditions together with technical and contractual risks generate new risks that affect the performance of the portfolio. The chapter concludes with recommendations on how to mitigate risks by developing specific methodologies for managing both financial and technical risks.*

### INTRODUCTION

Due to the complexity, long project duration and numerous stakeholders projects in the construction industry are considered to have a high level of risk.

The methods and tools from deterministic project management, even though efficient, are not sufficient to assure optimal execution of projects and project portfolios in the construction sector. In the present economic status of the world both private and government organizations should focus their attention on optimal use of limited resources. Even though optimal use of resources is impossible, near

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optimal use can be achieved only by dedicating time and effort in order to develop proper risk management methodologies.

While many industries have become aware of the advantages risk management provides project and project portfolio implementation, the construction sector is left behind. When risk management is used it usually uses a qualitative model, in favour of quantitative risk analysis. This may be due to the fact that quantitative risk analysis is little understood and users are unsure how to build efficient models for risk analysis.

The increase constraints that countries face due to the prolonged financial crisis yields in a shortage of funds for new investments, this in return has a negative impact on the internal rate of return of the country, thus increasing the country's financial crisis. Developing countries try to fund their projects from different sponsors such as the European Union. In order to obtain non-refundable funds for their projects they have to accept strict terms regarding project planning, design and implementation. These terms combined with technical risks for each type of project usually result in a failure to implement projects sponsored by the countries' government or their local, own, budget.

Another risk projects and project portfolios are exposed to consist of designs or execution contracts that are not made in such a manner to aid involved stakeholders in the proper implementation of the project, but rather to transfer risk and responsibility for project failure.

The project portfolio of a government agency reflects its' capacity to successfully implement projects thus making it eligible for obtaining sponsorship for future projects. The portfolios' components are grouped and prioritized according to certain characteristics that will be described in the case study.

The chapter aims to present concepts of project portfolio risk management and project prioritization in order to maximize portfolio performances. The case study will present the complex relationship between cash-flow, technical risks, project prioritization, performance criteria and portfolio performance. The case study is developed using Spider Project software.

## **BACKGROUND**

Construction projects are considered to have a high level of risk due to numerous stakeholders, long project durations and open production systems (Taroun, 2013). Even though project management and project risk management initially developed mainly because of the construction industry, today the construction industry has poor risk management in comparison to economic bases industries such as finance or insurance. However risk management can provide a solid basis for decision-making in projects and bring important benefits, such as reduced costs, increased engagement with stakeholders and better change management (Bayati, Gharabaghi, & Emrahimi, 2011).

In literature reside a variety of risk management methodologies, some of them concentrate on mathematical models while others on expert judgment and previous experiences. However these standards provide only a very generic description of the method and focus their attention only on high-level characteristics and not on the details of how the method should be performed.

Proper risk management lays in the ability of the users to properly identify and quantify the elements of risk. It is the authors' opinion that one of the main reasons why most practitioners avoid quantitative risk analysis is because it is considered to be the most difficult, mainly because it is based on advance mathematical and statistical models, making it very difficult to model properly.

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