

## Chapter 26

# Project Selection Frameworks and Methodologies for Reducing Risks in Project Portfolio Management

**Fabio Nonino**

*Sapienza University of Rome, Italy*

### ABSTRACT

*Extracting and consolidating knowledge from past projects can help managers in selecting projects with the correct level of riskiness, while market analysis gives directions for reaching the objective of a balanced project portfolio. To this extent, the chapter discusses strategic importance of project selection and the role of risks and uncertainties in project portfolio management and presents some fundamental and innovative frameworks and project selection methodologies for balancing risks. Finally, the chapter proposes a model containing an innovative methodology, based on artificial neural networks, to help managers in balancing project portfolio and assessing projects during the selection phase on the basis of risks, uncertainties and critical success factors.*

### INTRODUCTION

Project portfolio management (PPM) extends the objective of realizing successful projects to the alignment with strategic business objectives, but expected project success still remains the main determinant for projects selection. But management knows it and so do project managers: selection of new projects cannot be based only on quasi-guaranteed short-term revenues as the year-to-year viability of a company depends on its ability to innovate, the uncertain long-term returns on the company's total innovation investment.

The contemporary competitive environment, with its widespread lack of information, misleading signs and difficulties in forecasting future scenarios, makes the investments in the acquisition and management of projects always riskier. Consequently, one of the objectives of manager is the assessment of risk

DOI: 10.4018/978-1-5225-5481-3.ch026

across project portfolio. Companies must learn to manage innovation strategically to achieve a competitive advantage through a well-balanced portfolio. *But what does it mean to balance a project portfolio?*

As regard new markets and innovative products, firms should construct a portfolio selecting projects that balance riskiness of long-term return of investment for projects that will become the engines of blockbuster growth with guaranteed short-term revenues. Therefore, companies should align project portfolio with their strategic business objectives, achieving maximal project portfolio value by combining performances of projects in order to maximize the shareholders' value while balancing resource allocation and risks (Costantino *et al.*, 2015).

Achieving maximal project portfolio value for the resources used is often complicated by multiple selection criteria, subjective and imprecise assessments and project interdependencies. Project critical success factors (PCSFs) can serve as manageable criteria to prevent possible causes of failures with an effective project selection process, taking into account company strategic objectives, project manager's experience and the competitive environment.

The first section discusses strategic importance of project selection and the role of risks and uncertainties in project portfolio management. The subsequent section examines some fundamental and innovative frameworks and project selection methodologies for balancing project portfolio risks. The last part of the chapter proposes a framework an innovative methodology to help managers in assessing projects during the selection phase. An artificial neural network (ANN), scalable to any set of PCSFs, classifies the level of project's riskiness by extracting the experience of project managers from a set of past successful and unsuccessful projects taking into account risks and uncertainties.

## **BACKGROUND**

The main objectives of the project portfolio management are the identification, the ranking, the prioritization, the selection and the authorization of projects or programs. Project selection is a strategic process aimed at evaluating individual projects or groups of projects and then choosing which implement so that the objectives of the parent organization are achieved (Meredith *et al.*, 2015). However, too often it fails (Ghapanchi *et al.*, 2012) due to complexity caused by many factors, exogenous and endogenous, such as uncertainty, interrelationships among projects, changes over time and stakeholders behaviour.

Project portfolio selection is the result of multiple and conflicting objectives. The first challenge in managing project portfolio is translate qualitative objectives in measurable and manageable quantitative goals. The second is to identify the interdependence of projects driven by common objectives and often scarce resources. The third is managing risk and uncertainties while balancing revenues and investments, reaching the so-called ambidexterity, i.e. exploitation of consolidated products/services and standardized processes vs. exploration of new business opportunities.

## **Risks and Uncertainties in Project Portfolio Selection**

The process of protection from *risks* and *uncertainties* represents a fundamental component of the project portfolio and project management activities and needs of models, frameworks and methodologies translated in systematic procedures. Managers can reach a proper control of the projects' portfolio, balancing the overall exposure to risks, only with a clear perception of the expected results on every

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/project-selection-frameworks-and-methodologies-for-reducing-risks-in-project-portfolio-management/202235](http://www.igi-global.com/chapter/project-selection-frameworks-and-methodologies-for-reducing-risks-in-project-portfolio-management/202235)

## Related Content

---

### A Novel Method to Assign Weights to Decision Makers for each Criterion in Group Decision Making Under Multiple Criteria with Crisp and Interval Data

Mohammad Azadfallah (2018). *International Journal of Applied Management Sciences and Engineering* (pp. 15-46).

[www.irma-international.org/article/a-novel-method-to-assign-weights-to-decision-makers-for-each-criterion-in-group-decision-making-under-multiple-criteria-with-crisp-and-interval-data/207339](http://www.irma-international.org/article/a-novel-method-to-assign-weights-to-decision-makers-for-each-criterion-in-group-decision-making-under-multiple-criteria-with-crisp-and-interval-data/207339)

### A Robust Multi-Criteria Decision-Making Procedure for Outsourcing Decisions in Reverse Logistics

Gül Tekin Temurand Bersam Bolat (2021). *International Journal of Operations Research and Information Systems* (pp. 1-17).

[www.irma-international.org/article/a-robust-multi-criteria-decision-making-procedure-for-outsourcing-decisions-in-reverse-logistics/294116](http://www.irma-international.org/article/a-robust-multi-criteria-decision-making-procedure-for-outsourcing-decisions-in-reverse-logistics/294116)

### Income Diversification and Financial Performance of Selected Deposit Money Banks in Nigeria

Emmanuel Uniamikogbo, Emma I. Okoye and Arowoshegbe O. Amos (2021). *International Journal of Applied Management Sciences and Engineering* (pp. 89-105).

[www.irma-international.org/article/income-diversification-and-financial-performance-of-selected-deposit-money-banks-in-nigeria/259926](http://www.irma-international.org/article/income-diversification-and-financial-performance-of-selected-deposit-money-banks-in-nigeria/259926)

### Green Entrepreneurship in Transitional Economies: Breaking Through the Constraints of Legitimacy

Yang Gao, Sang-Bing (Jason) Tsai, Shuo Zhang and Guodong Li (2018). *Green Production Strategies for Sustainability* (pp. 184-209).

[www.irma-international.org/chapter/green-entrepreneurship-in-transitional-economies/192837](http://www.irma-international.org/chapter/green-entrepreneurship-in-transitional-economies/192837)

### Stochastic Frontier Analysis and Measurement of Productivity and Technical Efficiency of Indian Manufacturing Sector

Manoj Kumar (2017). *International Journal of Productivity Management and Assessment Technologies* (pp. 52-69).

[www.irma-international.org/article/stochastic-frontier-analysis-and-measurement-of-productivity-and-technical-efficiency-of-indian-manufacturing-sector/170399](http://www.irma-international.org/article/stochastic-frontier-analysis-and-measurement-of-productivity-and-technical-efficiency-of-indian-manufacturing-sector/170399)