

# Identifying the dimensions and components of uncertainty and risk and increasing flexibility in capital budgeting decisions with the investment option approach

Ali Rezaei<sup>1</sup> , Mahdi Mohammad Bagheri<sup>2</sup> , Hojat Babaei<sup>3</sup> , Mohsen Zayanderoodi<sup>4</sup> 

1- PhD student of Industrial Management Department, Kerman Branch, Islamic Azad University, Kerman, Iran.

2- Assistant Professor, Department of Management, Kerman Branch, Islamic Azad University, Kerman, Iran.

3- Assistant Professor, Department of Mathematics, Kerman Branch, Islamic Azad University, Kerman, Iran.

4- Associate Professor, Department of Economics, Kerman Branch, Islamic Azad University, Kerman, Iran.

## Receive:

27 September 2024

## Revise:

07 December 2024

## Accept:

08 January 2025

## Abstract

The aim of the present study is to determine a pattern for identifying uncertainty and risk and increasing flexibility in capital budgeting decisions with an investment discretionary approach. The research method is applicable-developmental in terms of its purpose, and qualitative in terms of the nature of the data. The statistical population of this study included 18 power plant experts from Mejmar who had at least 10 years of teaching, research, and management experience in power plants. Purposive sampling was used in this study. The data collection method was referring to documents and semi-structured interviews. Atlas ti software was used to code the interviews for data analysis. Based on the results obtained, 6 constructive themes and 14 basic themes were identified. The 6 constructive themes include political and international factors, legal and regulatory factors, financial and budgetary factors, technological and information factors, organizational structure and culture, and economic factors. The dimensions of the organizational structure and culture factors include: the structure and organization domain, the human resources domain, and the management domain. The dimensions of the technological and information factors include: the information technology environment domain and the information sharing domain. The dimensions of the economic factors include: the economic structure and the economic environment. The dimensions of the political and international factors include: the political structure and environment and transnational and international factors. The dimensions of the legal and regulatory factors include: general legal factors and specific legal factors. The dimensions of the financial and budgetary factors include: the human factors and individual capabilities domain, the intra-organizational requirements and factors domain, and the extra-organizational factors and requirements domain.

## Keywords:

Uncertainty identification,  
Risk identification,  
Capital budgeting,  
Investment discretion.

**Please cite this article as (APA):** Rezaei, A., Mohammad Bagheri, M., Babaei, H. and Zayanderoodi, M. (2025). Identifying the dimensions and components of uncertainty and risk and increasing flexibility in capital budgeting decisions with the investment option approach. *Journal of value creating in Business Management*, 5(2), 189-223.



<https://doi.org/10.22034/jvcbm.2025.485796.1446>



Authors retain the copyright and full publishing rights.

Published by Research Center of Resource Management Studies and Knowledge-Based Business. This article is an open access article licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0)

**Publisher:** Research Center of Resource Management Studies and Knowledge-Based Business

**Corresponding Author:** Mahdi Mohammad Bagheri

**Email:** mahdi.moba@gmail.com

## Extended Abstract

### Introduction

Since the late 1970s, along with the spread of advanced financial techniques such as internal rate of efficiency and net present value at the firm level, many researchers have offered criticisms regarding the use of these techniques in valuing strategic investment decisions (Dai et al., 2021). The first criticism is related to the inability of these techniques to correctly value uncertain investments, under conditions where the firm has a degree of flexibility in decision-making (Alipour and Behdadian, 2020). In particular, early proponents of the option theory of capital assets criticized the NPV method for considering decisions only in terms of whether or not they are or are not, without considering the value of flexibility (choosing between different options when receiving new information). Using the theoretical framework presented for pricing contingent claims, financial researchers have proposed the option theory of capital assets as an alternative to the NPV method to overcome its shortcomings. Since the aforementioned conditions are often related to the structure of strategic decisions, the option theory of capital assets claims to be the best method for valuing such decision-making problems (Cheong, 2021).

Recent research shows that about 20 percent of industrial projects are terminated before completion, and less than a third of them are completed on time and based on budget. Effective risk management is absolutely essential to prevent these problems from occurring. In fact, flexibility is a key factor in project success (Dai et al., 2021), because by it, senior management can design and develop risk coping tools according to the requirements and conditions of the risk. The option method allows project managers to be aware of the consequences of risk, deal with it in case of adverse events and use it in the best way if conditions are favorable, select the best capital allocation option and justify it to senior management and financial stakeholders. Therefore, this research, considering the Majmar Power Plant Group, seeks to answer the question: What is a model for identifying uncertainty and risk, and increasing flexibility in capital budgeting decisions with the investment option approach?

### Theoretical Literature

#### Risk

In the past, people used to rely only on financial information obtained from statements prepared based on historical values and analyzed by experts to make decisions about investment locations. However, since the collapse of large companies such as Enron and WorldCom due to the failure to disclose financial scandals by company managers, investors have paid more attention to the prominent role of the governance system and its principles (Komar et al, 2017). On the other hand, after the separation of the legal personality of commercial enterprises from the real personality of their owners and the development of global trade and the owners' need for financing sources, the discussion of multiple owners in companies took shape and led to the creation of joint-stock companies. In the meantime, each of the shareholders; especially those who had more influence (which was mainly due to the high volume of their capital), tried to direct the financial decisions of the companies towards their own interests (Cerchiello et al, 2016). For many years, economists assumed that all groups in a corporation work for a common goal. However, in the past 30 years, many cases of conflicts of interest between groups and how companies deal with such conflicts have been raised by economists. These cases are generally expressed under the title of “agency theory” in management accounting. According to Jensen and Meckling’s definition: an agency relationship is a contractual relationship in which a principal or owner appoints a representative or agent on his behalf and delegates decision-making authority to him (Chen et

al, 2019). The greater the number of major shareholders in the company's ownership structure, the more supervision and control is shared among the major shareholders and the conflict of interest between them decreases; therefore, the company's efficiency on equity increases (Kou et al, 2019).

### Research Methodology

The present study is an applied-developmental study in terms of its purpose, and a content analysis study in terms of its research implementation method. The statistical population of this study includes 18 Iranian power plant experts who have at least 10 years of teaching, research, and power plant management experience. The sampling method used in this study was purposive. Qualitative content analysis can be considered a research method for the subjective interpretation of textual data through systematic classification, coding, and theme-building processes or designing known patterns. After taking interviews from participants and writing line by line the text related to the interviews, the researcher analyzed the texts; in fact, in this method, codes, concepts, and categories were identified through a systematic classification process, and then a model of uncertainty and risk and increased flexibility in capital budgeting decisions with an investment discretionary approach was presented. The snowball technique was also used to select participants, and each interviewee was asked to provide the researcher with a list of people who were willing and specialized to participate in a study. Coding was used to analyze the data obtained from the interview and theoretical foundations. Atlas ti software was used for analysis.

### Research findings

Based on the results obtained from thematic analysis, 6 constructive themes, 14 basic themes and 132 initial codes were identified. The 6 constructive themes include political and international factors, legal and regulatory factors, financial and budgetary factors, technological and information factors, organizational structure and culture, and economic factors. The dimensions of the organizational structure and culture factors include: structure and organization, human resources, and management. The dimensions of technological and information factors include: information technology environment and information sharing. The dimensions of economic factors include: economic structure and economic environment. The dimensions of political and international factors include: political structure and environment, and transnational and international factors. The dimensions of legal and regulatory factors include: general and general legal factors and specific legal factors. The dimensions of financial and budgetary factors include: human factors and individual capabilities, intra-organizational requirements and factors, and extra-organizational factors and requirements.

### Discussion and Conclusion

The aim of this study was to develop a model for identifying uncertainty and risk and increasing flexibility in capital budgeting decisions with an investment discretion approach (study in the Mejmar power plant group). The coding and text analysis process of the interviews was carried out in the Atlas ti qualitative data analysis software. Based on the results obtained from thematic analysis, 6 constructive themes, 14 basic themes, and 132 primary codes were identified. The results of this study are somewhat consistent with the results of Mashhadizadeh et al, (2020) and confirm the results of this study.

According to the results of the study, it is suggested: to increase flexibility in the organizational structure, a map of the current organizational structure can be prepared and factors such as organizational hierarchy, different units, and the relationships between them

can be examined. Then, according to the needs and market conditions, optimization of the organizational structure can be proposed and the necessary reforms can be applied. This includes modifying hierarchies, creating matrix teams, increasing coordination, and transferring responsibilities and competencies. By planning and implementing training and professional development courses for employees, they can be improved and provided with the necessary capabilities to deal with changes and risks. By encouraging teams and employees to actively participate in decision-making and budgeting processes, the flexibility of the organization can be increased.