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Original Article (Qualitative)

## Interpretive-structural modeling of uncertainty and risk factors and increasing flexibility in capital budgeting decisions with an investment discretion approach

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### Abstract

The purpose of the present study is to interpretive-structural modeling of uncertainty and risk factors and increasing flexibility in capital budgeting decisions with an investment discretionary approach. The method of this research is applicable in terms of purpose, and qualitative in terms of method type. 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. The fuzzy Delphi method was used to analyze the findings, and the MICMAC software was used for influence and impact. The results showed that the variables of technology and information factors, organizational structure and culture, and economic factors had high influence and had low impact and were in the area of independent variables. Political and international factors, as well as legal and regulatory factors, have similar influence and degree of dependence, so it is a linked variable. Financial and budgetary factors also have high dependence but low influence, so they are considered dependent variables. No variable is in the first quadrant, i.e. the autonomous area.

### Keywords:

Uncertainty identification,  
Risk identification,  
Capital budgeting,  
Investment discretion

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## Extended Abstract

### Introduction

Since the late 1970s, along with the spread of advanced financial techniques such as internal rate of return and net present value at the company 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, in situations where the company has a degree of flexibility in decision-making (Alipour & Behdadian, 2020). In particular, early proponents of the discretionary theory of capital assets criticized the NPV method for considering decisions purely as if-or-not, without considering the value of flexibility (choosing between different options when receiving new information). By applying the theoretical framework presented for pricing contingent claims, financial researchers have proposed the capital asset investment option theory as an alternative to the net present value method to overcome its shortcomings. Since the aforementioned conditions are often related to the structure of strategic decisions, the capital asset investment option theory claims to be the best method for valuing such decision-making issues (Cheong, 2021).

Strategic cost management attempts to bridge the gap between financial techniques and strategy by introducing strategic insights into the evaluation of investment decisions; because strategic cost management as a theoretical framework is able to consider the aspects of strategic positioning, value chain, and cost accounting and management. Although the theory of investment discretion in capital assets and risk management belong to two distinct scientific worlds (i.e., financial management and cost accounting), it seems that they both address the same problem, which is how to improve the effectiveness of the techniques used in making strategic investment decisions. It is worth noting that the theory of investment discretion in capital assets and strategic risk management differ in the way they approach this problem. At first glance, it seems that the discretionary theory of capital assets focuses more on the adequacy of the accounting algorithm with respect to the intra-organizational structure of the decision (i.e., uncertainty, risk, and flexibility), while strategic risk management places more emphasis on the relationship of the decision with the company's strategy. Therefore, it would be useful to compare these two methods in order to identify commonalities and the possibility of integrating them into a single framework (Deng & Lin, 2021). Therefore, this research seeks to answer the question: what is the interpretative-structural modeling of uncertainty and risk factors and increasing flexibility in capital budgeting decisions with the discretionary approach?

### Theoretical Framework

#### Investment Options

Investment options imply that in many project evaluation scenarios, firms will have one or more options to make strategic changes to the project during its life. This strategic option, known as investment options, is generally ignored in standard discounted cash flow analysis techniques. However, these options can increase the value of a project by eliminating undesirable returns and creating new opportunities in the future (Makarem et al., 2023).

#### Environmental Uncertainty

Environmental uncertainty is a type of inability to predict the possible outcomes of a decision. Chandler states that environmental uncertainty is a condition under which organizations adjust their framework and is caused by environmental factors of the organization that relate to the degree of change that characterizes the environmental activities related to the organization's

operations, including the unpredictability of the activities of customers, suppliers, competitors, and legal entities (Hamidian et al., 2023).

### **Capital Budgeting**

Capital budgeting is the process of identifying, evaluating, planning, and financially supporting major investment projects in organizational units. Decisions made in connection with capital budgeting largely affect the success of the organization in achieving its set goals. Therefore, capital budgeting plays a major role in the long-term success of these units (Rezaei et al., 2025).

Rezaei et al. (2025) examined a model for identifying uncertainty and risk and increasing flexibility in capital budgeting decisions with an investment discretion approach. Based on the results obtained, 6 constitutive themes and 14 basic themes were identified. The 6 constitutive themes are political and international factors, legal and regulatory factors, financial and budgetary factors, technology and information factors, organizational structure and culture, and economic factors. The dimensions of the organizational structure and culture factors are: structure and organization, human resources, and management. The dimensions of technology and information factors are: 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 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 exogenous factors and requirements.

Hirota & Yunoue (2022) examined fictitious financial laws and accounting: Evidence from capital budgeting in Japan. The results showed that municipalities participate in stock flow adjustments by increasing their expenditures and revenues through intergovernmental transfers, which indicates creative accounting because it allows municipalities to delay the improvement of their financial conditions. To evaluate a new financial law, we should examine not only targeted indicators, but also non-targeted ones that municipalities have no incentive to control.

### **Research Methodology**

The method of this research is applicable in terms of purpose, and qualitative in terms of method type. The statistical population of this research includes 18 power plant experts from Mejmar who have at least 10 years of teaching, research and management experience in power plants. In this research, purposive sampling method was used. The data collection method is referring to documents and semi-structured interviews.

### **Research findings**

The fuzzy Delphi method was used to analyze the findings, and MICMAC software was used for influence and impact. The results showed that the variables of technology and information factors, organizational structure and culture, and economic factors have high influence and low influence and are in the area of independent variables. Political and international factors, and legal and regulatory factors have similar influence and level of dependence, so they are linked variables. The variables of financial and budgetary factors also have high dependence but low influence, so they are considered dependent variables. No variable is in the first quadrant, i.e. the autonomous area.

### **Conclusion**

The present study aimed to interpretative-structural modeling of uncertainty and risk factors and increase flexibility in capital budgeting decisions with an investment discretionary approach. The results of this study are consistent with the results of Rezaei et al. (2025), Hirota & Yunoue (2022), Frost & Rooney (2021), Dai et al. (2021), Zhang (2021), Cheong (2021), Vatanparast & Maleki (2020), Khoshkar Hassankiadeh et al. (2020), and Mashhadizadeh et al. (2020). Mashhadizadeh et al. (2020) showed that the economic evaluation of investment projects, given the uncertainty prevailing in their financial conditions, requires a new thinking called investment discretion theory to cover the shortcomings of traditional capital budgeting methods, including being static and not considering uncertainty. The results indicate the impact of uncertainty factors on the investment environment and the existence of a significant relationship between the use of investment flexibility and discretion with increasing the value of investment in this power plant. In addition, the experts positively evaluated the effect of using expansion, patience, and delegation options to increase the flexibility of investment decisions in this power plant.

Considering the results obtained, the following suggestion is made:

By planning and implementing training and professional development courses for employees, they can be improved and provided with the necessary capabilities to face changes and risks.