

Multi-criteria analysis of investment projects based on the ranking method

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Abstract

Today's business environment is becoming more challenging than ever and it brings new complexities in choosing the right investment projects for investors. Some standard financial analytical instruments do not seem to work effectively lately. Therefore, there is a growing need for new ways of handling arising business challenges. This work proposes a hybrid algorithm for the analysis of investment projects that combines the analytical hierarchy process and ranking method according to Borda count. The study shows that the hybrid approach can add a new horizon to the analysis of the investment projects and provides investors with an alternative mechanism to maximize expected profitability.

Keywords: analytic hierarchy process, Borda count, decision making, investment analysis

1 Introduction

When making an investment decision, the investor considers many alternative options for investment projects. The investor's task is to choose the most effective investment project. To choose an investment that will meet the goals of the investor, it is necessary to evaluate the projects. For a complex analysis of the investment projects, it is necessary to consider all possible financial assessment indicators, but this approach creates complexity for the investor. Therefore, it is necessary to simplify and streamline the approach of a comprehensive analysis of investment projects. One solution to this problem is to use the analytic hierarchy process. The analytical hierarchy process was developed by T. Saati [1] and is a method of organizing information for making complex decisions. This method has found wide application in making multi-criteria decisions, planning and allocating resources, as well as in resolving conflicts [2–5]. The analytic hierarchy process method can be used to rank the investment project evaluation criteria to subjectively determine the most important evaluation criteria as shown in figure 1.

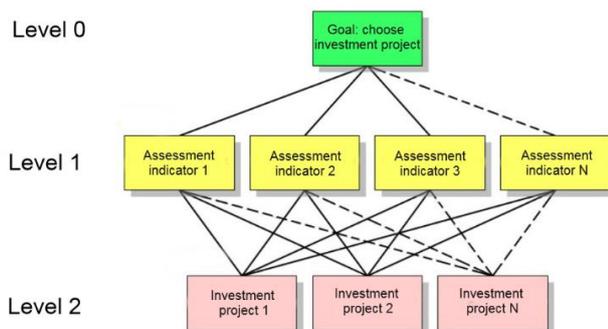


Figure 1 – Structure of decision making hierarchy

An alternative solution for making effective decision is to rank investment projects by investor's preference. In this case, it is recommended to use the method of ranking by Borda count [7]. As a result, aggregated points of all financial assessment indicators of investment projects would provide the winner project.

2 Overview

This work describes methods of investment projects evaluation:

- Analytical hierarchy process
- Borda count method

As a result, proposes hybrid algorithm of analytical hierarchy process and Borda count.

3 Decision

In order to consider priority levels of financial assessment indicators as well as their values, hybrid approach is developed to combine two subjective decision making methods. Thus, investment projects selection approach consists of two phases. The first phase determines the weights of each of the financial indicators using the hierarchy analysis process. The second phase ranks investment projects based on the Borda Count method taking into account their indicators weights. This approach considers the following variables: financial indicators of the investment project with calculated values, the number of investment projects and investor's preferences towards projects' financial indicators. The set of financial indicators of investments, in turn, consists of net present value, internal rate of return, return on investment, payback period and index of profitability.

4 Conclusion

This hybrid approach offers an effective problem structuring method for subjective investment analysis, which supports the selection of weighting criteria for financial evaluation

and ranking projects in descending order by investor's preference. This algorithm can be used as a financial tool for modeling multi-criteria ranking of investment projects for subjective decision making.

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