

BOCR-ANP Approach to Research Program Evaluation in Views of Social Effects: A Case Study

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Abstract

In daily life decisions, decision-makers may need to consider more than one factor to choose among decision alternatives. To support decision making in such problems, Multi-Criteria Decision-Making (MCDM) methods are widely utilized. Some cases of MCDM problems require consideration of interactions between criteria and the Analytic Network Process (ANP) method proposed by Saaty and considered the most appropriate method for these cases. However, some challenges may be faced in the determination of criteria in ANP applications, and the Benefits, Opportunities, Costs, and Risks (BOCR) method is suggested as a possible solution to these challenges, especially in decisions where no similar applications were made before. Evaluation of the effects on the technology-based strategic targets of the country of a scientific research program in view of social factors is an example of such a decision. Since the study is about this decision, an evaluation model based on BOCR-ANP is proposed in the study to measure the contribution of a research program in Türkiye to the development of additive manufacturing technologies in the aviation and space industry. Possible social effect factors were determined by the review of proposed indicators in several studies and consulting expert opinions. Feelings of program stakeholders and external experts on the additive manufacturing applications in aviation and space industry were collected, and the contribution of the program on the national targets was analysed. The results of the study can help the policymakers to understand the situation in the country in this technology area.

Keywords

MCDM, BOCR, ANP, Social effects, Research program.

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Biographies

Mehmet Kabak is a professor of Operations Research at Industrial Engineering Department of Gazi University, Republic of Türkiye. His research focuses on the solution of strategic decision problems faced in production and service systems by using multi-criteria decision-making and mathematical modelling. He has many publications in the form of SSCI/SCI-Expanded indexed journal articles, international scientific conference proceedings and scientific book chapters.

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Aylin Adem received her Ph.D. in Industrial Engineering from the Gazi University, Ankara, Türkiye in 2020. She is currently working Associate Professor at the Department of Industrial Engineering, Gazi University, Türkiye. Her research interests include applications of human factors / ergonomics and multi criteria decision making, decision making under fuzzy environment, process management.