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EVALUATION OF GLOBAL INNOVATION PERFORMANCES WITH INTEGRATED MULTI-CRITERIA DECISION MAKING METHODS: EU APPLICATION

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Abstract

In this study, it is aimed to evaluate the measurement of innovation performance of EU countries with integrated multi-criteria decision making methods and to explain the relationships between them and the realized Global Innovation Index (GII) ranking. Since the GII innovation performance measurement problem is defined in an integrated hierarchical structure and solved with this logic, it is thought to contribute to the literature.

The input and output sub-indices in the Global Innovation Index 2023 report are defined in a hierarchical structure and an integrated path is followed from the lowest criterion to the target. The criteria weights of the EU countries were calculated by the entropy method, one of the objective weight determination methods, and the weights found were added to the model and country rankings were realized by TOPSIS method.

In the calculation of criteria weights using GII scores, Business Sophistication has the highest weight with 0.21, while Infrastructure has the lowest weight with 0.027.

After the Global Innovation Index criteria weights of EU countries are calculated by entropy method, the GII scores of 28 EU countries are analyzed by TOPSIS method using each weight and rankings are obtained. As a result of the ranking using the entropy-based TOPSIS method, Sweden, Finland and the Netherlands took the first 3 places in terms of innovation performance. The 3 countries with the lowest performance were Croatia, Slovakia and Romania. These top three and bottom three countries were the same in both the GII ranking and the Entropy-based TOPSIS ranking. In general, the GII and Entropy-based TOPSIS country rankings give very similar results. The fact that the calculated rank correlation coefficient is very close to 1 supports this conclusion. For future studies using global innovation index data, it may be suggested to model the problem in a hierarchical structure with different methods and to make comparisons starting from the first year the report was published. In addition, it may be possible to conduct different analyses on subjective weighting methods by using the evaluations of decision makers belonging to different professional groups.

Keywords

Global Innovation Index, TOPSIS, Multi-Criteria Decision-Making

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