New TOPSIS Approach Based on Possibilistic Simulation for the Interactive Fuzzy MAGDM under Discrimination q-Rung Picture Linguistic Information. Application in Educational Programs Efficiency Evaluation

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In certain MAGDM models an aggregation of matrices of experts' evaluations/ratings of possible alternatives by their attributes into an etalon decision making matrix is an important task. Based on possible great experience and deep knowledge of the subject, the expert tries to dominate other experts in the decision-making process. Besides, every expert has a possibility of a certain degree to influence on the decision-making process. In such cases experts' evaluations aggregation by the additive or linear aggregation instruments is unacceptable. We have found one approach to solve this task. Connection between experts' pair interaction indexes and possibility levels of their influence on decision making process is constructed. Experts' evaluations are represented by the q-rung orthopair fuzzy numbers. Before aggregation of experts' data into decision making matrix, evaluations are transformed into discrimination q-rung picture linguistic numbers. q-rung picture linguistic numbers contain as well quantitative as qualificative information on experts' reflections on objects. Based on constructed possibility distribution on the experts' group, the ordered weighted averaging (OWA) and Choquet averaging (CA) aggregation operators q- RPLOWA and q-RPLCA under q-rung picture linguistic environment are extended. By the q-RPLOWA and q-RPLCA operators' matrices of experts' evaluations/ratings are condensed into an etalon matrix. Therefore, technique for the TOPSIS approach for the ranking of possible alternatives by aggregating of discrimination q-rung picture linguistic data of etalon matrix is developed. For illustration of the obtained results, Educational Programs Efficiency Evaluation problem is considered. Our constructed MAGDM model complies with the principle of expertise in educational programs evaluation commission.

Keywords: Interactive MAGDM, TOPSIS, possibility measure, associated probabilities, Choquet integral aggregation, OWA, general q-rung orthopair fuzzy sets, fuzzy discrimination measures, q-rung picture linguistic sets.