

# Service Centers Location Planning Problem in the Fuzzy Environment

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The present work focuses on a specific case of Facility Location Selection Problem, that is, on Service Centers Location Planning Problem.

In such a problem several possible options for the location of candidate centers (alternatives) are usually considered. Each alternative is evaluated by group of experts based on a set of weighted criteria. The goal of the problem is to determine the best alternative by all criteria in order to select it for implementation.

The study develops a decision support methodology that is based on the TOPSIS (Technique for Order Performance by Similarity to Ideal Solution) approach in the fuzzy environment. The expert assessments are expressed in fuzzy numbers. The case when the information on the criteria weights is completely unknown is considered. The weights identification based on Shannon information entropy is generalized for hesitant fuzzy set.

According to a TOPSIS method algorithm, the ranking of alternatives is performed depending on proximity of their distances to the both fuzzy positive-ideal and fuzzy negative-ideal solutions. For this purpose, the weighted Hamming distance is used in the context of the hesitant fuzzy set.

**Keywords:** Facility location selection problem, fuzzy TOPSIS approach, Shannon entropy, hesitant fuzzy set, ranking of alternatives.