

Supplier Appraisal using TOPSIS under Pythagorean Fuzzy Sets

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Abstract

A supplier appraisal is a fundamental task within the supply chain management field; and, basically, it can be considered a multi-criteria decision-making problem. The main objective of this paper is to develop an application to support the supplier selection process. This paper presents supplier selection with TOPSIS method and Pythagorean fuzzy sets. In this sense, the decision makers express their opinions' assessments about the criteria and alternatives involved in the evaluation using linguistic terms that are represented by Pythagorean fuzzy numbers. Likewise, the importance of each decision maker and criteria are considered. The alternatives under evaluation are compared with the ideal solution and anti-ideal solution to generate an index of similarity. At the same time, we are proposing a systematic manner to consider fuzzy and non-fuzzy criteria involved in the decision-making scenery. A numerical example focused on supplier selection is presented to illustrate the results.

Keywords: Vendor selection; multi-criteria decision making; TOPSIS; Pythagorean Fuzzy Sets.