

MULTI CRITERIA DECISION MAKING UNDER SINGLE-VALUED NEUTROSOPHIC SET ENVIRONMENT FOR SUPPLIER SELECTION

(Pembuatan Keputusan Multikriteria dalam Lingkungan Himpunan Neutrosofi Bernilai Tunggal untuk Pemilihan Pembekal)

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ABSTRACT

The process of selecting suppliers is a crucial decision for organisations and has a substantial effect on enterprises, particularly in industries with extensive and constantly evolving supply chains. In this study, six predetermined criteria are used to evaluate four possible supplier choices under the proposed framework for supplier selection. These criteria include competitive pricing, distance, volume flexibility, technological capabilities, material quality, and complaint handling. This study employs the multi-criteria decision-making (MCDM) technique and single-valued neutrosophic sets (SVNS) to address the challenge of selecting a sustainable supplier with insufficient information. To achieve this, the study uses SVNS-based scoring and accuracy functions. A ranking method, specifically designed for single-valued neutrosophic numbers (SVNN), is used to effectively represent and solve the supplier selection problem. Based on the weight model, the ranking order is $A_1 > A_2 > A_4 > A_3$. Unlike other methods, this technique helps decision-makers effectively communicate imprecise and unclear information. It offers a distinct perspective and approach for MCDM in situations marked by ambiguity. In addition, it allows decision-makers select suppliers that provide exceptional quality and prioritise sustainable business practices.

Keywords: decision-making method; single-valued neutrosophic set; supplier selection

ABSTRAK

Proses memilih pembekal adalah keputusan penting bagi organisasi dan mempunyai kesan besar terhadap perniagaan, terutamanya dalam industri dengan rangkaian bekalan yang luas dan sentiasa berkembang. Dalam kajian ini, enam kriteria yang telah ditetapkan digunakan untuk menilai empat pilihan pembekal di bawah kerangka kerja yang dicadangkan untuk pemilihan pembekal. Kriteria-kriteria ini termasuk harga yang kompetitif, jarak, fleksibiliti isipadu, keupayaan teknologi, kualiti bahan, dan penanganan aduan. Kajian ini menggunakan teknik pemilihan pembekal berdasarkan pelbagai kriteria (MCDM) dan set neutrosofi nilai tunggal (SVNS) untuk menangani cabaran memilih pembekal yang mampan dengan maklumat yang tidak mencukupi. Untuk mencapai ini, kajian menggunakan fungsi penilaian dan ketepatan berdasarkan SVNS. Kaedah penarafan, yang direka khas untuk nombor neutrosofi nilai tunggal (SVNN), digunakan untuk mewakili dan menyelesaikan masalah pemilihan pembekal dengan berkesan. Berdasarkan model berat, susunan penarafan adalah $A_1 > A_2 > A_4 > A_3$. Berbeza dengan kaedah lain, teknik ini membantu pembuat keputusan menyampaikan maklumat yang tidak tepat dan tidak jelas dengan berkesan. Ia menawarkan pandangan dan pendekatan yang berbeza untuk MCDM dalam situasi yang ditandai dengan keambiguitan. Selain itu, ia membolehkan pembuat keputusan memilih pembekal yang menyediakan kualiti yang luar biasa dan memberi keutamaan kepada amalan perniagaan mampan.

Kata kunci: kaedah membuat keputusan; set neutrosofi nilai tunggal; pemilihan pembekal

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