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A Comparative Analysis Approach Based on Fuzzy AHP, TOPSIS and PROMETHEE for the Selection Problem of GSCM Solutions

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Abstract : Sustainable economic growth is nowadays driving firms to extend toward the adoption of many green supply chain management (GSCM) solutions. However, the evaluation and selection of these solutions is a matter of concern that needs very serious decisions, involving complexity owing to the presence of various associated factors. To resolve this problem, a comparative analysis approach based on multi-criteria decision-making methods is proposed for adequate evaluation of sustainable supply chain management solutions. In the present paper, we propose an integrated decision-making model based on FAHP (Fuzzy Analytic Hierarchy Process), TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) and PROMETHEE (Preference Ranking Organisation METHod for Enrichment Evaluations) to contribute to a better understanding and development of new sustainable strategies for industrial organizations. Due to the varied importance of the selected criteria, FAHP is used to identify the evaluation criteria and assign the importance weights for each criterion, while TOPSIS and PROMETHEE methods employ these weighted criteria as inputs to evaluate and rank the alternatives. The main objective is to provide a comparative analysis based on TOPSIS and PROMETHEE processes to help make sound and reasoned decisions related to the selection problem of GSCM solution.

Keywords : GSCM solutions, multi-criteria analysis, decision support system, TOPSIS, FAHP, PROMETHEE
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