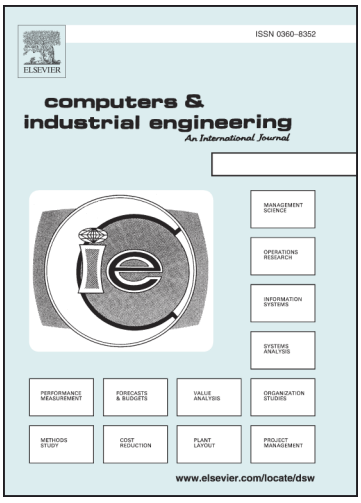

CLUS-MCDA: A Novel Framework based on Cluster Analysis and Multiple Criteria Decision Theory in a Supplier Selection Problem

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CLUS-MCDA: A Novel Framework based on Cluster Analysis and Multiple Criteria Decision Theory in a Supplier Selection Problem

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Abstract. In past recent years, by increasing in the considerations on the significance of data science many studies have been developed concerning the big data structured problems. Along with the information science, in the field of decision science, multi-attribute decision-making (MADM) approaches have been considerably applied in research studies. One of the most important procedures in supply chain management is selecting the optimal supplier to maintain the long-term productivity of the supply chain. There has been a vast amount of research which utilized MADM approaches to tackle the supplier selection problems, but only a few of these research considered big data structured problems. The current study presents a comprehensive novel approach for improving Multiple Criteria Decision Analysis (MCDA) based on cluster analysis considering crisp big data structure input which is called CLUS-MCDA (Cluster analysis for improving Multiple Criteria Decision Analysis) algorithm. The proposed method is based on consolidating a data mining technique i.e. k-means clustering method and a MADM approach which is MULTIMOORA method. CLUS-MCDA method is a fast and practical approach which has been developed in this research which is implied in a supplier selection problem considering crisp big data structured input. A real-world case study in MAMUT multi-national corporation has been presented to show the validity and practicality of the CLUS-MCDA approach which calculated considering the business areas and criteria based on expert comments of mentioned organizations and previuos literature on supplier selection problem.

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