

**UTILISING THE FUZZY DEMATEL METHOD BASED ON
SIMPLIFIED CENTROID DEFUZZIFICATION
FOR THE EVALUATION OF SUPPLIER
SELECTION CRITERIA**

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ABSTRACT

In the competitive landscape of the business industry, selecting the most suitable supplier is a primary objective for business owners striving to achieve operational excellence and sustainable growth. The Fuzzy Decision-Making Trial and Evaluation Laboratory (DEMATEL) method is an effective tool for addressing Multicriteria Decision-Making (MCDM) challenges in supplier selection. This study seeks to determine the degree of influence for each criterion and the influence relationships among criteria in the supplier selection by employing the fuzzy DEMATEL method with Simplified Centroid Defuzzification (SCD). The fuzzy DEMATEL method comprises 10 steps, during which the SCD based on pointwise operations was integrated into the process. This study also gathered primary data by distributing a set of questionnaires to three experts with at least five years of experience in the business industry, concentrating on nine supplier selection criteria pertinent to the industry, which are cost, quality, delivery reliability, service, flexibility, willingness and attitude, technology and equipment, surplus inventory and supplier's profile. Furthermore, by utilizing the four quadrants of the Influential Relation Map (IRM), suppliers can optimize resource allocation to maximize benefits. The results indicated that service is the most influential criterion for supplier selection in petrol convenience stores. By meticulously evaluating and selecting suppliers based on these well-defined criteria and methodologies, business owners can enhance their operational efficiency, reduce costs and ensure a sustainable and competitive business model.

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