An Integrated Multi-Objective Decision-Making Process for Supplier Selection with Bundling Problem

Abstrak:

When the cost of raw materials or component parts dominates the product cost, supplier selection becomes a crucial process for the company to maintain the cost while holding the quality of the products. At the same time, it is likely that the supplier offers bundling products, a strategy to get more orders from the company. In this situation, purchasing manager requires decision-making tool which can deal with these problems simultaneously. This article presents an integrated multi-objective decision-making process by using analytic network process (ANP) and mixed integer programming (MIP) to optimize the selection of supplier. The criteria, which are gathered from experts by using Delphi method, are used to construct an ANP model, and are continued to be used by collecting the data from them. The results indicated that cost per unit and failure product cost are important determinants. Thereafter, the ANP results were used as coefficients of an objective function in MIP to allocate order quantities if the supplier uses bundling strategy. A hypothetical example is presented and the results indicated that the combination of ANP and MIP provided useful tool to select the optimal supplier.

Keyword:

Supplier selection; Analytic network process (ANP); Bundling strategies; Mixed integer programming (MIP)