

A fuzzy ANP supplier selection model

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Abstract

Human development has improved greatly since the Industrial Revolution. Today, the division of work in manufacturing industries has become popular because of globalization. Firms are concerned about how to reduce costs, increase profits and competitive ability at the same time. In addition, they want to select the most appropriate suppliers since cooperation is increasingly important for the success of firms. However, in the selection of suppliers, many factors must be considered, for instance, cost, delivery date, quality, and so on. In recent years, many experts have focused on the studies of the factors that should be considered in the supply chain and have proposed many management models. Most studies assumed that all factors are independent, but in fact many criteria are interrelated. Analytic hierarchy process (AHP) has been a popular methodology for selecting suppliers, but all factors are assumed to be independent under AHP. In addition, experts may be undecided in filling out the questionnaire. There are aspects such as costs and risks that need to be considered in selecting suppliers. To tackle these issues, this study proposes a model to integrate fuzzy analytic network process (FANP) and benefits, opportunities, costs and risks (BOCR). In Taiwan, TFT-LCD industry has been emphasized and supported by the government. Since the TFT-LCD industry is increasingly competitive and globalize nowadays, it is very important to select the most suitable suppliers in order to survive and to make a reasonable profit. Thus, a case study of a TFT-LCD firm in selecting its suppliers is presented, and the proposed model is applied to facilitate the decision process. The priorities of the factors and the ranking of the suppliers can be a recommendation for decision makers when making supplier evaluation.

Keyword : TFT-LCD; analytic network process (ANP); fuzzy set; supplier; decision analysis.