

## A Neural Network Approach to Evaluate Supplier Efficiency in a Supply Chain

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**Abstract :** The success of a supply chain heavily relies on the efficiency of the suppliers involved. In this paper, we propose a neural network approach to evaluate the efficiency of a supplier, which is being considered for inclusion in a supply chain, using the available linguistic (fuzzy) data of suppliers that already exist in the supply chain. The approach is carried out in three phases, as follows: In phase one, we identify criteria for evaluation of the supplier of interest. Then, in phase two, we use performance measures of already existing suppliers to construct a neural network that gives weights (importance values) of criteria identified in phase one. Finally, in phase three, we calculate the overall rating of the supplier of interest. The following are the major findings of the research conducted for this paper: (i) linguistic (fuzzy) ratings of suppliers such as 'good', 'bad', etc., can be converted (defuzzified) to numerical ratings (1 - 10 scale) using fuzzy logic so that those ratings can be used for further quantitative analysis; (ii) it is possible to construct and train a multi-level neural network in order to determine the weights of the criteria that are used to evaluate a supplier; and (iii) Borda's rule can be used to group the weighted ratings and calculate the overall efficiency of the supplier.

**Keywords :** fuzzy data, neural network, supplier, supply chain

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