

Optimization of Excess and Waste of Closed Loop Supply Chain System by Using Fuzzy Model

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Abstract

Industry at present days is concerned with optimization of production and profit, which can be achieved through the recovery options such as recycling, remanufacturing and reusing in the scope of Closed -Loop Supply Chain (CLSC) concept due to the environmental, economic and legal obligations. In this research at each output of the reverse portion of the supply chain uncertainty involved provides unknown parameters affecting the forward portion and thus making the whole supply chain environment uncertain Therefore, fuzzy mixed integer linear programming model is implemented to represent the proposed framework in mathematical terms to maximize the total profit by optimally deciding the quantity of products and parts in each center of company. Then determine the number of products to be collected and reused at the various collection/repair centers, the number of products disassembled at the disassembly centers and how many parts to be refurbished, all of this helps the company to make a profit and reduce cost. The fuzzy model is first converted into an equivalent crisp. The crisp linear programming model is run with LINGO 14 computer software to determine the optimal solution. Results showed the maximum profit achieved also the optimal number of parts to be processed at each reverse supply chain facility and the number of parts to be purchased from multiple suppliers.

Keywords:

Closed loop supply chain, Optimization, Fuzzy models, LINGO 14 software, Recovery and recycling.