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## Designing a Scenario-based Supply Chain Network Considering Uncertainty on Demand and Capacity Levels

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### ABSTRACT

Due to the probability nature of some supply chain parameters like demands and capacity levels, this study considers a scenario-based supply chain network design problem considering stochastic customer demands and warehouse capacities. Demand uncertainty is a regular assumptions in many supply chain design problems while capacity level is usually assumed to be constant and known. What makes capacity level to be uncertain, can be external factors such as raw materials supply problems for plants and utilizing warehouses whose capacities are shared among different companies of different/the same supply chains. The aim of this paper is to locate the production plants and distribution warehouses, and determine the best strategy for the product distribution from the plants to the warehouses and from the warehouses to the customers in such a way that the supply chain costs are minimized. This paper allows stochastic demands and different values for the stochastic capacities of different levels of supply chains by using a scenario-based modeling. To this end, a mixed integer programming is proposed and ideas for applying the Lagrangean relaxation technique is given.

Keywords: Network Design; Supply chain; Scenario-based Approach; Stochastic Demand; Lagrangean Relaxation