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An AHP approach to prioritize the distributor's requirements while minimizing the transportation cost

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Academic and corporate interest in Supply Chain Management (SCM) has risen considerably in recent years as SCM has emerged as one of the major areas for companies to gain a competitive advantage. Basically, the three fundamental stages of a Supply Chain (SC) are, procurement, production and distribution. Among these three stages, distribution plays a vital role as it directly impacts both the SC cost and customer experience. Many models have been developed in the past to minimize transportation cost under different constraints, as the main cost of logistics is transportation. In fact, when the organizations run on cost cutting approaches, not all the customers are satisfied when the demand surpasses the supply. Therefore, to retain the most important customers a proper mechanism is needed to prioritize them. Previous studies have been addressed different problems in logistics and improved models have been developed to maximize the service level and customer satisfaction but prioritization of customers is still a gray area which remains in the logistics literature. One of the main hurdles for distributors is handling situations, where the demand is higher than the supply and selected set of orders have to be delivered. Therefore, the main objective of the study is to identify the most important customers to be delivered first, from the distributor's perspective while minimizing the cost of transportation.

In this study, Analytic Hierarchy Process is used to identify the most important customers to the organization, under different criteria, defined by the distributor. All the criteria and alternatives were compared pair-wisely to calculate the overall importance of the alternatives. A mixed integer linear programing model has been developed with priority values in order to minimize the transportation cost. The proposed model will satisfy the needs of the important customers first and then the rest of the customers will be satisfied with the remaining quantities.

When comparing the results of the developed model and ordinary transportation model, the transportation cost is higher in the developed model than the general transportation model. However, the satisfactory level of meeting the demands of the important customers is almost 100%. Therefore, this model is more appropriate for the firms who value customer needs more than minimizing the transportation cost.

Keywords: Analytical Hierarchy Process, Logistics management, Supply chain management, Transportation cost