Distribution Network Design for an Oil Blending Company

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Abstract

This study consists of modeling and solving a real problem in the supply chain design of a real petroleum company in Pakistan. The company facing an increase in the demand of some of its oil products decided to restructure its distribution network to serve the northern customers in Pakistan. The products are transported from the plant in Karachi to the warehouses (currently in Lahore and Multan) before delivery to one of the fourteen customer regions. The problem consisted of deciding how to relocate warehouses by opening a new one and eventually closing existing ones, how to reassign customer regions to the different warehouses, and analyzing the impact of different possible solutions.

The problem is modeled as a mixed integer linear program and solved using Microsoft Excel Solver. This choice is motivated by the availability of the software, its accessibility for the practitioners and its post-optimal analysis capabilities.

We present a thorough analysis of the results in terms of different costs, distribution modes, and other practical considerations.

In addition to the usefulness of our work for the company, it can serve as a good case study for students taking a course in supply chain management and logistics.

Keywords
MILP, Logistics, Distribution Network Design, Facility Location, Transportation

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