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Supply Chain Network Redesign, Case Study In Lubrication Industry

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Abstract

Supply chain studies have been key areas for optimization across many sectors. However, with the changing landscape of geo-economic factors in the Middle East, coupled with increased complexities within the supply chain network and growing competitiveness amongst industries, optimization studies have naturally become more complex overtime. This thesis considers a case study for a major lubrication company in Saudi Arabia. The case study addresses a single-sourcing network redesign problem for a four-level supply chain consisting of suppliers, plants, distribution centers (DC's) and markets. The demand, land prices, and energy prices are uncertain parameters with DC-to-market dependent lead times. The objective is to determine the optimal number and locations of plants and DC's, the assignment of each plant-DC and DC-market, which minimizes the system-wide location, transportation, and inventory costs for each scenario. The problem is formulated as mixed integer nonlinear programming models (MINLP). Finally, a multi criteria decision-making approach is developed to decide the best warehouse type for the six different local markets.

Keywords
Supply Chain Network Redesign, Multi Criteria Decision-Making, Lubrication Industry and Price Uncertainty.

Biographies

Khalid Al-Khodhairi is currently working as Operational Excellence Advisor at Saudi Aramco. His experience covers Operational Excellence, Supply Chain and Operation Research. Khalid is a board member of Saudi Society of Quality-Main Branch and a board member in Young Leaders Advisory Board at Saudi Aramco. Prior to joining Saudi Aramco, Khalid worked for General Electric in the US as a Productivity Engineer. Khalid holds a B.S. and M.S in Industrial & Systems Engineering with first honor distinction from King Fahad University of Petroleum & Minerals (KFUPM). He attended Texas A&M University as an exchange student. Khalid earned several certifications in the quality field including, Six Sigma Black Belt, EFQM Qualified Assessor and ISO 9001 Lead Auditor. He presented and published several technical papers in national and international conferences.

Ahmad Al Hanbali is an associate professor in the department of Systems engineering, KFUPM. He received his PhD in 2006 from University of Nice, France. Between 2007 and 217, he was faculty in the department of Industrial engineering at University of Twente, The Netherlands. He is a full member of the International Society of Inventory Research (ISIR), Production and Operations Management Society (POMS). He is a former member of the Beta research school The Netherlands, Twente is Maintenance Excellence (TIME), Service Logistics Forum (SLF), and Dutch Network on the Mathematics of Operations Research (LNMB). He was a member of many technical program committees of international conferences. He served as a reviewer for several international journals.