

CHAOS 2009

2nd Chaotic Modeling and Simulation International Conference

June 1 - 5, 2009 Chania Crete Greece

www.chaos2009.net

Modeling and Optimization of Production-Distribution Plan in Supply Chains

Behnam Fahimnia, Lee Luong, Romeo Marian

School of Advanced Manufacturing and Mechanical Engineering, University of South Australia,
Adelaide, Australia

behnam.fahimnia@unisa.edu.au

Supply chain (SC) is the network of organizations, people, activities, information and resources involved in the physical flow of products from suppliers to the end-users. Supply Chain Management (SCM) is, therefore, the process of integrating and utilizing suppliers, manufacturers, distribution centers, and retailers; so that products are produced and delivered to the end-users at the right quantities and at the right time, while minimizing costs and satisfying customer requirements.

The overall performance of a supply-chain (SC) is influenced significantly by the decisions taken in its production-distribution plan. A production-distribution plan integrates the decisions in production, transport and warehousing as well as inventory management. Hence, one key issue in the performance evaluation of a Supply Network (SN) is the modeling and optimization of production-distribution plan considering its actual complexity.

This paper firstly develops a mixed integer formulation for a two-echelon supply network that extends the previous production-distribution models through the integration of Aggregate Production Plan and Distribution Plan as well as considering the real-world variables and constraints. Secondly, A Genetic Algorithm is proposed for the optimization of the developed model. Thirdly, the methodology will be applied to solve real-world problem incorporating multiple time periods, multiple products, multiple manufacturing plants, multiple warehouses and multiple end-users. The validation of this model will be finally studied for the presented case study.

Key Words: Supply Chain, Genetic Algorithms, Optimization