Proceedings of the 3rd Annual World Conference
of the Society for Industrial and Systems Engineering,
San Antonio, Texas, USA
October 20-22, 2014

Measurement and Optimization of Reliability in Complex Supply Chain Systems

A. T. Almaktoom and K. K. Krishnan

Department of Industrial and Manufacturing Engineering,
Wichita State University, Wichita, Kansas USA

Corresponding author's Email: atalmaktoom@gmail.com

Abstract: With trade deregulation and globalization, supply chains have become increasingly global and complex. Supply chain systems have emerged as the new frontier for generating competitive advantages. It is now no longer a given single business competing against another; instead, it is the entire supply chain system competing against other supply chain systems in the global market. Because of uncertainties induced by various sources such as transportation delay and manufacturing processes variability, ensuring the reliability of the overall supply chain system and all members in the system while considering these uncertainties is a highly complex task. This research introduces a novel measure to quantify the reliability rate of the overall supply chain system and the reliability of each member involved in the system. Also, the paper introduces an optimization approach to develop reliability of each entity in the supply chain system such that the reliability rate requirement of the overall supply chain system is ensured. Methodology, numerical examples, and case studies are provided to illustrate the approaches for calculating the supply chain system reliability rate. The case studies include simple ones as well as multi-level complex supply chain system.

Keywords: Supply Chain System, Reliability Measure, Optimization