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Process flexibility for risk mitigation in supply chain design

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While considerable efforts have been put forth to design robust supply chains, implemented solutions remain highly risk prone due to failures and generally, to unexpected internal or external changes. Particularly, supply chains may fail for many reasons: Labor strikes, natural disasters, machine breakdowns, political instability, last minute customer changes, etc. Even the slight possibility of occurrence of these failures places the supply chain at risk of service failure, increased cost, and capacity imbalances. In this context, a major concern for businesses is to deploy supply chain structures that provide protection against these failures and changes. We will present some strategies that can be effective in mitigating supply chain risks. We particularly focus on one specific solution: Process flexibility. In supply chain design, it is common that a firm installs multiple plants for producing multiple products. As processes become more flexible, different types of products can be manufactured within the same plant. While full process flexibility, where each plant is configured to produce all products, reduces process risks significantly, the cost of implementing such processes can be prohibitive. Thus without a clear understanding of the benefits associated with different levels of flexibility, firms would be reluctant to invest in process flexibility especially when reliable data are difficult to obtain. Based on a cost/benefit analysis on an array of supply chain configurations we show how and when certain semi-flexible configurations can provide the same benefits as those provided by full flexible configurations, when the underlying processes are subject to disruptions.

Biography

Atidel Boubaker Hadj-Alouane is currently Professor of Industrial Engineering at the National Engineering School of Tunis (ENIT), Tunisia. She holds the MSE and PhD degrees in Industrial and Operations Engineering from the University of Michigan, Ann Arbor. She is founding Director of OASIS laboratory (Optimization and Analysis of Service and Industrial Systems) and Director of the IE doctoral program at ENIT. Her teaching and research interests include supply chain design and management and the application of mathematical programming to health planning and telecommunication networks. Her research work was supported by several grants and is published in reputed journals.

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