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A Bayesian Model for The Optimization of Supply Chain

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Abstract

Supply chain plays a critical role in the modern economic development which impacts both the microeconomics and macroeconomics. However, in general the supply chain is subject to uncertainties and affects the production management. Supply chain is an inherently complex process spanning global scales which can be easily disrupted by natural and man-made disasters. The supply chain poses highly complex and risk challenges and thus, the organizations must handle properly the balance between operational efficiency and uncertainty of supply chain disruptions. Over decades, the statistical analysis proved to be a promising approach in mitigating the supply chain uncertainties. Therefore, in this research a Bayesian model is proposed to enable the uncertainty analysis of the decision-making in the supply chain risk management. The Bayesian model would enable the identification of the main factors that can impact the supply chain management. The Bayesian model allow the production management to make risk-based decision. To provide insightful managerial decisions, sensitivity analysis along with belief propagation is employed in the proposed Bayesian model. The results of the current research shows that the Bayesian model is a suitable and promising model for the supply chain risk management.

Keywords: bayesian stochastics; operations management; stochastic modeling; supply chain risk management; uncertainty