

Coordinating a Multi-echelon Apparel Supply Chain in the Presence of Supply and Demand Uncertainty

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Abstract

In this paper, we focus on designing a coordinated apparel supply chain deviating from conventional two-level setting. For the sake of realistic depiction, we present the apparel supply chain by incorporating a four-level structure under demand and supply uncertainty. Existing works under stochastic demand and random yield are limited to the two and three-level setting. The proposed supply chain comprises an apparel retailer, an apparel manufacturer, a textile firm, and a cotton firm. The apparel retailer and the cotton firm faces demand uncertainty due to customer preferences, changing trends, etc. and supply uncertainty because of adverse weather, technological changes, etc. respectively. Real life instances such as the demand volatility in the fashion apparel market, draught in USA (2012), weak monsoons in India (2012), and impact on supply chain performance justify it. In this setting, we conclude that wholesale price contract cannot coordinate the textile supply chain. Following the supply contract mechanism, here, we show how buyback contract between apparel retailer and apparel manufacturer can coordinate the supply chain. Also, application of a risk sharing contract between the textile firm and the cotton firm can be useful to improve the cotton firm's profitability in case of high loss-making scenario.

Keywords

Supply Chain; Supply Chain Coordination; Buyback contract; Risk Sharing contract

Biography

Arnab Adhikari is currently a doctoral candidate of operations management area at Indian Institute of Management Calcutta. Prior to that, he worked in WIPRO Technologies for two years as a SAP consultant. He has done his engineering in Electronics and Communication engineering from National Institute of Technology, Durgapur, India. He is currently doing his thesis on designing coordination mechanism and risk hedging strategy for apparel supply chain. Apart from this, his research interests include innovative application of operations research techniques like DEA in real life problems, novel application of statistical tools and techniques in real life scenarios, transportation and logistics etc.

Arnab Bisi is an Assistant Professor at the Johns Hopkins Carey Business School from 2014. He has done his PhD from Hong Kong University of Science and Technology. Previously he worked as an Assistant Professor at the Krannert School of Management of Purdue University. Dr. Bisi's research interests include supply chain management, inventory management, stochastic modeling and optimization, dynamic pricing, and operational risk

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