Incentivizing Sustainability: Price Optimization for a Closed-Loop Apparel Supply Chain

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Abstract

Although sustainability in supply chains has been garnering increased attention, there is much room for prescriptive research devoted to operationalizing sustainability in apparel supply chains (ASCs). Being one of the largest polluters, apparel industry landfills immense amounts of garments most of which could be reconditioned, reused, or recycled into useful raw materials. Especially, fast fashion (low-cost clothing designs based on current, high-cost luxury fashion trends) necessitates fast-response supply chains, encouraging disposability, and thereby exacerbating an unsustainable consumption. The importance of sustainability in ASCs are emphasized via trends in 3R (Reduce, Reuse and Recycle), recycling facts in North America, and apparel companies that actively engaged in sustainability initiatives. To that end, we study a closed-loop apparel supply chain (CLASC) model that include the process of recycling end-of-life garments. When the implications of fast fashion on profitability, environmental and social costs, recycling costs, and incentives offered to consumers are factored in, we study the optimal pricing decision for the CLASC and provide a closed-form solution. Model analytics, managerial insights along with numerical illustrations are offered.

Keywords
Supply Chain Management, Sustainability, Reverse Logistics, Pricing Optimization, Consumer Behavior.

Biographies

Shayla Fitzsimmons received her MBA, MSc, and BSc degrees from Dalhousie University, Canada. She is currently working as the Executive Director at the Canadian Integrated Ocean Observing System (CIOOS) Atlantic Regional Association, in Halifax, NS. She has worked as a project manager, analyst, and researcher at various organizations in Canada. She enjoys researching, among others, current issues in sustainability. Her current focus is the development of a system for sustainable management of ocean science data in Canada.

Lisa Ma received her MBA from Dalhousie University, Canada, and her BSc degree from Tianjin Foreign Studies University, China. She is currently working as a senior analyst in supply planning, at the Restaurants Brand International, Toronto, Canada. Previously, she worked as analyst at Canadian Tire Corporation and Ipsos Business Consulting. She enjoys bringing about innovative solutions to complex supply chain management problems.

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